T-2000-P: Effect of Age and Adiposity on Subcutaneous Adipose Tissue Estrogen Receptor mRNA Expression in Pre- and Postmenopausal Women

Beret Casey; Kimberly Cox-York, PhD; Christopher Erickson, BA; Rachael E. Van Pelt, PhD;

Background

We determined whether estrogen receptor (ER) mRNA expression in abdominal (AB) and femoral (FEM) subcutaneous adipose tissue (SAT) was associated with menopausal status, age and regional adiposity.

Methods

We studied 23 pre- (Mean+-SD; age 42+-4 y) and 22 post-menopausal (55+-4 y) women with similar fat mass (FM, 22.7+-5.3 vs. 21.7+-5.3 kg). Total and regional FM were measured by dual x-ray absorptiometry (DXA). AB and FEM SAT biopsies were collected and ER alpha (ERα) and beta (ERβ) mRNA expression in both SAT tissues was determined by qPCR.

Results

Compared to premenopausal women, ERα and ERα:ERβ were lower in postmenopausal AB and FEM SAT; ERβ did not differ between groups. Irrespective of menopausal status, age was inversely associated with AB and FEM SAT ERα (r=-0.371 and 0.343, p<0.05) and ERα:ERβ (r=-0.335 and r=-0.416, p<0.05). Trunk FM, but not leg FM, was also inversely associated with AB and FEM SAT ERα (r=-0.272 and r=-0.326, p<0.05). The inverse association of ERα with age remained after adjusting for trunk FM. ERβ was not correlated with age or any measures of adiposity.

Conclusions

ERα mRNA expression in AB and FEM SAT appear to be associated with age independent of adiposity and menopausal status.

T-2001-P: Extra Cellular Matrix Remodeling During Mature Adipocyte Dedifferentiation

Julie Anne CA AC, RD; Julie Lessard, PhD; Odette Lescelleur, Me; André Tchernof, PhD;
Background

Adipose tissue plasticity is involved in the process of mature adipocyte dedifferentiation. Objective: To study expression of transcripts encoding proteins implicated in extracellular matrix remodeling during the dedifferentiation process.

Methods

Subcutaneous (SC) and omental (OM) adipose tissue samples were obtained from patients undergoing bariatric surgery. They were digested with collagenase and cell suspensions were cultivated in ceiling cultures using DMEM/F12 supplemented with 20% serum. TGFβ1, TGFβ2, TGFβ3, Col1α1, Col1α2 and Col6α3 gene expression was measured using qRT-PCR in whole SC and OM adipose tissue samples, in the stroma-vascular fraction (SVF) and in dedifferentiated fat cells. Protein expression of TGFβ1 was confirmed by Western Blot.

Results

TGFβ1, Col1α1 and Col6α3 gene expression was significantly higher in dedifferentiated cells compared to whole adipose tissue samples (p=0.05, p=0.02 and p=0.03, respectively) in both depots. TGFβ1, TGFβ3 and Col1α1 gene expression was significantly higher in dedifferentiated cells compared to SVF cells (p=0.02, p=0.01 and p=0.02, respectively) in both depots. TGFβ1, Col1α1 and Col6α3 gene expression was significantly higher at day 12 of the dedifferentiation process compared to day 0 (p=0.01, p=0.02 and p=0.02, respectively) in both depots.

Conclusions

These results show that adipose tissue dedifferentiation is associated with increased mRNA expression of transcripts encoding proteins involved in extracellular matrix remodeling.

T-2002-P: Enhancing Glucose Disposal Independent of Insulin Receptor Signaling “A Potential Strategy to Improve Insulin Resistance Linked with Obesity

Ha-Na Na, PhD; Olga Dubuisson, PhD; Vijay Hegde, PhD; Nikhil V. Dhurandhar, PhD, FTOS;

Background
Obesity is linked with insulin resistance, including impairment in insulin receptor (IR) signaling. Overexpression of ENPP-1, a transmembrane protein, impairs IR signaling and reduces glucose uptake. We tested if E4orf1(E4), an adenoviral protein, enhances glucose uptake despite impaired IR signaling.

**Methods**

We tested the hypotheses that E4 impairs IR signaling (Aim 1), yet, enhances glucose uptake by activating the distal insulin signaling pathway (Aim 2). Aim 1: High fat fed mice when injected with vector carrying E4 improved glycemic control vs mice injected with a null vector (NV). We determined IR activation and protein abundance of ENPP1 (Ectonucleotide pyrophosphatase/phosphodiesterase) in adipose tissue of these mice, and in 3T3-L1 preadipocytes treated with anti-diabetic agent rosiglitazone (TZD), E4 or NV. Aim 2: The ability of E4 to promote glucose uptake independent of IR was determined by knocking down IR with siRNA in 3T3-L1 preadipocytes that inducibly expressed E4 or NV.

**Results**

Aim 1: E4 down-regulated IR signaling in epididymal adipose tissue, as indicated by reduced tyr-phosphorylation of IR, and increased ENPP1 expression (both p<.05). In 3T3-L1 cells, TZD reduced, but E4 increased ENPP1 (both p<.05). Aim 2: Despite IR knockdown, E4 up-regulated the distal insulin signaling pathway as indicated by greater activation of AKT, greater membrane translocation of Glut4, greater adiponectin (all p<.05 or better), and increased cellular glucose uptake (p<0.00001).

**Conclusions**

E4 enhances glucose uptake independent of proximal insulin signaling, by up-regulating the distal insulin signaling. E4 provides a template to enhance glucose disposal by bypassing the impaired proximal insulin signaling, which is often linked with obesity.

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**T-2003-P: Either AKT1 or AKT2 Isoform Can Mediate Ad36-Induced Cellular Glucose Uptake**

*Olga Dubuisson, PhD; Vijay Hegde, PhD; Ha-Na Na, PhD; Nikhil V. Dhurandhar, PhD, FTOS;*

**Background**

Human adenovirus Ad36 promotes adipogenesis, yet improves glycemic control by up-regulating distal insulin signaling including AKT/GSK3beta/Glut4, to enhance cellular glucose uptake. Of the AKT isoforms, AKT1 and 2 preferentially promote adipogenesis or glucose uptake, respectively, in preadipocytes.

**Methods**
Using mouse embryonic fibroblasts (MEF) that have intact AKT (WT), AKT 1 and 2 knocked out (DKO), AKT2 knocked out (AKT2), or AKT1 knocked down (AKT1), we determined which AKT isoform is needed for Ad36-induced glucose uptake. These cell types were infected with Ad36 or mock infected, and basal and insulin stimulated glucose uptake was determined 4d later. Activation of AKT and its isoforms was determined by western blotting. Phosphorylation of GSK-3β, which is linked with greater cellular glucose uptake, was also determined.

**Results**

Compared to mock infected cells, insulin or Ad36 significantly increased glucose uptake in WT, AKT1 and AKT2 groups, but not in DKO. This indicates that Ad36 requires any of the two AKT isoforms to enhance cellular glucose uptake in MEF. In agreement with this finding, Ad36 increased abundance of the available intact AKT isoform in the cell type used. Interestingly, insulin, but not Ad36 increased p-GSK3β abundance, independent of AKT or its isoforms.

**Conclusions**

The results indicate potential to uncouple adipogenic effect of Ad36 by knocking down AKT1, and yet enhance cellular glucose uptake via the AKT2 isoform. This study provides further support to develop anti-diabetic agents based on the template offered by Ad36 proteins.

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**T-2004-P: The Amount of Lipid Stored in Adipocytes Exposed to Lauric Acid Depends Upon the Stage of Adipogenesis**

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**Background**

Besides the amount of fat, the type of dietary fatty acid has an important effect on lipid metabolism. Lauric acid (LA) is a saturated fatty acid of 12C greatly present in coconut oil. However, it has been little explored the effect of LA on the process of adipogenesis and fat accumulation.

**Methods**

Since the stage of maturation of adipocytes is an important determinant on its metabolism, the aim of this work was to study how adipocytes in various adipogenesis stages exposed to several doses of LA could modify the storage of intracellular lipids. Therefore, 3T3-L1 cells were exposed to a wide spectrum of doses of LA (10-1500 μM) starting in various maturation stages; from differentiation maturation and once adipocytes were mature. The cytotoxicity was evaluated through the MTT assay, whereas Red Oil O staining was used to determine the quantitative accumulation of intracellular fat by spectrophotometry.
Results

Cells treated with LA since the induction of differentiation, increased 50% fat accumulation compared to control at doses from 100-500 Î¼M. Instead, cells exposed to LA from the beginning of adipocyte maturation, showed a dose-response pattern in lipid storage starting with 10 Î¼M, reaching a 2-fold increase with 500 Î¼M in comparison to control. Higher doses resulted cytotoxic in both conditions. Finally, fat accumulation was gradually increased in mature adipocytes from the dose of 500 Î¼M, reaching values up to 70% more than the control.

Conclusions

The amount of fat accumulation in adipocytes exposed to non-cytotoxic LA doses depends upon the stage of adipogenesis. Adipocytes precisely in the maturation stage are more sensitive to store lipids than pre-adipocytes in the differentiation process or once they are already mature.

T-2005-P: Differential Expression of lncRNA in Human Abdominal and Gluteal Subcutaneous Adipose Tissue Depot

Adeline Divoux, PhD; Kalypso Karastergiou; Hui Xie; Ranjan J. Perera, PhD; Susan K. Fried, PhD; Steven R. Smith, MD;

Background

Increased peripheral / lower body fat is associated with reduced cardiometabolic risk. Physiological differences in gluteal compared with abdominal subcutaneous adipocyte functions are known but the molecular basis for depot differences in adipocyte function is poorly understood.

Methods

Abdominal and gluteal adipose tissue aspirates obtained from 18 subjects (age=30.6±1.6 years; BMI=27.3±1.3 kg/m2) were analyzed using the SurePrint G3 Human GE 8x60k V2 (Agilent Technologies) arrays containing lncRNA probes. Expression of selected genes were confirmed by RT-PCR. Bioinformatic analysis using a Structural Equations Model (SEM) established correlation between selected lncRNA expression and mRNA expression obtained during a previous study with the same adipose tissue samples.

Results
We identified 82 lncRNA differentially expressed between abdominal and gluteal depots. Among them, we identified two lncRNA expressed in gluteal but not in abdominal sc adipose tissue and additional lncRNA whose expression correlated with PPARg expression and other genes involved in adipose tissue biology. SEM analysis revealed correlation between expressions of some of these lncRNAs and HOX genes, previously identified as differentially upregulated in gluteal adipose tissue.

Conclusions

LncRNAs could be new key regulators implicated in abd and glut differential gene expressions and phenotypes. In particular we identified HOTAIR as a gluteal specific lncRNA that may regulate key processes in adipocyte differentiation.

T-2006-P: Depot-Dependent Effects of Glucocorticoids on the TGF-β Pathway in Human Visceral and Subcutaneous Adipose Tissue

Susan K. Fried, PhD; Richard T. T. Pickering, BS; Mi-Jeong Lee, PhD;

Background

Visceral adipose tissue (VAT) mass and adipocyte size are associated with numerous negative health outcomes and are preferentially increased by glucocorticoids (GC) by poorly understood mechanisms. Although GC promote adipogenesis, mass cultures of visceral (oment(al)om)) cells differentiate poorly.

Methods

Affymatrix Human Gene 1.0 ST arrays were used to identify dose-dependent differential effects of the glucocorticoid receptor agonist dexamethasone (dex) in Om and abdominal subcutaneous (Sc) adipose tissue maintained in organ culture for 7d with insulin (0.7 nM) and 0, 1, 10, or 1000nM dex (n=3 paired samples from severely obese females). Gene Set Enrichment Analysis and qPCR confirmation were used to identify pathways most differentially regulated by dex between depots. Primary cultures of preadipocytes from each depot were also studied.

Results

Dex suppressed the TGF-β pathway in both depots. INHBA/Activin A and GREM1, secreted factors known to suppress adipogenesis and activate TGF-β signaling were 3-4 fold higher in Om at 0 nM Dex and in fresh tissue (n=6, p<0.05). Both were suppressed by dex in both depots, but remained higher in Om. Activin A mRNA and secreted protein were >2 fold higher in Om compared to Sc preadipocytes, and knockdown enhanced differentiation. TGFb-stimulated Smad2 phosphorylation was higher in Om and negatively correlated with differentiation.
Conclusions

Depot differences in expression and activity of the TGFβ family of signaling molecules may play a crucial role in the differential response of adipose tissues to GC and contribute to the limited differentiation capacity of Om preadipocytes.

T-2007-P: Computational Analysis of Genome-Wide Alternative Transcript Expression Patterns in Mouse Subcutaneous and Epididymal Adipose Tissue

Sujoy Ghosh, PhD; Xiaoran Chai, BSc;

Background

Alternative transcript expression (ATE), due to alternative splicing or differential promoter usage from a single gene, underlies the control of several biological functions. To determine its relevance in obesity, we investigated genome-wide ATE in distinct adipose tissue depots in C57BL/6NJ mice.

Methods

ENCOD generated paired-end RNA sequencing data from mouse subcutaneous (SC) and epididymal (EPI) fat-pads were downloaded from Gene Expression Omnibus (accession number GSE36025). There were 4 biological replicates in each group. Splice-junction aware read mapping, and read-normalized transcript level abundances (FPKM) were derived via Tophat2.0.9 & Cufflinks2.1.1 (mm10 reference genome assembly). Transcripts with an average FPKM >=5 in SC or EPI were considered to be expressed. Statistical significance of differential transcript expression was determined via a Bayesian regularized t-test. Pathway enrichment analysis for genes displaying ATE was conducted via the DAVID bioinformatics tool.

Results

Of 38553 genes, 2665 & 2678 genes displayed >=2 expressed transcripts in SC and EPI, respectively. 1360 genes had unequal ATE between SC and EPI. Comparison of differentially expressed transcripts (p<0.01 & absolute fold-change>=2.0) to the total number of expressed transcripts identified 454 genes with differential regulation of ATE between SC & EPI. Pathway enrichment analysis on these genes displayed significant enrichment for focal adhesion, ECM-receptor interaction and glutathione metabolism pathways (p<0.0005, false discovery rate<5%).
Conclusions

There is considerable evidence for depot-specific, genome-wide ATE in adipose tissue. Additionally, specific biological pathways show enrichment for genes with ATE. These results provide new insights into potentially relevant transcriptome regulatory mechanisms that may be dysregulated in obesity.

T-2008-P: Increase in Postprandial Triglycerides 1 Year Following Femoral Liposuction

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Background

It has been suggested that femoral subcutaneous adipose tissue (SAT) sequesters triglycerides (TG), lowering circulating TG, which may explain its potential cardio-protective benefit. We aimed to determine whether removal of femoral SAT by liposuction alters postprandial serum TG.

Methods

Normal-weight women (n=29; Mean±SD; 45±6yrs; BMI 23.9±2.6 kg/m2) were randomized to femoral liposuction (LIPO) or control (CON). Total and regional (trunk, leg, arm) fat mass (FM) were measured by dual x-ray absorptiometry (DXA). Fat areas in the abdominal subcutaneous (AbSFA), visceral (VFA), mid-thigh subcutaneous (ThSFA), and intramuscular (ThIMFA) regions were measured by computed tomography (CT). Postprandial plasma TG were measured for 6 hrs following a liquid meal (1/3 of daily energy requirements) containing 50%CHO/34%fat/16%pro. Women were studied at baseline, 2 mo and 1 yr following LIPO or CON.

Results

At 2mo, leg FM was reduced in the LIPO group vs. CON (-1.40±0.75 vs 0.09±0.48 kg; p<0.001) and remained reduced at 1yr (-1.12±1.42 vs -0.17±0.54 kg; p<0.05). At 1yr ThSFA was reduced (-39.6±36.6 vs 4.7±14.6 cm2; p<0.01) and ThIMFA was increased (0.2±4.6 vs -4.9±6.3 cm2; p<0.05) in LIPO vs. CON; there were no changes in AbSFA or VFA. Postprandial TG was unchanged at 2mo (1.4±6.1 vs 1.9±5.6 *103 mg/dl), but was increased at 1yr (5.9±7.7 vs -6.2±5.3 *103 mg/dl; p<0.05) in LIPO vs. CON.

Conclusions

One year after liposuction, abdominal fat areas were unchanged, while femoral FM remained reduced and ThIMFA increased. The increase in postprandial TG suggests that femoral SAT plays a role in postprandial TG metabolism and may protect against the development of cardiometabolic disease.
T-2009-P: Relationships between Palmitate Uptake Ex Vivo and CD36, ACS, GPAT and DGAT

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Background

Fatty acid storage rates vary among adipose tissue depots and are greater in women than men. These variations in storage rates could contribute to the differences in fat distribution and metabolic health observed clinically.

Methods

Omental and abdominal subcutaneous adipose tissue samples were collected from 32 adults (17 men) undergoing elective abdominal surgery. Adipose fragments were incubated in media that contained either high (0.5 mM) or low (0.05 mM) palmitate concentrations with [3H]palmitate. Palmitate storage rates in TAG and the fraction of tracer present in diacylglycerol (DG) were determined. We measured acyl-CoA synthetase (ACS), glycerol 3-phosphate acyltransferase (GPAT) and diacylglycerol-acetyl transferase (DGAT) activity as well as CD36 protein. The goal of this study was to determine whether there are unique rate-limiting enzymes in the TAG synthesis pathway that determine fatty acid storage.

Results

There was a strong, positive correlation between ACS, GPAT, and DGAT activities for both sexes and depots ($r$ values 0.58 - 0.91) and between the fatty acid storage factors and palmitate storage rates into TAG at both high and low palmitate concentrations ($r$ values 0.55 - 0.90). In addition, we found a negative correlation between omental DGAT activity and palmitate accumulation in DG for both sexes at both high and low palmitate concentrations ($r$ values -0.49 to -0.69).

Conclusions

ACS, GPAT, and DGAT are coordinately regulated, thus storage rates are seldom reliant on single rate limiting enzyme. A negative correlation between DGAT activity and palmitate in DG shows that reductions in DGAT allow increased fatty acids in DG, with potential adverse effects on insulin signaling.

T-2010-P: Pulsatile Delivery of Cortisol Regulates Lipid Storage in Adipocytes In
Vitro and Human Adipose Gene Expression In Vivo

Kalypso Karastergiou; Pornpaj Pramyothin, MD; Ava Port, MD; Caroline M. Apovian, MD; Mi-jeong Lee, PhD; Susan K. Fried, PhD;

Background

Glucocorticoids (GC) regulate the distribution and function of human adipose tissue. Disruption of the diurnal rhythm of cortisol is associated with increased cardiometabolic risk, but the mechanisms involved remain poorly understood.

Methods

Microarray analysis and qPCR verification were used to identify genes with expression changes between morning and afternoon (9:00-15:00), as circulating cortisol declines, in human abdominal subcutaneous adipose tissue of healthy volunteers (n=5). Further, to identify genes with expression changes dependent on the GC rhythm, at 11:30, when endogenous cortisol has returned to low levels, placebo or a single, oral dose of cortisol (30 mg) were administered in two separate visits and in random order. In addition, a novel in vitro model was established to study the long-term effects of pulsatile versus constant treatment with dexamethasone, a GC receptor agonist, in human adipocytes.

Results

280 genes were significantly upregulated and 292 downregulated from 9:00 to 15:00. A single dose of cortisol changed the expression pattern of 191 (33.4%) of these genes, including the clock gene PER1, the GC receptor co-chaperone FKBP5, and the transcription factor KLF15, implicated in adipogenesis. In vitro treatment of human adipocytes with pulsatile versus constant dexamethasone for 3 days established rhythmic clock gene expression, increased lipid droplet size and decreased basal lipolysis and de novo fatty acid synthesis.

Conclusions

These findings suggest that a disruption of the glucocorticoid rhythm, as occurs in depression, stress and Cushing's syndrome, may contribute to central fat accumulation, higher triglyceride turnover, and hence to increased cardiometabolic risk.

T-2011-P: Cortisol Interacts with Meal-Induced Signals to Acutely Regulate Adipose Tissue Gene Expression
Background

Glucocorticoids (GC) are powerful transcriptional regulators of adipose metabolic and endocrine functions. Our objective was to identify genes and gene networks acutely regulated by a single, physiological dose of cortisol, given with or without a meal, in human abdominal subcutaneous adipose tissue.

Methods

Five healthy volunteers (3 males - 2 females, age 26.8 ± 5.9 years, BMI 27.8 ± 3.1 kg/m²) completed a cross-over study with four study visits (in random order): (A) no meal/placebo, (B) no meal/cortisol (30 mg), (C) meal/placebo and (D) meal/cortisol. Cortisol/placebo was administered at 11:30 and meal (30% of daily energy requirements)/H2O at 12:00 followed by an abdominal subcutaneous adipose aspiration at 15:00.

Results

Cortisol significantly upregulated mRNA levels of 216 genes and downregulated 45. The meal alone increased 235 and decreased 24 genes (FDRq< 0.05 and change >30%). Gene set enrichment analysis showed cortisol effects on the mTOR, IGF1 and EGF pathways (FDRq<0.1) and meal effects on TCA cycle and cholesterol/triglyceride biosynthesis (FDRq<0.001). Two-way least mean squares ANOVA identified 549 genes with significant cortisol/meal interaction (p<0.01), including VEGFA, SIK2 and CBLB.

Conclusions

Both a single meal and cortisol have substantial effects on adipose tissue gene expression, within a short time, only 3.5 hours. These data support a key role for cortisol in modulating daily rhythms of adipose metabolism; these mechanisms may by dysregulated with stress and obesity.


Dheshnie Keswell, PhD; Kevin Adams, MBChB, FC Plast Surg (SA); Thandiwe Dlamini, Dr, MD; Hendriena Victor, Diploma in Datamatrix; Julia Goedecke, PhD;

Background
We have previously shown that adipogenic and lipogenic gene expression were downregulated to a greater extent in obese black versus obese white SA women. We hypothesized that this may increase adipocyte hypertrophy, and associate with inflammation and reduced insulin sensitivity (SI) in black women.

**Methods**

Black (n=13) and white (n=9) premenopausal SA women, with varying BMIs, underwent measurements of body composition (DXA) and SI (frequently-sampled intravenous glucose tolerance test). Gluteal fat was collected by liposuction, pre-adipocytes (Ap) and mature adipocytes (AM) were isolated, and cell area and PPARγ, TNFα and MIF mRNA levels were measured.

**Results**

When matched for body fatness, SI did not differ by ethnicity (p=0.09), but black women had larger median cell size than white women (MCS, p=0.02). The expression of Ap PPARγ was lower in black women than white women (p=0.03). MIF and TNFα expression did not differ by ethnicity. In black women only, increased AM PPARγ expression (r=-0.78; p=0.01) and reduced Ap TNFα (r=0.78; p<0.01) and MIF (r=0.76; p<0.01) expression associated with reduced MCS. In both ethnic groups, gene expression did not associate with SI.

**Conclusions**

Reduced adipogenic potential in black women may be associated with increased adipocyte cell size and increased inflammation compared to white women.

**T-2013-P: 1,25-Dihydroxyvitamin D Regulation of Adipocyte Lipid Metabolism**

*Brienna M. Larrick; Kee-Hong Kim, PhD; Dorothy Teegarden, PhD;

**Background**

It is well established that vitamin D status is inversely related to adiposity. While 1,25-dihydroxyvitamin D (1,25(OH)2D) has been shown to promote pre-adipocyte differentiation, the effects of 1,25(OH)2D on mature adipocyte function and lipid metabolism have been less thoroughly investigated.

**Methods**

Fully differentiated 3T3-L1 adipocytes were treated for 7 days with 10 nM 1,25(OH)2D or ethanol vehicle. mRNA abundance and protein expression of lipid metabolism enzymes were determined by RT qPCR and Western blotting, respectively. Lipolysis, assessed by quantitative enzymatic determination of free glycerol
release (Sigma Aldrich), and total triglyceride accumulation (Wako Diagnostics) were assessed with spectrophotometric assays.

**Results**

Treatment of differentiated adipocytes with 1,25(OH)2D stimulated a statistically significant 52% reduction in total triglyceride accumulation. HSL phosphorylation at Ser660 was increased by 1,25(OH)2D treatment, leading to a significant 129% increase in lipolysis. 1,25(OH)2D stimulated a significant 62% reduction in CPT-1 mRNA expression and a 93% increase in ACC2 expression, as well as significant reductions in mRNA expression of genes regulating fatty acid synthesis (FAS, -35%; SCD-1, -43%; C/EBP[α], -63%).

**Conclusions**

In summary, 1,25(OH)2D acts on mature adipocytes to promote fatty acid mobilization, reduced lipid storage, and downregulation of genes related to fatty acid oxidation and synthesis. Collectively, these changes in adipocyte lipid metabolism may prevent excessive fat mass accumulation.

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**T-2014-P: Dipeptidyl Peptidase 4 (DPP4) and Fibroblast Activation Protein (FAP): Two Serine Proteases Up-Regulated during Dedifferentiation of Omental and Subcutaneous Adipocytes Obtained from Obese Men and Women**

*Julie Lessard, PhD; Frederic-Simon Hould, MD; André Tchernof, PhD;*

**Background**

During mature adipocyte dedifferentiation, cells change their morphology over a few days of ceiling culture to become fibroblast-like cells. Our research objective was to identify genes that may play a role in matrix remodeling during dedifferentiation of adipose cells isolated from obese patients.

**Methods**

During mature adipocyte dedifferentiation, cells change their morphology over a few days of ceiling culture to become fibroblast-like cells. Our research objective was to identify genes that may play a role in matrix remodeling during dedifferentiation of adipose cells isolated from obese patients.
Results

FAP and DPP4 mRNA and protein levels were increased during dedifferentiation. Both proteins were localized at the extremities of adipocytes in dedifferentiation and expressed in native adipose tissue. No sex difference was observed in DPP4 and FAP gene expression. Treatment of adipocytes undergoing dedifferentiation with a DPP4 inhibitor slightly but significantly (p<0.05), affected mRNA expression of C/EBPα+, a gene that is reduced during dedifferentiation. Its expression decrease was less pronounced when cells were treated with the inhibitor.

Conclusions

Overexpression of DPP4 and FAP in mature adipocyte dedifferentiation suggest that they could be important for this process and in the cellular plasticity of adipose tissue. Further studies are needed to precisely evaluate the possible impact of DPP4 inhibitors on adipose tissue remodeling.

T-2015-P: Nonshivering Thermogenesis Activates Lysosome Biogenesis and Requires Lysosomal Acid Lipase

Yuxi Lin; Anthony W. Ferrante, MD PhD;

Background

Nonshivering thermogenesis (NST) maintains body temperature partly by brown adipocytes. Current models show that thermogenesis uses fatty acids from white adipocyte neutral lipases. We hypothesized that cold challenge also induces lysosomal acid lipase and lysosomes in adipocytes during NST.

Methods

To determine whether cold challenge affects lysosomes and lysosome function, individually housed mice were placed at 4 C. Following sacrifice, their brown adipose tissue (BAT) and white adipose tissue (WAT) were analyzed for gene expression, protein content, and lysosomal acid lipase (LIPA) activity. Frozen tissue sections were stained for lysosomes via immunohistochemistry (IHC). After local inhibition of lysosome function in BAT by chloroquine (CQ) injection, mice were cold challenged and their body temperatures measured. Finally, the ability of mice deficient in lysosomal acid lipase (Lipa) to maintain body temperature in response to a cold challenge was measured and their tissues analyzed.

Results

Cold challenge induced expression of lysosomal genes and proteins as well as LIPA activity in BAT but not WAT. IHC confirmed the increased number of lysosomes in BAT in cold challenged mice. Local injection of CQ blunted NST response of mice when cold challenged. Moreover, Lipa deficiency impaired the thermogenic program of BAT, reducing Ucp1 and Pgc1a expression in BAT, but not WAT, compared
to wildtype mice. Consistent with LIPA being critical for NST, Lipa knockout mice dropped body temperature when placed in 4 C, requiring early sacrifice.

**Conclusions**

Lysosomal function is necessary for the thermogenic program of BAT and maintaining body temperature in mice but is not required for the adaptive thermogenic 'beige-ing' program of WAT. These data indicate different nonshivering thermogenic pathways employed by the two adipose tissues, BAT and WAT.

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**T-2016-P: Effect of REDOX Couples on ROS Production and Lipid Turnover in Human Adipocytes**

*Tova Meshulam, PhD;*

**Background**

Many tissues play a role in metabolic homeostasis and the development of diabetes. We hypothesized that the redox metabolome is a master metabolic regulatory system that impacts all organs and modulates reactive oxygen species (ROS) production, lipid peroxidation, energy production and lipid turnover.

**Methods**

Differentiated human preadipocytes were exposed to the metabolites lactate (L) and pyruvate (P), ß-hydroxybutyrate (ßOHB) and acetoacetate (A), and the thiol-disulfide pairs Cys/Cyss and GSH/GSSG for 1.5 hr. ROS measurements were done with CM-H2DCFDA. Fluorescent readings were taken every 2 minutes for 1.5 hours. Data are expressed as a change of the final value minus the initial baseline reading. Lipid peroxidation (LPO) was assessed by a modification of the thiobarbituric acid method. Lipolysis was measured by glycerol release during 4 hours using an NADH-linked assay. Lipid synthesis was measured as 14C-glucose incorporated into fat. Respiration was assessed using the SeaHorse XF24.

**Results**

Metabolites with increasing oxidation potentials (GSSG, CySS, A) increased ROS between 123-202%. In contrast, P caused a 12% decrease in ROS compared to L. A also significantly increased LPO (122.3+-1.2% of ßOHB). L and A increased lipolysis by 449% and 127%, respectively. A induced a 1.8+-0.22 fold increase in lipid synthesis. ßOHB increased respiration by 1.65 +-0.48 fold due to an increased proton leak (1.96 +-0.74 fold). GSSG, when present throughout 14 days of differentiation significantly increased fat accumulation, but not when added later.

**Conclusions**
In human adipocytes, changes in the external redox state regulated intracellular ROS production, LPO, energy efficiency, lipid handling, and adipocyte differentiation. A more oxidized state increased ROS, LPO and lipid turnover and more reduction increased respiration and a proton leak.

T-2017-P: Expression of Genes Related to Prostaglandin Synthesis or Signaling in Human Subcutaneous and Omental Adipose Tissue: Depot Differences and Modulation by Adipogenesis

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Background

Our objectives were 1) To examine depot-specific PGE2 and PGF2Î± release and mRNA expression of enzymes or receptors involved in PG synthesis or signaling in human adipose tissues; and 2) To identify changes in expression of these transcripts through preadipocyte differentiation.

Methods

Fat samples were obtained surgically in women. PGE2 and PGF2Î± release by preadipocytes and adipose tissue explants was measured. Expression levels of mRNA coding for enzymes or receptors involved in PG synthesis or signaling were measured by RT-PCR.

Results

Preadipocytes and explants from OM fat release more PGE2 and PGF2Î± than those from the SC depot. Expression of genes encoding enzymes involved in PGE2 and PGF2Î± synthesis were higher in OM compared to SC cells (COX-1, COX-2, AKR1B1 and PTGES) (p<=0.05, for all). During preadipocyte differentiation, PGE2 secretion rate was higher in OM compared to SC cells (p<=0.05). Expression of PLA2G16 and PTGER3 mRNA expression increased whereas COX-1, COX-2, PTGIS and PTGES mRNA abundance decreased in both fat compartments during differentiation (p<=0.01).

Conclusions

Cells from the OM fat depot release more PGF2Î± and PGE2 than those from the SC depot. Obesity modulates adipose tissue expression of PG-synthesizing enzymes and PG receptors, which likely occurs in part through adipogenesis-induced changes in expression of these transcripts.
T-2018-P: Fat Gain with Physical Detraining Correlates with the Increased Glucose Transport and Oxidation in Periepididymal White Adipose Tissue in Rats

Rogério R. Sertié, PhD; Sandra Andreotti, PhD; Fabio B. Lima, MD;

Background

In a previous study, we demonstrated that the 4 weeks period of physical detraining in rats was enough for a total recover of the adiposity lost after 8 weeks of training due to the increase, also, in the lipogenic capacity of these animals. As is well known, lipogenesis depends, among other factors, on greater glucose supply for the adipocyte which generates more ATP needed for fat storage and, therefore, in this work we aimed to investigate the repercussions of the physical detraining on the uptake and oxidation of glucose in adipocytes isolated from the periepididymal fat (PE) of animals submitted to 4 weeks of physical detraining.

Methods

Male Wistar rats (45 days old and weighing 200 g) from the Animal Resources Center, Institute of Biomedical Sciences - University of São Paulo, with free access to food and water, and under a constant temperature (23 ± 1°C) and lighting conditions (12 h light/12 h dark, lights on at 1900 h), were divided into two groups: 1) group D (Detrained), trained for 8 wk and untrained for 4 wk; 2) group S, age-matched animals that remained sedentary throughout the 12-week period. The exercise was performed on a treadmill, 60 min/day; 5 days/wk. The exercise intensity was 50-60% of maximal race capacity

Results

Adipocytes from D animals were more active in taking up glucose when stimulated with insulin compared to the sedentary group (p<0.05). No differences among groups were observed on the basal [3H]-2DG uptake rates. Similar results occurred when the basal and insulin-stimulated rates of glucose oxidation were measured in isolated adipocytes from the 2 groups. Adipocytes from detrained rats were more responsive to insulin than those from sedentary animals.

Conclusions

The physical detraining creates a favorable environment for building TAG molecules and consequently for enhancing adiposity and works as an obesogenic factor. The increased ability of transporting and oxidizing glucose observed when stimulated by insulin can explain this phenomenon.
T-2019-P: G-Protein Coupled Estrogen Receptor (GPER/GPR30) Activation Inhibits Adipogenesis, Stimulates AMPK and Antioxidant Pathways and Attenuates Weight Gain in Ovariectomized Mice

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Background

Estrogen regulates adiposity and loss of estrogen or estrogen receptor function promotes weight gain in mice and humans. Estrogen exerts its effects through multiple receptors such as Estrogen receptor α or ß and G-protein coupled estrogen receptor (GPER/GPR30).

Methods

3T3-L1 cells were differentiated in the presence of selective agonist for GPER, G-1. Lipid content was measured with Oil Red O and cells were also harvested to subsequently quantify mRNA or protein levels through qPCR or Western blotting respectively. Additionally, ovariectomized mice were injected subcutaneously with G-1 and body weight and fat distribution in the mice were followed.

Results

In the present study, we show that selective GPER activation with agonist G-1, inhibited adipogenesis in 3T3-L1 cells; activated AMPK and increased the expression of antioxidant genes, superoxide dismutase and catalase. Conversely GPER KO mice exhibited lower levels of anti-oxidant genes. G-1 treatment also induced the expression of adiponectin. Furthermore, G-1 supplementation in female mice post ovariectomy inhibited weight gain and decreased the overall fat deposition as measured by perigonadal and subcutaneous fat accumulation.

Conclusions

Thus, we report here for the first time that specific GPER activation regulates multiple pathways involved in adipogenesis and prevents fat and body weight accumulation in ovariectomized mice.
T-2020-P: Function-Decreasing Missense Human Melanocortin 3 Receptor (MC3R) Sequence Variants (Thr6Lys and Val81Ile) Direct the Fate of Mesenchymal Stem Cells Toward Adipogenesis: Studies in Homozygous Double Mutant (Thr6Lys and Val81Ile) Human (MC3R hDM/)

Joo Yun Jun, PhD; Bonggi Lee, PhD; Jack A. Yanovski, MD, PhD;

Background

Even at an early age, MC3RhDM/hDM children and knockin mice have greater weight and fat mass but less fat-free mass compared to MC3RhWT/hWT. We therefore tested the hypothesis that MC3RhDM/hDM mesenchymal stem cells (MSCs) are predisposed towards adipocyte differentiation and away from osteogenesis.

Methods

We examined adipose tissue from MC3RhDM/hDM and MC3RhWT/hWT mice for cellularity and macrophage infiltration. We then isolated mesenchymal stem cells (MSCs) from the compact bone of MC3RhDM/hDM and MC3RhWT/hWT mice. The purity of MSC preparations were verified by flow cytometry using MSC specific markers. We examined MSC differentiation capacity after 14 days of differentiation under either osteoblastic conditions or adipogenic conditions. Osteogenesis was measured using Alizarin red S staining. Osteoblast-specific gene expression was measured by TaqMan Q-PCR. Adipogenesis was measured as Oil red O staining.

Results

Compared to MC3RhWT/hWT, white adipose tissue from more obese MC3RhDM/hDM had similar adipocyte size with increased inflammatory cell infiltration or greater levels of inflammatory markers. MC3R mRNA and protein expression were detected in MSCs from C57BL/6 mice. Under osteogenic differentiation conditions, MC3RhDM/hDM MSCs demonstrated significantly less osteogenesis. Osteoblast marker gene expression was correspondingly reduced. Under adipogenic differentiation conditions, MC3RhDM/hDM MSCs demonstrated significantly greater adipogenesis.

Conclusions

These data suggest that MC3R activity may regulate MSC fate. These results may explain why MC3RhDM/hDM human and mouse have increased fat mass and reduced fat-free mass yet maintain a healthy metabolic profile when compared to MC3RhWT/hWT.
T-2021-P: Adipocytokines and Atherothrombotic Risk in Obese Subjects: Associations with Platelet Activation Markers and Carotid Intima-Media Thickness

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Background

Obesity is associated with enhanced platelet activation and prothrombotic state. While the prothrombotic role of obesity-associated metabolic abnormalities are well recognized, the direct endocrin effects of adipocytokines on platelet activation and atherothrombotic risk are not well understood.

Methods

154 obese patients (age: 40.6+-11.1 years; BMI: 38.2+-7.72 kg/m2) and 62 age- and gender-matched healthy controls (age: 39.7+-10.0 years; BMI: 22.1+-1.96 kg/m2) were enrolled to study the associations of adipocytokines with platelet activation markers and carotid artery intima-media thickness (IMT). Platelet surface P-selectin and platelet-derived microparticles were measured by flow cytometry analysis using monoclonal antibodies. Serum concentrations of leptin, adiponectin, resistin, tumor necrosis factor-alpha (TNF-Î±) and interleukin-6 (IL-6) were analysed by ELISA. Carotid IMT was examined by ultrasonography.

Results

Platelet surface P-selectin correlated significantly (p<0.05) with leptin (r=0.20), resistin (r=0.29), TNF-Î± (r=0.30) and IL-6 (r=0.21). The number of platelet-derived microparticles showed a significant correlation with all adipocytokines: leptin (r=0.63), adiponectin (r=-0.41), resistin (r=0.21), TNF-Î± (r=0.56) and IL-6 (r=0.34) (p<0.05 for all). Significant correlations were found between carotid IMT and leptin (r=0.49), adiponectin (r=-0.27), resistin (r=0.43), TNF-Î± (r=0.57) and IL-6 (r=0.45) (p<0.05 for all).

Conclusions

In obese subjects, the close relationship of adipocyte-derived adipocytokines with platelet activation markers and carotid wall thickness emphasize the potential direct effects of adipocytokines on atherothrombotic risk.
T-2022-P: Physiologic State of Pregnancy Revealed Genetic Variant Implicated in Adipocyte Metabolic Function: Results from Gestational Adiponectin Levels Genome-Wide Association Study (GWAS)

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Background

Environmental or physiological conditions may interact with genetic variants to influence phenotypic expression. We tested whether adiponectin levels during pregnancy were associated with genetic variants across the whole genome to reveal novel biology of adipokine regulation.

Methods

We conducted a GWAS in 1,322 pregnant women from the Hyperglycemia and Adverse Pregnancy Outcomes (HAPO) Study with adiponectin levels measured at ~28 wks of gestation. We selected independent variants reaching $P<5\times10^{-5}$ for de novo genotyping in two replication cohorts (Gen3G n=522 and Chicoutimi n=174). Variants reaching $P<5\times10^{-8}$ were tested for association with other maternal and newborn metabolic traits, when available (n reported for each trait). Models were adjusted for maternal age, anthropometry, blood pressure, parity, gestational age, and gender of the neonates.

Results

In the combined meta-analysis (n=2004 women), the T allele of rs900400 (frequency=0.61) located on chr3q25 was associated with lower adiponectin levels at ~28 wks gestation ($\bar{I}^2= -0.18$ adiponectin z-score per risk allele; $P=1.4\times10^{-8}$) and nominally associated with lower insulin sensitivity ($P=0.002$). In newborns, the risk variant was strongly associated with higher cord blood leptin ($P=8.2\times10^{-9}$; n=502), higher birth weight ($P=6.2\times10^{-5}$; n=1828) and skin folds ($P=4.5\times10^{-4}$; n=1441), but not with cord blood adiponectin ($P=0.39$; n=456).

Conclusions

Physiologic status of pregnancy revealed a novel variant associated with gestational adiponectin, suggesting that a gene near rs900400 may have a role in adipocyte metabolic function. Previous GWAS did not report that rs900400 was associated with adiponectin levels in non-pregnant individuals.
T-2023-P: Hyperadiponectinemia Differentiates Metabolically Healthy Versus Unhealthy among Both Obese and Non-Obese Individuals

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Background

Centrally obese individuals have lower plasma adiponectin levels (ADPN). However, some obese are metabolically healthy and have predominantly peripheral adiposity. In this study, we analyzed obese and non-obese subjects to determine the effect of adiposity distribution and ADPN on metabolic health.

Methods

Approximately 2487 (72% female) subjects were recruited and defined as obese or non-obese (NO) based on standard BMI criteria. Their anthropometrics, blood pressures, and fasting plasma glucose, lipids and ADPN levels were obtained. They were defined as being metabolically unhealthy if they had hypertension, diabetes mellitus, or dyslipidemia (low HDL and high triglycerides per NHLBI definition). Waist to hip ratio (WHR) was used as a surrogate marker for adiposity distribution. Subjects were divided into 4 groups: metabolically healthy non-obese (MHNO), metabolically unhealthy non-obese (MUNO), metabolically healthy obese (MHO), and metabolically unhealthy obese (MUO).

Results

Among the 4 groups, MHNO subjects had the lowest WHR and highest ADPN (p<0.001). Among NO, MHNO had higher ADPN (p<0.001) and lower WHR (p=0.02) compared to MUNO. Among obese, MHO had higher ADPN (p=0.003) than MUO. While WHR was lower among MHO compared to MUO, it was not significant (p=0.09). All the results were adjusted for age, gender, and hormone therapy. When adjusted for WHR, the differences in ADPN among MHO and MUO were less notable (p=0.05) and although they remained significant among MHNO and MUNO, the mean levels of ADPN were lower.

Conclusions

Higher ADPN and lower WHR were associated with better metabolic health in both obese and NO subjects. Changes in ADPN levels, adjusted for WHR (surrogate for peripheral adiposity), are suggestive of some contribution of adiposity distribution to ADPN and also, the metabolic complications of obesity.
T-2024-P: Adipocyte OSM Receptor Promotes Metabolic Dysfunction In Vivo

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Background

Oncostatin M (OSM) is a gp130 cytokine with known roles in cancer and hematopoiesis. Unlike other gp130 cytokines which can share receptors, OSM signals through a transmembrane receptor specific to the OSM protein (OSMR²). Recently, we and others have demonstrated a putative role for OSM in obesity and metabolic syndrome. We have previously shown that: 1) expression levels of OSM and OSMR² are increased in white adipose tissue in obese mice and humans; 2) adipose tissue-derived OSM is made in immune cells and acts via OSMR² in adipocytes; and 3) OSM induces pro-inflammatory cytokine expression in adipocytes. These data have led us to hypothesize that decreased adipose tissue OSM signaling will be metabolically beneficial in vivo.

Methods

To test our hypothesis, we generated mice that lack OSMR² only in adiponectin expressing cells (OSMR FKO mice).

Results

After 12 weeks of high-fat diet feeding, OSMR FKO mice exhibited increased body weight when compared to littermate controls, but had no alterations in body composition, glucose tolerance, or insulin tolerance.

Conclusions

Based on observations that adipose tissue OSM is highly elevated after chronic high-fat feeding, we hypothesize that after 20 weeks of feeding, OSMR FKO mice will be protected from the metabolic dysfunction associated with the high-fat diet. The generation and study of OSMR FKO mice have allowed us to assess the contribution of OSM signaling, specifically in fat cells, to the development of metabolic disease states.

T-2025-P: Calcium Sensing Receptor Activation in Human Subcutaneous Adipose Depots
Background

The calcium sensing receptor (CaSR) is expressed in human adipose cells. Our laboratory has proposed that its activation may be associated with a dysfunctional phenotype in omental (Om) adipose tissue, however its presence and role in the subcutaneous (Sc) depot has not been addressed.

Methods

We determined abundance of CaSR, adipokine expression, lipolytic response and insulin signaling in adipocytes from Sc depots from healthy adults. CaSR expression was evaluated by Western Blot in human Sq and Om preadipocytes. Differentiated Sc human adipocytes were exposed to the calcimimetic cinacalcet, 1uM. The effect of CaSR stimulation (72h exposure to the calcimimetic) on expression of leptin and adiponectin was measured by ELISA. Lipolysis was assessed by glycerol release (fluorimetry). We also evaluated the effect of 3-day CaSR stimulation on insulin sensitivity in adipocytes by measuring AKT phosphorylation.

Results

CaSR was verified in Sc and Om preadipocytes (n=5), without any consistent differences between the two depots. CaSR activation in Sc differentiated adipocytes increased leptin (n=5) and tended to increase adiponectin (n=5). At 72 h cinacalcet decreases glycerol release in 17.3% (n=5), supporting the antilipolytic effect and also exhibited lower lipolytic rates in isoproterenol stimulated condition (n=2). We note that CaSR activation decreases insulin-stimulation of AKT phosphorylation at lower concentration (600 pM insulin, n=3).

Conclusions

CaSR is present in human Sc adipocytes and our preliminary data suggest that their activation is associated with increased adipokine expression, decreased lipolysis and reduction of insulin response. Future research is needed to understand the functional consequences involved in Sc adipose tissue.

T-2026-P: Waist-to-Height Ratio. A Useful Marker of Low-Grade Inflammation in Obese Children and Adolescents?

Marisa M. Armeno, Md; Carolina Caminiti; Carmen S. Mazza, MD;
Background

The epidemic of childhood obesity is associated with early atherosclerosis. Several reports have related this event to low-grade inflammation described in obesity. CRP and IL6 are markers that best correlate with adiposity. The waist-to-height ratio (WHtR) is a simple marker associated with inflammation.

Methods

To assess the correlation between WHtR and pro-inflammatory factors in obese children and adolescents, weight, height, waist circumference, glycemia (glucose-oxidase), insulin (chemiluminescence microparticle immunoassay), CRP (nephelometry), TNF-α and IL-6 (ELISA) were measured in the baseline sample in 280 patients 6 to 19 years of age with a diagnosis of overweight or obesity (OW/OB) according to BMI >pc85(CDC) and 112 normal-weight controls (BMI pc5-85). WHtR was calculated using 0.5 as a cut-off point. Mean, standard deviation, median and range for variables were calculated. Logistic regression was performed using WHtR. P>0.05 was considered significant. Statistical program STATA was used.

Results

Mean WHtR was 0.6±0.06 in OW/OB patients and 0.43±0.02 in controls (p<0.01). WHtR was increased in 93% of the OW/OB group vs 2% of the control group. In the OW/OB inflammatory markers were significantly increased (p<0.01) compared to the control group (CRP 2.2 vs 0.8; IL-6 2.9 vs 2.1; and TNF-α 6.2 vs 5.5). In the WHtR>0.5 group, inflammatory markers were significantly increased (p<0.01) compared to the WHtR<0.5 group (CRP 2.3 vs 0.6; IL-6 2.9 vs 2.1; and TNF-α 6.4 vs 5.55). An independent association was found between WHtR with CRP, IL6 and TNF-α.

Conclusions

Obese children and adolescents have high inflammatory markers that may increase cardiovascular risk. WHtR is associated with low-grade inflammation and may be considered a relevant anthropometric marker in the clinical practice.

T-2027-P: Adipocyte Size, Macrophage Infiltration and Insulin Resistance Status among Morbidly Obese Subjects

Nain-Feng Chu, MD; Ya-Shien Huang, MS; Jhu-Ting Syu, M.S.;

Background

Inflammatory response is associated with the development of insulin resistance and later diabetes mellitus among obese subjects. The purpose of this study is to examine the relationship between adipocyte size, macrophage infiltration and insulin resistance status among morbidly obese subjects.
Methods

We examine the adipocyte size and macrophage infiltration from 35 morbidly obese subjects during received metabolic surgery. Adipocyte size and macrophage infiltration of omental tissue were measured using immunohistochemistry stain (IHS) methods. Analysis of covariance (ANCOVA) was performed to compare the differences among groups and Spearman correlation was calculated to examine the association between variables. P value less than 0.05 is considered as statistical significance. This study was approved by human subjects committee (IRB).

Results

Total there are 15 normal, 10 insulin resistance (IR) and 10 diabetes (DM) subjects. Subjects with insulin resistance status had larger adipocyte size (mean±SD as 50402±4435, 70108±8865 and 72172±9223 μm² for normal, IR and DM subjects, p<0.001). Macrophage infiltration (as measured CD68 counts) was 51272, 89031 and 92233 for normal, IR and DM subjects (p< 0.001). Furthermore, adipocyte size and CD68 counts were highly positively correlated with HOMA-IR status (r=0.934 and 0.884 respectively, p< 0.001).

Conclusions

From this study, we found that adipocyte size and macrophage infiltration may be played certain roles on obesity developing insulin resistance and/or diabetes even among morbidly obese subjects.

T-2028-P: The Role of Different Dietary Fatty Acids on Rats Submitted to Visceral Lipectomty.

Desire Coelho; Aline Tritto, Bachelor in Nutrition; Daisy Diwan, Mrs; Fabiana B. Benatti, PhD; Hamilton Roschel, Dr; Marilia C. Seelaender, PhD, Livre-Docente; Antonio Lancha, Jr, PhD;

Background

A high-fat diet consumption has been directly associated with obesity. The main hypothesis is that different fatty acids will result in different effects: a high-saturated fat (SAT) diet would have deleterious effects, while a high-polyunsaturated fat diet (PUFA) would have beneficial effects.

Methods

The aim of the first study was to investigate the effects of visceral (epididymal) lipectomty (surgical adipose tissue removal) in rats submitted to different high-fat diets. The rats were allocated into three groups; a high-saturated fat diet (SAT), a high-polyunsaturated fat diet (PUFA) and a control diet (CON). Following eight weeks, rats in each group were allocated to lipectomy (L) or a sham operation (S); animals were euthanised three weeks after surgery. Glucose and insulin tolerance tests, lipid profile and adiposity were
measured prior to and three weeks following surgery. Cytokines and insulin levels were measured only at the end of the experiment.

**Results**

We showed that when L was performed following a SAT diet there was a compensatory growth of the retroperitoneal fat depot and increased IL-6 and TNF-α levels which resulted in decreased insulin sensitivity, increased cholesterol levels and an increased fatty liver. However, when L was performed following a PUFA diet these deleterious effects were not shown likely due to increased brown adipose depot and an improved inflammatory response compared to the SAT diet.

**Conclusions**

When associated to L the SAT diet exerted deleterious effects probably related to a compensatory growth of the retroperitoneal depot and the increased pro-inflammatory cytokine levels. PUFA diet counteract this effects resulting in a more protective profile.

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**T-2029-P: Hepatic Iron Storage Is Related to Body Adiposity and Hepatic Inflammation**

*Sung Nim Han; Kyung-Ok Koo, MSc; Chan Yoon Park, A Master's degree; Min Soo Kim, PhD; Jayong Chung, PhD;*

**Background**

In order to investigate whether body adiposity was responsible for altered hepatic iron storage and to understand the mechanisms responsible for reduced iron storage associated with obesity, we compared hepatic iron status and inflammation, and factors involved in iron absorption using obese, control, and mildly calorie restricted lean mice.

**Methods**

Seven-wk-old C57BL/6 mice were fed control diet containing 10% kcal fat (control), high fat diet containing 60% kcal fat, or reduced amount of control diet to achieve 14% calorie restriction for 16 wks. Hepatic non-heme iron content and ferritin protein level, and hematocrit and hemoglobin levels were determined to assess iron status. Hepatic expression of MCP-1 and TNF-a were measured as hepatic inflammatory markers. Hepatic hepcidin and duodenal DMT1 and ferroportin mRNA levels were measured as factors involved in regulation of iron absorption.

**Results**
After 16-wk of feeding, obese mice had the highest body weight and amount of adipose tissue than other groups. Dietary iron intake was not significantly different among groups. Hepatic non-heme iron and ferritin protein levels were lower in obese mice and higher in lean mice compared with the control. These two iron status showed negative correlation with the amount of white adipose tissue. MCP-1 and TNF-a mRNA levels were significantly higher in obese mice compared with lean mice. Hepatic non-heme iron level showed negative correlation with both MCP-1 and TNF-a expression.

Conclusions

Hepatic iron status is closely associated with body adiposity evidenced by significantly negative correlation with adipose tissue weight. Inflammation in hepatic milieu may have contributed to reduced hepatic iron storage in the obesity.

T-2030-P: The Combinational Effects of Pioglitazone and Fish oil on Adipose Tissue Inflammation and Oxidative Stress in KK Mice

YUZURU IIZUKA; Hyoun-Ju Kim, PhD; Maki Nakasatomi, MD; Takuya Izawa, university student; Akiyo Matsumoto, PhD;

Background

Pioglitazone is selective ligands for PPAR\(^\gamma\), which have been used widely in clinical treatment of type 2 diabetes as insulin-sensitizer drugs. Fish oil improves lipid metabolism and obesity by suppressing fatty acid synthesis and stimulating fatty acid oxidation in the liver.

Methods

In the present study, we investigated the combinational effects of pioglitazone and fish oil on adipose tissue inflammation and oxidative stress in KK mice. The experimental diets were consisted of 20 energy % (en%) fat. SO, SP/L and SP/H diets contained 20 en% safflower oil with 0%, 0.006% or 0.012% pioglitazone. FO, FP/L, FP/H diets were replaced fat source with 10 en% fish oil and 10 en% safflower oil mixture. These diets were fed to 7 week age KK mice for 8 weeks. We analyzed adipocyte areas in epididymal adipose tissue and its mRNA expressions related with inflammation. In addition, we are planning to evaluate d-ROMs test as oxidative stress marker.

Results

The combination of pioglitazone and fish oil significantly decreased mean adipocyte area compared with pioglitazone monotherapy. The mRNA levels of IL6 and MCP1 were significantly lower in all fish oil
and/or pioglitazone-treated groups than SO group. TNFα mRNA level significantly decreased in all pioglitazone-treated groups compared with SO group, but not in FO group.

Conclusions

The combination of pioglitazone and fish oil may have beneficial effects on inhibition of epididymal adipocyte hypertrophy and inflammation. The effect on oxidative stress is under analysis.

T-2032-P: Impact of Weight Loss on Obese Adipose Tissue Immune Cell Function

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Background

Obesity induces inflammation in adipose tissue involving the recruitment of M1-like macrophages and activated CD8+ and CD4+ T cells. Relatively little is known about how this pro-inflammatory environment may be deactivated with interventions such as weight loss.

Methods

Diet switch from a 60% high-fat diet to a 13% normal-fat diet for 8 weeks was used to induce weight loss in diet-induced obese C57Bl/6 mice. Adipose tissue fibrosis and crown-like structure formation was evaluated by immunofluorescence and tissue histology. Inflammatory leukocyte populations were analyzed by flow cytometry for microarray analysis.

Results

Diet switch improved glucose tolerance and reduced serum insulin levels within 6 weeks. However, crown-like structures and adipose fibrosis developed after diet switch and continued to accrue even after visceral adipose tissue had returned to lean-like weights. Analysis of adipose macrophages after weight loss showed they retained an inflammatory gene expression profile and had high surface marker expression of T cell co-stimulatory markers, similar to macrophages found in obese adipose tissue.

Conclusions

Inflammatory adipose leukocytes in previously obese mice are retained despite body and adipose tissue weight loss and improvements to systemic insulin sensitivity. These findings have potential clinical significance given the variability of response to weight reduction therapy.
T-2033-P: Mesolimbic and Cognitive Control Circuitry Activity Related to Emotional Eating Behaviors in Pre-Surgical Vertical Sleeve Gastrectomy Patients

Laura M. Holsen, PhD; Paul Davidson, PhD; Florina Haimovici, MD; Priyanka Moondra, BA; Max T. Curran, BS; Jill M. Goldstein, PhD; Luke Stoeckel, PhD;

Background

Prognostic indicators in bariatric surgery include emotional eating (EE), driven by inadequate emotion regulation strategies and heightened reward sensitivity. The neural circuits responsible for food-related emotion regulation and hormones (ghrelin) may be dysfunctional in patients with high EE.

Methods

The goal of this study was to investigate neural pathways associated with food craving and cognitive regulation in bariatric surgery patients with and without a history of EE. To date, 6 vertical sleeve gastrectomy patients have completed baseline (pre-surgery) visits, including a blood draw, eating behavior assessment, and an fMRI scan with a food-related emotion regulation task with 2 strategies: upregulation of food craving and cognitive reappraisal. fMRI data were analyzed using SPM8, thresholded at \( p<0.05 \), FWE-corrected, to correct for multiple comparisons. ROIs included ventral tegmental area, hypothalamus, amygdala, dorso-/ventrolateral prefrontal cortex, medial superior frontal gyrus.

Results

Patients showed activation in mesolimbic circuitry during upregulation in ventral tegmental area (VTA; Z-score=3.16), hypothalamus (Z=2.95), and amygdala (Z=4.03). VTA activity was positively related to EE severity (r=0.85). During cognitive reappraisal, they demonstrated activity in cognitive control regions, including dorsolateral prefrontal cortex (Z=3.51), medial superior frontal gyrus (Z=3.64), and ventrolateral PFC (Z=4.84), with low EE patients exhibiting higher activity. Ghrelin levels were higher in those with more severe EE.

Conclusions

These results offer initial evidence of disrupted neural circuitry which may allow us to identify and develop treatment strategies for those vulnerable to post-surgical weight regain. We will include pre-surgical data and 6-month post-surgical data on additional patients in the final presentation.
T-2034-P: Obese Men and Women Differ in Brain Activation Patterns Related to Decision-Making

Gilly Koritzky, PhD; Qinghua He, PhD; Antoine Bechara, PhD;

Background

Neuroscientific research links obesity to imbalance between two systems: an 'impulsive system' and a 'reflective system'. We previously found that obese men and women differ in decision-making properties. This suggests that obesity is associated with gender differences in neural activation patterns.

Methods

Inspired by these findings (which were observed using behavioral measures), the present study tested the hypothesis that obesity is associated with a hyperactive impulsive system (amygdala/striatum) in men, and with an underactive reflective system (prefrontal cortex, or PFC) in women. 5 obese men (MBMI=32.2) and 5 obese women (MBMI=37.5) completed a complex decision-making task while their brains were being scanned. 6 lean subjects (3 men, 3 women) were also tested. The task was a risk-taking task that measures response to prospects of high rewards, and engages the amygdala, striatum and related structures, as well as the PFC. fMRI imaging was done in a 3T Siemens MAGNETOM Tim/Trio scanner.

Results

Compared to obese women or lean controls, obese men showed higher activation in the caudate (L), pallidum (R) and amygdala (R) when making high risk/high reward decisions, and high activation in the pallidum (R+L) putamen (L), and amygdala (R) when receiving feedback of high winnings. Compared to obese men or lean controls, obese women showed lower activation in the suppl. motor area (R), middle frontal gyrus (R), and superolateral and medial frontal gyrus (R+L) [all contrasts \( p < .01 \), uncorr.]

Conclusions

We found that high activation in the impulsive system is more prominent in obese men than obese women, while low activation in the reflective system is more prominent in obese women than obese men. This suggests that gender interacts with the underlying neuro-cognitive processes that lead to obesity.
T-2036-P: Brand Preference and Dietary Restraint Modulate Neural Responses to Food Advertisements

Kristina Rapuano; Andrea L. Worsham, MA; Todd Heatherton, PhD; William M. Kelley, PhD;

Background

Food marketing seeks to establish preferences for food brands, but little is known about how the brain responds to naturalistic food advertisements. Here we examine how neural responses to real-world food advertisements predict individual differences in brand preference and dietary restraint.

Methods

Fifty undergraduates (30 female) viewed images of branded advertisements for food and non-food products while undergoing functional magnetic resonance imaging (fMRI). Subjects were naïve to the purpose of the study and performed an incidental task (making indoor/outdoor discriminations) to ensure an appropriate level of attentiveness. Subsequently, subjects were asked to rate their preferences for each brand shown during the scanning session on a scale from 1 to 7 in addition to answering questions about their weight and dieting concerns.

Results

Consistent with previous studies, food images elicited greater activation in reward-related regions of the brain in comparison to non-food images, such as the amygdala, insula, and orbitofrontal cortex. These regions also predicted individual ratings for preferred food brands. Interestingly, self-reported concerns for weight and diet status were associated with attenuated reward responses to food advertisements as well as a weaker correspondence between individual brand preference ratings and neural responses.

Conclusions

Food ads engage brain regions involved in reward processing. Neural signals linearly track individual brand preference and are modulated by concern for weight status. This study provides a neural basis for understanding the interaction of brand preference and dietary restraint in response to food ads.

T-2038-P: Responses to Visual Food Stimuli Differ in Normal-Weight and Obese Women Depending on Neural or
Subjective Assessment Methods: An Electroencephalogram Study

James D. Lecheminant, PhD; Kaylie Carbine, Undergraduate; Larry A. Tucker, PhD; Bruce W. Bailey, PhD; Michael J. Larson, PhD; William Christensen, PhD;

Background

This study compared normal-weight and obese women for: 1) neural responses to pictures of food and flowers, and 2) subjective ratings of these pictures.

Methods

Nineteen normal-weight women (NWW) (31.3+-10.0 yrs, 22.2+-1.4 kg/m2) and 22 obese women (OBW) (31.3+-10.0 yrs, 37.1+-5.8 kg/m2) participated. On two separate occasions, participants presented to the laboratory and were shown pictures of food and flowers (control) during electroencephalogram (EEG) measurements. Event-related potentials (mv) of interest were the P300 and the late positive potential (LPP). Subsequently, participants subjectively rated the same pictures of food and flowers for arousal and valence (each on a scale of 1-9). The mean value of the two conditions was used for the analyses.

Results

In the NWW, difference in food and flowers was 1.1+-0.8, 0.8+-0.6, 1.2+-1.1, and 0.3+-1.3 for the P300, LPP, arousal, and valence, respectively. In the OBW, difference in food and flowers was 0.8+-0.7, 0.8+-0.7, -0.3+-2.1, and -1.1+-1.6 for the P300, LPP, arousal, and valence, respectively. Group differences in response to pictures were partially a function of type of measure (P300, LPP, arousal, valence). In other words, there were similar responses for the P300 and LPP between groups, but the OBW reported flowers more arousing and pleasant than food;

Conclusions

Responses to pictures of food and flowers differed in normal-weight and obese women as a function of subjectively-determined ratings. These findings have clinical relevance when assessing responses to visual food stimuli in these sample populations.

T-2039-P: Neural Reactivity to Visual Food Stimuli Is Lower in the Evening Than the Morning in Some Areas of the Brain: An fMRI Study
Background

Neural responses to visual food cues may be associated with eating behavior; however, the role of time of day on these responses is not well-known. Therefore, this study examined the influence of time of day on neural responses to high- and low-energy visual food stimuli.

Methods

In cross-over fashion, each participant received functional magnetic resonance imaging (fMRI) scans of their brain while presented with low- and high-energy food pictures, once in the morning (6:30-8:30am) before breakfast and once in the evening (5-7pm) before the evening meal. Diets were identical on both days of the fMRI scans, and were verified using weighed food records. Pictures used were based on the work of Sweet et al. (2012). Visual analog scales were used to record hunger and preoccupation with food prior to each fMRI scan.

Results

Nine brain regions showed greater activation to high-energy compared to low-energy food stimuli (p<0.05). Six areas of the brain (including reward pathways) showed a main effect of time of day (lower activation in the evening) for both high- and low-energy pictures (p<0.05). Subjectively, there was no difference in hunger by time of day (F=1.84, p=0.19); however, participants reported they felt they could eat more (F=4.83, p=0.04) and were more preoccupied with food in the evening (F=5.51, p=0.03).

Conclusions

High-energy food stimuli produced greater fMRI responses than low-energy stimuli in key areas of the brain; however, responses were lower in the evening in some areas. These data have clinical implications for fMRI measurement and practical implications for sensitivity to food cues by time of day.

T-2040-P: The Maternal Obesity Management (MOM) Pilot RCT: A Prenatal Lifestyle Intervention

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Background
Pregnancy is a critical period for weight management as excessive gestational weight gain (GWG) is a key contributor to the intergenerational cycle of obesity. The MOM trial pilot aimed to evaluate the effects of a structured prenatal physical activity and nutrition program on offspring weight status.

**Methods**

This two-arm, parallel group, randomized controlled trial conducted in Ottawa, Canada, included 72 pregnant women (BMI > 18.5 kg/m²) recruited between 12 and 20 weeks gestation. Women were randomized to the intervention arm, designed to reduce excessive GWG, or the control arm. Women in the intervention arm received our MOM Trial 'A Healthy Pregnancy Handbook', 2 visits with a dietitian, 7 mailed postcards plus a structured physical activity (PA) and nutrition program. Those in the control arm received Health Canada's - A Sensible Guide to a Healthy Pregnancy booklet.

**Results**

Adherence to the intervention was low (<50%) as measured by class attendance. No differences between intervention (n=28) and control (n=19) groups were seen in mean GWG, PA, or postpartum weight retention at 6 months. There was a trend towards lower offspring weight for length (WFL) at 6 months. (WFL z-score: 0.003±1.3 vs. 0.542±1.2, p=0.16). Moderate-to-vigorous PA during pregnancy was negatively correlated with offspring WFL z-score (-0.329, p=0.04) at 6 months.

**Conclusions**

The lifestyle intervention did not significantly impact GWG or offspring weight status, in part due to low participant adherence. PA level was associated with lower offspring weight status. Future studies are needed to address the barriers to adherence to prenatal lifestyle intervention programs.

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**T-2041-P: Effects of a Two-Year Behavioral Weight loss Intervention on Sleep Duration, Sleep quality and Mood in Obese Individuals Treated in Primary Care Practice (Results from the POWER-UP Trial)**

*Nasreen Alfaris, MD; Thomas A. Wadden, PhD; Lisa Diewald, MS, RD; Jesse Chittams, MS;*

**Background**
To examine the effect of weight loss on sleep duration and sleep quality in obese individuals who received a behavioral weight loss intervention in the Practice-based Opportunities for Weight Reduction trial at the University of Pennsylvania (POWER-UP).

**Methods**

Data were analyzed by mixed effect general linear regression models in 390 obese participants (75.4% female, mean age 52 years, mean BMI 38.5 kg/m²) who participated in the POWER-UP study. This study reports changes at months 6 and 24 in weight and sleep quality and duration assessed by the Pittsburgh Sleep Quality Index questionnaire (PSQI) and mood, measured by the Patient Health Questionnaire-8 (PHQ-8). In addition, changes in sleep and mood in participants who lost ≥5% of weight were compared with those who lost <5%.

**Results**

There were few significant differences between treatment arms in changes in sleep or mood. At month 6, however, mean (+SD) min of sleep increased significantly more in participants who lost ≥5% vs <5% (21.6±7.2 vs 1.2±6.0 min, p=0.0031). PSQI total scores similarly improved (declined) more in those who lost ≥5% vs <5% (-1.2±0.2 vs -0.4±0.2, p < 0.001), as did PHQ scores (-2.5±-0.4 vs -0.1±0.3, p <0.0001). At month 24, only the differences in mood remained statistically significant (p < 0.05).

**Conclusions**

Losing ≥ 5% of initial weight is associated with short-term improvements in sleep duration, sleep quality, and mood.

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**T-2042-P: Development and Impact of an Evidence Based Undergraduate Course to Address Perceived Motivators and Barriers of Adopting a Healthy Lifestyle.**

*Ali Al-Rajhi; Anne Mathews, PhD, RDN; Andrew Silverman, Undergraduate;*

**Background**

College is a significant life transition, as many begin new independent lives and exposed to new social and environmental influences, that may lead to the adoption of harmful health behaviors. Meaningful evidence based courses are needed to encourage adoption of healthy behaviors in undergraduates.

**Methods**
Sex-specific focus groups were conducted using a socio-ecological framework. Themes were identified about what undergraduates perceived to be important motivating or barring factors to living healthier lives and preventing the onset of chronic disease (e.g., obesity). Identified themes were then used to develop an evidence based undergraduate health course. Perceptions of these identified themes were assessed before and after completion of the course to evaluate the impact of the health course.

**Results**

Common themes perceived as being either a motivator or barrier to pursuing a healthy lifestyle arise from intrapersonal (time, finances, self-image, stress management, self-efficacy), interpersonal (acceptance by others and social influences), and environmental (environment and accessibility) constructs with some differences between sexes. Self-efficacy for health behaviors significantly increased after completion of a preventative health course (p=0.0001).

**Conclusions**

College campuses may provide an ideal environment for supporting the adoption of health behaviors. Formal coursework, tailored to the needs of students, can be an effective means to both educate and increase self-efficacy for the adoption of health behaviors.

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**T-2043-P: Should Providers Encourage Realistic Weight Expectations and Satisfaction with Lost Weight in Commercial Weight Loss Programs? A Preliminary Study**

Gretchen Ames, PhD; Colleen S. Thomas, MS; Jillian S. McMullen, RD; Lesley L. Lutes, PhD;

**Background**

Many patients who are paying for treatment in 'real world' medical settings drop out of treatment. One potential problem related to attrition is unrealistic expectations for treatment outcome in that if patients are unable to reach a weight they expect to achieve, they may be more likely to drop out.

**Methods**

This study investigated patient variables likely to be associated with attrition among 30 patients who completed a 21-week liquid meal replacement program (LMR) and enrolled in a 52-week small changes maintenance intervention (SCM). These variables included percent of initial weight lost during LMR, satisfaction with weight after completion of LMR (1 = 'not at all satisfied', 9 = extremely satisfied'), expectation for further weight loss (lbs.), and duration of time expected to achieve desired weight loss (0 to
Measurement occurred at the time of enrollment in SCM (pre-SCM). Participants' median weight at the start of LMR was 111 kg and they lost 18% of body weight during LMR.

Results

Of the 30 patients who started the SCM, 8 (27%) were lost to attrition prior to SCM week 52 assessment. Associations with SCM attrition were explored using Fisher's exact tests where the variables of interest were categorized based on the sample median. Odds of SCM attrition were higher in patients who lost <=18.2% of pre-LMR weight (OR: 12.25, P=0.035), had lower satisfaction with weight (≤7) pre-SCM (OR: 10.11, P=0.040), and who expected further weight loss of 9.1 kg or more pre-SCM (OR: 10.11, P=0.040).

Conclusions

Attrition is a significant problem for LMR patients in particular. Failure to participate in follow-up care will lead to greater than 50% regain of lost weight in one year. Improving satisfaction with lost weight and encouraging moderation of expectations may help patients remain engaged in treatment.

T-2044-P_DT: Physician-Perceived Barriers to Effective Gestational Weight Gain Counseling in Low-Income Overweight and Obese Women

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Background

Low-income women affected by overweight and obesity are at risk for excess gestational weight gain (GWG) in pregnancy. This study assessed physicians' perceived barriers to effective counseling related to GWG, diet quality, and lifestyle in low-income, overweight and obese pregnant women.

Methods

Trained facilitators conducted focus groups with physicians recruited from a community-based perinatal clinic in Madison, Wisconsin, which predominantly serves low-income, minority women, many of whom are affected by obesity. Open-ended focus group questions were designed to elicit physician attitudes towards weight management counseling of overweight and obese pregnant women, limitations with discussing the topic, and perceived adequacy of training on weight management counseling. Transcripts were analyzed and coded for themes by three investigators. Investigators agreed that thematic saturation was reached.
Results

Nine physicians participated in two focus groups. Most felt uncomfortable counseling women on weight management in pregnancy, citing inadequate training. Physicians did not have time or stated that other prenatal issues took priority. They hesitated to make nutrition or activity recommendations because of perceived patient barriers that they could not address. Though most referred to dieticians, they did not know the content of dietary counseling and were unable to reinforce key messages.

Conclusions

Physicians are uncomfortable counseling low-income, obese pregnant women on GWG for lack of time and inadequate training. Specialist referrals may be beneficial, but improved communication between the specialist and physician is needed. Additional training of physicians may also be warranted.

T-2045-P: Behavioral Intervention in Underserved Overweight Postpartum Women “Does it Work?”

Ashley C. Bourland, BA; Alexandra Pitkin, RD, LDN; Mufaddal Mahesri, MBBS, MPH; Lisa Sullivan, PhD; Caroline M. Apovian, MD;

Background

To test the feasibility of a culturally-tailored, in-person weight loss intervention for underserved overweight/obese postpartum Black women at an urban hospital. Primary outcomes were feasibility and satisfaction measures; secondary outcomes were anthropometrics and self-reported attitudinal changes.

Methods

Overweight/obese postpartum Black or African American women were randomized to a 12-week culturally-tailored, in-person, group-based weight loss program or control group. The weight loss program was adapted from the Diabetes Prevention Program. Demographics were recorded at enrollment after consent. After delivery, all subjects completed a baseline visit (approximately 6 weeks postpartum) where anthropometrics were measured and women completed questionnaires to assess typical food intake and physical activity, attitudes about eating, physical activity and body image. Subjects also completed a 3-day food and step counter log. These measures were repeated 12 weeks later.

Results

60 women randomized (31 intervention/29 control). The groups were balanced at baseline (BMI 35.1 (SD 7.3) intervention vs 34.2 (5.4) control). 35 women (16 intervention/19 control) completed 12-week follow-up. The Eating Behavior Patterns Questionnaire showed significantly more low fat eating in intervention vs control. Over 12 weeks, 63% of intervention and 74% of control subjects gained weight (p=0.48). Women
who gained weight tended to be younger, had lower annual family incomes and higher BMI at baseline as compared to women who lost weight.

Conclusions

For those who completed follow-up, satisfaction and measures of healthy eating improved, however many women gained weight. The intervention group showed improvements in self-esteem, greater motivation and greater knowledge of healthy eating and the importance of exercise than the control group.

T-2046-P: Effects of Lifestyle Interventions that Include a Physical Activity Component in Severely Obese Individuals: A Systematic Review and Meta-Analysis

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Background

Lifestyle intervention is the first step to achieve weight loss and treat obesity-related comorbidities before considering bariatric surgery. A systematic review and meta-analysis were performed to assess the impact of lifestyle interventions on health outcomes of class II and III obese individuals.

Methods

An electronic search was conducted in 4 databases (Medline, Scopus, CINAHL and Sportdiscus). Two independent investigators selected and assessed the quality of original studies assessing the impact of lifestyle interventions with physical activity (PA) components on anthropometric parameters and cardiometabolic risk factors (fat mass, blood pressure, lipid and glucose metabolism) in adults with BMI 35 kg/m². Estimates were pooled using a random-effect model (DerSimonian and Laird method). Heterogeneity between studies was assessed by the Cochrane's chi-square test and quantified through an estimation of the $I^2$.

Results

Of the 3,170 identified articles, 56 met our eligibility criteria, with a large majority of uncontrolled studies (80%). The meta-analysis based on uncontrolled studies showed significant moderate to high degree of heterogeneity among included studies. The pooled mean difference in BMI was $-2.8 \text{ kg/m}^2$ (95% CI -3.1; -2.2; $p<0.01$). A significant mean effect of lifestyle intervention on fat mass, blood pressure, total
cholesterol, LDL-C and triglycerides was found (p<0.01), without significant effect on HDL-C and fasting blood glucose.

Conclusions

Lifestyle interventions incorporating a PA component can improve weight and various cardiometabolic risk factors in severely obese individuals. However, more high quality randomized controlled trials are needed to confirm this finding, especially beyond weight loss.

T-2047-P: A Randomized Controlled Trial Comparing Scalable Weight Loss Treatments in Primary Care

Rachel Barnes, PhD; Marney White, PhD, MS; Steve Martino, PhD; Carlos M. Grilo, PhD;

Background

Primary-care (PC) settings may be an opportune place to deliver obesity interventions. Scalable interventions utilizing motivational interviewing (MI) and web-support may overcome obstacles to effective obesity treatment dissemination. This randomized controlled trial (RCT) tested such an intervention.

Methods

Patients were 89 overweight/obese individuals, with and without binge eating disorder (BED), receiving PC services at a large urban university-based medical healthcare center. Average age was 47.9 years, 76.4% were female, and 25.8% met BED criteria. Patients were randomly assigned to one of two web-supported interventions, motivational interviewing (MIC; n=30) and nutrition psychoeducation (NPC; n=29), which served as an attention-control, or to usual care (UC; n=30). Treatment was provided by medical assistants over the course of 3 months. Blinded assessments occurred at post-treatment and at 3-month follow-up. Patient retention was excellent, 84 (94.4%) patients completed treatment.

Results

At post (p=.014) and 3-month follow-up (p=.024) NPC patients lost significantly more weight than UC but not MIC; MIC and UC did not differ significantly. Twice the patients achieved at least 5% weight loss in MIC (23.3%) and NPC (27.6%) compared to UC (10.0%). Weight loss did not differ by BED status. Triglycerides (p=.024) and depression (p=.032) decreased significantly for NPC patients compared to UC but not MIC; MIC and UC did not differ significantly. Fidelity ratings were high and treatment compliance was associated with weight loss.

Conclusions
This is the first RCT in PC testing MI for obesity to include an attention-control (NPC). NPC, but not MIC, showed a consistent pattern of superior benefits relative to UC. BED status was not associated but treatment compliance was associated with weight loss outcomes.

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**T-2048-P: A Community-Based Weight Loss Program with Mindfulness Components Results in Initial and Sustained Weight Loss**

*Laura Barre; Jennifer Gordon, MSW; Jeremiah Eckhaus, MD; Jean L. Kristeller, PhD;*

**Background**

Mindful eating interventions have been shown to reduce overeating and promote weight loss in randomized controlled trials. This study explored the viability of these approaches in a community primary care setting.

**Methods**

A pre-post study of 'Eat for Life', an 8-12 week group program based on MB-EAT (Mindfulness-Based Eating Awareness Training), including instruction on nutrition, exercise, mindful eating and meditation, with self-monitoring of activity (pedometers) and food intake (journals). Participants (n=114) were enrolled in seven cohorts between 2/11 and 6/13 in Vermont, with data collected at baseline and after 8 sessions. Weight at 7-12 months post-intervention was extracted from medical records for a subsample (n=52). Linear regression analysis explored the association of mindfulness with weight change controlling for age, gender, education, binge eating, depression, class cohort, and attendance.

**Results**

Participants were all white, with 86% female; average age=54.4 years (SD=11.1); and average BMI=39.4 kg/m2 (SD=7.8). Mean weight loss was 7.8 lbs. (95% CI 6.7-8.9). Percent reporting binge eating decreased from 70% to 41% (p<0.001). Participants spent a mean of 74 min/week (SD=56) in formal meditation. Minutes of meditation predicted weight change (B=-0.04, p=0.001; 0.4 lb weight loss per 10 minutes of meditation/week). At 7-12 months, mean weight was unchanged (0.2lbs); 22% maintained weight loss and 29% showed further weight loss.

**Conclusions**

Weight loss programs with mindfulness components can be implemented in a community setting and potentially lead to sustained weight loss. Formal meditation practice may facilitate initial weight loss.
Background

Geriatric Nutritional Risk Index (GNRI) has been reported as a predictor of clinical outcomes in maintenance hemodialysis (MHD) patients. We aimed to test whether GNRI provides an improved specificity for adverse prognosis in this population than its individual components.

Methods

A two-year prospective observational study performed on 261 MHD outpatients (38.7% women) with a mean age of 68.6±13.6 years. Prospective all-cause and cardiovascular (CV) hospitalization and mortality, geriatric nutritional risk index (GNRI) and short form 36 (SF-36) quality-of-life (QoL) scores were measured.

Results

For each one unit increase in baseline GNRI levels, the multivariable adjusted hazard ratios (HR) were: for first hospitalization 0.98 (0.97 to 0.99) and for first CV event - 0.96 (0.93 to 0.99); for all-cause death - 0.96 (0.93 to 0.98) and for CV death - 0.95 (0.92-0.99). Adjusted HRs for each 0.1 g/dl increase in baseline albumin levels expressed markedly lower risk of adverse outcomes. The accuracy of albumin was also stronger than GNRI in predicting these outcomes according to the receiver operating characteristic curve analysis. Albumin was related to self-reported QoL with higher strength and magnitude than GNRI. This difference was prominent in total score (r=0.24, P<0.001 vs r=0.15, P=0.01) and in most scales of the SF-36. Body weight/ideal body weight, another component of GNRI, performed worse than GNRI as a predictor of clinical outcomes and QoL.

Conclusions

Despite the strong relationship with clinical outcomes and QoL, GNRI doesn't improve or even worsens performance of albumin. This questions the clinical value of GNRI as a prognostic tool in MHD population.
T-2050-P: The Influence of Herbs, Spices, and Regular Sausage and Chicken Consumption on Liking of Reduced Fat Breakfast and Lunch Items

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Background

Adults often consume more fat than is recommended. We examined factors that may improve liking of reduced fat and reduced saturated fat foods, including the addition of herbs and spices and habitual consumption of different high-fat and low-fat food items.

Methods

We randomized approximately 150 adults 18 to 65 years old in each of two separate studies to taste three different meal conditions: full fat (FF), reduced fat with no added spice (RF), and reduced fat plus spice (RFS). We obtained habitual dietary intake data with the 2005 Block Food Frequency Questionnaire. Subjects rated their liking of a French toast entrée, a sausage side dish and the overall meal, or a chicken entrée, a vegetable side dish, a pasta side dish, and the overall meal on a 9-point hedonic Likert scale. Subjects came to the Anschutz Health and Wellness Center once a week for three weeks to consume the meals. All meals were weighed and photographed before and after consumption.

Results

Overall liking of the RF breakfast and lunch meals were lower than the FF and RFS versions. RFS and FF breakfast and lunch meals, French toast, chicken and vegetable likings were similar. FF and RFS conditions were liked more than RF condition for the breakfast and lunch meals, French toast, chicken entrée and vegetables. Liking of all three sausage conditions were similar. FF Pasta was liked more than RFS and RF. Habitual consumption of roasted chicken was associated with reduced liking of FF chicken and FF pasta.

Conclusions

Our findings provide evidence that herbs and spices can offset the decline in liking from fat reduction. Herbs and spices can be a useful tool to improve liking of lower-fat foods and help Americans maintain a diet consistent with the US Dietary Guidelines.

T-2051-P: Health Professionals™ Perspectives about their Scope of Practice
and Responsibility of Providing Weight Management: Highlighting the Role of Nutrition Professionals

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Background

Nutrition professionals are uniquely positioned to contribute to weight-related counseling but are underutilized in the delivery of obesity care.

Methods

We conducted a national internet-based survey (in 2014) of 500 health professionals who worked at least 15 hours a week in an ambulatory setting (100 from each of five professions: nutrition, nursing, behavioral/mental health, exercise, pharmacy). Using T-tests, we evaluated differences in perspectives on: 1) the health care professionals most qualified to help obese individuals [lose weight / maintain weight], 2) quality of weight-related training and 3) self-efficacy for weight management.

Results

Nutrition professionals were most commonly identified by themselves and their peers as the most qualified group to help patients with obesity lose or maintain weight (nutrition professionals - 92%; other health professionals - 57%). Three-fourths of nutrition professionals reported receiving high quality (very/pretty good) training in weight loss counseling (77%) compared to half of other health professionals (51%). Those who reported high quality training were significantly more likely to report confidence (97% vs. 56%) in helping obese patients.

Conclusions

Nutrition professionals may be better suited than other health professionals to provide routine weight management counseling to patients with obesity, as long as they receive high quality training in this area.

T-2052-P: Comparison of Maximal Oxygen Uptake between Whole Body and Cart Calorimetry

Christopher P. Bock; Erica Wohlers-Kariesch, BS; Jon Moon, PhD; Steven R. Smith, MD, FTOS;
Background

Maximal oxygen uptake tests (VO2 max) define fitness and cardiovascular health. However, results often rely on VO2 peak due to an inability for the subject to achieve a true VO2 max plateau. We propose using a Whole Body Calorimeter (WBC) to increase accuracy and repeatability of VO2 max testing.

Methods

VO2 max tests were conducted using a TrueOne2400 metabolic cart (ParvoMedics). Data collected from the cart test were used to create a maximal oxygen uptake test profile for infusion to a small room calorimeter (5400 L). Infusions were prepared by a traceable gas blender programmed to reproduce the VO2 and VCO2 measurements observed during the cart test. The WBC was operated in a push configuration with an inflow rate of 100 L/min to maximize the change in gas concentrations, while mitigating the rise of CO2. Infusions simulated a test with a VO2 peak (qualified max based on: HR, RER, VO2) and a test with a true VO2 max plateau with infusion rates determining the expected max, 2242 ml/min.

Results

The traceable blender infusions provided a repeatable method to test the WBC with expected max VO2 CV of 0.04% for peak and max infusion. The total VO2 peak infusion profile proved repeatable, CV 3.12%, but measured VO2 did not reach the expected max, the average VO2 peaked at 2120 ml/min (-5.54% error, 95% CI -254 to 5). The VO2 with plateau infusion also was repeatable, with CV 4.0%, and the plateau allowed for the infused gas to register with an average VO2 max of 2240 ml/min (-0.04% error, 95% CI -197 to 195).

Conclusions

A Whole Body Calorimeter has the necessary resolution to capture VO2 max. VO2 peak data is lower than expected VO2 but the tradeoff for the rapid response of the breath by breath cart measurement is a free breathing test that will result in a larger percentage of true VO2 max plateaus.

T-2054-P: Effectors of Body Composition and Weight Gain Among BRCA Mutation Cancer Survivors
Aileen Caceres, MD; Olga Ivanov, MD; Cynthia K. Buffington, PhD;

Background

Weight gain post-diagnosis breast cancer increases the risk for disease relapse and may result from adverse changes in body composition. We have examined the association between body composition and self-reported weight gain among BRCA mutation cancer survivors and identified potential effectors.

Methods

The population included 37 BRCA mutation cancer survivors, 45 BRCA mutation previvors, and 26 controls. Anthropometric measurements were weight, body mass index (BMI), and body composition (bioelectric impedance). Potential effectors of anthropometrics included physical activity (General Practice Questionnaire), sleep, diet, quality of life (QoL; RAND-36), and anxiety (Beck).

Results

We found no significant differences in BMI between survivors, previvors and controls (26±2, 25±1, 25±1, respectively). However, % lean mass was significantly lower and % fat mass significantly higher for survivors than for previvors or controls (p=0.0005). Body composition was an independent predictor of self-reported weight gain (r=0.86, p<0.001). Body composition measures were significantly (p<0.001) correlated to levels of physical activity and physical QoL but not to other potential effectors (psychological status, diet or sleep).

Conclusions

Low physical activity and function contribute significantly to post-diagnosis cancer weight gain for BRCA mutation carriers.

T-2055-P: Effect of Obesity on Outcomes of Minimally Invasive Hysterectomy

Karen Wiercinski, RN, BSN; Aileen Caceres, MD; Cynthia K. Buffington, PhD;

Background

Systematic reviews and database analyses find obesity adversely affects surgical outcomes with total abdominal hysterectomy performed via laparotomy. We have examined the effects of obesity on the outcomes of minimally invasive total hysterectomy, conventional and robot-assisted laparoscopy.

Methods
A 3-year retrospective review was conducted on 150 women (82 non-obese; 68 obese) who underwent total hysterectomy by minimally invasive procedures. Patient demographics, health status, surgical indications for hysterectomy, and operative outcomes (estimated blood loss, operative time, complications, length of stay, postoperative pain medication) were evaluated.

**Results**

Preoperatively, the obese vs. non-obese had a higher number of health-related co-morbidities but no differences in surgery indications for hysterectomy. Obesity had no significant impact on surgical outcomes of total hysterectomy by minimally invasive surgery, although clinical outcomes did significantly differ (p<0.05) with regard to surgical approach, i.e. lower estimated blood loss and pain medication and higher operative times for robotic-assisted vs. conventional laparoscopy.

**Conclusions**

The study findings suggest that obesity has no adverse effects on total hysterectomy when performed with minimally invasive procedures.

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**T-2056-P_DT: The Veterans Health Administration (VHA) Telephone Lifestyle Coaching (TLC) Pilot for Weight Loss: Treatment Engagement and Outcomes.**

*Jennifer Lovejoy, PhD; Sophia Hurley, MSPT; Terry Bush; Rachel Urrutia, MD, MS; Trang Lance, MPH; Linda Kinsinger, MD, MPH;*

**Background**

There is a significant burden of obesity among Veterans enrolled in Veterans Health Administration (VHA). To increase options for weight management care, VHA conducted a pilot for telephone lifestyle coaching (TLC) in 24 health care facilities.

**Methods**

TLC was a telephone-based, multi-behavior coaching intervention consisting of 9 calls with trained lifestyle coaches over 6 months to which Veterans desiring assistance with weight management could be referred by physicians. Of 9357 referrals, 5321 (57%) enrolled, and 55% chose to work on weight loss. Participants were predominantly male (84%), aged 51-70 (66%) and Caucasian (69%); 25% were overweight, 62% obese, 93% had chronic health conditions (hypertension (62%), high cholesterol (53%), diabetes (35%), sleep apnea (32%), mental health conditions (52%).
Results

Call engagement was high with 43% completing >= 7 calls. At 6 months follow-up, 45% maintained or lost <= 5% of their body weight; 19% lost between 5% and 10%; 5.3% lost >= 10%; 35% improved min/week of physical activity by one category or more, and 31% increased their fruit and vegetable intake one category or more. Over 95% were satisfied with the program and would recommend TLC to others. Additional analyses of predictors of engagement and outcomes will be presented.

Conclusions

Provider referrals, treatment engagement, and satisfaction were high. A 9-call health coaching program produced meaningful weight loss in a Veteran population. Dissemination of this low cost, convenient and effective program could reduce obesity related health risks and greatly improve the health.

T-2057-P: Next Steps: A Pilot Study of Innovative Lifestyle Modification for Midlife Women

Meghan L. Butryn, PhD; Danielle Arigo, PhD; Greer Raggio, MS, MPH; Marie Colasanti, BA; Emilie Pinkasavage, HS; Evan M. Forman, PhD;

Background

Self-monitoring and social connectivity enhancements have the potential to promote behavior change in lifestyle modification (LM) programs and facilitate long-term adherence to PA and weight control goals when face-to-face treatment contact occurs infrequently.

Methods

This pilot study was designed to test whether sedentary women (n=38, Mage = 54.4 years, MBMI = 33.9 kg/m2) in an enhanced LM program would increase moderate-to-vigorous PA (MVPA) and sustain PA changes during a period of reduced in-person contact. Group meetings were held weekly during months 1-3 (Phase I) and two booster sessions were held during months 4-6 (Phase II). Self-monitoring was enhanced with use of an Internet-connected PA sensor. Social connectivity was enhanced by promoting contact among participants outside of group, including in an Internet Community forum, which illustrated group members’ PA progress. Change in PA was measured with ActiGraph GT3X accelerometers.

Results

Participants increased MVPA from 24.5 to 101.4 min/wk during Phase I (p < 0.01) and maintained this improvement at the end of Phase II (113.8 min/wk). Self-reported increases in social support during Phase I predicted better PA maintenance during Phase II (ps < 0.05). Consistent with program goals, participants achieved modest weight loss in Phase I (M = 4.4 kg) and avoided weight regain in Phase II. Treatment was
received favorably, and use of the PA self-monitoring and social connectivity features was high during both phases of treatment.

Conclusions

These pilot data demonstrate the feasibility and effectiveness of enhancing self-monitoring and social connectivity in LM. Participants were successful in substantially increasing and sustaining MVPA, achieving modest weight loss, and avoiding weight regain.

T-2058-P: Association between Body Image and Weight Loss in Adult Patients with Obesity

Thomas D. Byard, BS, MS; Renee J. Rogers, PhD; John M. Jakicic, PhD;

Background

There is variability in the weight loss achieved with behavior interventions. It is important to identify factors that may contribute to this variability and provide intervention targets. This study examined whether perceptions of body image were associated with change in body weight in adults.

Methods

Participants (N=154; age: 37.5±5.7 years; BMI: 32.7±4.1 kg/m2) engaged in a 6 month behavioral weight loss intervention. This included weekly group sessions, and a prescribed energy restricted diet with increased physical activity. Assessments of weight and body image were completed at baseline and 6 months. Body image was assessed using the Multidimensional Body-Self Relations Questionnaire, with standard orientation (value or investment placed on an item) and evaluation subscales computed.

Results

Weight loss was 8.6±4.7 kg. Baseline illness orientation (r=0.16, p=0.04) and overweight preoccupation (r=0.17, p=0.04) were associated with weight loss. Weight loss was associated with changes in weight satisfaction (r=0.28, p=0.001), health orientation (r=0.18, p=0.03), fitness orientation (r=0.31, p<0.001), and appearance evaluation (r=0.40, p<0.001). Regression showed that change in appearance evaluation and fitness orientation were predictors of weight loss (R-square=0.20, p<0.001).

Conclusions

Components of body image are associated with improved weight loss. Emphasizing the value of fitness and physical activity (fitness orientation), which are components that can be modified by interventions, may improve weight loss in patients seeking treatment for overweight and obesity.

Kelly M. Carpenter, PhD; Jennifer Lovejoy, PhD; Liz Kellogg, MPH;

Background

Psychological stress has been implicated in weight gain, poor compliance with weight loss programs, and failure to maintain weight loss.

Methods

We conducted semi-structured telephone interviews with 25 participants who recently completed an employer-sponsored weight loss program. Participants were included if they scored >=5 on the internal disinhibition subscale of the Eating Inventory, indicating high rates of eating in response to stress or emotion. Interviews included questions regarding impact of stress on eating and weight loss efforts, the impact of weight loss on stress levels and methods of managing stress. Participants (20 women, 5 men) had a mean age of 43 yr (s.d. = 10.5; range 25-64 yrs) and starting BMI of 31.5 kg/m2 (s.d. = 2.1).

Results

Participants described stress as impacting eating and weight loss efforts and cited a range of emotions as triggers for eating, with 'frustrated' and 'anxious/worried' being the most frequent. Most participants (80%) reported that eating did not improve their mood or described a brief improvement in mood, followed by guilt or anger. About 50% stated that trying to lose weight increased their stress level and most participants cited at least one weight loss task that was particularly stressful.

Conclusions

Individuals who recently completed a weight loss program recognize the impact of stress on their eating patterns, but struggle to cope with stress in healthy ways. A weight loss program that specifically addresses stress and emotional eating may be helpful to many obese individuals.

T-2060-P: Effect of Sit-Stand Workstations on Cardiometabolic Risk in Sedentary Office Workers: A Pilot Study
Background

Excessive sedentary time may have independent deleterious effects on health. Today's workforce spends most of the time sitting, thus making the workplace an ideal intervention site. The purpose of this study was to evaluate the effect of sit-stand workstations on cardiometabolic risk.

Methods

Sedentary office workers (ages 23-64; BMI=27.0±6.2 kg/m2) were recruited from two Minneapolis offices and randomly assigned to one of four intervention groups for 6-months: 1) Control group, 2) Stand group (standing at work ≥50% of the workday using a sit-stand workstation), 3) Move group (accruing ≥30 min of light and moderate activity during the workday), or 4) Stand + Move. Outcomes were resting systolic (SBP) and diastolic (DBP) blood pressure, fasting blood glucose (BG), HDL-cholesterol, and triglycerides measured at baseline and 6 months. Blood pressure was assessed in all participants (n=75), while glucose and lipids were measured at one worksite (n=37).

Results

There were no significant changes in body weight. SBP (x±se=-5.1±2.78 mm Hg, p=.03) and DBP (-2.8±1.67, p=.10) decreased only in the Stand + Move group. BG and triglycerides decreased and HDL-C increased in the Stand + Move Group, but not with statistical significance given the low sample size.

Conclusions

Sit-stand workstations, in combination with an intervention to increase physical activity at work, may be an effective tool to improve cardiometabolic risk.

T-2061-P: Weight Change with Implementation of Preventive Vital Signs

Isaac Chambers, MD; Justin Moore, MD; Frank Dong, PhD; Elizabeth Ablah, PhD, MPH;

Background

More than two thirds of U.S. adults are overweight or obese. Low levels of fruit and vegetable (F/V) consumption and physical activity (PA) are two risk behaviors. However, most outpatient health care settings do not have mechanisms in place to routinely encourage these patients on their F/V and PA.

Methods
A retrospective chart review identified overweight and obese patients who visited an outpatient clinic between January 1, 2010 and December 31, 2012. Starting January 2010, patients who visited the University of Kansas School of Medicine-Wichita (KUSM-W) Cypress clinic were reminded about their fruit and vegetable consumption, physical activity, and smoking status at each outpatient visit ('preventive vital signs' [PVS]) by the nurses. A cohort of 125 patients was compared to an age and sex-matched cohort of 125 patients from the KUSM-W Midtown clinic that was not exposed to PVS.

**Results**

The cohorts were predominantly female participants (62.4%) and Caucasian (50.4%). More participants with diabetes mellitus were included in the PVS cohort than in controls (40% vs. 19.2%, respectively; P=0.0003). Though baseline weights were similar between the two cohorts (99.12 ± 25.63 and 98.95±25.60 kg, respectively; P=0.9570), after a mean of 33 months follow up over a mean of nine visits, weight change and BMI change did not differ between groups.

**Conclusions**

Use of preventive vital signs was not associated with weight reduction in an outpatient clinic.

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**T-2062-P_DT: Associations of Gestational Weight Gain with Postpartum Weight Change among African American Women.**

*Camille R. Schneider, RD; Joseph R. Biggio, MD; Paula C. Chandler-laney, PhD;*

**Background**

Excess gestational weight gain (GWG) is associated with postpartum (PP) weight retention and may contribute to obesity. Existing research often fails to distinguish weight retention from weight accrual. We tested the hypothesis that women with excess, versus appropriate, GWG, would gain weight PP.

**Methods**

Participants (N=33) were healthy African American women enrolled in a study investigating early life origins of childhood obesity. Body mass index (BMI) from early pregnancy and GWG were calculated using data retrieved from prenatal medical records. Women were stratified according to the 2009 Institute of Medicine (IOM) recommendations for GWG. Investigators measured body weight at 2-weeks and 3-months PP, with the difference reflecting PP weight change. Analysis of covariance was used to examine whether women with excess GWG gained more weight PP than did those who met or failed to meet IOM recommendations, and whether this association was independent of early pregnancy BMI.
Results

42% of this cohort gained at least 1kg from 2-weeks to 3-months PP. A group difference in PP weight change was found ($P<0.001$), but contrary to the hypothesis, those with excess GWG did not differ from those that gained appropriately. Instead, women who failed to meet IOM recommendations gained an average of 3kg PP, compared to an average loss of 1.9kg among those who met the IOM recommendations ($P<0.05$). When adjusted for early pregnancy BMI, the group difference weakened ($P=0.07$), and BMI itself was associated with PP weight change ($P<0.01$).

Conclusions

If replicated in a larger cohort, these results suggest that interventions to prevent PP weight gain may be needed, particularly among women who enter pregnancy in an overweight or obese state and who fail to gain weight appropriately during the pregnancy.

T-2063-P: Processes Associated with Success in Lifestyle Modification Programs

Marie Colasanti; Danielle Arigo, PhD; Emilie Pinkasavage, HS; Greer Raggio, MPH; Evan Forman, PhD; Meghan L. Butryn, PhD;

Background

Participants in lifestyle modification (LM) programs designed for weight control and physical activity show varied response to treatment and mechanisms of change are not well understood. Evidence points to mindfulness-related skills and social support as components that may be especially effective.

Methods

The present study enrolled overweight, sedentary women ($n=30$, $Mage=54$ years) in a 6-month LM program that employed (1) standard behavioral skills such as self-monitoring and planning, (2) mindfulness-related psychological skills (e.g. acceptance of uncomfortable internal experiences), and (3) strategies for increasing social support. Weight, physical activity (PA), and process variables were assessed at baseline (BL), mid-treatment (MT), and end-of-treatment (EOT).

Results

Perceived barriers to PA decreased from BL to EOT, including lack of willpower, skills, and resources ($ps<.03$, $ds>=.40$). Acceptance of PA-related discomfort and ability to separate from internal experiences (defusion) also showed noteworthy increases ($ps<.13$, $ds >=.34$). Increases in mindfulness from BL to MT were associated with larger weight losses during that interval ($R=.42$, $p=.03$). Improvement in social
support from BL to MT also predicted increased PA ($p = .03$, $d = 1.32$) and weight loss (marginal; $p = .07$, $d = .93$) from MT to EOT.

Conclusions

These findings highlight acceptance, mindfulness, defusion and social support as processes relevant to success in LM programs. Greater emphasis on these processes in LM programs may increase their effectiveness.

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**T-2064-P: Effectiveness of the Medifast 5&2&2 Meal Replacement Plan for Weight Loss in Obese Adults: A Systemic Retrospective Chart Review of 19 Medifast Weight Control Centers (MWCC)**

*Christopher Coleman, MS, RD; Jessica Kiel, RD; Kevin Davis, CCRP; Andrea Mitola, PhD; Linda Arterburn, PhD; Janice Langford, RN;*

**Background**

A chart review was performed to evaluate the effectiveness of the Medifast 5&2&2 Plan on body weight (wt) and cardiometabolic parameters in obese adults. This plan is often recommended for people that are >100 lbs overweight or who have class III obesity (BMI $\geq$ 40 kg/m$^2$).

**Methods**

Charts from adults $\geq$ 18 years who signed a research consent form, had a BMI $\geq$ 25 kg/m$^2$ and used the Medifast 5&2&2 Plan between January 2012 and March 2014 were reviewed. The Medifast 5&2&2 Plan consists of 5 portion-controlled meal replacements, 2 self-prepared meals, 2 healthy snacks, and provides a total of 1200-1400 kcals daily. Body weight and composition, systolic and diastolic blood pressure (SBP, DBP), and pulse were collected at multiple time points between 1 and 24 weeks (wks). The primary endpoint was weight change at 12 wks. A completers analysis was performed using nonparametric paired Wilcoxon signed rank tests to examine change from baseline.

**Results**

62 charts (56.5% male, 46.8+13.7 yrs, BMI 48.7+9.9 kg/m$^2$, 82.3% class III obesity) were assessed. Significant ($p = .001$) wt loss occurred at all times (-29.3+14.2 lbs ($n=32$) at 12 wks and -45.5+25.2 lbs ($n=15$) at 24 wks). Fat mass loss exceeded lean mass loss by 2-4-fold at all times. By wk 12, 78.1% and
43.8% achieved clinically significant wt loss of 5% and 10%, respectively. Both SPB and DBP were significantly (p<0.05) lower by 4 wks and at all times thereafter (12 wk SBP -19.9+-16.4 mmHg; DBP -9.1+-7.9). Pulse reductions were not significant.

Conclusions

The Medifast 5&2&2 plan administered through MWCCs, used often in those with class III obesity, is effective for weight loss and improvements in cardiometabolic risk factors while preserving lean mass.

T-2065-P: Making Signal Out of Noise: Variability and Linearity in Weekly Weight Change during a 15-Week Weight Loss Program

Sandra Coulon; Jason E. Chapman, PhD; Janet Lydecker, M.S.; Joshua Brown, PhD; Robert J. Malcolm, MD; Patrick M. O’Neil, PhD;

Background

Weight loss is typically described with a single net change value, averaged across patients. This implies a uniform and linear pattern of change within and across individuals. We tested this by assessing variability in week-to-week weight changes and trajectories in a weight loss program.

Methods

Archival data for adults who completed a 15-week lifestyle-change program were used (N=690; 79% female; Mean start weight=101.9 kg, SD=23), with % weight change from baseline measured weekly (Mean total weight loss=10.1%; SD=4.35). For each subject, we calculated variability indices in week-to-week weight change including the standard deviation of the individual's weekly changes (SDi) and the number of weeks with weight gains. Growth models quantified linearity and variability using random slope estimates.

Results

Mean SDi for week-to-week changes was 1.54% (SD=.89); range=0.03-5.96%. Mean # weeks with gains was 2.00 (SD=1.52); range=0-7. Even among 65 subjects with near-identical final losses (10% +/- 0.50), weekly variability was large (Mean SDi=1.37, SD=.74; range=0.30-3.47%). Individual differences accounted for 27% of variability in weight change patterns, with significant variation in slopes across subjects. Weight loss was best characterized by a quadratic pattern with rapid initial reductions.

Conclusions
Individuals vary greatly in their consistency and pace of weight loss, even with similar final weight losses. The variability and slope of each individual's weight loss trajectory may represent useful 'signals' in their own right, as subject characteristics or outcome measures.

T-2066-P: Six Days of 30% Energy Restriction via Selective Reduction of Dietary Carbohydrate versus Fat does not Influence Subsequent Ad Libitum Energy or Macronutrient Intake

Amber B. Courville, PhD, RD, CSSD; Carla Prado, PhD; Stephanie Goodwin, PhD, MPH, RD; Shanna B. Bernstein, MPH, RDN, CDE; Laura Gorman, MS; Kevin Hall, PhD;

Background

Restriction of dietary fat versus carbohydrates may differentially influence hunger, satiety and food preference. Therefore, we hypothesized that subsequent to controlled feeding of diets selectively reduced in carbohydrate versus fat, less energy and more carbohydrates would be consumed ad libitum.

Methods

Seventeen (53% female) adults with mean (±SD) age of 34 ± 2 years and BMI of 36.3 ± 1.2 kg/m2 consumed eucaloric metabolic diets consisting of 15% protein, 35% fat and 50% carbohydrate for 7 days, the last 5 days as inpatients on a metabolic ward. They then switched to a 30% reduced energy diet achieved solely by restriction of either fats (RF) or carbohydrates (RC). After 6 days on each energy reduced diet, participants were given 3 days of unlimited, 24 hour access to a vending machine containing typical breakfast, lunch, dinner and snack items (>10,000 kcal/d). Each subject completed both RF and RC diets and subsequent ad libitum intake in random order with a washout period of 2-4 weeks.

Results

On the ad libitum diets, participants consumed 3264 ± 1234 kcal/d which was 21± 2.6% in excess of their eucaloric energy intake of 2694 ± 474 kcal/d (p<0.01). Average ad libitum energy intake did not differ subsequent to the RC vs. RF diets (3225 ± 1335 kcal/d vs. 3303 ± 1250 kcal/d, respectively). The proportion of macronutrients consumed ad libitum also did not differ between the RC and RF diets (16.5 ± 3.3 vs. 15.9 ± 3.7% protein, 39.4 ± 5.6 vs. 39.1 ± 3.5% fat, and 44.1 ± 5.2 vs. 45.1 ± 4.1% carbohydrate, respectively).

Conclusions
Six days of selective reduction of dietary carbohydrate versus fat did not influence subsequent energy intake or selection of macronutrients on an *ad libitum* diet from a computerized vending machine.

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**T-2067-P: Weight Loss is Associated with Dose and Types of Physical Activity**

*Seth Creasy, MS; Renee J. Rogers, PhD; John M. Jakicic, PhD;*

**Background**

Physical activity is important for weight loss and other health outcomes. This analysis examined the relationship of total physical activity (TPA), sport, fitness, recreational activity (SFR), and walking with weight loss and fitness during a 12 month weight loss intervention.

**Methods**

Participants were 83 adults (age=37.5+/-6.1 yrs; BMI: 32.5+/-4.4 kg/m2) who completed a 12 month behavioral weight loss intervention. Participants received weekly contact that included a combination of group sessions and brief telephone calls, and were prescribed a calorie restricted diet and increased physical activity. Assessments were conducted at 0 and 12 months. Physical activity was measured using the Paffenbarger Questionnaire, which estimated energy expenditure for TPA, walking, and SFR. Fitness was assessed with a submax graded exercise test. Subjects were grouped based on weight loss at 12 months as <5% (WL<5%, N=27), 5 to <10% (WL5%, N=16), and >10% (WL>10%, N=40).

**Results**

Weight loss was different between WL10% (16.8+/-5.2 kg), WL5% (8.1+/-1.3 kg), WL<5% (1.3+/-3.2 kg) (p<0.001). Change in TPA (kcal/wk) was different across groups (WL10%=1401+/-1354; WL5%=1231+/-745; WL<5%=397+/-980) (p=0.002). Change in walking (kcal/wk) was different across groups (WL10%=949+/-1142; WL5%=826+/-837; WL<5%=331+/-884) (p=0.034). Change in SFR was not significantly different between groups. Change in fitness (N=81) was associated with change in TPA (r=.26, p=.019) but not with walking or SFR.

**Conclusions**

TPA is associated with 12 month weight loss and improved fitness. Walking is also associated with weight loss but not fitness, with SFR not significantly contributing to weight loss or change in fitness. Thus, interventions should focus on total physical activity and walking to enhance weight loss.
T-2068-P: The Influence of Dietary Restraint, Disinhibition and Physical Activity on 18 Month Weight Loss

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Background

Dietary restraint and disinhibition are associated with weight loss in behavioral weight loss interventions (BWLI). Physical activity (PA) is associated with weight loss, and may be associated with restraint and disinhibition. The combination of these factors on weight loss warrants investigation.

Methods

This study examined the role of constructs of eating behavior (restraint and disinhibition) and moderate-to-vigorous PA (MVPA) on weight loss. Subjects (n=221; 42.8+9.2 years; BMI=32.7kg/m2+3.6) engaged in an 18-month BWLI that included decreasing energy intake to 1200-1500 kcal/d and progressing PA to 300 min/wk. Weight, Restraint (total (TR), flexible (FR), rigid (RR)), Disinhibition (total (TD), internal (ID), external (ED)) and MVPA were assessed at 0 and 18 months. Restraint and Disinhibition were measured by the Three-Factor Eating Questionnaire (TFEQ). Objective MVPA was assessed by the SenseWear Pro ArmbandTM (defined as bouts >10 min in duration and >3.0 METs).

Results

Spearman's correlations showed 18-month weight change (-8.1+8.5 kg) was associated with changes in TR(r=-.39),FR(r=-.37),RR(r=-.28),TD(r=.35),ID(r=.35),and ED(r=.23)(\(\text{P}<0.0001\)). Regression (controlled for demographics) revealed change in TR and MVPA predicted weight loss (R2=.36,P<0.001), and that FR and MVPA, but not RR, predicted weight loss (R2=.35,P<0.001). Regression revealed TD and MVPA predicted weight loss (R2=.36,P<0.001), and that ID and MVPA, but not ED, predicted weight loss (R2=.37,P<0.001).

Conclusions

Interventions focused on strategies to change both FR and ID, in combination with MVPA, may improve weight loss. Additional research is necessary to distinguish the fundamental relationships between eating behaviors, physical activity, and weight loss in overweight and obese adults.
T-2069-P: A Randomized Controlled Trial Examining Expectancy Effects on the Accuracy of Weight Measurement

Gareth R. Dutton, PhD; Kevin R. Fontaine, PhD; Amy S. Thomas, MPH, RD; John A. Dawson, PhD; Patrice L. Capers, PhD; David B. Allison, PhD;

Background

It is known that researchers' and participants' expectations can influence treatment response. However, less is known about the effects of researchers' expectations on the accuracy of data collection in the context of a weight loss trial.

Methods

Students from the University of Alabama at Birmingham were recruited to weigh individuals who they thought were completing a 12-month weight loss trial but were in fact actors playing these roles. Prior to data collection, student raters were provided information suggesting that the tested treatment had been effective. They then each received a list of 9-10 'participants' to weigh. While the list identified each person as a 'treatment' or a 'control', these labels were randomly assigned. It was hypothesized that raters would underestimate weights of 'treatment participants' and overestimate weights of 'control participants'.

Results

Contrary to the initial hypothesis, the student raters recorded weights that were 0.293 kilograms heavier when weighing 'treatment' versus 'control' participants; this difference was not statistically significant from zero (p=0.175). Funding: P30DK056336, K23DK081607, T32HL072757, K12GM088010.

Conclusions

This pilot study found no evidence that manipulating expectancies about treatment efficacy or unblinding raters biased weight measurements. Future work should examine measurement bias among the research staff who implement weight loss trials.

T-2070-P: Primary Care Providers' Attitudes About Use of Electronic Health Records for Addressing Overweight and Obesity
Background

Background: Primary care providers often fail to identify overweight or obese patients or counsel them about weight loss. Electronic health records (EHRs) could assist providers with diagnosis and management of overweight and obesity.

Methods

Methods: We conducted a cluster-randomized controlled trial in primary care practices at Brigham and Women's Hospital. We developed several new EHR features, including reminders and clinical decision support, to help primary care providers address overweight and obesity. We randomized 23 clinics to have access to the new features (intervention group) or not (control group). We sent a web-based survey to 174 providers in these clinics to assess their attitudes about the features, and 86 providers completed it (response rate = 49.4%). We also conducted phone interviews with 10 providers in the intervention group who expressed interest on the survey.

Results

Results: Although 81.6% of providers in the intervention group and 73.0% in the control group were confident in their ability to counsel patients about weight management (p=0.63), most providers wanted more help creating weight loss plans for their patients (77.6% and 89.2% in the intervention and control groups, respectively, p=0.22). Among intervention providers, 28.6% reported that the recommendations about management of overweight and obesity were useful, and 14.3% felt that the new features improved the quality of care.

Conclusions

Conclusion: These findings suggest that primary care providers were not satisfied with the EHR features and felt that they did not fit well into their workflow. Further improvements are needed to help providers with the management of overweight and obesity.

T-2071-P: Effects of Almonds on Post-Lunch Cognitive Function in Overweight and Obese Adults

Jaapna Dhillon; Richard D. Mattes, PhD, RD;

Background
The post-lunch dip syndrome is a phenomenon of decreased cognitive performance in the early afternoon hours. This dip in cognitive performance may be particularly pronounced following high carbohydrate meals. The unique nutrient profile of almonds may lessen the post-lunch dip in cognitive function.

Methods

Overweight and obese adults (n=60, age: 18-60 yr, body mass index (BMI): 25-40 kg/m2) were randomly assigned to an almond-enriched high fat lunch (HFL) group (>55% energy from fat, n=28) or a high carbohydrate lunch (HCL) group (>85% energy from carbohydrates, n=32) to assess the post-lunch dip in cognitive function. The lunch comprised of 23-25% of daily energy intake of participants. The memory and attention domains of cognitive function were assessed immediately after lunch and 30 minutes after lunch consumption. The memory tests were adapted from the RBANS test. The 'd2' test of attention was used to assess concentration performance, qualitative performance and errors in attention.

Results

Memory, concentration performance and qualitative performance scores decreased 30 minutes after lunch consumption (p<0.05). Errors in attention increased 30 minutes after lunch consumption (p<0.05). The HFL group supplemented with almonds caused smaller declines in memory scores compared to the HCL group (p<0.05). Both lunch groups caused similar declines in attention.

Conclusions

Consumption of a midday meal caused a post-lunch dip leading to a decline in cognitive function in overweight and obese adults. Consumption of an almond-enriched high-fat lunch reduced the dip in memory. However, the macronutrient composition of the lunch did not affect the dip in attention.

T-2072-P: Results of 200 Ketogenic Feeding Tube Diet Patients in the USA

Oliver R. Di Pietro, MD; Eric C. Westman, MD, MHS; Ashley Nobili, BS;

Background

According to the US Department of Health and Human Services, 35.7% of adults and 17% of children in the USA are currently obese.

Methods

241 patients were administered a carbohydrate-free protein, fat and vitamin mixture ranging from 600 to 800 kcal/day which was administered via a pediatric feeding tube for 10 days as an outpatient.

Results
Mean BMI was 31.8 (range 21.3-54.3, SD=5.01). Mean age was 44.7 years (range 20-70 years) with an 83.1% female ratio and 65% Caucasian ratio. Mean duration of treatment was 8.7 days (range 2-13 days) with mild average discomfort (Mean=0.31, SD=0.31). Total weight loss (Mean=10.87lb, SD=4.44) correlated with duration of treatment [t(198)=18.24, p<.000] as well as ketone levels[t(197)= -18.63, p<.000].

**Conclusions**

The ketogenic feeding tube diet may be a viable treatment option for obesity. It may also be useful for rapid weight loss prior to bariatric surgery or to break through plateaus in patients undergoing lifestyle modification programs.

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**T-2073-P: Sleep-Timing Discrepancies and Light Exposure Are Not Associated with BMI in a Treatment-Seeking Overweight / Obese Population**

*Caroline Doyle, BA; Tricia Leahey, PhD; Chantelle Hart, PhD;*

**Background**

Disruption of circadian rhythms is linked to obesity. Studies have shown that a sleep timing construct--social jetlag--is positively associated with BMI, whereas daylight exposure may be negatively related. However, these associations have not been examined using an objective assessment of BMI.

**Methods**

Individuals seeking behavioral weight loss treatment had their height and weight measured. They completed the Munich Chronotype Questionnaire, which assesses both social jetlag, a quantification of the misalignment between our social (i.e. work/school) and biologically-based circadian sleep/wake schedules by calculating the difference in the midpoint of sleep on workdays and weekends, and daylight exposure (an important external cue that assists in maintaining synchronization of the circadian timing system). We hypothesized that increased social jet lag and decreased exposure to daylight would be associated with higher objectively assessed BMI.

**Results**

Participants (N=83; 85% female; BMI=32.7+-5.8; age=46+-9.4 years) completed data collection procedures at an academic medical center. Average social jetlag accrued between workdays and weekends was 58+-36 minutes. Average weekly daylight exposure was 8:19+-6:17 hours. Objectively assessed BMI was not associated with social jet lag or daylight exposure (r=-.025, p = .820; r=.085, p=.442).
Conclusions

Objectively measured BMI is not associated with discrepancies in sleep timing or weekly daylight exposure. Follow-up analyses will examine whether these factors impact weight loss outcomes.

T-2074-P: Diet Adherence Predicts Weight Loss Better than Individual Nutrigenomic Profile

Jeremy Egnatios; Karen A. Frankwich, MD; Mandy L. Kenyon, MS, RD, CSSD; Thomas R. Rutledge, PhD; Liao Patricia, MD; Amir Zarrinpar, MD PhD;

Background

Obesity is a heterogeneous disease with genetic and environmental factors. Despite many diet strategies, few patients achieve or sustain substantial weight loss. We evaluated the impact of nutrigenomics guided personalized dietary recommendations on Veterans entering a weight loss program (MOVE!).

Methods

This was a prospective, randomized controlled clinical trial of 46 obese Veterans enrolled in the MOVE! Program. Veterans received diet/lifestyle counseling and meal coupons for 8 weeks. They were assigned either to a diet (low carbohydrate, low fat, Mediterranean, or balanced) based on Nutrigenomic testing (GD group; Pathway Fit test) or to standard care (SC group). Weight loss and metabolic markers were assessed at week 0, 8, and 24. Adherence was measured with returned meal receipts for reimbursement. Nutrigenomic predictors of weight loss were assessed in post-hoc analyses.

Results

Compared to SC, the GD group had no difference in weight loss (4.3% vs. 4.4%, respectively), or metabolic biomarkers (e.g. HgbA1c, 0.06% vs. -0.05%, respectively) at 24 weeks. Adherence was the best predictor of percent weight loss (-4.6% vs. -1.6%, p<0.01). Participants matched to a balanced diet (BD) based on Nutrigenomics lost more weight compared to all others at 8 weeks (-5.0% vs. -2.9%, p<0.05), and continued to have lower BMI (-3.5 kg/m2 vs. -1.4 kg/m2, p<0.05) and waist circumference (-8.0 cm vs. -3.5 cm, p<0.05) at 24 weeks.

Conclusions

Adherence was the best predictor of weight loss. However, nutrigenomic testing identified the BD group who had a particularly strong response to lifestyle intervention. Hence, we postulate nutrigenomics can potentially predict which patients will respond to lifestyle modification.
T-2075-P: Evaluation of an Obesity Stigma Intervention in Reducing Implicit and Explicit Weight Bias

Danielle A. Gagne; Jillon S. Vander Wal, PhD; Kevin Wenzel, MS;

Background

Obesity stigma is a public health concern due to its deleterious effects on obese individuals. Few studies have developed effective weight bias-reduction interventions. We developed an intervention to reduce implicit and explicit weight bias modeled after a successful race-bias reduction intervention.

Methods

Using a randomized controlled design, 63 undergraduate students were randomly assigned to Intervention (n = 36) or Control (n = 27) groups. The intervention consisted of two study sessions with a two-week (Post-intervention) and four-week follow-up (Follow-up).

Results

At Post-intervention, the Intervention group significantly reduced their explicit weight bias (p<.05) and implicit bias on one measure of implicit bias (p<.05). No significant group differences on explicit measures were observed at Follow-up, but the Intervention group maintained their reduction on one measure of implicit bias (p<.05). Moreover, a significant interaction effect revealed that men in the Intervention group reduced their scores on explicit weight bias when compared to Control group men (p<.05).

Conclusions

This weight-bias reduction intervention shows promise in reducing the explicit and implicit weight bias of undergraduate students. Our results also suggest that men and women may respond differently to this type of intervention, thus identifying a rich area of inquiry for future researchers.

T-2076-P: Adherence and Differentiation Issues with Low-Fat vs. Low-Carb Weight Loss Diets â€œ‘Limbo-Titrates’ Quality
Christopher D. Gardner, PhD; Jennifer Hartle, DrPH; Lisa Offringa, PhD; Kristopher I. Kapphahn, MS;Michael Stanton, PhD; Rise Cherin, MS, RD;

Background

Effectively contrasting different weight loss diets in human trials requires achieving adequate adherence and diet differentiation. Many weight loss diet studies suffer from poor initial treatment fidelity compounded by extensive recidivism. Addressing this was an objective of the current trial.

Methods

Generally healthy, non-diabetic, BMI 28-40, adults (n=61) were randomized to Low-Fat or Low-Carb diets for 6m (Phase I), then switched to the other diet for 6m (Phase II). Diet instruction was provided in 14 class-based sessions. Initial goal was to reach 20g fat or carbs within 8 wks (LIMBO) with no specific caloric restriction. After anchoring at these low levels, participants were allowed to add fat or carbs back in 5g/day increments (TITRATE) until a level was achieved that could become their new habitual diet. Overall dietary QUALITY was heavily promoted - both high quality fat and high quality carb food sources, on both diets. Diet was assessed by 3 unannounced 24hr recalls per timepoint.

Results

Forty-nine participants completed both phases. Reported average proportions (%) of energy intake at baseline were 43:37:20 for %carbs; %fat; %protein; 2,060 ± 735 Kcal (mean ± SD). 

<table>
<thead>
<tr>
<th></th>
<th>End of Phase I (6m)</th>
<th>End of Phase II (12m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low-Fat</td>
<td>57:21:22 (1,549 ± 509 Kcal)</td>
<td>52:27:21 (1,497 ± 380 Kcal)</td>
</tr>
<tr>
<td>Low-Carb</td>
<td>22:53:25 (1,481 ± 653 Kcal)</td>
<td>28:46:26 (1,538 ± 900 Kcal)</td>
</tr>
</tbody>
</table>

Groups switched diets

The 3m & 9m diet results were similar to 6m & 12m.

Conclusions

Free-living participants were able to achieve substantial shifts in fat and carb intakes after 3 months of instruction, and sustain these through 6m. Several aspects of the LIMBO-TITRATE-QUALITY method to achieving meaningfully differentiated dietary changes may be useful in other human diet trials.

T-2077-P: Weight Loss on Low-Fat vs. Low-Carbohydrate Diets by Insulin Resistance Status among Overweight and Obese Adults: A Randomized Pilot Trial

Christopher D. Gardner, PhD; Lisa Offringa, PhD; Jennifer Hartle, DrPH; Kristopher I. Kapphahn, MS;

Background
Differential weight loss response to Low-Fat (LF) vs. Low-Carbohydrate (carb)(LC) diets by baseline insulin resistance status was examined. Emphasis was placed on achieving substantial differences in the relative proportions of fats vs. carbs, and on overall nutrition quality of both diets.

**Methods**

The study employed a 2 X 2 design: LF vs. LC diets, and more insulin sensitive (IS) vs. more insulin resistant (IR). Insulin resistance status was determined by OGTT area-under-the-curve (INS-AUC); above median = IR. Generally healthy, non-diabetic adults, with BMI 28-40 (n=61) were randomized to LF or LC, stratified by IR status. Diet instruction was provided in a class-based setting; 14 classes over 6 months (8 weekly, 4 bi-weekly, 2 monthly). The primary outcome was 6-month weight change; secondary outcomes included 6-month change in blood lipids, glucose and blood pressure. Dietary intake was assessed using 3 unannounced 24-hour recalls at baseline and 3 and 6 months using NDS-R.

**Results**

Baseline %carb: %fat: %protein was 43:37:20; 2,060 + - 735 Kcal (mean + SD). At 6m the LF group (IS & IR combined) reported 57:21:22 (1,549 + - 509 Kcal), and the LC group (IS & IR) reported 22:53:25 (1,481 + - 653 Kcal). 6m weight change was: IS IRLow-Fat -10.4 +- 7.8 kg -7.4 +- 6.0 kgLow-Carb -8.6 +- 5.6 kg -9.6 +- 6.6 kgNo significant main effects were detected by diet group or IR status; and no significant diet X IR interaction. Some significant changes in secondary outcomes were observed.

**Conclusions**

A significant interaction between LF & LC diets by IR status for weight loss was not detected. Opportunity to detect an interaction may have been diminished by the small sample size, the focus on high diet quality for both diet groups, and relatively high weight loss success for all four groups.

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**T-2078-P_DT: Reducing Waist Circumference among African Americans in the Fit Body and Soul Study**

*Jane T. T. Garvin, PhD, FNP-BC, RN; Lovoria B. Williams, PhD; Richard Sattin, MD; Stephen Looney, PhD;*

**Background**

African Americans have the highest rates of obesity. Waist circumference is one measure of obesity associated with developing Type 2 diabetes (T2DM). Adaptations of a Diabetes Prevention Program (DPP) including Group Lifestyle Balance (GLB) were effective in lowering T2DM risk.

**Methods**
Baseline, 12-week, and one-year data were collected from participants in the a single-blinded, cluster randomized trial in a Southeastern US community to test the effectiveness of Fit Body and Soul (FBAS), a faith-based adaptation of GLB versus a health education (HE) program among adults without diabetics in 20 African-American churches. Along with other variables, waist circumference was measured at three time points; changes in waist circumference were skewed and, therefore, were assessed using Mann-Whitney U tests.

**Results**

Of the 603 participants with waist circumference data, mean age was 47 years, 84% were female, 51% were college graduates, 52% were married, and 73% were employed full-time. At baseline, mean weight was 98.55 Å± 21.3 kg, BMI was 35.67 Å± 7.24 and waist circumference was 107.48 Å± 15.06 cm. Changes in waist circumference between baseline and 12 weeks and between baseline and one year differed significantly for FBAS compared to HE, p < .001 (mean Å± sd; -3.03 Å± 4.81cm FBAS vs -0.95 Å± 4.88cm HE; -2.36 Å± 6.46cm FBAS vs -0.06 Å± 6.27cm HE). Changes in waist circumference between 12 weeks and 1 year was not significantly different for the two groups, p = .89.

**Conclusions**

Our results show that a faith-based adaptation of the GLB among African Americans, FBAS, can lead to larger reduction in waist circumference than health education alone. The reduction in waist circumference with FBAS was less than in other community adaptations of the DPP/GLB that had a smaller percentage of African Americans.

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**T-2079-P: The Effect of Motivation and Partner Support Styles on Weight Loss Outcomes in a Self-Guided Program**

_Katelyn Gettens, Ms., B.A.; Amy Gorin, PhD; Erin M. Lenz; Ted Powers, PhD;

**Background**

The present study examined the effects of autonomous versus controlled self-regulation and autonomy versus directive support provided by family and friends of college students participating in a 6-week, self-guided weight loss program.

**Methods**

Participants at a large public university in the Northeast (N=39;18.7 1.1 years; 82.1% women, 69% White; BMI 27.4±3.8 kg/m2) enrolled in a 6-week intervention designed to help lose or maintain a healthy weight. Participants were instructed to set two weight loss goals, identify a supportive partner, and track goal progress weekly via online diary. At baseline and 6 weeks, participants completed inventories of self-regulation and support and were weighed. Analyses assessed whether autonomous and controlled self-regulation, support style, and confidence predicted weight outcomes.
Results

At program entry, participants reported higher levels of autonomous than controlled self-regulation (6.0+-0.8 vs.4.3+-1.3, p<.05) and higher levels of autonomy than directive support (6.3+-1.0 vs.5.2+-1.3, p<.05). Confidence to reach weight goals was correlated with both autonomous self-regulation (r=0.4, p<.05) and autonomy support (r=0.4, p<.05) but not controlled self-regulation or directive support. Regression analyses revealed that the 'personal health' autonomous self-regulation item best predicted 6-week weight loss (b=.27, t(32)=3.1, p<.05).

Conclusions

Wanting to lose weight for health reasons was associated with weight loss outcomes in young adults participating in a self-directed program. College students may benefit from maximizing autonomous motivations prior to embarking on weight loss to achieve self-selected weight management goals.

T-2080-P: Transcranial Direct Current Stimulation (TDCS) Over the Left Dorsolateral Prefrontal Cortex (DLPFC) Leads to Weight Loss and Decreased Fat Consumption in Obese Individuals

Marci Gluck, PhD; Colleen Venti, MS; Martin Reinhardt, MD; Irene Beck, PhD; Miguel Alonso-Alonso, MD; Eric M. Wassermann, MD; Susanne B. Votruba, PhD, RD; Jonathan Krakoff, MD;

Background

Anodal TDCS may increase prefrontal cortex activity, which is implicated in addictions and obesity. We compared energy intake (EI) and weight change in participants who received active (cathodal) vs. sham TDCS (study 1) and subsequent active (anodal) vs. sham TDCS (study 2) to the left DLPFC.

Methods

Nine (3m,6f) healthy obese volunteers (94Â±15kg [MÂ±SD]; 42Â±8 y) were admitted as inpatients for 9d. Study 1: following 3d of a weight-maintaining diet, participants received cathodal (2m,3f) or sham (1m,3f) TDCS (2mA, 40 min) on 3 consecutive mornings and then ate ad libitum from a computerized vending machine, which recorded EI. Weight was measured daily. Study 2: participants returned for a repeat study, maintaining original assignment to active (this time anodal) and sham. We compared differences in weight change and ad libitum EI (mean kcal/d, % weight maintaining energy needs [WMEN], macronutrient content) between: a) cathodal v. anodal conditions and b) sham v. sham conditions.
Results

Participants who received active TDCS tended to consume fewer kcal/d during anodal TDCS (p=0.076) and %WMEN (p=0.11). They also consumed significantly fewer kcal from soda (p=0.02) and fat (p=0.03). Those who received sham on both occasions had no difference in EI or macronutrient intake. At the end of the inpatient period, the anodal TDCS condition had a greater %weight loss (p=0.05) compared to the cathodal condition. There was no difference for those who received sham on both occasions.

Conclusions

In this cross-over study, individuals consumed less fat and a tendency toward fewer total calories during ad libitum EI after anodal v. cathodal TDCS, and lost more weight, indicating a role for the DLPFC in controlling EI and potential application of TDCS to facilitate weight loss.

T-2081-P: Frequency of Self-Weighing and Weight Loss Outcomes Within a Brief Lifestyle Intervention Targeting Young Adults

Jessica Gokee LaRose, PhD; Autumn Lanoye, BA; Rena Wing, PhD;

Background

Over 40% of 18-25 y/o are affected by overweight or obesity, yet they are all but absent from adult lifestyle interventions (LI). We recently tested a LI specifically for this age group; the goal of this analysis is to examine the relationship between self-weighing and weight loss in this trial.

Methods

Participants (N=52, 79% female, 54% minority, Age=22.3±2.0, BMI=34.2±5.4) were randomly assigned to one of three 3-month programs. The LI was developed based on extensive formative work; core intervention content and contact were the same across arms, while delivery format and emphasis on autonomy differed. Evidence on the benefits of self-weighing was presented and participants were encouraged to weigh at least weekly and no more than daily, but were allowed to choose their own self-weighing regimen. Frequency of weighing was assessed at baseline, post-treatment (3 months), and at 6 months after a no-treatment contact period. Data were pooled across arms and arm was included as a covariate.

Results
At baseline, most participants reported infrequent weighing; 42.3% less than monthly or never and 21.2% less than weekly. At post-treatment, 42.9% reported weekly, 31% several times a week, and 7.2% daily. Participants weighing several times a week or more achieved greater weight losses than those weighing weekly or less (5.8% vs. 2.9%, p=.034) and were more likely to achieve a clinically significant 5% weight loss (p=.005). Further, increases in weighing frequency predicted greater weight loss at post-treatment (p=.005) and follow up (p=.004).

Conclusions

In a brief LI designed specifically for 18-25 year olds, frequent self-weighing was associated with greater weight loss at post-treatment and follow up. Data are consistent with findings in adults and will be discussed in terms of treatment development for this high-risk and underserved population.

T-2082-P: Baseline Socio-Demographic, Anthropometric and Psychosocial Predictors of Attrition across Behavioral Weight-Loss Trials

Rachel W. Goode, MSW; Lei Ye, BMed; Susan M. Sereika, PhD; Yaguang Zheng; Cynthia Danford, PhD, CRNP; Sushama D. Acharya, PhD; Christopher Imes, PhD; Linda Ewing, PhD, RN; Juliet M. Mancino, MS, RDN; Lu Hu, MSN; Meghan Mattos, MSN RN; Yaguang E. Zhen

Background

Preventing attrition is a major concern in the conduct of randomized clinical trials (RCTs). The purpose of the study was to identify baseline factors associated with participant attrition in behavioral weight loss trials.

Methods

We analyzed data from three independent behavioral weight loss RCTs conducted over 10 years using multivariate logistic regression, and controlling for trial. Baseline measures included: body mass index (BMI) and subjective measures that included Barriers to Healthy Eating, Beck Depression Inventory-II (BDI), Hunger Satiety Scale (HSS), Binge Eating Scale (BES), Medical Outcome Study Short Form and Weight Efficacy Lifestyle Questionnaire. The sample (N = 504) was predominantly female (84.92%) and White (73.61%), with a mean BMI of 33.83±4.18kg/m2 and mean (+-SD) age of 47.35±9.75 years. Twenty percent of the sample (n=100) did not complete the final assessment (i.e. 'non-completers').

Results

Non-completers were younger (OR=0.95; 95% CI: 0.93, 0.98), completed less years of education (OR=0.90; 95% CI: 0.82, 0.98), less likely to have health insurance (OR=0.32; 95% CI: 0.11, 0.96) or had
a history of having lost 50 to 79 pounds (OR=0.52; 95% CI: 0.29, 0.95). Non-completers had a higher BMI (OR=1.11; 95% CI: 1.06, 1.18), higher BDI score (OR=1.05; 95% CI: 1.01, 1.09), higher BES score (OR=1.05, 95% CI: 1.02, 1.08), and lower HSS scores (OR=.93; 95% CI: .89, .98). BMI and BES scores were associated with attrition in all trials (ps<=.05).

Conclusions

Baseline demographics and responses to key measures revealed those at increased risk for withdrawing from the trials. Increased attention to individuals with similar profiles may help to reduce attrition.

T-2083-P: High Intensity Lifestyle Intervention and Use of Meal Replacements is Associated with Clinically Meaningful Weight Loss and Durable Weight Maintenance

Linda D. Gotthelf, PhD; Linda Grant, BS; Carol Addy, MD, MMSc;

Background

High-intensity lifestyle intervention (HILI) is critical for weight loss (WL) and weight maintenance (WM), regardless of whether other therapies are used. HILI is ideally delivered using a multidisciplinary team-based approach, but many healthcare settings are unable to deliver this type of care.

Methods

Retrospective study of patients with body mass index (BMI) >30 kg/m2 who voluntarily enrolled in an HMR program in a U.S.-based clinic. HMR provides HILI through weekly group sessions led by a health educator to achieve reduced calorie intake with meal replacements (MR), increased fruit/vegetable intake, and increased physical activity (PA; ≥2,000 kcal/week). Eligible patients had continuous participation in WL and WM phases of the program and completed a health risk assessment (HRA) at baseline and during WM. HRA assessment included body weight (BW), systolic (SBP) and diastolic blood pressure (DBP), lipids, fasting plasma glucose (FPG) and self-reported PA.

Results

721 patients (mean age 56.7 yrs) had mean initial BW (IBW) and baseline BMI of 115.4 kg and 39.1 kg/m2. Mean change in BW vs IBW was -18.9%. 81.7% of patients maintained weight loss of ≥10% of IBW (mean duration of WL+WM 107.6 weeks). There were decreases in total cholesterol/HDL (-11.8%), triglycerides (-26.6%), FPG (-9.2%), SBP and DBP (-6 mmHg and -4 mmHg) and discontinuation (%
patients) of oral anti-hyperglycemics (40.5%), insulin (35.5%), anti-hypertensives (36.2%) and anti-hyperlipidemics (23.3%). PA increased from 1009 to 2541 kcals/wk.

**Conclusions**

HILI and MR use results in clinically meaningful WL and durable WM and is associated with improved risk factors and decreased medication use. Intensive programs such as HMR should be considered as a treatment option for patients with obesity when other team-based HILI are not available.

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**T-2084-P: Beneficial Effects of High-Amylose Maize Resistant Starch (HAM-RS2) in Insulin-Resistant Women**

*Barbara A. Gower, PhD; Richard Bergman, PhD; Darko Stefanovski, PhD, MS; Betty Darnell, MS, RD; Fernando Ovalle, MD; Gordon Fisher, PhD; S. Katherine Sweatt, MAEd; Holly Resuehr, PhD; Christine Pelkman, PhD;*

**Background**

This study was designed to examine the effect of HAM-RS2 resistant starch on insulin sensitivity in women.

**Methods**

Participants were 40 healthy women (age 49.2 ± 12.7 yr; BMI 29.4 ± 6.4 kg/m2). The study was conducted using a randomized, placebo-controlled, double-blind cross-over design. HAM-RS2 (HI-MAIZE260 corn starch, Ingredion Incorporated, Bridgewater, NJ) was formulated into snack foods and tested at two doses, 15 and 30 g resistant starch per day. An isocaloric snack formulated with a highly-digestible waxy corn starch served as a control. Each arm was 4 weeks, with a 4-week wash-out period between. The main outcome was insulin sensitivity (SI) assessed at the end of each arm by Minimal Model. Data were analyzed by mixed-effects modeling, adjusting for covariates.

**Results**

Two Gaussian distributions for SI were identified, an insulin-resistant (IR) group (SI<7.9), and an insulin-sensitive (IS) group (SI≥7.9). No effect of HAM-RS2 on insulin sensitivity was observed among IS participants. Among IR participants, SI was on average 23% higher after the 30 g supplement when compared to the control (P=0.02). The 30g supplement had a larger beneficial effect in women with a greater waist circumference.

**Conclusions**
Among insulin-resistant women, consumption of 30 g/d HAM-RS2 improved insulin sensitivity by 23%. Because insulin resistance is a risk factor for diabetes, HAM-RS2 may be an appropriate dietary ingredient to reduce risk for diabetes in insulin-resistant women.

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**T-2085-P: Effectiveness of Commercial Weight Loss Meal Replacement Programs: An Updated Systematic Review**

*Kimberly Gudzune, MD MPH; Ruchi Doshi, BA; Ambereen Mehta, MD, MPH; Zoobia Chaudhry, MD; Jeanne M. Clark, MD;*

**Background**

Little evidence exists about the efficacy of commercial weight loss meal replacement (MR) programs. Our objective is to examine the weight loss outcomes and clinical benefits of commercial programs that use MR as compared to control or behavioral counseling among adults with overweight or obesity.

**Methods**

We searched MEDLINE from inception to March 2014 for randomized controlled trials of commercial MR programs (HMR, JennyCraig, Medifast, Nutrisystem, Optifast) versus control or behavioral counseling that were published in English. Two reviewers extracted information on study design, population characteristics, and outcomes (mean percent weight loss, systolic blood pressure (SBP), diastolic blood pressure (DBP), and fasting glucose). We synthesized the data qualitatively, and were unable to perform meta-analyses due to heterogeneity. From the 3,103 articles identified in our search, we included 7 trials.

**Results**

As compared to control, HMR achieves mean percent weight losses that are 11-13% greater and Nutrisystem achieves mean percent weight losses that are 5-7% greater at 3 months. Single trials examining Jenny Craig, Medifast, and Optifast reported mean percent weight losses of 8% (6 months), 6% (9 months), and 12% (7 months) greater than control, respectively. Nutrisystem lowers SBP up to 10 mmHg and DBP up to 5 mmHg more than control at 3 months. Single trials for HMR and Nutrisystem reported fasting glucose significantly lower than control.

**Conclusions**

HMR and Nutrisystem achieve greater weight loss and Nutrisystem achieves greater blood pressure reductions as compared to control; however, it is unclear whether these programs are superior to counseling. Scant evidence remains regarding comparative effectiveness of commercial weight loss MR programs.
**T-2086-P: Effectiveness of SlimFast: An Updated Systematic Review**

*Kimberly Gudzune, MD MPH; Ruchi Doshi, BA; Ambereen Mehta, MD, MPH; Zoobia Chaudhry, MD; Jeanne M. Clark, MD;*

**Background**

Scant evidence exists about the efficacy of commercial weight loss programs. Our objective is to compare the weight loss outcomes and clinical benefits of SlimFast (without additional support) to control or behavioral counseling among adults with overweight or obesity.

**Methods**

We searched MEDLINE from inception to March 2014 for randomized controlled trials of SlimFast versus control or counseling that were published in English. Two reviewers extracted information on study design, population characteristics, and outcomes (mean percent weight loss, systolic blood pressure (SBP), diastolic blood pressure (DBP), and fasting glucose). We synthesized the data qualitatively, and were unable to perform meta-analyses due to heterogeneity. From the 3,103 articles identified in our search, we included 8 trials.

**Results**

As compared to control, SlimFast achieves mean percent weight losses that are 6-9% greater at 6 months. Only one trial comparing SlimFast to control reported blood pressure and fasting glucose. As compared to behavioral counseling, SlimFast achieves mean percent weight losses that are up to 6% greater at 3 months and no difference at 12 months. SlimFast lowers SBP by 0.5-10 mmHg and DBP by 1.0-2.0 mmHg more than counseling at 3 months. SlimFast lowers fasting glucose up to 13.2 mg/dL more than counseling at 3 months.

**Conclusions**

SlimFast achieves greater weight loss and improved blood pressure outcomes as compared to behavioral counseling. Clinicians could consider integrating SlimFast into their weight loss counseling practices for patients with obesity.

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**T-2087-P: Quantification and Comparison of Long-Term Energy Intake**
Changes in the SOS and Look AHEAD Trials

Arjun Sanghvi, BS; Kevin D. Hall, PhD;

Background

A variety of behavioral and surgical interventions have been explored in their capacity to achieve long-term weight loss. Unfortunately, many studies have relied on self-report methods to measure the associated changes in energy intake (?EI) which are known to be inaccurate and imprecise.

Methods

We used a validated mathematical model to calculate mean ?EI over time in subjects who underwent gastric bypass surgery (GB, baseline N = 265) or participated in an intensive lifestyle intervention (ILI, baseline N = 2570) as part of the SOS or Look AHEAD trials, respectively. The only inputs to the model were mean body weight measurements taken over 15 years in the GB group and 8 years in the ILI group along with baseline demographics.

Results

The gastric bypass procedure produced larger decreases in mean ?EI than the lifestyle intervention at every point in time. Interestingly, both ?EI trajectories followed an exponential time course from a larger early effect (GB: -2245 kcal/d, ILI: -342 kcal/d) to a smaller persistent effect (GB: -639 kcal/d, ILI: -90 kcal/d). Furthermore, by the time maximum weight loss was achieved - at the end of year 1 in both groups - the initial reduction in ?EI had already waned considerably (GB: 55%, ILI: 52%).

Conclusions

We quantified the long-term ?EI changes during two disparate weight loss interventions. The typical weight loss, plateau, and regain pattern observed in both interventions was found to be associated with waning exponential time courses describing ?EI.

T-2088-P: Effect of a Behavioral Intervention on Weight Loss, Body Composition, Fitness and Physical Activity in Young Adults
Background

Overweight and obesity in young adulthood (age=18 to 35 years) has been increasing. Few studies have specifically examined the effect of a standard behavioral intervention on change in weight, body composition, fitness, and physical activity in this age group, which is the aim of this study.

Methods

Participants (N=470; median age: 30.6[IQR: 27.0, 33.5] years; median BMI: 30.9[IQR: 28.1, 34.1] kg/m2) were enrolled in a 6 month behavioral weight loss intervention. The intervention included weekly group sessions, a prescribed energy restricted diet and prescribed moderate-to-vigorous physical activity (MVPA). Assessments included weight, body composition by DXA, fitness by exercise test, and objective physical activity using a monitor. The monitor provided data on minutes of total MVPA (≥3 METs), MVPA performed in bouts ≥10 minutes, total light physical activity (LPA, 1.5 to <3 METs), and % of time the monitor was worn as sedentary behavior (<1.5 METs). Data are presented as median[IQR].

Results

There were changes in %weight loss (-8.8%[-3.8,-13.4]), %body fat (-3.7%[-1.6,-6.4]), and fitness (3.5 [0.8,6.2] ml/kg/min)(p<0.0001). There was an increase in MVPA performed in bouts ≥10 minutes from 100[26,192] to 215[99,389] min/wk (p<0.0001), with no significant change in total MVPA. LPA increased (p=0.01) and sedentary time decreased (p=0.03). Participants engaging in ≥150 min/wk of MVPA performed in ≥10 minute bouts increased from 34.2% at baseline to 66.3% at 6 months (p<0.0001).

Conclusions

A behavioral intervention can be effective at eliciting significant 6 month changes in weight, body composition, fitness, and physical activity in young adults. However, additional efforts are needed to further increase physical activity participation, which may be the focus of future interventions.

T-2089-P: Using the Bite Counter to Overcome the Effect of Plate Size on Food Intake

Phillip Jasper; Eric Muth, PhD; Thomas Alley, PhD; Adam Hoover, PhD;

Background
People tend to eat more when eating from larger plates. The purpose of the current study was to determine if bite count feedback provided by the Bite Counter device and an instruction on the number of bites to take could overcome the effect of plate size.

Methods

Participants (n = 108; 62 female; BMI 23.1 +/- 3.2; 97 Caucasian, 6 African Americans, and 5 others) ate a meal of macaroni and cheese with up to three other participants in a laboratory setting. In a 2x2 design, the participants were assigned to one of four conditions with grams consumed and bites taken measured as the main dependent variables. The conditions were as follows with average grams consumed and bites taken: (1) small plate and instruction given (193+-104 grams, 19+-6 bites); (2) large plate and instruction given (187+-61 grams, 18+-5 bites); (3) small plate and instruction not given (111+- 35 grams, 12+-4 bites) and (4) large plate and instruction not given (195+-111 grams, 20+-6 bites).

Results

A 2x2 ANOVA of grams consumed revealed a main effect of INSTRUCTION (F (1,104)= 5.297, p=.023, $\hat{\eta}^2 = .048$), a main effect of PLATE SIZE (F (1,104)= 5.798, p=.018, $\hat{\eta}^2 = .053$), and an interaction (F (1,104)= 7.695, p = .007, $\hat{\eta}^2 = .069$). A 2x2 ANOVA of bites taken revealed a main effect of INSTRUCTION (F (1,104)= 7.47, p = .007, $\hat{\eta}^2 = .067$), a main effect of PLATE SIZE (F (1,104)=14.264, p< .001, $\hat{\eta}^2 = .121$), and an interaction (F (1,104)= 14.964, p< .001, $\hat{\eta}^2 = .126$).

Conclusions

The results suggest that a given instruction on the number of bites to take along with feedback on the number of bites taken, can partially overcome a known environmental cue of plate size.

T-2090-P: Association of Regular Resistance Training and Flexibility Exercise with Sarcopenia and Sarcopenic Obesity in Community-Dwelling Older Adults in S. Korea: The Fourth Korean National Health and Nutrition Examination Survey

Se Young Jung; Ju Young Kim, MD, PhD;

Background
The association of regular resistance training and flexibility exercise with sarcopenia and sarcopenic obesity has not been examined among the community-dwelling elderly Koreans.

**Methods**

The fourth Korean national health and nutrition examination survey was conducted in 2009. Participants included 1015 men and 1248 women aged 60 years or older. Total times of resistance training and flexibility exercise per week were surveyed. Resistance training consists of push-ups, sit-ups, dumbbell lifts and barbell lifts. Flexibility exercise consists of stretching and free-standing exercises. Exercise of three times or more per week is defined as regular. Sarcopenia is defined as an appendicular skeletal muscle mass divided by body weight that is less than 2 SD below the sex-specific mean for young adults. Obesity was defined as a body mass index of 25 kg/m2 or higher.

**Results**

Regular resistance training was inversely associated with sarcopenia regardless of whether participants were obese (OR 0.43, 95% CI 0.30–0.62) or non-obese (OR 0.56, 95% CI 0.33–0.95). Regular flexibility exercise was inversely associated with sarcopenia regardless of whether participants were obese (OR 0.48, 95% CI 0.36–0.66) or non-obese (OR 0.69, 95% CI 0.49–0.98). Regular flexibility exercise was also inversely associated sarcopenic obesity (OR 0.76, CI 0.58–0.99).

**Conclusions**

We found a strong inverse association of regular resistance and flexibility exercise with sarcopenia regardless of the presence of obesity and an inverse association between regular flexibility exercise and sarcopenic obesity in older Korean adults.

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**T-2091-P: Distress Tolerance as a Predictor of Physical Activity Intentions and Engagement**

*Stephanie Kerrigan; Meghan L. Butryn, PhD; Evan M. Forman, PhD; Graham G. Thomas, PhD;*

**Background**

Poor adherence to prescribed physical activity (PA) is common in behavioral weight loss (BWL) programs. Motivation is a key determinant of PA; distress tolerance (DT; i.e., willingness to experience discomfort) may be an equally important predictor of PA in BWL given that PA may cause discomfort.

**Methods**

Participants (n=48; 89.0% women, 53.7% Non-Hispanic White, mean±SD 53.3±9.1 years old, baseline BMI 37.4±5.5 kg/m2) in a 1-year group-based BWL program were prescribed 250 min/wk of moderate-to-
vigorous (MV) PA. For a 2-week period at 6-months, participants rated their weekly PA motivation (single item on a 1-11 scale) and intentions (in minutes of planned MV PA). Min/wk in bouts of MV PA were measured objectively via GT3X+ accelerometers. DT was measured by latency in seconds to discontinuation of a cold pressor task in which a hand is submerged in cold water kept at 3 degrees Celsius. We hypothesized that DT and PA motivation would be independent predictors of PA intention and behavior.

Results

Mean±SD PA was 67.2±90.8 min/wk, intentions were 224.5±126.0 min/wk, motivation was 7.4±2.9, and DT was 26.9±18.8 s. Motivation was unrelated to DT (r=.01, p=.95). In two multiple linear regressions, DT and motivation were independently associated with intention (R²=.32, SE=.11, h=.14, p<.01; and R²=.50, SE=.12, h=.27, p<.01; respectively) and measured PA (R²=.30, SE=.14, h=.10, p=.04; and R²=.28, SE=.15, h=.09, p=.06; respectively). The interaction of DT and motivation was associated with intention (R²=.98, SE=.53, h=.07, p=.08), but not measured PA.

Conclusions

These results suggest that DT and motivation are important predictors of PA intention and behavior in BWL programs. Additionally, building motivation for PA may be insufficient when DT is low. Intervening on both motivation and DT may yield better adherence to PA prescriptions in BWL programs.

T-2092-P: The Effect of Protein Supplements with and without Calcium on Weight Loss Maintenance over 6 Months in Overweight and Obese Individuals

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Background

In obesity treatment, weight loss (WL) maintenance (WLM) is a major challenge. In this study, the effect of protein subtypes, combined with calcium, on weight maintenance was investigated.

Methods

In a randomized controlled trial, 220 participants (18-60 years, BMI: 28-40 kg/m2) initiated an 8-week WL period (800-1000 kcal/day) followed by 24 weeks of WLM with isocaloric supplements (45 g/day): whey protein (W), whey protein and calcium (WC), soy protein (S) or carbohydrate (C) (control). Participants,
who lost a minimum of 8% of their initial BW were included in the WLM period. Body weight (BW) was measured and fat mass (FM) determined by DXA. Fecal samples were collected and microbiota was determined by 16S sequencing (Illumina MiSeq).

Results

During WLM, the 153 completers increased their BW (2.0+-4.4 kg, p<0.001) and FM (0.3+-4.1 kg, p=0.43). Initial analyses, without correction for dietary protein intake, indicated that the type of supplement did not affect changes in BW (W:2.0+-4.6 kg, WC:2.2+-4.6 kg, S:1.5+-4.9 kg C:2.2+-3.8 kg, p=0.85) or FM (W:0.1+-4.1 kg, WC:0.5+-4.5 kg, S:-0.1+-4.4 kg C:0.54+-3.3 kg, p=0.86). The Bacteroidetes/Firmicutes ratio did not change (p=0.82). The \( \hat{I}^2 \)-diversity shifted during WL but returned to initial diversity in some participants during WLM.

Conclusions

The preliminary results indicate that whey protein (with or without calcium) or soy protein as supplementation does not improve WLM, compared to isocaloric supplement of carbohydrate.

T-2093-P: Alternate Day Fasting is More Effective Than Daily Calorie Restriction for Increasing LDL Particle Size

Cynthia M. Kroeger

T-2094-P_DT: Health Literacy and Weight Change among Medically Vulnerable Women: An eHealth Randomized Controlled Trial in the Primary Care Setting

Michele G. Lanpher; Gary G. Bennett, PhD;

Background
In the U.S., 90 million adults have limited health literacy, which is associated with poor treatment adherence and lower readiness to change. A challenge for obesity interventionists and health providers is to design treatments that are accessible to individuals across the spectrum of health literacy.

**Methods**

The Shape Program, a 2-arm eHealth randomized controlled trial, aimed to prevent weight gain among overweight and obese (class I) black women in the primary care setting. The intervention lasted 12-months and incorporated 3 tailored behavior change goals, which were tracked via weekly Interactive Voice Response (IVR) telephone calls. Dietitians delivered monthly coaching calls. To assess health literacy, the 6-item Newest Vital Sign instrument was administered to 175 participants. We examined differences in baseline sociodemographic characteristics and weight outcomes by health literacy. Differences in intervention engagement (completion of IVR calls and coaching calls) were also assessed.

**Results**

In the Shape Program, 55% of participants had low health literacy. Correlates of low health literacy included fewer years of educational attainment and lower income. There was no effect of health literacy on 12-month weight change. No differences were found for intervention engagement outcomes by health literacy. On average, participants with low health literacy completed 71.8% of IVR self-monitoring calls, while those with adequate health literacy completed 73.6% of calls. Coaching call completion rates were 83.2% and 85.5%, respectively.

**Conclusions**

Shape intervention participants achieved weight stability and had high engagement, regardless of their health literacy level. Behavioral interventions can be designed specifically for those who lack adequate health literacy and can produce meaningful weight change, even among an at-risk demographic.

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**T-2095-P: Success of Online Educational Interventions on Obesity Management**

*Amy Larkin, PharmD; Stacey Hughes, BS; Kristin Richardson, MA; Anne Le, PharmD;*

**Background**

Obesity is a major public health crisis. In the past 10 years, prevalence in the United States has increased from 20.0% to 35.7%. Despite recognition as a disease, obesity remains undertreated. We sought to determine if continuing medical education (CME) improves physician knowledge and performance.

**Methods**

Primary care physicians (PCPs) and endocrinologists participated in at least 1 of 3 online CME activities within a curriculum focusing on obesity management. Case-based surveys were conducted after completion
of the activity. Results were compared with responses from demographically similar control groups (nonparticipants) in order to determine the impact of the education. The domains measured included weight loss, lifestyle modifications, pharmacotherapy, and patient communication.

**Results**

PCPs (n = 210) and endocrinologists (n = 90) were more likely to make evidence-based practice choices than a demographically matched group of nonparticipants (P<0.05). Participants demonstrated significant improvement for all domains, including targeting an appropriate weight-loss goal of 5-10% to reduce risk of comorbidities, knowledge of adverse effects of pharmacologic agents, discussing pharmacotherapy in addition to lifestyle management, and using the 5As paradigm and motivational interviewing to initiate discussions about weight.

**Conclusions**

This study demonstrated the effectiveness of a curriculum-style educational intervention on improving the knowledge, competence, and performance of PCPs and endocrinologists in management of obese and overweight patients.

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**T-2096-P: Effect of an Online, Mobile App-Mediated Structured Meal Replacement Program on Weight Management: Outcomes in a Real World Setting**

*Francis C. Lau, PhD; Jamie P. McManus, MD; Bruce P. Daggy, PhD*

**Background**

Weight management interventions that promote dietary and lifestyle modification may be effective in facilitating weight loss. Meal replacements, combined with a healthy diet, result in structured meal plans that are portion-controlled, low glycemic and compatible with macronutrient recommendations.

**Methods**

Subjects were on a customizable 3-meal-a-day structured meal plan, with 2 meals replacements daily. A mobile application was used to tracked self-reported data. Initial body weight and height were used to establish the baseline values for weight and BMI. A total of 290 participants (80% females with an overall average age of 46.2 years and BMI of 31.2 kg/m2) completed a 3-month program. Weekly data were analyzed on individuals reporting body weight. Data were normalized by baseline transformation and
comparisons at different time points were assessed by ANOVA. Two-tailed t-test was used for baseline comparison at specific time points. Statistical significance was set at $P<0.05$.

**Results**

Participants lost an average of 12.1 lbs or 6.1% of their initial body weight after 3 months ($P<0.001$). BMI was significantly reduced from 31.5 to 29.6 kg/m². Categorical shift occurred in subjects who were obese (53.8 to 41.4%) and who were normal weight (14.1 to 26.9%). Sub-analysis indicated that men lost significantly more weight ($\Delta 5.6$ lbs) than woman ($P<0.005$). The effect of this structured meal plan was seen in the first week resulting in a significant weight loss of 2.7 lbs ($P<0.001$).

**Conclusions**

Reporting bias may be reduced when paying customers self-report data for their own benefit. However results are limited to subjects continuing to use the tracking tool. In that cohort clinical meaningful weight loss led to more than 1/4 of the subjects falling in the normal weight range by 3 months.

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**T-2097-P: Impact of a 12-week Nutritional Intervention Based on the Self-Determination Theory: Gender Differences in Motivation, Level of Adherence to the Mediterranean Diet and Metabolic Changes**

_Vicky VL. Leblanc, PhD candidate; Catherine Bégin, PhD; Anne-Marie Hudon, M.Sc.; Marie-Michelle Royer, M.Sc.; Louise Corneau, RD; Sylvie Dodin, MD, Msc; Simone Lemieux, PhD;_

**Background**

Individual characteristics, such as gender and motivation, must be considered by health professionals in order to support individuals undertaking dietary changes. Our objective was to evaluate gender differences in changes in self-determined motivation, adherence to the Mediterranean diet (MedDiet) and metabolic variables, in response to a 12-week nutritional intervention promoting the MedDiet and at follow-up (6-month post-intervention).

**Methods**

The intervention was based on the Self-Determination Theory and used a motivational interviewing approach. Motivation was evaluated with the Regulation of Eating Behaviors Scale. A Mediterranean score
(Medscore) was calculated with a validated FFQ. Sixty-four men (BMI: 30.8±4.4 kg/m²) and 59 premenopausal women (29.6±6.0 kg/m²) were included.

Results

No gender difference was observed in changes in the Medscore during the intervention and follow-up. Men showed greater increases in self-determined motivation than women in response to the 12-week intervention and at follow-up (gender effect, \(p = 0.04\)). Changes in self-determined motivation in response to the 12-week intervention were associated with long-term increases in the Medscore in men only (\(r = 0.45\); \(p = 0.002\)). A gender by time interaction was found for waist circumference, i.e. men had lower waist circumference in response to the intervention and at follow-up than at baseline while women's waist circumference was lower in response to the intervention only (gender by time interaction, \(p = 0.05\)).

Conclusions

The nutritional intervention based on the Self-Determination Theory increased self-determined motivation, which contributed to improvements in long-term adherence to the MedDiet and lowering waist circumference, more specifically in men.

T-2098-P: Self-Efficacy on Change in BMI in a Longitudinal Randomized Controlled Trial for Weight Loss in an Obese and Overweight Population

Christine J. Lee; Charles Swencionis, PhD; Judith Wylie-Rosett, Ed.D., RD; Elizabeth K. Seng, PhD;

Background

Self-efficacy has been found to be the best predictor in changes in behaviors such as diet and exercise. This study examines the relationship between measures of baseline self-efficacy and overall weight change measured by BMI of participants in a RCT.

Methods

Longitudinal, clinical intervention study of people randomized into one of three weight loss interventions of incremental intensity for twelve months. The RCT compares computer-guided intervention (CGI), CGI+staff, and workbook only control group. This study reports secondary analyses. Exercise and dieting self-efficacy was measured as 'Total Self-Efficacy' at baseline and BMI was measured at baseline and quarterly visits for 12 months. N=588, Age M=52.2 years, SD=11.7, BMI M=34.9 kg/m², SD=6.6. Missing data was estimated as part of the mixed model procedure.
Results

Longitudinal mixed effects model revealed significant main effects of Self-efficacy $F(1, 559)=5.1, p<.01$, Time $F(1, 1760)=44.0, p<.01$, and Group $F(2,587)=3.5, p<.05$, qualified by a significant Group x Time interaction $F(2, 1760)=5.0, p<.01$. CG+Staff resulted in larger decreases in BMI over the course of the study compared to control ($t = -3.09, p = .002$). CGI alone was not significantly different from CG+Staff ($p = .057$) or control ($p = .134$). Higher self-efficacy was associated with lower BMI, regardless of group or time ($t = -2.84, p = .005$).

Conclusions

Significantly larger decrease in BMI was observed in participants in CGI+Staff intervention compared to control. Higher baseline scores of Self-efficacy were associated with lower BMI.

T-2099-P: How Much is Too Much?
Binge Eating Among Overweight and Obese College Students

Erin M. Lenz; Katelyn Gettens, Ms., B.A.; Ted Powers, PhD; Amy Gorin, PhD;

Background

Obese individuals who engage in binge eating tend to have poorer health outcomes than obese individuals who do not binge eat; however, less is known about how binge eating behaviors among overweight and obese college students impact weight loss progress in this critical developmental window.

Methods

Participants (N= 39; 18.7 +/- 1.1 years; 82.1% women; BMI=27.4+/-3.8 kg/m2) enrolled in a 6-week self-guided weight loss study that required participants to set two weight loss goals, identify a support partner, and track goal progress. Objective height and weight were obtained and participants completed the Binge Eating Scale assessing binge eating frequency and severity at baseline (BL) and 6-week follow-up.

Results

At BL, all participants endorsed binge eating, with 74.7% (n=29) reporting severe binge eating (SBE) and 25.6% (n=10) reporting moderate binge eating (MBE) behaviors. Interestingly, >50% of individuals engaging in SBE reported thinking about weight control daily, compared to <20% of MBES. At 6-weeks, 2.9% of participants reported no binge eating, with 32.4% (n=11) reporting MBE and 64.7% (n=34) reporting SBE. At 6-weeks, participants endorsing SBE were most likely to report weight loss obstacles ($p<.05$), and lost less weight ($p<.05$).
Conclusions

Given the addition of BED in the DSM-5, it is important to establish the effects of binge eating behavior on weight loss progress, particularly among college students where this behavior is common. This study suggests that binge eating presents a barrier to initial weight loss and goal attainment.

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T-2100-P: Downstream Effects of a Meaningful Use Initiative to Improve Gestational Weight Gain Counseling: Effects on Gestational Weight Gain and Early Diabetes Screening

Sara M. Lindberg, PhD, MS; Cynthie K. Anderson, MD, MPH;

Background

Inappropriate gestational weight gain increases risk for adverse maternal and neonatal outcomes. Yet only a third of pregnant women gain weight with guidelines. We previously showed that an electronic health record ‘best practice alert’ improved antenatal gestational weight gain counseling rates.

Methods

We implemented a gestational weight gain best practice alert in the electronic health record. The alert provides: individualized total gestational weight gain goals, weight gain goals per week of gestation, a template for scripted provider counseling and documentation, a patient handout, related orders and diagnosis codes. The alert recommends early screening for undiagnosed type 2 diabetes in patients who are obese or overweight with risk factors. Retrospective chart reviews were conducted for a total of 734 pre- and post-intervention patients. We used pre-post comparisons to evaluate the effect of the intervention on secondary health endpoints.

Results

Implementing a gestational weight gain best practice alert in the electronic health record improved the proportion of prenatal patients who gained weight within Institute of Medicine guidelines, from 28% to 35%. However, improvement was seen only for women who began pregnancy at a healthy weight, not for underweight, overweight, or obese women. The best practice alert also improved the proportion of obese women screened for undiagnosed type 2 diabetes before 20 weeks gestation, from 18% to 34%.

Conclusions

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The electronic medical record can be leveraged to promote healthy gestational weight gain and early
detection of undiagnosed type 2 diabetes. Yet patients need additional support to achieve healthy
gestational weight gain, particularly those who begin pregnancy underweight, overweight, or obese.

T-2101-P: Binge Eating Disorder and
Coping with Temptation to Food

Maria Loizos; Charles Swencionis, PhD; Judith Wylie-Rosett, Ed.D.; RD;

Background

In the United States, more than one-third of adults are obese. Of this one third, it is reported that 4 million
obese adults suffer from Binge Eating Disorder (BED). The exact cause of BED is still unknown; however
there is research that suggests that temptation to food may be a key factor.

Methods

Cognitive and behavioral coping strategies in response to temptation to food were examined in an obese
population separated into two groups: those with BED and those without BED. BED classification was
determined via the Questionnaire of Eating and Weight Patterns (QEWP). Coping was assessed using the
Coping Response Survey (CRS), which measured both frequency and helpfulness of cognitive and
behavioral coping techniques. After statistically separating items on the CRS into 16 factors divided
amongst 4 groups, a multivariate analysis of variance was performed to assess the effect of BED on
reported frequency and helpfulness of cognitive and behavioral coping techniques.

Results

Participants without BED utilized Positive Thinking (F=4.47, p<.035) and Decreasing Stress (F=6.19,
p<.013) more frequently than participants with BED. Participants with BED utilized Social Comparison
(F=5.75, p<.017) more frequently than those without BED. Lastly, participants with BED found that
Embarrassment of Relapse (F=4.72, p<.030) was more helpful in reducing temptation to food than those
without BED.

Conclusions

It was determined that those with BED utilize cognitive coping more frequently, and find it more helpful
than participants without BED. Research suggests that patients with BED may not have enough strength in
order to effectively employ self-control and not succumb to binging when tempted by food.
T-2102-P: Improvements in Dietary Quality after Ten Weeks of Daily Consumption of Sugar-Sweetened, Low-Fat Milk

Stephanie Sinnett, MS; Von Nguyen, MS, RD; Joshua Lowndes; James Rippe, MD;

Background

The present study explored the effects of consuming sweetened 1% fat milk at different levels (9% from glucose or fructose or 18% from HFCS or sucrose) of added sugar as part of the usual diet on dietary quality.

Methods

Participants (n=251) were healthy, weight stable and had not been following any diet. The energy intake required for weight maintenance was estimated (Mifflin St. Jeor) and milk prescribed so the added sugar provided the required percentage of calories as required by group assignment. Participants were educated how to account for the calories in the milk, but were given no other dietary instructions. Dietary quality was determined from evaluation of 3 day food records.

Results

In the entire cohort, there were increases in energy intake (2011.8 ± 708.2 vs 2254.6 ± 647.6Kcal/day), carbohydrate (278.9 ± 149.0 vs 309.1 ± 93.6g) and protein intake (86.2 ± 37.6 vs 99.4 ± 30.8g, p<0.001), which was offset by a reduction in fat (76.8 ± 33.2 vs 71.2 ± 27.8g, p<0.01). Intakes of calcium (849.3 ± 403.98 vs 1613.3 ± 406.3mg, p<0.001), vitamin D (5.4 ± 5.2 vs 13.2 ± 4.8mcg, p<0.001), and potassium (2887.2 ± 963.1 vs 3182.9 ± 867.2mg, p<0.01) increased, while sodium was unchanged (p>0.05). The type or amount of sugar no effect (p>0.05)

Conclusions

These data show that improvements in macro and micronutrient profiles can be achieved with the simple incorporation of low-fat, sweetened milk into the usual diet.

T-2103-P: How Does Frequency of Intervention Sessions Affect Weight Change Over the Holidays?
Background

Winter holidays have often resulted in weight gain for individuals participating in weight loss programs. We examined weight change over the winter holiday season and its associations with frequency of intervention sessions in a behavioral weight loss study.

Methods

The parent study was a one-group, descriptive study that delivered a standard 12-month behavioral weight loss intervention. We defined the 6-week holiday season as the Sunday before Thanksgiving to January 2. Participants, enrolled in 5 cohorts, attended group behavioral weight loss sessions. The group sessions met weekly for 3 mos., bi-weekly for 3 mos. and monthly for the rest of the study. Participants weighed themselves daily on a Wi-Fi scale; weights were electronically transmitted nightly. Weight change (kg) was calculated over the 6 weeks (end of study [January 2] minus beginning of study [Thanksgiving]).

Results

Complete data were available for 93 participants. The sample was 88.17% female, 86.02% White, on average 52.17+-8.51 years old with a BMI of 33.93+-4.30, and 16.95+-2.78 years of education. The mean weight loss for the full sample was 0.59 kg. The median weight change for participants attending weekly sessions during the holiday season was -2.01 kg (-2.97, -0.80) compared to those attending monthly sessions, 0.28 kg (-0.61, 0.97), p<.0001.

Conclusions

These data demonstrated that greater frequency of intervention sessions during the holiday period had a positive influence on preventing the expected holiday weight gain. Future studies and clinical treatment programs could consider increasing the frequency of contact during the holiday season.

T-2104-P: Association between Perceived Value of Health, Fitness and Appearance with Engagement in Behavioral Weight Loss Intervention Components

Stephanie M. McCoy, MPH; Renee J. Rogers, PhD; John M. Jakicic, PhD;

Background
Engagement with key components of behavioral interventions is associated with improved weight loss. The aim of this analysis is to examine the associations between engagement in weight loss intervention components and perceived value or investment placed on health, fitness, or appearance in adults.

Methods

Participants (N=154; age: 37.8+/-5.6 years; BMI: 32.7+/-4.1 kg/m2) engaged in a 24-week standard behavioral intervention, which included weekly group sessions, an energy restricted diet, and increased physical activity. Assessments were completed at baseline and 24 weeks. Perceived value and investment placed on health and fitness was assessed from the orientation subscales (health, fitness, appearance) from the Multidimensional Body-Self Relations Questionnaire. Engagement in intervention components (attendance at weekly meetings, self-monitoring diaries [SMD] returned, physical activity [PA]) were assessed. PA (kcal/week) was assessed with the Paffenbarger Questionnaire.

Results

Weight loss was 8.6+/-4.7 kg. Baseline health, but not fitness orientation, was associated with change in PA (r=.19, p=.02). Baseline health or fitness orientation were not associated with attendance at sessions or SMD returned. Change in fitness orientation was associated with change in PA (r=.20), with change in health orientation associated with SMD return (r=.19) (p=.02). Neither baseline nor change in appearance orientation was associated with engagement in the intervention components.

Conclusions

Emphasizing the value of health prior to weight loss intervention and the value of fitness across the intervention may be associated with improved participation in PA. However, the value of appearance should be de-emphasized as this does not appear to be associated with intervention engagement.

T-2105-P: Dietary Quality and Composition of High and Low FODMAP Diets in Healthy Young Adults

James O'Toole, MS; Geoffrey W. Greene, PhD, RD; Kathleen J. Melanson, RD;

Background

Colonic fermentation of poorly-digested carbohydrates may offer health benefits related to energy balance and chronic disease risk, but may produce gastrointestinal distress in some people. Diet quality may shift when intake of these carbohydrates is altered.

Methods
Diets high and low in fermentable oligosaccharides, disaccharides, monosaccharides and polyols (FODMAPs) were studied. In a single blind, randomized, crossover design, 16 healthy young adults (age 20.47+-1.77yr; BMI=22.2+-2.5 kg/m2) followed a low FODMAP and high FODMAP diet for three days each, separated by 11-days. FODMAP intake was analyzed by 24-hour recalls using the Nutrient Database System for Research before and on day 3 of each diet. Dietary quality was calculated using the Healthy Eating Index-2010 (HEI-2010). Data were analyzed via ANOVA.

**Results**

Between diets, a non-significant trend in FODMAP intake ($p=.052$) and difference in HEI2010 ($p=.001$) were seen. Carbohydrate, starch, & glycemic load were lower during low-FODMAP diets (all $p<.05$). With low-FODMAP treatment, FODMAP intake decreased from 36.3+-22.6g to 19.3+-15.8g ($p=.01$) and HEI2010 increased from 53.6+-17.2 to 63.1+-17.2 ($p=.04$). Energy intake also decreased from 2259+-1325kcals to 1510+-795kcals ($p=.017$). With high-FODMAP treatment, FODMAP intake did not change ($p=.731$), but HEI2010 decreased from 60.8+-12.8 to 52.0+-11.3 ($p=.027$).

**Conclusions**

Subjects reduced FODMAP intake, which was associated with higher dietary quality, and lower kcals, total carbohydrate, starch and glycemic load. Subjects did not increase FODMAP intake. Larger, longer duration studies are needed to examine compliance and other outcomes on diets varying in FODMAP's.

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**T-2106-P: A Dietary Weight Loss Intervention Utilizing Partial Meal Replacements Improves Nutrient Intake in Older Overweight and Obese Adults**

*Gary Miller, PhD; Daniel Beavers, PhD; Daniel Hamm, MPH; Shannon Mihalko, PhD; Barbara J. Nicklas, PhD; Stephen P. Messier, PhD;*

**Background**

Dietary restriction for weight loss is not always recommended for obese older adults, partly due to concerns about worsening nutritional health. This study investigated the effect of an 18-month dietary weight loss intervention on nutrient intake in older adults.

**Methods**

Obese older adults (n=388; BMI=33.7+-3.8 kg/m2; 65.8+-6.1 yrs) were randomized into either: exercise (E); intensive dietary weight loss (D); or intensive dietary weight loss plus exercise (D+E). The weight loss intervention (goal of >=10% loss by 18-mos) included up to 2 meal replacement shakes/day (Lean Shake; General Nutrition Centers) and were provided x 6-mos; participants then transitioned to conventional food.
Meal replacements (per serving) contained 180 kcals, 9 g protein, 2 g fat, and 20-60% of the daily value for vitamins and minerals. Exercise training of walking and resistance training was 3 d/wk, 60 min/d. Diet intake (3-day food records) was collected at baseline, 6-mos, and 18-mos.

**Results**

Weight loss at 6-mos was 9.4% (D+E), 8.5% (D), and 0.0% (E). Further weight loss occurred through 18-mos in all groups (11.4% (D+E), 9.5% (D), and 2.2% (E)). D and D+E, compared to E, consumed fewer total kcals at 6-mos (p=0.030), and at 18-mos (p=0.082). Total fat, saturated, monounsaturated, and polyunsaturated fatty acids, and cholesterol were less for D and D+E compared to E at both 6 and 18-mos (p<0.05). Intake of Mg, Fe, folate, and vitamins E, C, B1, B3, B6, were all higher for D and D+E compared to E at 6 and 18-mos (p<0.05).

**Conclusions**

The weight loss intervention caused no worsening, and improved intake of many nutrients. This is likely based on diet selection as after 6-mos, subjects transitioned from meal replacements to conventional food. Sound dietary practices can be maintained during intensive weight loss in older adults.

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**T-2107-P: Impact of Cognitive Dietary Restraint on Eating Behaviors during Energy Restriction in Overweight and Obese Women**

*Isabelle IM. Morin; Catherine BÂ©gin, PhD; Vicky VL. Leblanc, PhD candidate; Marjolaine Pella, B.Sc; Julie Maltais-GiguÃ¨re, MSc; Simone Lemieux, PhD;*

**Background**

No study has evaluated the difference between energy restriction alone or combined with cognitive dietary restraint (CDR) on eating behaviors. The objective was to examine the short-term effects of a reduced-calorie diet with or without messages aiming at increasing CDR on eating behaviors in women.

**Methods**

Preliminary analyses were performed with a group of 23 overweight and obese women (mean age: 39.3 +/- 6.9 y; mean BMI: 31.9 +/- 5.0 kg/m2). All women were fed under controlled conditions with a low energy density diet corresponding to 85% of their energy needs during a 4-weeks period. In one group, women were told that they were on a low-calorie diet (CDR+) while in the other group, women were not told about the energy deficit (CDR-). Measurements were performed before and after the 4-week feeding protocol. Anthropometric variables were measured and the Three-Factor Eating Questionnaire was completed in order to assess eating behaviors.
Results

A significant reduction in body weight was observed in response to the 4-week intervention ($p<0.0001$) in both CDR+ (-2.49 +/- 1.95 kg) and CDR- (-2.17 +/- 1.09 kg) groups, with no between-group difference. A significant reduction in disinhibition was also observed in both groups ($p=0.0373$). No significant changes in dietary restraint and susceptibility to hunger were observed in response to the intervention.

Conclusions

These results suggest that our feeding protocol induced, as expected, a similar reduction of body weight in both groups. Although no significant differences in eating behaviors were observed between groups, this should be interpreted with caution considering the preliminary nature of these results.

T-2108-P: Snacking, Satiety, & Weight: A Randomized, Controlled Trial

Valentine Njike, MD, MPH; Yasemin Kavak, MPH; Judith Treu, MS, RD; David L. Katz, MD, MPH;

Background

Snacking has been implicated in the obesity epidemic, but judicious snacking may help control appetite and calorie intake and add nutrient-dense foods to the diet. The purpose of this study was to compare the effects of KIND snack bars vs. typical American snack foods, on anthropometric measures.

Methods

This parallel-design randomized controlled trial compared the effects of consuming two types of snacks on a daily basis for a 12-week period on health outcomes, diet quality, and self-reported satiety in a group of overweight adults. Thirty four overweight participants were enrolled in the study. Of these participants, 17 were randomized to consume conventional snacks, while the rest were randomized to the KIND snack group. The types of snacks studied were KIND snack bars with almonds as a primary ingredient and typical American snack foods. Participants received a 12-week supply of their assigned snack that provides a total available energy content of up to 800 kcal/day.

Results

Daily consumption of KIND snacks for 12 weeks, as compared to daily consumption of conventional snacks, significantly reduced percent body fat (-1.7 +/- 10.8 vs. 6.2 +/- 9.3 %; $p=0.04$) and visceral fat rating (-1.3 +/- 5.9 vs. 2.7 +/- 4.0; $p=0.03$). Daily consumption of KIND snack had no significant ($p>0.05$) effects on blood pressure, lipid panel, and quality of life.

Conclusions
Our data suggest that daily consumption of KIND snacks for 12 weeks reduced body fat and did not have any adverse effects on weight, blood pressure, lipid profile, and quality of life in this small sample of overweight individuals.

**T-2109-P: Effect of Cooked White Rice with High Î²-glucan Barley on Appetite and Energy Intake in Japanese Healthy Subjects: Randomized Controlled Trial**

*Hiroki Noguchi; Seiichiro Aoe, PhD; Takeshi Ikenaga, MS; Chieko Kohashi, MS; Keiji Kakumoto, MS; Noriyuki Kohda, PhD;*

**Background**

White rice is a main grain food in Japan, but excess intake of polished rice may cause obesity. Barley is also a grain food, but it has the potential to control appetite and reduce energy intake. We investigated the effect of cooked white rice with high Î²-glucan barley on appetite and energy intake.

**Methods**

The study was conducted as a randomized crossover design with twenty-one Japanese healthy women [mean +- standard deviation body mass index (BMI) 23.3+-0.7 kg/m2]. Subjects consumed a breakfast of cooked white rice with high Î²-glucan barley (BAR) or white rice (WR), followed by an *ad libitum* lunch and dinner. Energy intake was measured at the lunch and the dinner using plate waste. Subjects’ perception scores on hunger, fullness, satiety, and prospective food consumption were assessed using a visual analogue scale (VAS) before and after the breakfast, lunch and dinner.

**Results**

BAR significantly reduced the VAS scores of hunger and prospective food consumption, and increased fullness before lunch compared to WR (*P*=0.032, 0.019 and 0.038, respectively). Energy intake at lunch and the cumulative energy intake (lunch + dinner) subsequent to BAR consumption were significantly lower than WR (*P*=0.035 and 0.021, respectively).

**Conclusions**

BAR was able to modulate appetite and reduce energy intake. The combination of white rice with high Î²-glucan barley would play a beneficial role in preventing and treating obesity and other obesity-related metabolic diseases.
T-2110-P: Effects of Chronic Exercise Training on Inflammatory Markers in Australian Overweight and Obese Individuals in a Randomized Controlled Trial

Sebely Pal, PhD; Suleen Ho, PhD:

Background

Physical activity has been shown to lower levels of inflammatory markers. However, results are inconsistent; indicating different modes of exercise may have different effects on inflammatory cytokines. Our study compared aerobic, resistance or combination exercise training on plasma TNF-Î± and IL-6.

Methods

We aimed to investigate the effects of 12 weeks of moderate-intensity aerobic, resistance or combination exercise on TNF-Î± and IL-6 compared to no exercise in overweight and obese individuals. Overweight/obese adults were randomized to four groups; no exercise, 30 minutes of aerobic, 30 minutes of resistance or a combination of 15 minutes of aerobic and 15 minutes of resistance exercise five days a week for 12 weeks. Fasting blood samples were taken for determination of inflammatory markers at baseline and 12 week.

Results

TNF-Î± levels were significantly decreased at week-12 compared to baseline by 20.8% in the Aerobic group (p=0.011), 26.9% in the Resistance group (p=0.0001) and 32.6% in the Combination group (p=0.003). Levels of TNF-Î± were significantly lower in the Combination compared to the Control group after 12 weeks of exercise training (-22.6%, p=0.025) when adjusting for baseline levels.

Conclusions

Twelve weeks of moderate-intensity aerobic, resistance, but mainly combination exercise training, decreased TNF-Î± in overweight and obese individuals compared to no exercise. Therefore, combination exercise training may be physiological relevant in decreasing risk of developing chronic diseases.
T-2111-P: Diagnosis and Management of Obesity in Quebec Family Medicine Groups

Alex AP. Pare, B.Sc; Christine Brown, RD, M.Sc.; Karine Duval, PhD; Aurelie Baillot, PhD; Jean-Patrice Baillargeon, MD; Marie-France Langlois, MD;

Background

Even if we are facing an obesity epidemic, few canadian studies have assessed the quality of care for obese patients. Therefore, our project aimed to establish the first portrait of obesity diagnosis and management in the Province of Quebec.

Methods

Anthropometric measures and a review of the medical records were completed for 439 adults treated in one of 10 family medicine groups affiliated with the Université de Sherbrooke Network. We determined the presence of obesity diagnosis among participants using the list of health problems and general practionner (GP) notes from the last 18 months of medical visits. To evaluate the quality of management of obesity (18 months retrospectively), we used a score based on 7 recommended obesity management interventions from the Canadian clinical guidelines for treatment of obesity. Multivariate regression models were used to identify the determinants of obesity quality of care.

Results

Forty percent of participants were obese (BMI >= 30 kg/m2). Only 47.3 % of them had a diagnosis of obesity in their medical record. In the last 18 months : 82.3 % had their weight measured by a GP/nurse, 19.4 % had their waist circumference measured, none received eating disorders screening, 6.2 % were assessed for readiness to change, 29.1 % had physical activity or dietary counseling. Median obesity management score was 3/7 [IQR : 3-4]. BMI increment (p<0.001) and sleep apnea (p=0.046) were significatively associated to higher quality of care.

Conclusions

The diagnosis and management of obesity in the primary care setting of Quebec family medicine groups are suboptimal. Readiness to change assessment and eating disorders screening rates are dramatically low considering the importance of those steps in setting an obesity management plan.

T-2112-P: Supplementing the Diet with Pea Fiber Promotes Weight Loss
Through Reduced Energy Intake and Alters Gut Hormones in Overweight/Obese Adults: A Double-Blind, Randomized Control Trial

Jill A. Parnell, PhD; Jennifer E. Lambert, PhD; Jay Han, PhD; Troy Sturzenegger, BSc; Raylene A. Reimer, PhD, RD;

Background

Intakes of dietary fibers are inadequate, despite beneficial effects on appetite, body weight, lipids, and glucose metabolism. Pea fiber is easily incorporated into foods and may confer health benefits associated with other fiber types.

Methods

A biscuit containing 5 g of yellow pea fiber/68 kcal serving was developed. Participants (BMI 33±6 kg/m2) were randomly assigned to consume 3 servings of biscuits/day (YPF; n=26/grp) or an isocaloric placebo (CT; n=24/grp) for 12 weeks. Baseline and follow-up testing included body composition (via DXA), fasting serum lipids and inflammatory markers, and satiety hormones, insulin and glucose responses to an oral glucose tolerance test. An *ad libitum* lunch buffet assessed objective food intake.

Results

YPF had 85% retention. BMI decreased in YPF 0.3±0.1 kg/m2 and increased 0.1±0.1 kg/m2 in CT (p=0.03) with corresponding changes in fat mass (-0.8±0.3 kg vs 0.4±0.4 kg; p=0.01). Fasting GIP decreased in YPF (p=0.02). Fasting leptin and PYY increased in CT and decreased in YPF. MCP1 tended to decrease in YPF (p=0.08). Insulin response increased throughout, yet fasting HbA1c levels tended to stabilize with YPF and increase in CT (p=0.06). *Ad libitum* intake decreased in YPF and increased in CT (-198±87 kcal vs 34±50 kcal; p=0.02).

Conclusions

Consumer pleasing, pea fiber biscuits decrease energy intake and promote weight loss, providing justification for the inclusion of pulse fibers into functional foods. (Funded by Alberta Innovates Bio and Health Solutions and Alberta Pulse Growers)

T-2113-P: Intensive Medical Weight Loss and Weight Maintenance is Associated
with Reduced Medication Utilization and Costs

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Background

Obesity drives healthcare expenditures in the United States. This study investigates the medication cost reduction related to type 2 diabetes mellitus (DM), hypertension (HTN), and dyslipidemia (CHOL) among patients following weight loss (WL; 12 weeks) and weight maintenance (WM; 52 weeks).

Methods

Retrospective analysis of data from all eligible participants who voluntarily enrolled in Via Christi Hospital's medically supervised weight management program (Health Management Resources; HMR) using a high intensity lifestyle intervention (HILI) and meal replacements (MR) between years 2009 and 2013. Included in this study were adult, overweight or obese participants, who met the requirements of the HMR Medical Guidelines for participation. Drug costs were estimated using the National Average Retail Prices for Medicaid Covered Outpatient Drugs. Follow up weights were analyzed only in participants for whom medication records were complete.

Results

984 patients had a mean baseline BMI of 44.1 kg/m² (SD 9.1). Mean body weight reduction was 12% (n=739) at 12 weeks and 19% (n=240) at 52 weeks. The mean DM medication cost per patient per day at baseline and 12 weeks (n=191) was $7.33 and $2.36, respectively (68% reduction); and at baseline and 52 weeks (n=85) was $7.26 and $1.31, respectively (82% reduction). The associated DM, HTN and CHOL medication cost per patient decreased by 45% from baseline to 52 weeks ($2115.67 to $1159.58 per year).

Conclusions

HILI and use of MR for overweight/obese participants resulted in clinically meaningful WL that is associated with a reduction in medication use and cost following WL and long term WM. Participation in comprehensive weight management programs may result in durable reduction in healthcare costs.

T-2114-P: Experiencing Weight Bias in a Just World: Impact on Exercise and Internalization

Rebecca Pearl; John F. Dovidio, PhD;
Background

This research aimed to examine the role of a potential moderator, belief in a just world, in determining mental and physical health outcomes among individuals with overweight and obesity who experience weight bias.

Methods

In Study 1, 804 participants in an online study reported just world beliefs; exercise intentions, motivation, self-efficacy, and behavior; weight bias experiences; and height/weight/weight status. In Study 2, 237 online participants with overweight and obesity were randomly assigned to read one of two passages describing weight bias as rare versus pervasive, and rated their perceptions of pervasiveness. Participants then read one of three randomly-assigned vignettes that confirmed, challenged, or did not attempt to influence just world beliefs, and completed measures of exercise intentions and motivation; body dissatisfaction; weight bias internalization; and weight bias experiences.

Results

In Study 1, weaker just world beliefs were associated with lower ratings on all exercise variables among participants who reported experiencing weight bias. In Study 2, regression analyses revealed that when participants perceived weight bias as more pervasive, the condition that challenged belief in a just world led to lower ratings of exercise intentions and motivation, and higher reports of body dissatisfaction and weight bias internalization.

Conclusions

Threats to belief in a just world may lead to negative outcomes, for both health behaviors and psychological well-being, among individuals who have experienced weight bias and perceive it to be pervasive. Findings hold potential implications for intervention and policy.

T-2115-P: How Long Does It Take to Identify Non-Responders to Weight Loss Treatment?

Christine Pellegrini, PhD; Christine Pellegrini, PhD; Inbal Nahum-Shani, PhD

Background

Background: Stepped treatment for obesity has been less effective than fixed treatment, but the decision about whether to step up from minimal treatment has been delayed for 1.5 - 3 months. We assessed whether 6 month weight loss success could be predicted earlier.
Methods

Methods: We treated 64 adults (age: 38.9 +/- 12.1; BMI: 34.8 +/- 2.9 kg/m2, 84% female, 59.4% white) with an abbreviated 8-session version of the Diabetes Prevention Program. Participants attended weekly treatment sessions in person and received regular telephone support calls. ROC analysis was used to compare how well weight loss success (>=5% loss) versus failure (<5% loss) at 6 months can be predicted by weight loss at weeks 2, 3, 4, 5, 6.

Results

Results: Of 55 participants with complete weight data, 49.1% failed to achieve 5% weight loss at 6 months, whereas 50.9% succeeded. Week 2 weight loss was highly predictive of treatment success (OR=1.54; p<=0.001). A cut-point of losing >= 1 lb by the end of week 2 correctly discriminated the 6 month weight loss success versus failure, with 85% sensitivity and 60% specificity. Waiting longer to assess treatment response or using other cut offs besides 1 lb did not significantly improve the ability to predict 6 month outcome.

Conclusions

Conclusions: Results provide preliminary evidence that treatment non-response can be identified very early in the course of weight loss treatment, enabling a rapid decision to be made about the provision of augmented or alternative treatments that could prevent patient disengagement.

T-2116-P: Association between Fruit and Vegetable Consumption and Weight Loss in Response to a Behavioral Weight Loss Intervention

Anna Peluso, MS; Renee J. Rogers, PhD; John M. Jakicic, PhD;

Background

Fruit and vegetable consumption has been recommended as part of a healthy diet. This study examined the change in fruit and vegetable consumption within the context of a 12 month behavioral weight loss intervention and whether this was associated with weight loss.

Methods

Participants were 151 adults classified as overweight or obese (age=38.0+-5.5 years; BMI=32.6+-4.2 kg/m2) who completed a 12 month behavioral weight loss intervention. Participants received weekly contact that included a combination of group sessions and brief telephone call, and were prescribed a
calorie restricted diet and increased physical activity. Assessments were conducted at baseline, 6, and 12 months. Weight was assessed on a calibrated scale. Total daily energy intake (TDEI) and daily servings of fruits and vegetables (FR+VEG) were assessed using a food frequency questionnaire (FFQ).

Results

Weight loss was 9.7+ -5.3% at 6 months and 9.4+ -7.8% at 12 months (p<0.001). TDEI decreased at 6 (-626+ -1011 kcal/d) and 12 months (-656+ -1015 kcal/d)(p<0.001). FR+VEG increased from 3.9+ -1.9 serving/d at baseline to 5.5+ -2.8 at 6 months and 4.9+ -2.8 at 12 months (p<0.001). 31%, 51%, and 45% of participants consumed 5 serving/d of FR+VEG at baseline, 6, and 12 months, respectively. Change in FR+VEG or consuming 5 servings/d of FR+VEG was not significantly associated with weight loss at 6 or 12 months.

Conclusions

An intervention focused on energy restriction can also increase fruit and vegetable intake. However, fruit and vegetable consumption is not associated with weight loss. Thus, fruit and vegetable consumption may not be important as a dietary recommendation to improve weight loss.

T-2117-P: Validation of an On-line 24-Hour Physical Activity Recall

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Background

While 24-hr recalls are a standard for dietary assessment, this is not the case for physical activity. 24-hr recalls may have advantages of brevity and low recall bias. The purpose of this study was to describe the validity of an online 24-hour physical activity recall.

Methods

The 24-hr PA recall was developed from a previously published 3-day written record. From a menu, the subjects selected their primary activity for each 15-min period of the past 24 hours. The objective measurement of PA was derived from a validated accelerometer (Gruve). Our primary outcome of interest was daily (individual days) and habitual (mean of 4 or more days) PA expressed as kcal/hr above basal.

Results

PA from the 24-hr recall was highly correlated with the accelerometer for both daily (r=0.65) and habitual (r=0.74) PA. The 24-hr recall estimates were higher than those for the accelerometer (37.4 kcal/hr higher for daily, and 37.9 kcal/hr higher for habitual). The median duration to complete the questionnaire was 3 min and 56 sec.
Conclusions

The combination of brevity, validity, and low cost of this new on-line 24-hr PA recall suggests that it may be an attractive option for research, especially for large and long-term studies.

T-2118-P: Intragastric Balloon as a Treatment for Nonalcoholic Fatty Liver Disease in Adults: A Systematic Review and Meta-Analysis

Violeta Popov, MD; Nitin Kumar, MD; Christopher C. Thompson;

Background

Obesity and the metabolic syndrome are established risk factors for non-alcoholic fatty liver disease. Intragastric balloons have been shown to be safe and effective in inducing weight loss in obese patients. The objective of this study was to determine the effect of the intragastric balloon on NAFLD.

Methods

Searches were performed of MEDLINE and Embase databases from inception through November 2013. Review of titles/abstracts, full review of potentially relevant studies, and data abstraction were performed independently by 2 authors. Study inclusion criteria were the following: series of &ge;5 adult patients undergoing intragastric balloon therapy (IGB) with liver tests (alanine aminotransferase (ALT) or gamma-glutamyl transpeptidase (GGT)) or markers of NAFLD (e.g. ultrasound, biopsy) reported before balloon insertion and after balloon removal.

Results

Eight studies reported the effect of the IGB on liver enzymes, and two randomized trials reported radiologic and histologic outcomes. The estimated average change in ALT is -9.9067 (95% CI: -13.0954, -6.7181), p<0.001; heterogeneity: t²=6.077, I²=27.6%. Change in GGT is -10.4197 (95% CI: -13.1922, -7.6472), p<0.01; I²=0%. In the randomized trial, the NAFLD activity score was lower in the treatment group vs. the control (2 ±0.75 vs. 4 ±2.25, p=0.03) after 6 months of IGB, with no difference at baseline (5 ±1.00 vs. 5 ±2.25, p=0.52).

Conclusions

The use of intragastric balloon improves biochemical and histologic liver parameters, and is potentially an effective short-term treatment for NAFLD as part of a multidisciplinary approach.
T-2119-P: Changes in Regional Body Composition over Eight Years in a Randomized Trial of a Lifestyle Intervention in Obese or Overweight Diabetic Persons: The Look AHEAD Study

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Background

The Look AHEAD Study compared the effects of an intensive lifestyle intervention (ILI) that reduced the weight among obese or overweight diabetic persons with a control group receiving diabetes support and education (DSE) to test if intentional weight loss reduces CVD events.

Methods

Diabetes is associated with an adverse distribution of fat (FM) and lean body mass (LBM). Leg-, arm-, and trunk-LBM and FM at baseline and Years 1, 4, and 8 post-baseline were measured by dual-energy X-ray absorptiometry in a subgroup of 1,018 participants randomized to DSE or ILI groups. The Look Ahead population is well-suited for determining whether ILI modifies regional FM and LBM distributions. At baseline, body compositions of DSE and ILI groups within genders did not differ.

Results

Over 8 years DSE-LBM declined in all regions; FM was unchanged. Baseline-Year 1: ILI-FM and LBM Years-1- 8: Changes in regional FM among DSE were nil; ILI regained FM in all regions. Baseline-Year 8: ILI- and DSE-LBM converged for all regions. Regional LBM and FM varied linearly with total LBM and FM change respectively; changes were proportional to region size, trunk > leg > arm. For ILI and DSE, % leg-LBM loss >%trunk-LBM loss for females; % arm- and leg-LBM loss >trunk-LBM loss for males.

Conclusions

Regional LBM and FM changes are proportional to total body LBM and FM changes respectively. The greater % LBM loss in arm and leg vs. trunk if extended over a longer term may impact mobility and independent living.
T-2120-P: Changes in Diet Quality During Weight Loss in Adults with Intellectual and Developmental Disabilities

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Background

Previous research indicates individuals with intellectual and developmental disabilities (IDD) are at risk for poor diet quality.

Methods

We compared energy intake (3-day proxy assisted food records) and diet quality (Healthy Eating Index (HEI) 2010) across a 6 month weight loss period in a sample of adults with mild to moderate IDD. Participants were randomly assigned to one of 2 reduced energy diets: an enhanced Stop Light Diet (eSLD; Stop Light Diet + portion controlled meals) or a conventional meal plan diet (CD) following USDA MyPlate guidelines. Energy intake and HEI-2010 were calculated from food records using the Nutritional Data System for Research -2011. Data from 90 participants (eSLD= 49, CD=41), with food records at baseline and 6 months are included in this analysis.

Results

Energy intake decreased significantly from baseline to mo 6 in both groups; however, the between group difference for change in energy intake was not significant (eSLD = -506+- 556 kcal/day; CD=-491+- 987 kcal/day, p=0.94). There were no significant within or between group changes in total HEI-2010 (eSLD = 2.5 +/- 11.3; CD = 1.7 +/- 10.2, p= 0.36). However, scores for total fruit, whole fruit, total vegetable, and empty calorie improved (all p < 0.05) in the eSLD group, while only whole fruit score significantly improved in the CD group (p = 0.01).

Conclusions

Both the eSLD and CD diet significantly reduced energy intake and provided improvements in components of diet quality over a 6 month weight loss intervention in adults with IDD.

T-2121-P: Limiting Variety of Non-Nutrient-Dense, Energy-Dense Foods:
Changes in Cravings during an 18-Month Lifestyle Intervention

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Background

Decreasing intake of specific foods reduces cravings for these foods. Limiting food group variety reduces food group intake and potentially food group cravings. We measured non-nutrient-dense, energy-dense food (NND-EDF: chips, cookies) cravings during an intervention that limited NND-EDFs variety.

Methods

Two hundred two adults (51.3 ± 9.5 y; 34.9 ± 4.3 kg/m2, 57.8% women, 92.2% white) were randomly assigned to an 18-month Lifestyle (1200-1500 kcal/d, ≤ 30% of energy as fat; n = 101) or Lifestyle + limited variety (LV) (limit variety of NND-EDFs to 2 choices; n = 101) intervention. Diet (3, 24-hr dietary recalls), number of cravings/week for NND-EDFs, number of different NND-EDFs craved/week, and weight were measured at 0, 6, 12, and 18 mo.

Results

LV consumed less variety (p < 0.01) and daily energy (p < 0.05) from NND-EDFs than Lifestyle at 6, 12, and 18 mo. No condition difference in %wt loss occurred (18 mo = -9.7 ± 8.4%). Cravings for NND-EDFs significantly decreased, with no condition difference (0 mo = 4.3 ± 8.4/week; 18 mo = 1.5 ± 4.1/week; p < 0.05). For number of different NND-EDFs craved, LV significantly (p < 0.05) reduced cravings at 6, 12, and 18 mo, with significantly lower cravings than Lifestyle at 18 mo (LV = 0.4 ± 0.4/week vs. Lifestyle = 0.6 ± 0.8/week; p < 0.05).

Conclusions

Reducing NND-EDF variety within a lifestyle intervention decreased the number of different NND-EDFs craved, which was also related to a lower intake of these foods.

T-2122-P: Assessing Behavioral Predictors of Suboptimal Weight Loss after Bariatric Surgery: The Dietary-
Adherence Intake and Eating Test (DIET)

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Background

Up to 30% of patients experience suboptimal weight loss outcomes after bariatric surgery. Reliable and valid clinical measures are needed to detect the presence of early post-op behavioral predictors of poor outcome to allow for subsequent targeted interventions.

Methods

The Dietary-adherence Intake and Eating Test (DIET) contains 13 items generated from a previous signal detection analysis that identified the most sensitive and specific behavioral predictors of suboptimal weight loss using a large dataset of post-bariatric patients. Presently, 88 patients completed the DIET between 2-weeks and one-year post-op (mean = 3.63 ± 3.12 months). The sample was 73% female, mean age = 46.83 (+-11.52) years, and mean BMI = 36.53 (+-12.30) kg/m2. To examine temporal stability, 30 of these participants completed the DIET again 2-4 weeks thereafter. A maximum likelihood exploratory factor analysis investigated the data's internal reliability and latent structure.

Results

The DIET demonstrated good test-retest reliability (r(30)=.648; p<.001) and internal consistency (Cronbach's alpha = 0.86). All items loaded adequately onto a one-component factor solution accounting for 48.26% of the variance.

Conclusions

The DIET: 1) is a brief, reliable, and internally consistent with good psychometric properties; 2) can be administered to patients up to one year post-op for early detection of behavioral predictors of suboptimal weight loss outcomes; and 3) may inform subsequent targeted intervention.

T-2123-P: Mobile Technology Tools to Improve Physical Activity and Healthy Eating Among Families

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Background
Mobile applications (apps) offer a scalable way to deliver family obesity interventions. The aim of the present study is to test the efficacy, usability, and acceptability of commercial apps and mobile monitoring devices for physical activity (PA) and healthy eating (HE) with parent-child dyads.

**Methods**

Parent-child dyads interested in improving their PA and HE using mobile technology were recruited from the community. Enrolled dyads (n=3) attended pre- and post-test assessments at the university research center, including measurement of their height and weight. Dyads completed a 4-week mobile-based program to test PA and HE apps (selected based on prior study by research team), and PA monitoring devices (e.g., FitBit), which included brief in-person visits and remotely-delivered content. At post-test, dyads participated in a structured interview about their preferences for app and device features. Validity of devices was tested with concurrent use of accelerometers.

**Results**

Though recruitment was difficult, engagement of enrolled dyads (n=3) was excellent. Parents were female, with an average BMI of 25.5±1.4 kg/m2; children were 10±0.3 years old (1 female, 2 male). Emerging qualitative themes included feedback that dyads enjoyed using the PA technologies but wanted progress graphs from apps and more immediate feedback from devices (e.g., readout screen); interviews also revealed gaps in the functions of HE apps. Paired t-tests suggest that no single PA device was most effective at motivating dyads to increase PA.

**Conclusions**

This is the first known study to test PA devices with families, including concurrent testing of accelerometers on children. Given the known deficiencies of existing commercial apps and devices for PA and HE, theory-based recommendations and pilot testing are essential for future success.

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**T-2124-P: Ecological Momentary Assessment of Dietary Lapse Experiences among Overweight and Obese Adults in a Behavioral Weight Loss Study**

*Leah Schumacher; Evan M. Forman, PhD; Meghan L. Butryn, PhD; Danielle Arigo, PhD;*

**Background**

Behavioral weight loss (BWL) programs have limited long-term effectiveness, largely due to poor adherence to dietary prescriptions. Occasional lapses in adherence are to be expected, but frequent lapses may cause weight gain. The psychological factors associated with lapses are poorly understood.
Methods

This is among the first studies to use ecological momentary assessment (EMA) to examine the relations among dietary lapses and several psychological variables that the cognitive behavioral (CB) model of relapse prevention posits are important to understanding lapse responses. EMA allows repeated measurements taken in individuals’ natural environments. Participants (n=52, MBMI=38.3 kg/m2) in a BWL study responded to EMA prompts 6 semi-random times per day and when a lapse occurred during the first 14 days of treatment. At each prompt, participants reported whether they had a recent lapse, and their attribution for the lapse, self-efficacy, self-regard, and negative affect (e.g., sadness).

Results

Within person, lapses were associated with greater sadness, lower self-efficacy, and more negative self-regard compared to non-lapse prompts (ps<.03). Most lapses (69%) were fully attributed to internal causes. More external attributions were concurrently associated with higher self-regard (r=.11, p=.05); internality-externality of attribution was not related to mood or self-efficacy (rs=.08). These results provide support for some of the hypothesized relations among attribution, affect, and self-efficacy posited by the CB relapse model.

Conclusions

This study contributes to the growing literature on dietary lapses. Future research should examine which psychological factors associated with lapses most strongly predict whether a lapse precipitates a relapse (i.e., abandoning weight control goals) or remains a temporary ‘slip’ in adherence.

T-2125-P: Using an Environmental Intervention to Encourage Healthy Food Choices at a Military Dining Facility

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Background

Less than 20% of military personnel regularly consume a diet that follows USDA guidelines. To address this problem, a MyPlate intervention was introduced in an Army dining facility (DFAC). It was hypothesized that the intervention would promote better adherence to USDA dietary guidelines.

Methods

The MyPlate intervention consisted of four components: (1) plates whose surface depicted the MyPlate model, sized appropriately for portion guidance, replaced plain plates, (2) MyPlate trays replaced plain trays, (3) foods were labeled with their appropriate MyPlate quadrant or circle, and (4) posters introduced
the new plates, trays, and food labeling system. Military participants (15 men, 3 women, age = 30 ± 13) ate lunch in the DFAC for six weeks: a two-week baseline, a two-week MyPlate intervention, and a two-week post-intervention period. The digital photography method measured food intake at two lunches per week. Food intake was estimated from photos by three trained raters.

**Results**

Participants' dairy consumption increased significantly from baseline (0.5 cups/meal; 17% RDA) to intervention (0.81 cups; 27% RDA; \( p < 0.005 \)). Protein consumption decreased from baseline (45g; 99% RDA) to post-intervention (37g; 81% RDA; \( p < 0.05 \)). There were no significant changes in fruit, vegetable, and whole grain consumption during the MyPlate intervention. The participants consumed, on average, 1.2 cups of vegetables (40% RDA), 0.33 cups of fruit (17% RDA), and 0.01 ounces of whole grains (<1% RDA) during all three phases.

**Conclusions**

A brief MyPlate intervention in a military DFAC was an effective tool to increase dairy consumption. Very low intake of whole grains compared to USDA recommendations suggests that increasing whole grain consumption should be a goal for future dietary interventions for US Army Soldiers.

**T-2126-P: Response Inhibition and Trait Impulsivity in Young Adults with High and Low Levels of Hedonic Hunger**

*Lisa M. Shank, MS; Bradley M. Appelhans, PhD; Allison E. Tipton, BS; Stephanie Malamas, BS; Na Young Kim, BS; Michael R. Lowe, PhD*

**Background**

Individuals with high hedonic hunger are driven to consume food for pleasure, which may predispose them to loss-of-control eating and weight gain. We studied whether hedonic hunger was related to response inhibition difficulties, and whether inhibition varied by hunger state and/or exposure to food.

**Methods**

Participants were 97 undergraduates (\( M_{\text{age}}=19.8±1.4; 61.9\% \) Caucasian) primarily within a healthy weight range (\( MBMI = 23.3±4.5 \)). Hedonic hunger was measured with the Power of Food Scale (PFS). Participants scored in the upper (H-PFS) or lower tertile (L-PFS) and also completed the Barratt Impulsiveness Scale (BIS). Participants, who consumed a standardized breakfast before the study visit, were randomized to one of four conditions, which varied hunger level (hungry, sated) and food presence (yes, no) during the cognitive test. Participants completed the Conners' Continuous Performance Test II (CPT-II) under one of these four conditions.
Results

With BMI controlled, the H-PFS group committed significantly more commission errors on the CPT-II than the L-PFS group (p<.01). No main effects or interactions involving hunger state or food exposure condition were found. Additionally, compared to the L-PFS group, the H-PFS group self-reported higher levels of trait impulsivity for the BIS total score as well as the three BIS subscales: attentional impulsivity, motor impulsivity, and non-planning impulsivity (ps<.02).

Conclusions

The H-PFS group displayed difficulty with response inhibition, which did not vary by hunger state or food exposure. Correspondingly, the H-PFS group reported higher impulsivity. Future research should examine whether impulsivity mediates eating- and weight-related outcomes in this population.

T-2127-P: Associations between BMI, Body Composition and Gait Speed in Overweight and Obese Adults

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Background

Slow gait speed (GS) is a predictor of disability and mortality in older adults. Also, overweight and obese individuals walk at slower speeds than normal BMI individuals. This study examined associations between BMI, body composition, and usual pace GS in overweight and obese adults.

Methods

Participants (N=300, BMI=43.62+-9.81 kg/m2) were individuals being treated at the Wake Forest Baptist Health Weight Management Center who were enrolled in a clinical outcomes study. Gait speed (GS) was measured by a timed 4-m walk at the patient's usual pace. Body fat % (BF%), total fat mass (FM), and lean mass (LM) were measured by bioelectrical impedance. Pearson correlations were performed between body composition components and BMI with GS. One-way ANOVA was used to test for differences in GS and BF% between normal weight, overweight, and class I, II, and III obesity.

Results

There was a significant negative correlation between GS and BMI (-.476, p<.01), GS and BF% (-.247, p<.01). Correlations between GS and LM were not significant. GS was lower with higher levels of obesity, and differences were significant between BMI categories: F(4, 300) = 17.3, p < .001. Mean GS (m/s) in normal = 1.18, overweight = 1.31, class I=1.26, class II=1.16, class III=1.10. BF% and FM also increased with obesity level: F(4,284) = 37.65, p<.001; F(4, 284) = 8.96.
Conclusions

Slower gait speeds are associated with higher BMI and FM in the overweight and obese population. Further research is needed to determine whether slow gait speed is modifiable and whether it is also a predictor of poorer health outcomes and weight loss success in the overweight and obese population.

T-2128-P_DT: Race Differences in the Energy Expenditure Response to Sleep Restriction

Andrea M. Spaeth, PhD; David F. Dinges, PhD; Namni Goel, PhD;

Background

Habitual short sleep duration is a significant risk factor for weight gain and obesity, particularly in African Americans. Increased caloric intake contributes to this relationship but it remains unclear whether decreased energy expenditure is also a contributory factor.

Methods

After two baseline sleep nights, 36 subjects (21-50y, 15 females, 22 African Americans) were randomized to an experimental condition (n=25; 4h time-in-bed [TIB]/night for 5 nights followed by 1 night of 12h TIB recovery sleep) or a control condition (n=11; 10h TIB/night), in a laboratory protocol with ad libitum food/drink access and limited physical activity. Metabolic rate and respiratory quotient were measured using indirect calorimetry in the morning after overnight fasting and again 30 minutes after consumption of a standardized liquid meal.

Results

Resting metabolic rate decreased after sleep restriction (p<0.05) and returned to baseline levels after recovery sleep but did not vary in control subjects. Relative to Caucasians (with age and fat-free mass as covariates), African Americans exhibited a lower resting metabolic rate after baseline sleep, sleep restriction and recovery sleep, a smaller rebound in resting metabolic rate after recovery sleep, and a higher respiratory quotient (indicating decreased lipid metabolism) after sleep restriction (all p<0.05).

Conclusions

Sleep loss produces energy expenditure changes that may contribute to weight gain. African Americans may need to compensate for energy expenditure deficits by reducing caloric intake or increasing physical activity to prevent weight gain. [NIH R01 NR004281 & F31; CTRC UL1RR024134; ONR N00014-11-1-0361]
T-2129-P: Altered Approach-Avoidance Tendencies in Obese Women Following Attentional Retraining

_Elena Spieler, PhD; William Sharp, Bachelor of Science; Tracy Sbrocco, PhD_

**Background**

Selective attention toward high-calorie food cues (e.g., attention bias (AB)) is linked with food craving and overeating. Reducing AB to palatable foods may be achieved with cognitive training. This study tested whether attention retraining (AR) alters AB toward high-calorie food cues in obese women.

**Methods**

Obese (n=36; body mass index (BMI) 36.3+6.0kg/m2) and healthy weight (n=43; BMI 22.2+2.1kg/m2) women completed a single two hour laboratory session one hour post-lunch. Participants were randomly assigned to complete a visual probe retraining task that focused attention toward low-calorie food stimuli (i.e., encouraging avoidance of unhealthy foods) or a matched control task (i.e., no-retraining). AB was measured at baseline and post-AR using a standard visual probe task.

**Results**

AB index scores changed between pre and post training ($F(1, 74) = 3.960$, $p = 0.050$) among OB ($p = 0.023$) women, particularly OB women who completed AR ($p = 0.026$). The direction of AB index scores among this subgroup changed ($p = 0.036$) from an approach tendency toward high-calorie cues at baseline ($M = 5.61$, $SD = 27.36$) to an avoidance tendency for high-calorie foods ($M = -12.97$, $SD = 50.93$) post-AR.

**Conclusions**

AR may encourage high-calorie food avoidance in real-life situations. AR may benefit women who experience dissonance (e.g., I want to lose weight but I want cake) by altering approach-avoid tendencies, reducing internal conflict that interferes with successful long-term behavior change.

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T-2130-P: Is Calorie Restriction Associated with the Development of Eating Disorders in Non-Obese Adults?
Background

The Comprehensive Assessment of the Long-term Effects of Reducing Intake of Energy II (CALERIE-II) study is a multicenter, parallel group, randomized controlled trial of 25% caloric restriction (CR) vs. an ad libitum (AL) control in non-obese humans.

Methods

The present study reports data on the association of calorie restriction (intentional dietary restriction) and the development of eating disorder symptoms in CALERIE-II. 220 healthy weight and overweight adults (body mass index between 22.0 and 27.9 kg/m2), aged 21-50 (men)/21-47 (women), with no significant medical history or psychiatric/behavioral problems that may have interfered with study completion were randomized in a 2:1 allocation to the CR or AL group. Two participants failed to start the intervention resulting in an analysis population of 218.

Results

Outcomes included changes in: body weight, dietary restraint, eating disorder symptoms, cognitive bias for food and body shape related information, and weight self-efficacy. CR was associated with significantly decreased weight, decreased binge eating, increased dietary restraint, and improved body image. CR was not associated with the development of eating disorder symptoms or cognitive biases for food and body shape related information. Further, compared to the control group, the CR group experienced a larger increase in weight self-efficacy.

Conclusions

In sum, study results indicate that calorie restriction does not cause eating disorder symptoms in healthy non-obese adults.

T-2131-P: Energy Expenditure Response to Acute Vibration Exercise

Pamela D. Swan, PhD; Zachary Zeigler, MS;

Background

Time efficient strategies that increase energy expenditure (EE) are needed. Whole body vibration (WBV) with resistance exercise (RE) consists of performing RE while standing on a machine that generates repeated rapid oscillations. This study examined post exercise EE in response to acute WBV.
Methods

Eleven adults (BMI = 26 ± 2 kg/M2) participated in a randomized crossover trial of WBV plus RE or Control (CON). Subjects came to the lab fasted, refrained from exercise for 24hr at the same time of day. Baseline VO2 was assessed after 30 minutes of rest. WBV was performed while standing barefoot on a vibration platform (Pneumex Pro-Vibe) with a frequency of 35 Hz and amplitude of 5 mm. 10 minutes of RE consisted of 15 repetitions of 9 exercises at 10% body weight with 30 seconds rest. Following exercise subjects were seated and VO2 was measured continuously for 180 minutes. During CON, subjects remained seated for the entire time. Total EE was determined as net VO2 averaged over 15 minutes.

Results

Mean rating of perceived exertion (RPE) during WBV was 12.9 ± 2.1 which is considered 'somewhat hard' on a Borg 6-20 point scale. Total VO2 was significantly (P < .001) greater for WBV as compared to CON (75.0 ± 12.0 Liters vs. 55.0 ± 11.0 Liters). Post exercise respiratory exchange ratio (RER) was significantly lower for WBV compared to CON (P < .001). Total net EE over 180 minutes for WBV was 100 ± 58 kcal greater than CON.

Conclusions

Ten minutes of WBV plus RE was well tolerated, elicited a moderate intensity perception of effort and produced significantly greater energy expenditure than sitting. WBV could be considered a viable and time efficient way to increase energy expenditure for overweight men and women.

T-2132-P: Behaviors Associated with Early Evaluation of Weight Loss for Identifying Non-Responders to a Weight Loss and Maintenance Intervention

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Background

Early identification of behaviors associated with weight maintenance (WM) is neccessary to inform future intervention design. Objective: To determine the behaviors associated with early weight loss (WL) success (i.e., month 1, 2, 3) and their relationship with WM at 12-months post WL.

Methods

Methods: Participants included 390 over weight and obese adults (BMI=34.78 ± 4.77) that participated in an 18M WL (6M) and WM (12M) trial designed to reduce caloric intake through the use of portion
controlled meals (PCMs) and increased physical activity. 1, 2, 3 and 18M weight changes and corresponding behaviors were calculated and results were adjusted for age, gender, ethnicity and BMI. Results: Participants achieving at least 3% WL at 1M were 6.04 (95% CI: 3.25, 11.24) times more likely to achieve 10% WL at 6Ms and 1.78 (95% CI: 0.81, 3.90) times more likely to maintain at least 5% WL at 18M compared to those losing less than 3% initially.

Results

The odds of achieving 10% WL at 6Ms were increased to 14.17 (95% CI: 3.89, 51.68) and 21.80 (95% CI: 2.54, 187.16) when using the 3% threshold at 2 and 3Ms, respectively. The odds of maintaining 5% WL at 18Ms were increased to 11.46 (95% CI: 1.31, 100.49) when using the 3% threshold at 2Ms. Achieving less than 3% WL is associated with being male (p=.00) and consuming more PCMs (p=.02), attendance (p=.03), and fruit and vegetable consumption (p=.04) at 1, 2, and 3Ms, respectively.

Conclusions

Conclusion: These findings validate that the first few months of WL treatment are crucial to WM long-term and that early success is associated with PCM and fruit and vegetable consumption, and class attendance. This information can be used to inform future WM intervention design to improve success.

T-2133-P: Meal Replacement Plans to Support Weight Loss Among People with Mental Illnesses

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Background

Increasingly, meal replacement plans (MRP) are being recommended by health professionals and used in research to support weight loss and weight maintenance. However, studies have yet to investigate the feasibility or efficacy of using MRP among people with mental illnesses (MI).

Methods

Participants with a MI were recruited from a community mental health center in Chicago. Participants attended an in-person baseline assessment and were provided with a four week supply of SlimFast MR products. They were also offered 4 brief, weekly telephone coaching calls and attended an in-person end-of-treatment assessment 5 weeks post-baseline. During each coaching call and at end-of-treatment participants were asked about daily frequency of use of MR products and usefulness of the MRP (not at all - extremely useful). They also completed the Depression, Anxiety and Stress Scale (DASS-21). Participants' weight and BMI were also recorded.
Results

11 participants with a MI were recruited. They were aged 23-65 years (M= 50.8) and nine were women. Participants reported using at least one MR product on an average of 6.5 days per week. Mean BMI decreased from 35.8 to 35.1 during the study and change in weight ranged from -15 lbs to +3 lbs (M= -4.43 lbs). All but two participants lost weight during the study. For all but one participant, scores on the DASS-21 decreased during the study. 40/44 (90.9%) coaching calls were attended.

Conclusions

These results suggest that using MRP as a strategy to support weight loss and weight maintenance is feasible and potentially effective among people with MIs.

T-2134-P: Associations Between Healthful Dietary Variety and Weight Change Among Pounds Lost Participants

Maya Vadiveloo, PhD; Frank M. Sacks, MD; George Bray, MD; Catherine Champagne, PhD; Josiener Mattei, PhD, MPH.

Background

Greater variety among energy-poor, nutrient-dense foods may improve the palatability and sustainability of low-calorie diets and improve weight outcomes. Healthful food variety favorably affects adiposity cross-sectionally, but it is unclear if it predicts longitudinal changes in body weight.

Methods

367 participants in the Pounds Lost trial with 7-day food records at baseline and three 24-hour dietary recalls at 6-months were analyzed. Healthful dietary variety quantified using the US Healthy Food Diversity (HFD) index was calculated for each participant. Body weight (kg) and waist circumference(cm) were measured at both time points. We used generalized linear models to estimate the effect of changes in the US HFD index on weight and waist circumference (WC) change. Changes in US HFD scores were divided into tertiles (T), with individuals in T1 reducing US HFD scores over time and individuals in T3 improving their scores.

Results

Energy intake reduction was similar across US HFD index change tertiles in multivariable models (-401 vs.-271 kcal in T1 vs.T3, p=0.15). However, adults in the highest US HFD change tertile lost the most weight in age- and sex- (F²= -0.73, p=0.04) and multivariable-adjusted (F²= - 0.72, p=0.06) analyses, albeit non-significantly. Although WC was non-significantly reduced across tertiles after age-and sex (F²= - 0.77,
(p=0.06) and multivariable (\(\hat{\beta}=-0.64, p=0.13\)) adjustment, WC change was significantly higher in T3 vs. T2 (-9.0 vs. -6.8 cm, p=0.02).

**Conclusions**

We provide preliminary evidence that increasing healthful food variety while reducing energy intake may improve weight loss outcomes among individuals trying to lose weight.

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**T-2135-P: Behavioral Interventions for the Treatment of Night Eating Syndrome: A Pilot Study**

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**Background**

Night eating syndrome (NES) is an eating disorder characterized by delayed circadian food intake, resulting in excessive evening and nighttime food intake. The purpose of the present study was to evaluate the effectiveness of a behavioral intervention for NES using a stacked treatment approach.

**Methods**

Forty-four participants were randomly assigned to the Education (E; n=14), Education plus Progressive Muscle Relaxation Therapy (E/PMR; n=15), or Education plus PMR and Exercise (E/PMR/EX; n=15) groups. Participants received the intervention at baseline with a follow-up intervention session one week later. Outcomes were evaluated at week three.

**Results**

All groups improved on total symptom scores (p<.001), # of days on which breakfast was eaten (p<.01), % food intake after the evening meal (p<.001), # of nighttime awakenings per week (p<.05), and # of nighttime ingestions per week (p<.01). The E/PMR group had the greatest improvement in % eaten after the evening meal (-30.5%), followed by the E/PMR/EX (-20.4%) and E (-9.5%) groups. Reductions in symptom scores were associated with reductions in depression (r=.44, p<.01) and perceived stress scores (r=.36, p<.05).

**Conclusions**

Conclusions: This brief intervention for NES holds promise and warrants investigation in a larger trial.
T-2136-P: Protein Supplementation and Weight Loss in a Physician-Supervised Weight Loss Program

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Background

It is known that protein supplementation increases satiety and decreases caloric intake in randomized controlled clinical trials. Less is known about the weight loss impact of supplementation with protein bars and shakes in patient self-selected and self-moderated settings.

Methods

This is a retrospective, cohort study, with weight loss expressed as a percentage of patients' starting body weight (n=477). Data collection occurred seasonally at one location and continued until patients discontinued the program (maximum of 16 weeks). Patients received intensive lifestyle coaching as part of a physician-supervised weight loss program but self-selected if and how much supplementation to get from protein bars and shakes. Multiple linear regressions were performed to assess the associations between the quantity of protein bars and shakes purchased and weight loss at follow-up weeks 4, 8, and 12.

Results

Patients who purchased more of the protein bars and shakes lost on average more weight than patients who did not. These findings were statistically significant for weeks 4 (p<0.03), 8 (p<0.01), and 12 (p<0.01) of the program. For example, at week 12, patients who purchased the most protein bars and shakes (average: 14.2) lost, on average, 12.2% of their starting body weight while patients who purchased the least (average: 1.7) lost, on average, 10.7%.

Conclusions

Our findings are consistent with other studies that have linked patients' weight loss outcomes to use of protein supplements. Results indicate that the purchase of protein bars and shakes is positively associated with weight loss.

T-2137-P: The Group Cognitive-Behavioral Therapy (G-CBT) in Obesity
with Binge-Eating Disorder (BED): Strengths and Weaknesses of Follow-Up

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Background

BED associated with obesity should be treated with dietary habits changes, physical activity promotion, behavioral strategies and cognitive restructuring. G-CBT fits into this context as a useful therapeutic tool, but long-term results are often poor due to loss of motivation and drop-out.

Methods

Our G-CBT experience started in 1995 with 245 patients (pts) followed until 2008. Due to the high rate of drop-out (58 % at 12 months) in 2009, in order to improve the outcome of therapy, we changed the G-CBT intensifying the follow-up: 66 pts (63 females, 3 males), average age 47 yrs, began the 12-weeks G-CBT program, starting with individual interview, anthropometric and serum data collection, calorimetry, BIA. Tools used were as follows: food pyramid and guidelines on chronic degenerative diseases prevention, food and physical activity diary, Miller wheel of change, assertiveness strategies. Group-conductors (physicians and dietitians) are trained in G-CBT and group analytic techniques.

Results

The 66 pts. showed a good BMI trend, that was as follows at baseline (BL), at the end of the G-CBT, at 6 and 12 months (average and SD): 33.0 (29.4-35.6), 32.4 (27.9-37.2), 31.4 (27.0-35.8), 31.0 (27.9-33.6) with a p<0.05 (=0.017) at 12 months vs. BL. Waist circumference (WC) in women (in cm) was at same intervals: 108 (102-116), 102 (97-107), 100 (88-114), 100 (95-106) with a p <0.01 (=0.009 ) at 12 months vs. BL. Calorimetry showed a basal metabolic rate 10-15% below Harris-Benedict BEE. Drop out at 6 months was 30%, at 12 months was 50%.

Conclusions

In our experience an intensive follow-up, compared to our previous approach, succeeded in improving significantly the outcome of treatment in compliant pts., but has not led to a significant reduction of the drop-out, that shows anyhow a good trend with better results compared to other CBT studies.

T-2138-P: Changes in the Edmonton Obesity Staging System Scores After a Six-Month Obesity Intervention Program
in Obese Patients With and Without Type 2 Diabetes

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Background

Treatments for obesity and diabetes seek to improve overall health beside weight loss (WL) and glucose control. We aimed to evaluate the effect of a six-month Obesity Program on the Edmonton Obesity Staging System (EOSS) scores in subjects with diabetes in comparison with subjects without diabetes.

Methods

Retrospective database analysis of 837 patients who completed a six-month Multidisciplinary Obesity Program. Comparisons between initial and final EOSS scores of subjects with and without type 2 diabetes mellitus (T2DM) were performed. EOSS establishes five categories according with medical, mental and functional aspects: 0, no obesity-related risk factors; 1, subclinical factors, and/or mild physical symptoms, psychopathology or functional limitation; 2, established chronic diseases, psychopathology or functional limitation; 3, established end-organ damage, significant psychopathology or functional limitation; 4, severe disability.

Results

Twenty-eight percent of the sample had T2DM. Diabetic patients were older (37.2 versus 43.4 yrs). There were no statistical differences in initial BMI, %WL, weight gain and exercise at the end of the Program. Medical comorbidities improved significantly in diabetic patients, but goals of metabolic and blood pressure control were better achieved by non-diabetic subjects. Despite that, there were no significant differences in the improvements in mental health, function and EOSS scores between diabetic and non-diabetic subjects.

Conclusions

Subjects with type 2 diabetes improved goals of control as well as weight, function, and mental health in a Program focused on weight management. Changes in EOSS scores were similar between diabetic and non-diabetic subjects.

T-2139-P: Validation of a New Obesity Model to Epidemiological and Cost Studies
Background

Obesity adversely affects health and quality of life and increases medical costs. Credible, scientifically robust health economic models are important in healthcare decision making. Our aim was to validate a natural history model of obesity to short- and long-term clinical and economic outcomes.

Methods

The model is a fixed-time-increment patient-level simulation designed to model the natural history of obesity, its impact on quality of life and life expectancy and its clinical and economic implications. Published risk equations were utilized to predict obesity-related complication risk. Validation was undertaken to 170 endpoints from nine epidemiological studies and one cross-sectional cost study. Clinical endpoints included diabetes incidence, cardiovascular (CV) disease, diabetic retinopathy, neuropathy and nephropathy, end-stage renal disease, myocardial infarction, stroke, all-cause and CV mortality and total annual medical cost.

Results

Validating modeled clinical endpoints to all epidemiological studies yielded an R² goodness-of-fit statistic of 0.92. Validating to internal and external endpoints led to R² statistics of 0.95 and 0.92, respectively. Compared to a reported incidence of 55, the model predicted 58 incident cases of diabetes per 1,000 patient-years. The model estimated total annual costs rising from $6,867 to $8,853 across a BMI range of 27.5-45.0kg/m², versus an observed range of $7,070-10,096 derived from US medical insurance data, with an R² of 0.95.

Conclusions

The model produced results consistent with epidemiological findings across numerous clinical endpoints and relatively accurately estimated BMI-related medical expenditure. Its replication of clinical and economic outcomes supports its use in obesity-related healthcare decision making.

T-2140-P: The Amount of Weight Loss Required to Produce Clinically Important Improvements in Health-Related Quality of Life in the Severely Obese

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Background

Treatment guidelines indicate that 3-5% weight reductions produce clinically meaningful health benefits. Of all health outcomes, patients consistently rate health-related quality of life (HRQL) as most important. It is unclear if 3-5% weight loss produces clinically meaningful HRQL improvement.

Methods

Data from the APPLES study, a population-based, prospective Canadian cohort was examined. Two-year changes in weight and HRQL measures [Short-Form (SF)-12 physical (PCS) and mental (MCS) component summary score, EQ-5D Index and Visual Analog Scale (VAS), Impact of Weight on Quality of Life (IWQOL)-Lite total score] were calculated in 500 patients. Multivariable linear regression models were constructed to calculate HRQL improvements associated with 1% total body weight reduction. Model coefficients were then used to estimate the weight loss that would be required to achieve pre-defined, widely accepted, minimal clinically important improvements for each HRQL instrument.

Results

Mean age was 43.7(SD 9.6) years, 88% were women, 92% were white, and mean baseline BMI was 47.9(8.1) kg/m2. Mean baseline PCS score was 37.9(10.3), MCS score was 41.9(10.4), EQ-index was 0.73(0.19), EQ-VAS was 57.0(20.4) and IWQOL-Lite total score was 45.2(20.4). Percent weight reductions required to achieve minimal clinically important improvements in HRQL were: 23% (95% CI: 17.5, 32.5) for PCS, 25% (17.5, 40.2) for MCS, 9% (6.2, 15.0) for EQ-Index, 23% (17.3, 36.1) for EQ-VAS, and 17% (14.1, 20.4) for the IWQOL-Lite total score.

Conclusions

Weight reductions required to achieve minimal clinically important improvements in HRQL are markedly higher than the 3-5% weight loss thresholds recommended in contemporary guidelines. We estimate that, depending on the HRQL instrument, weight reductions of 9-25% are needed instead.

T-2141-P: Physical Activity Behaviors Between Successful and Unsuccessful Weight Loss Intervention Completers

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Background

Few studies have examined differences between participants who successfully lose weight and those who gain weight after completing a weight loss intervention. Studies examining physical activity behaviors have found mixed results.
Methods

A longitudinal RCT was conducted over 12 months with 3 treatment groups. This study focuses on identifying differences among 12-month completers who gained weight (N = 246) and lost weight (N = 126) in 3 treatment groups: computer guided intervention (CGI), CGI plus clinical staff, and workbook only. Measurements collected at baseline included perceived exercise barriers, as well as exercise engagement, confidence, and time management. Treatment groups including CGI intervention prompted participants to select weekly behavioral prescriptions, which were specific measurable exercise, dietary, and cognitive behavioral goals. Participants rated their success during the following CGI session.

Results

Significant associations were found among exercise confidence and success of goals (r = .23, p<.01, N = 225), perceived barriers of exercise and behavioral goal success (r = -.162, p=.017, N=225), and total goals and final weight loss (r = .145, p=.030, N = 225) in the successful weight loss group only. Independent T-tests revealed no significant differences between both groups and baseline measurements of physical activity engagement, confidence, and time management, nor on perceived barriers of exercise.

Conclusions

Despite non-significant differences among the groups, overall results indicate that setting behavioral goals, addressing perceived barriers of exercise, and increasing exercise confidence among participants of weight loss interventions may be important components which yield successful weight loss.

T-2142-P: Do Measures of Inhibitory Control Predict Weight Loss Outcomes in Overweight Women Participating in an Education-Based Weight Reducing Dietary Intervention?

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Background

Research indicates that maladaptive eating behaviors and obesity are related to impaired executive function and poor impulse control. We hypothesize that factors related to inhibitory control will predict weight loss outcomes in overweight women.

Methods
Subjects (n=55) were invited to participate in a 9wk education based dietary intervention, designed individually to reduce body weight by 1 lb/wk. Subjects met with nutrition educators weekly to be weighed and counseled. At baseline body weight was collected and subjects completed the Three Factor Eating Questionnaire and the Iowa Gambling Task (IGT), a cognitive test designed to engage executive networks that weigh risk in the context of future consequence. Data were analyzed using multiple linear regression with weight change as the outcome variable and cognitive restraint, disinhibition, hunger and the score from block 5 minus block 1 of the IGT as independent variables with age.

**Results**

Weight was reduced on average by 4.6% and mean restraint, disinhibition, hunger and IGT score were 11.7, 6.9, 5.4, and 14.7, respectively. While the model was significant r=0.528 p=0.03, only IGT score and hunger predicted the magnitude of weight change p=0.03 and p=0.05, respectively. When cognitive restraint and disinhibition were removed, the remaining model was highly significant, r=0.508, p<0.01.

**Conclusions**

Dieting requires the repeated inhibition to consume palatable, energy rich foods for the uncertain promise of improved health and appearance. Our results indicate that phenotypic variations in both hunger and executive function, related to assessing consequence, impact weight loss success.

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**T-2143-P: Long Term Effects of Weight Loss with a Very Low Carbohydrate, Low Saturated Fat Diet or a High Carbohydrate, Low Fat Diet on Endothelial Function in Patients with Type 2 Diabetes**

*Tom Wycherley; Natalie Luscombe-Marsh, PhD; Campbell H. Thompson, MD, DPhil; Jonathan Buckley, PhD; Manny Noakes, PhD; Gary A. Wittert, MD; Grant D. Brinkworth, PhD;*

**Background**

Very low carbohydrate, high fat diets are a popular weight loss strategy. However, compared to a traditional high-carbohydrate low fat (HC) diet, these diets have been associated with impaired effects on endothelial function that could be due to their high saturated fat content.

**Methods**
This study aimed to examine the effects of a hypocaloric very low carbohydrate, low saturated fat (LC) diet compared to an isocaloric HC diet, after 12-months, on brachial artery flow mediated dilatation (FMD; a measure of endothelial function) in patients with type 2 diabetes (T2D). 115 obese patients with T2D (age 58.4+-7.1[SD]yrs, BMI 34.6+-4.3kg/m2, HbA1c 7.3+-1.1%) were randomised to consume either a moderately energy restricted LC diet (Carb:Pro:Fat:Sat-Fat 14:28:58:<10; n=58) or an isocaloric HC diet (53:17:30:<10; n=57) whilst undertaking supervised exercise classes (60mins, 3/wk). Body weight and FMD were assessed before and after 6 and 12-months using mixed models analysis.

**Results**

72 participants completed the intervention (LC=40, HC=32). Both groups experienced similar substantial weight reduction after 6 months (-11.8+-6.5kg), followed by a small weight-regain from 6-12 months (1.9+-3.5kg; P<0.001) with no differential diet effects (P=0.99). FMD did not change significantly in either diet group (P=0.054 time, P =0.42 time x group).

**Conclusions**

Both diet groups achieved substantial weight loss and had comparable effects on FMD. This suggest that compared with a HC diet a very low carbohydrate diet that is low in saturated fat does not adversely affect endothelial function after 12 months of lifestyle intervention in obese patients with T2D.

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**T-2144-P: Improvements in Sleep Apnea Endpoints and Quality of Life are Related to the Degree of Weight Loss: Results from the Randomized, Double-Blind SCALE Sleep Apnea Trial**

*Gary Zammit, Dr; Gary Foster, PhD; Russell Rosenberg, PhD; Louis Aronne, MD; Thomas A. Wadden, PhD; Birgitte Claudius, MD; Christine Bjoern B. Jensen, MD PhD; Adam Blackman, MD;*

**Background**

The relationship between weight loss (WL) and endpoints related to sleep apnea and quality of life in the SCALE Sleep Apnea trial was examined *post hoc.*

**Methods**

Obese adults (72% male, mean age 49 years, apnea-hypopnea index [AHI] 49.2 events/h, body weight 117.6 kg) with moderate or severe obstructive sleep apnea (OSA) and unable or unwilling to use continuous positive airway pressure therapy were treated with liraglutide 3.0 mg (n=180) or placebo (n=179), both as adjunct to diet and exercise counseling, for 32 weeks. Pre-specified ANCOVA model
included treatment, country and gender as fixed effects and baseline age, BMI, parameter value as covariates. Post hoc analyses also included % weight change covariate and examined its interactions with other effects. Clinicaltrials.gov ID: NCT01557166. Funding: Novo Nordisk.

Results

Liraglutide 3.0 mg reduced AHI (-12.2 vs. -6.1 events/h, p=0.015) and body weight (-5.7 vs. -1.6%, p<0.0001) vs. placebo after 32 weeks. AHI reduction was significantly associated with WL, irrespective of treatment. The reduction in AHI per % WL depended on baseline AHI, with reductions of 0.7, 1.4, 2.8 events/h for baseline AHI cohorts <30, 30-59 and >=60 events/h (both groups, p<0.0001). Greater WL was also significantly associated with greater improvements in oxygen saturation, sleep architecture and quality of life endpoints (p<0.01, all).

Conclusions

Greater improvements in sleep apnea endpoints and quality of life were significantly associated with greater WL, irrespective of treatment. Greater WL was more likely with liraglutide. The liraglutide 3.0 mg safety profile was generally consistent with that seen with liraglutide in type 2 diabetes.

T-2145-P: How Does Self-Monitoring with a Mobile Device Affect Weight Loss Maintenance Over the Holidays?

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Background

In 1999, researchers reported that participants who consistently self-monitored using a paper diary maintained better weight loss over a 2-week winter holiday period. We examined the association between self-monitoring adherence using mobile technology and wt. change during a 6-week holiday period.

Methods

We used data from the Sunday before Thanksgiving to January 2nd from a 12-month behavioral weight loss study. Participants self-monitored their dietary intake using the Lose It! app on their smartphone and weighed themselves daily on a Wi-Fi scale. Weights were transmitted in real time to the Lose It! server and nightly to the study server. Participants had no contact with the interventionists from approximately December 23rd to January 2nd. We calculated weekly percent wt. change from week 1 to week 6. Adherence to self-monitoring was defined as the number of days that subjects recorded at least 50% of their calorie goal. Linear mixed modeling was used for statistical analysis.
Results

The sample (N=107) was predominantly female (89.7%), White (82.2%), on average, completed 16.8+2.8 years of education and was 51.6+9.6 years old with a BMI of 34.0+4.4 kg/m2. The mean percent wt. change at week 6 was -0.71+-2.00. The weekly mean percent days adherent to self-monitoring ranged from 69.0% (before Thanksgiving) to 51.1% (week between Christmas-New Years). There was a significant association between self-monitoring adherence and weight change (b=-0.01, p <.001).

Conclusions

Nearly two decades later, self-monitoring remains significantly associated with wt. loss maintenance over a 6-week holiday period. It is possible that technology-supported self-monitoring facilitated acceptable adherence to self-monitoring and prevention of wt. gain during the busy holiday season.

T-2146-P: The Prevalence of OSA among Participants in a Weight Loss Study

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Background

Overweight and obesity are known risk factors for obstructive sleep apnea (OSA). However, few weight loss studies have screened for OSA using objective measures. The study purpose was to use ApneaLink Plusâ“¢ to objectively measure the presence and severity of OSA in weight loss study participants.

Methods

This was a secondary analysis of data from a 12-month behavioral intervention for weight loss study. We excluded those with diagnosed OSA. Participants wore the ApneaLink Plusâ“¢ device at home for a single night; all studies had >= 4 hours of data. ApneaLink Plusâ“¢ automatically analyzes and derives apnea-hypoxia index (AHI) scores. AHI categories were <5, 5-14, 15-30, and >= 30, representing no, mild, moderate, and severe OSA, respectively. For data analysis, we dichotomized AHI as follows: normal (AHI<5) and OSA (AHI >=5). We used logistic regression to examine the associations between BMI and OSA unadjusted and adjusted for menopause.

Results

The sample (N = 119) was mostly female (90.8%), with 50.5+10.4 years old and a BMI of 34.0+4.6 kg/m2. OSA was present in 51.3% of the sample with a range of severity; mild in 40.3%, moderate in 9.2%, and severe in 1.7%. Having a higher BMI increased risk of developing OSA (OR=1.12, 95% confidence interval [CI]: 1.03, 1.21). Among 108 females, 39.3% were pre-menopausal, 23.4% perimenopausal, and 37.4% post-menopausal. The association between BMI and OSA remained significant after adjusting for menopausal status (OR=1.19, 95% CI: 1.07, 1.31).
Conclusions

OSA is present in a much higher percent of this overweight/obese sample than is reported for the general population. Objectively assessing OSA in weight loss study participants can be an important strategy for early detection and treatment of this disorder.

T-2147-P: Dual Trajectories of Weight Change and Adherence to Treatment Regimen during a 24-month Weight Loss Study

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Background

Researchers have reported that adherence to treatment regimens results in weight loss. However, no study has examined how temporal adherence patterns are associated with weight change patterns. Our aim was to identify trajectories of adherence and weight change and examine their temporal association.

Methods

This was a secondary analysis of data from a 24-mo. clinical trial of standard behavioral treatment (SBT) for weight loss. The sample (N=209) was mostly female (85%), White (78%) and on average 47+9 years old with a BMI of 34+4 kg/m2. Weight was digitally measured semi-annually. Adherence was measured as the average of five treatment components including attendance, self-monitoring, and adherence to calorie, fat and exercise goals. For data analysis, % weight change was calculated as ([weightt - weight0]/weight0)×100, t =6, 12, 18, 24 mos; % time adherent was calculated as the mean % of time adherent in each 6-mo block. Group-based dual trajectory modeling was used for data analysis.

Results

Three trajectories were identified for percent weight change from 6 to 24 mos: Weight loss maintenance (-16 to -20%); Weight regain (-8 to -4%); and Non-significant weight loss (-2 to 3%). Percent time adherent for 3 trajectories from 6 to 24 mos was estimated as High (75 to 21%); Medium (60 to 3%); and Low (29 to 2%). Temporal association (in terms of joint classification) showed that 58% in Weight loss maintenance group had high adherence; 53% in Weight regain group had medium adherence, and 65% in Non-significant group had low adherence.

Conclusions
Our analysis revealed distinct trajectories of adherence averaged over 5 intervention components of SBT over 24 mos and that these are associated with distinct weight change trajectories. Adherence patterns including initial magnitude and the decline rate collectively impact weight change patterns.

T-2148-P: In Silico Reverse Engineering of Human Energy Physiology using Agent-Based Modeling (ABM)

Edward Archer, PhD;

Background

Advances in computational simulation technology have facilitated the development of sophisticated representations of biological systems. While these techniques have the potential to be powerful complements to the more traditional animal and mathematical models of obesity, to date no in silico models of human metabolism have been validated.

Methods

Agent-based modeling (ABM) is a well-established computational simulation and analytic technique that explicitly represents multiple levels of heterogeneous entities (e.g., cells, tissues, organs) as virtual 'agents' via software programming. ABM methodology has been applied successfully to numerous fields as diverse as economics, ecology, and biomedical research. The in silico reverse engineering of human energy metabolism on the tissue/organ-level via the ABM methodology represents a major paradigm shift in obesity research, and is potentially transformative due to the significant strengths of this approach.

Results

The proposed ABM will be modular, hierarchical, and constructed in an iterative, data-driven process guided by in silico simulations. It will provide an experimental platform that facilitates the real-time examination of the micro-level interactions (e.g., fatty acid and glucose disposal) that yield the macro-level emergent phenomena of interest (e.g., changes in adiposity and body weight). The resulting experimental platform will be free of the resource, ethical, and practical constraints that limit in vivo experimentation with human subjects.

Conclusions

The development of an in silico model of human energy physiology via the ABM methodology represents a significant paradigm shift in the modeling and simulation of human obesity, and will provide an essential complement to mathematical and animal models, and in vivo experimentation.
T-2149-P_DT: DNA Methylation Changes Associated with Obesity: Identification of Risk Genes

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Background

Obesity is a growing pandemic, which increases risk to diabetes, heart disease and cancer, therefore making it one of the leading risk factors for death globally. Although several genetic loci have been linked to obesity measures, these account for only a small proportion of phenotypic variability.

Methods

There is growing interest in epigenetic mechanisms as mediators of obesity, and although DNA methylation is likely to play a role in obesity, few studies have investigated this on a genome-wide scale. We used the Illumina Infinium HumanMethylation450 array to interrogate >480,000 CpG sites across the genome for association with obesity measures (body mass index (BMI), waist circumference) in peripheral blood samples from 850 Mexican Americans within 39 large families. Using SOLAR, we conducted association analyses, applying a FDR of 0.05. Additional analyses are currently underway on a subset of 250 individuals for which we have DNA methylation data at an earlier time-point (5 years prior).

Results

We identified significant associations (FDR<0.05) between 29 CpG sites and either BMI, waist circumference or obesity. Several of these have been previously implicated in obesity or related disorders, including CPT1A (BMI p=2.58x10^-10, waist p=2.34x10^-8, obesity p=7.32x10^-8), ABCG1 (BMI p=8.04x10^-9, waist p=5.73x10^-9), SOCS3 (BMI p=3.68x10^-10, waist p=1.21x10^-10) and SREBF1 (BMI p=8.68x10^-10, waist p=1.02x10^-10). Additional potentially novel candidate genes for obesity risk were also identified.

Conclusions

DNA methylation plays a strong role in obesity, driven by both genetic and environmental factors, which we are investigating. To better understand the contribution of DNA methylation to obesity, we are examining longitudinal data to identify causal, rather than consequential, epigenetic factors.

T-2150-P: Epigenome-Wide Association Study (EWAS) of BMI in African
American Adults Identifies Multiple Replicated Loci

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Background

Obesity is an important component of the pathophysiology of diabetes, atherosclerosis, and other chronic diseases. Identifying epigenetic modifications associated with obesity, including DNA methylation variation, may therefore point to genomic pathways that are dysregulated in numerous conditions.

Methods

The Illumina 450K chip array was used to assay DNA methylation in peripheral blood DNA obtained from 2,107 African American adults (mean age 56.6 years, mean BMI 30.1 kg/m2) in the Atherosclerosis Risk in Communities (ARIC) study. Mixed effects regression models tested association of average methylation beta value (dependent variable) with concurrent BMI, with random effect for batch, covariate adjustment for potential confounders, and imputed white blood cell count differentials (p significance <1E-07). Replication using whole blood from 2,377 whites in the Framingham Heart Study and T cells from 991 whites in GOLDN was followed by testing using adipose tissue DNA in the MuTHER cohort.

Results

24 probes passed the threshold for significance in ARIC; direction of association was consistent and meta-analysis p was <1E-07 for 18 of them in the replication phase, including the recently published HIF3A site. Five (5/18) were also associated with BMI using adipose tissue DNA, including sites near PIK3IP1, LINC00649, PKM2, RM12, ANKRD11. Pathway analysis found over 100 gene ontology pathways significantly enriched including those involving immune response, cytokine signalling, lipid homeostasis, and neuronal development and differentiation.

Conclusions

There are numerous loci harboring individual variation in blood DNA methylation levels associated with BMI that replicate across studies despite variation in tissue type, ethnicity, and analytic approaches. Experimental and longitudinal study designs are needed, however, to assess causality.

T-2151-P_DT: Whole Exome Sequencing in Metabolically Healthy but Obese African American Women
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**Background**

Metabolically healthy but obese (MHO) individuals are apparently protected from obesity-related co-morbidities. However, the underlying mechanisms conferring this protection remain unknown. We hypothesized that coding genetic variants may be associated with the MHO phenotype.

**Methods**

We conducted whole exome sequencing (WES) on 20 African American women: 10 MHO cases and 10 non MHO controls. MHO was strictly defined using modified Wildman et al. criteria (2008). Sequence was aligned to the hg19 human reference genome using Novoalign and variant calling done. After appropriate quality control, analysis was done using Variant Annotation Analysis and Search Tool (VAAST), allowing for a recessive model of inheritance and locus heterogeneity. Empirical p-values for the test statistics were generated using 106 permutations. The list of genes prioritized using P-values and VAAST variant scores were tested for overrepresentation of biological functions using PANTHER.

**Results**

BMI was similar between MHO cases and controls (p=0.20) whereas waist circumference was smaller in MHO (p=0.03). The top scoring genes (p=6.4x10^-6) were dystrophin (DMD), triadin (TRDN), DNAH14 and DDX60L. Intronic variants in both DMD and TRDN have been previously reported in GWAS of obesity-related markers, especially lipids. Lipid transport (p=8.4x10^-3), chromosome segregation (p=6.8x10^-3), and digestive system tract mesoderm development (2.1x10^-2) were the most overrepresented biological functions in the prioritized gene set.

**Conclusions**

This is the first use of a WES approach to understanding the molecular basis of MHO. While the findings are preliminary, a useful gene set has been identified for future testing in larger study samples.

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**T-2152-P: Carrying a Greater Number of Variants Associated with BMI Gain in Childhood Leads to Greater Fat Mass and Less Lean Body Mass in Adulthood**

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Background

It is unclear if accumulation of risk alleles from single nucleotide polymorphisms (SNPs) individually associated with rates of BMI change in childhood will impact childhood BMI gain, adult measures of body composition and onset of type 2 diabetes (T2D) in early adulthood.

Methods

As part of a longitudinal study of health, a genome wide association analysis with follow-up genotyping in 6839 Native Americans found 67 SNPs associated with maximum BMI at age>20 years. In 3477 subjects with childhood data, 36 of these SNPs were associated with BMI change/year. An allelic risk score (RS) based on these 36 childhood SNPs was calculated, and contribution of the RS to childhood BMI trajectories was assessed using a mixed model. A subset of the 6839 subjects also had 1) measures of body composition assessed by DXA at age 20-40 years (N=342) 2) measures from a 75g oral glucose tolerance test (OGTT; N=2223), and 3) follow up data on development of future T2D (N=2962).

Results

The RS was associated with BMI gain during childhood ($\bar{I^2}=+0.04 \text{ kg/m}^2/\text{year}/\text{allele}; p<0.001$). This difference in rate of BMI accumulation led to a difference of 9.9±1.6 kg/m$^2$ between those with the lowest RSs versus highest RSs at age 20y. The RS was also positively associated with adult %body fat ($\bar{I^2}=0.5\%/\text{allele}; p<0.001$) and fat mass ($\bar{I^2}=0.3\text{kg}/\text{allele}; p=0.001$) but negatively associated with lean mass ($\bar{I^2}=-0.6\text{kg}/\text{allele}; p<0.001$). The RS did not impact OGTT measures nor risk of future T2D development beyond the effect on adult BMI (all $p>0.1$).

Conclusions

An accumulation of childhood obesity risk variants is associated with accelerated BMI gain in childhood which translates to greater fat mass and reduced lean mass in early adulthood indicating a polygenic etiology for early fat mass accumulation.

T-2153-P: Single Nucleotide Polymorphisms Associated With Obesity in a Small Group of Metabolically Healthy Obese

Doina Kulick, MD; Karen Schlauch, PhD;

Background
Background/Objectives: Several phenotype subgroups of polygenic obesity have been described, including metabolically healthy obese (MHO). The goal of this pilot genome-wide association study (GWAS) is to identify single nucleotide polymorphisms (SNPs) associated with obesity in MHO adults.

Methods

Forty MHO and 39 lean healthy adults age 40 or older were included in this pilot study. The BMI of the obese group was 42.9 ± 6.3 kg/m² and 22.6 ± 1.7 kg/m² within the lean group. The groups had normal: fasting glucose, HDL-cholesterol, total cholesterol, triglycerides, systolic and diastolic blood pressure, and no history of cardiovascular diseases. DNA was genotyped using the Affymetrix Human SNP Assay 6.0 including 900,000 SNPs; 678,058 SNP genotypes were examined for association with BMI. Simple genetic association using BMI and SNP genotype under the log-additive genetic model was performed for each SNP, and genotype-obesity associations having p-values << 0.05 were further examined.

Results

Strong association with BMI was found for 180 SNPs (uncorrected p-values p<1x10^-6). These SNPs were mapped to genes, some of which have been previously implicated in obesity associations like SEC11 homolog C (S. cerevisiae), GRP (gastrin-releasing peptide); CDH20 (cadherin 20, type 2); others were novel like CDH18 (cadherin 18, type 2); FNDC1 (fibronectin type III domain containing 1); CACNA1S (calcium channel, voltage-dependent, L type, alpha 1S subunit); SREBF2 (sterol regulatory element binding transcription factor 2).

Conclusions

In spite of the very small sample size, the careful ascertainment of phenotype and the matching study design allowed for the detection of a significant number of SNPs strongly correlated with high BMI in MHO in our cohorts. Supported by a NIGMS/NIH grant (P20GM103440).

T-2154-P: Association of MC4R, TMEM18, and SH2B1 Gene Variants with Anthropometric, Dietary and Metabolic Parameters in a Cohort of Children

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Background
Childhood obesity is an increasing public health problem all over the world, resulting from interaction between lifestyle and genetic factors. In this study we evaluated the influence of genetic variants related to obesity identified by genome wide association studies (MC4R, TMEM18, SH2B1 and SEC16B) on anthropometric phenotypes, food intake and metabolic profile in a cohort of 325 children followed-up since birth until 8 years old.

**Methods**

The polymorphisms were genotyped using real-time polymerase chain reaction and the dependent variables were compared among genotypes at the ages of 1, 4 and 8 years old by t-tests, analysis of variance and longitudinal mixed models.

**Results**

In this sample, 57.2% were boys. At 8 years, overweight prevalence was 28.3%. MC4R rs17782313 was associated with total lipids intake at 1 year (P=0.041) and intake of sugar dense foods at 4 years and over the years (P<0.001, P=0.040; respectively). TMEM18 rs6548238 was associated with waist circumference at 4 years (P=0.039); intake of sugar dense foods, blood HDL cholesterol levels and LDL cholesterol at 8 years (P=0.014, P=0.042, P=0.044; respectively); and BMI Z-score and intake of lipids dense foods over the years (P=0.015, P=0.016, respectively). SH2B1 rs7498665 was associated with total cholesterol at 4 years (P=0.039) and this association remained at 8 years (P=0.003). We also found associations with LDL cholesterol and total carbohydrates intake at 8 years (P=0.003, 0.014; respectively). Association with intake of lipid dense foods was observed over the years (P=0.046).

**Conclusions**

This study provides indications that genetic variants in TMEM18, MC4R and SH2B1 genes might be associated with anthropometric phenotypes, food intake and metabolic profile in children.
Methods

A cross-sectional study on 673 high-school adolescents from Guadalajara, Jalisco, Mexico, with apparently good health. Alanine aminotransferase (ALT) is a surrogate marker of NAFLD. Elevated ALT (>40 IU/L) and NAFLD (elevated ALT + AST/ALT ratio <1) were evaluated. Metabolic syndrome (MetS) was defined according to the International Diabetes Federation criteria. Metabolic markers (total cholesterol, LDL-C, VLDL-C, non HDL-C, C-reactive protein, insulin resistance and obesity), low height-for-age, polymorphisms (TNFA-308G>A, CRP+1444C>T and IL1RN) and haplotype IL6-597/-572/-174 were evaluated. Multiple logistic regression analysis was used to evaluate associations.

Results

Elevated ALT was observed in 3.0%, 45% and 45% (total, overweight and obese, respectively) and NAFLD in 2.7%, 38.9% and 50% (total, overweight and obese, respectively). MetS was associated with elevated ALT (OR = 4.1). After multivariable adjustments, sex (OR = 5.6), non HDL-C (OR = 7.0), insulin resistance (OR = 22.5), obesity (OR = 8.0), low height-for-age (OR = 26.9), CRP+1444C (OR = 11.4) and haplotype GGG-GGG for IL6-597/-572/-174 (OR = 17.5) were more likely to have elevated ALT or NAFLD.

Conclusions

MetS, growth, metabolic and several inflammation polymorphism/haplotype variants were associated with NAFLD in adolescents. It is urgent to reduce obesity trends in this age group to reduce the risk for NAFLD development.

T-2156-P_DT: Association of Hypothalamic-Pituitary-Adrenal (HPA) Axis Activation with Depressive Symptoms among Adolescents At-Risk for Type 2 Diabetes (T2D)

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Background

Depressive symptoms may play a role in the etiology of worsening insulin resistance and T2D onset, beyond traditional risk factors. Activation of the HPA-axis has been proposed as a potential mechanism for depression's effects on insulin resistance.
Methods

Participants were 97 adolescent girls (Mage=14.6±1.6y; 57% non-Hispanic Black) at-risk for T2D based on overweight/obesity (BMI >=85th%ile) and a family history of T2D. All girls endorsed elevated depressive symptoms (CES-D total>=16). Interviewer-rated depression was assessed with the Schedule for Affective Disorders and Schizophrenia for School-Age Children; adolescents self-reported trait anxiety. HPA-axis activation was assessed as: 1) peak cortisol reactivity to a laboratory cold-pressor test (CPT), and 2) cortisol awakening response (CAR) 0-15 min after waking in the natural environment.

Results

74% of girls were obese. Depressive and anxiety symptoms related to higher peak cortisol values after CPT, accounting for age, race, and BMI-z (ps<.05). Adjusting for the same covariates, depressive and anxiety symptoms also were associated with higher subjective ratings of pain and unpleasantness during CPT (ps<.05). In contrast, neither depressive nor anxiety symptoms were related to CAR (ps>.30). BMI-z was related to steeper CAR (p<.01), but not to CPT reactivity (p>.20).

Conclusions

Among girls at-risk for T2D, more severe depression/anxiety related to heightened cortisol reaction to a stressor. Depression/anxiety were unrelated to CAR; but, heavier girls had steeper CAR. HPA-axis dysregulation could partly explain how depression and obesity contribute to T2D pathophysiology.

T-2157-P_DT: Obesity Genotypes and Physical Activity Interaction Influence Body Composition in Mexican School-Aged Children

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Background

Prevalence of childhood obesity in Mexico is among the highest in the world. Genetic and environmental factors contribute to the development of excessive body fat. Some genotypes are believed to interact with the amount and intensity of physical activity (PA), influencing body composition in children.

Methods
354 Mexican school children (8 to 10 y of age) were included in this study. Informed consent was obtained from parents and children. Nutritional assessment of children was conducted by anthropometric measures, dietary surveys and analysis of body composition using bioelectric impedance. Physical activity was analyzed using an Actigraph accelerometer. DNA was isolated from 5 mL saliva. Selected SNPs in ApoE, ENPP1, FTO and AdipoR1 were genotyped by allelic discrimination. Statistical analysis was conducted by GLM using sex and genotypes as fix factors, and age, body fat percentage and BMI as covariates, depending on the model. Main effects and interactions were estimated.

Results

48% of participants were overweight and obesity. Low levels of moderate and vigorous PA were observed in the studied sample. A significant association was found between the ApoE isoform and waist circumference (p<0.05), the rs9939609 had a significant main effect (p= 0.033, eta2 = 0.026) and interaction with total minutes of PA (p=0.036, etha 2=0.025) influencing waist circumference. No other genotype showed a significant effect on this trait. Variation in ENPP1 interacted with PH affecting % body fat.

Conclusions

: Overall, these findings suggest that the genotype X PA interaction may influence phenotypes related to body composition in children. Different genotypes seemed to influence the analyzed phenotypes. Limited variation in PA was observed among the sample.

T-2158-P: Identification of a Functional Variant in ADCY3 Associated with Fat Mass through Phenotypic Refinement and Genome-Wide Association

Nicholas J. Timpson

T-2159-P: Butyrate-Producing Bacterial Species are Associated with Obesity Phenotypes in Children

Anthony A. Wang, None

Background
Childhood obesity is a nutrition-related disease with multiple underlying etiologies. The gut microbiota is thought to be a contributor in the development of obesity by fermentation of non-digestible polysaccharides to short chain fatty acids, which increase host capacity for energy harvest.

**Methods**

However, butyrate has been shown to have beneficial effects on overall colonic health including protective effects against inflammation. Building upon previous data, the association between abundance of several butyrate-producing bacterial species within *Clostridium* clusters IV and XIVa and obesity was studied in Caucasian children (4-7 yrs) from the STRONG Kids Program. Quantitative RT-PCR was performed on DNA extracted from fecal samples for *Faecalibacterium prausnitzii*, *Roseburia intestinalis*, and *Eubacterium rectale*. Height and weight were measured to calculate BMI and other obesity phenotypes. Whole and regional percent body fat was measured by dual energy X-ray absorptiometry.

**Results**

*F. prausnitzii* was inversely associated with BMI and BMI percentile (R²=0.30, p=0.02; R²=0.25, p=0.04 respectively) and was negatively correlated with BMI percentile (r=-0.53, p=0.03). *F. prausnitzii* abundance was negatively correlated with BMI and trunk percent fat while *E. rectale* abundance was negatively correlated with whole body percent fat in girls. *R. intestinalis* was negatively correlated with BMI and BMI percentile in girls.

**Conclusions**

These results suggest specific butyrate producers in *Clostridium* clusters IV and XIVa are involved in obesity development. Upcoming work on the short chain fatty acid production of fecal microbiota of obese and normal weight children will provide evidence of the observed host-microbe interaction.

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**T-2160-P: A Combined Clinical and Genetic Classification Score for Nonalcoholic Fatty Liver Disease (NAFLD) in Patients with Morbid Obesity**

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**Background**
Accurate clinical and laboratory biomarkers for NAFLD have been elusive. A missense variant (I148M) in the PNPLA3 gene has recently been associated with NAFLD. This study aims to determine if combining clinical markers with PNPLA3 I148M status increases the diagnostic accuracy of NAFLD.

Methods

PNPLA3 (rs738409) was genotyped and a NAFLD clinical prediction score was calculated in 506 bariatric patients undergoing intraoperative liver biopsy. Liver pathology was evaluated according to the NASH Clinical Research Network scoring system. Logistic regression was used to estimate the area under the curve (AUC) of the clinical score, PNPLA3, and their combination for diagnosing the presence of moderate/severe NAFLD (>33% hepatic steatosis). The net reclassification index was used to determine if the addition of the PNPLA3 genetic marker reclassified patients into the appropriate risk group.

Results

The 506 patients had a mean age of 46 years, a mean BMI of 49 kg/m2, and 82% were female. The prevalence of moderate/severe NAFLD was 54%. When evaluated separately, the clinical score (AUC=0.823, p<0.001) and PNPLA3 (AUC=0.605, p<0.001) were significantly associated with moderate/severe NAFLD. In the combined model, both the clinical score (p<0.001) and PNPLA3 (p<0.001) remained significant and the overall AUC increased to 0.838. The net reclassification index was 8% (95% confidence interval=2%-16%, p=0.044).

Conclusions

The combined use of clinical and genetic markers to develop a risk algorithm increased the diagnostic accuracy for NAFLD. Combining clinical and genetic variables may be a useful approach for other disorders.

T-2161-P: Obesity, Overweight and Stunting among Under-Five Children in Four Communities in Ibadan North and Ido Local Government Areas in Nigeria.

Bukola BB. Bamisaye, MPH;

Background

Malnutrition is associated with high mortality among children. However there is paucity of data on coexistence of stunting and obesity among under-five children in Nigeria. This study assessed the coexistence of stunting and obesity in under-five children in Ido and Ibadan North in Nigeria.
Methods

A cross-sectional survey of under-five children in four communities in Ibadan north and Ido Local government areas in southwestern Nigeria was conducted. Using four stage random sampling technique 450 (214 males and 236 females) under-five children were selected from the two Local government areas. A pre-tested, interviewer-administered semi-structured questionnaire was used to collect information on demographic and socio-economic status of respondents. Anthropometric indices (weight and height) measurement were taken and categorized according to WHO standards.

Results

The mean age of the children was 29.8±17.0 months (Ibadan North=29.1±16.8, Ido= 31.9±17.4 months) with 52.6% being female. The prevalence of stunting, overweight and obesity in the two LGAs were 32.9%, 14.4% and 20.2% respectively. A total of 28.9%, 17.2% and 22.1% of children in Ibadan north and 38.6%, 5.0% and 13.9% in Ido LGA were stunted, overweight and obese respectively. A high proportion of the obese children (44.0%) were stunted indicating a co-existence of obesity and stunting among the study population.

Conclusions

A dual burden of overweight and stunting were observed in the study. Therefore Public policies should target both malnutrition conditions to prevent its attendant long-term health risks and complications.

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T-2162-P: Does Prenatal Exposure to Extra Vitamin D from Fortified Margarine Influence Body Size at age 7 years? A Societal Experiment.

Camilla Bjørn Jensen; Michael Gamborg, PhD; Tina Landsvig Berentzen, PhD; Thorkild Ia IA. Sørensen, MD, Dr Med Sci; Berit L. Heitmann, PhD;

Background

Risk of obesity may be associated with prenatal vitamin D deficiency. Vitamin D can be obtained from diet, supplements, sunshine exposure, but also from vitamin D fortified foods. We studied if body size at 7 years of age was associated with prenatal exposure to vitamin D from fortified margarine.

Methods

Vitamin D fortification of margarine was mandatory in Denmark from 1961 to 1985. Using the national fortification program as the setting for a quasi-randomized societal experiment we compared children
according to whether their mothers were pregnant during the fortification program or not. Information on BMI z-score at age 7 years was obtained of 29,189 children who were measured during the mandatory Copenhagen School Health examination. Children born just before and just after initiation or termination of margarine fortification periods were compared, respectively. Children were classified as overweight and obese by the 85th and 95th percentiles, respectively.

Results

After adjusting for secular trend we observed no statistically significant difference in OR of overweight (Initiation: 0.91 (0.83, 1.00) and termination: 0.99 (0.91, 1.08)) or obesity (Initiation: 0.88 (0.77, 1.02) and termination: 1.00 (0.91, 1.09)) in children exposed to vitamin D fortification in utero compared to non-exposed children. Mean BMI z-score was not significant different in the two groups either ( Initiation: -0.02 (-0.05, 0.01) and termination: -0.01 (-0.05, 0.04)).

Conclusions

Body size at 7 years showed no association with prenatal exposure to extra vitamin D from fortification of margarine.

T-2163-P: High Adherence to Mediterranean Diet during Pregnancy Associates with Lower Adiposity in Childhood in both USA and Greece

Leda Chatzi, MD, PhD; Sheryl Rifas-Shiman, MPH; Vaggelis Georgiou, MSc; Kyoung Joung, MD; Stella Koinaki, MSc; Katerina Sarri, PhD; Georgia Chalkiadaki, PhD; Manolis Kogevinas, MD; Christos Mantzoros, MD; Matthew Gillman, MD, SM; Emily Oken, MD, MPH;

Background

Maternal diet during pregnancy may be related to fetal growth, but associations with offspring adiposity are unclear.

Methods

We studied 997 mother-child pairs from Project Viva in Boston, USA, and 527 pairs from the Rhea study in Crete, Greece. We assessed maternal diet during the first trimester of pregnancy by a validated food frequency questionnaire. Through an a priori defined 9-point scale we estimated adherence to a Mediterranean Diet (MD) with the use of cohort-specific cutoffs. We measured child weight, height, waist circumference, and skinfold thicknesses in mid-childhood (median 7.7 years) in Viva, and in early childhood (median 4.2 years) in Rhea. We used linear regression models, adjusted for maternal age, prepregnancy BMI, education, parity, ethnicity, smoking during pregnancy, and child age and sex.
Results

Mean (SD) MD score during pregnancy was 4.5 (2.0) in Project Viva and 4.8 (1.9) in Rhea. For each 3-point increment in the MD score in pregnancy, offspring BMI z score was lower by -0.13 (95% CI, -0.22 to -0.03) in Viva, and by -0.16 (95% CI, -0.30 to -0.03) in Rhea. We also observed inverse associations with waist circumference (Viva: -0.54 cm; 95% CI, -1.24 to 0.17; Rhea: -0.85 cm per 3 points; 95% CI, -1.57 to -0.13), and the sum of subscapular and triceps skinfold thicknesses in both cohorts, though significant only in Rhea.

Conclusions

Greater adherence to a Mediterranean diet during pregnancy may protect against excess adiposity in childhood.

T-2164-P_DT: WIC Cohort Weight Trajectories in the First Four Years of Life

Mary Ann Chiasson, DrPH; Roberta Scheinmann; Diana Hartel, DrPH; Juan Pena, PhD; Sally Findley, PhD;

Background

~Analyzing different weight gain patterns in the first years of life may help in understanding the development of obesity in early childhood. We used growth trajectories to examine heterogeneity in weight-for-length z-score percentiles (W/L%) among a cohort of children enrolled in WIC from birth and retained through age 3 years.

Methods

~NY State WIC program data were from 2008-13 (N=40,360: 37% Hispanic, 29% White, 26% Black, and 8% Asian). Growth mixture modeling in Mplus was used to identify growth trajectory groups. Six distinct trajectory groups were identified; high-high (HH), low->high (LH), high->average (HA), low->average (LA), low-low (LL), and high->low (HL). All W/L% are reported as means in this preliminary analysis.

Results

~The HH group (40% of the cohort) began with a high mean W/L% > 80 and at age 3 reached a mean W/L% = 87. LH (12%) began with a low W/L% = 31, but by age 3 had a high W/L% >84. HA (15%), began with a high W/Lpct > 70 and at age 3 were average (about 50 W/L %). LA (12%) started off with a low W/L% < 30 and by age 3 was average. HL (8%) started at a W/L% > 70, but by age three had a low W/Lpct < 21. LL (13%) began with a low WL% = 25 and remained low. Composition of groups varied by race/ethnicity. Hispanic children were overrepresented in HH, LH, and HA and underrepresented in LL.
Whites were underrepresented in LH. Blacks were underrepresented in HH, LH, and HA. Asians were overrepresented in LL, LH, and LA and underrepresented in HH.

Conclusions

At 3 years of age, 52% of the cohort (HH+LH) became or remained above average weight, 26% were average weight (HA+LA) and 21% were below average weight (HL+LL). Identified growth patterns provide a means to refine and target early childhood obesity prevention programs to those at greatest risk.

T-2165-P: Maternal Overweight Does Not Influence Duration of Exclusive Breastfeeding Among Brazilian Mothers

Camila Dallazen; Paula S. Leffa, MD; Vivian R. Ferreira, Mcs; Márcia R. Vântolo, PhD;

Background

In Brazil, only 9.3% of women are exclusively breastfeeding (EB) at six months postpartum. There is evidence of maternal overweight as a predictive factor for discontinuing breastfeeding. This study evaluated the effect of maternal overweight on duration of EB.

Methods

A cohort study recruited women in 20 healthcare centers in Porto Alegre, Brazil. Women were interviewed in their third trimester of pregnancy. Current weight and height were measured and pre-pregnancy weight was self-reported. The duration of EB was investigated at six months postpartum. The pre-pregnancy nutritional status (PNS) and gestational (GNS) were determined by Body Mass Index. Women were stratified into three groups according to PNS and GNS, respectively: normal who remained normal, normal who became overweight, and overweight who remained overweight. The analysis was based on the Generalized Estimation Equation model using the SPSS 16.0.

Results

We evaluated 619 women and approximately 36% and 51% had pre-pregnancy and gestational overweight, respectively. The mean (SD) of duration of EB was 2.1 (+- 1.6) months. There was no significant difference in the prevalence of EB at six months postpartum among women with and without pre-pregnancy (p=0.344) and gestational (p=0.873) overweight. There was no difference in EB duration among groups, even after adjusting for factors that could influence the rate of early discontinuation.

Conclusions

In conclusion, our study did not confirm maternal overweight as a risk factor for discontinuing breastfeeding.
T-2166-P: Influence of Maternal Gestational Weight Gain on Milk Composition

Ellen W. Demerath, PhD; David A. Fields, PhD;

Background

Human breast-milk (HBM) is comprised of numerous appetite, growth and obesity-related hormones and inflammatory factors that vary among women. Whether this variation is linked to maternal nutritional status (e.g., BMI or gestational weight gain (GWG)) is as yet unknown.

Methods

This analysis tested the association between excessive GWG (defined by 2009 Institute of Medicine guidelines) with HBM concentrations of hormones (leptin, insulin, irisin) and inflammatory factors (IL-6 and TNF-Î±) at 1 and 6-months of age. HBM was collected from 32 exclusively breast-feeding non-diabetic mothers of healthy term infants using a single full breast expression. The analyses were run with both 1 and 6-month visits combined as no visit differences were observed, and using a mixed effects regression model with within-subject repeated measure (time) as a random effect. Analytes were natural log transformed prior to analysis.

Results

Milk leptin (p=0.02) and TNF-Î± (marginally, p=0.08) were higher, and milk IL-6 was lower (p=0.04), in women with excessive GWG as compared to those with GWG within recommended limits. There were no differences in insulin or irisin by GWG group. The relationships between GWG and milk leptin (p=0.0001) and milk IL-6 (marginally, p=0.06) were independent of maternal pre-pregnancy BMI.

Conclusions

Previous work by our group showed an association between pre-pregnancy BMI and milk leptin and insulin; this exploratory study adds to the observation that GWG may pose independent, additional effects on some aspects of milk composition.
T-2167-P: The Impact of Obesity Epidemic on Population Dynamics: Implication of 'Vertical Transmission'

Keisuke KE. Ejima, PhD;

Background

Epidemiological studies have revealed that the obesity is transmissible from mothers to children. However, the implication of 'vertical transmission' of obesity hasn't been well investigated especially about the impact on the population dynamics.

Methods

We constructed a simple mathematical and statistical model to describe the obesity epidemic in the U.S. in these 40 years especially focusing on the reproduction process, such as vertical transmission, differential fertility rate between the obese or non-obese mother. We fitted the proposed model to the national surveillance data in the U.S., National Health and Nutrition Examination Survey (NHANES). Subsequently, we calculated age dependent prevalence of obesity in 2020 and 2050 based on the best fitted model. Through the sensitivity analysis, changing the parameters that govern the vertical transmission, we evaluate the impact of vertical transmission on the population dynamics.

Results

The statistical estimation of the parameters in the proposed model suggests 23%(95%CI:14-34%) of the children from obese mother would be born as obese, which is extremely higher than the proportion for non-obese mother (2%). Based on the best fitted model, we found that the trend of obesity prevalence would be still positive even in 2050, however, the prevalence would be almost saturated.

Conclusions

We investigate the impact of vertical transmission obesity on the population dynamics. To explicitly investigate the impact of vertical transmission of obesity, we need to include the more precise natural history of the obesity especially in the reproduction process in the modelling.

T-2168-P: The Influence of Postpartum Changes in Dietary Restraint and
Disinhibition on Postpartum Weight Retention One Year Following Delivery

Rebecca Emery; Michele Levine, PhD;

Background

Postpartum weight retention (PPWR) increases risk for weight-related disorders and is promoted by myriad factors, including excessive gestational weight gain and smoking cessation. However, little is known about how postpartum changes in modifiable eating behaviors affect longer term PPWR.

Methods

The relation between postpartum changes in dietary restraint and disinhibition and PPWR at 12 months postpartum was evaluated in a sample of 300 women who quit smoking before or early in pregnancy. At 3, 6, and 12 months postpartum, the Three Factor Eating Questionnaire was used to assess dietary restraint and disinhibition and weight was recorded. Postpartum changes in eating behaviors were computed by subtracting dietary restraint and disinhibition scores collected at 3 months postpartum from those collected at 6 months postpartum. PPWR was calculated by subtracting self-reported pre-pregnancy weight from weight recorded at 12 months postpartum.

Results

On average, women were 24.99 ($SD = 5.65$) years old and 54% were black. Average PPWR was 15.83 ($SD=22.23$) pounds with 48% of women retaining an excess of 10 pounds. Adjusted linear regression models were used to examine postpartum changes in dietary restraint and disinhibition as predictors of 12 month PPWR. Changes in dietary restraint were unrelated to PPWR ($p=.41$). However, changes in disinhibition were positively related to PPWR ($p=.004$), such that increases in disinhibition were associated with an average 12 month PPWR of 6.32 pounds.

Conclusions

Thus, changes in disinhibition, but not dietary restraint, across the postpartum period are associated with longer term PPWR, suggesting that heightened levels of overeating in response to emotional and environmental stimuli may be relevant in efforts to address PPWR.

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T-2169-P: Genetic, Prenatal and Postnatal Environmental Contributions to Children’s BMI Trajectories from 27- to 84-Months
Background

Most studies examining genetic, prenatal, and environmental risks for child overweight focus on single time points. This study used an adoption design to tease apart the contributions of genetic, prenatal, and environmental risks to children's Body Mass Index (BMI) trajectories from 27 to 84 months.

Methods

Participants included 160 adoptees, along with their birth mothers (BMs) and adoptive parents (APs), drawn from the Early Growth and Development Study (EGDS). Child weight and height at birth, and 9-, 18-, 27-, 54-, 72- and 84-months were obtained from APs. BM's prepregnancy BMI was used as an indicator of the adopted children's genetic risk for obesity. Prenatal risk factors for childhood obesity (BM pregnancy weight gain, smoking during pregnancy) were assessed by interviews with BMs. AP BMI and early child postnatal weight gain (difference in weight z-score between 0 - 9 months) were included as indices of postnatal environmental risks for obesity.

Results

Adoptee birth weight was associated with prenatal (pregnancy weight gain $r=.19$, smoking during pregnancy $r=-.14$) and genetic (BM's BMI, $r=.20$) factors. Early child postnatal weight gain was associated with BMI percentiles at 27- and 84-months ($r's=.20-.24$). Growth modeling indicated that birth weight percentile, BM BMI, and early child postnatal weight gain predicted increases in BMI percentile between 27 and 84 months. However, the effect of postnatal weight gain was less pronounced with age.

Conclusions

Genetic factors, birth weight, and early postnatal weight gain predict children's BMI trajectories. However, early weight gain effects declined over time while other effects did not. This pattern suggests that the importance of specific risk factors for child obesity may change across development.

T-2170-P: Maternal cis-Vaccenic (18:1 cis-11) Acid Measured in Pregnancy Negatively Predicts Maternal Central Fat Distribution

Holly Hull, PhD; Shengqi Li, PhD; Marlies Ozias, PhD; Emily Newbold, MS; Susan Carlson, PhD;

Background
Epidemiologic data are mixed regarding the relationship between palmitoleic (PA) and cis-Vaccenic (cVA) acid and disease risk. The underlying mechanism behind how a risk or benefit may be conferred is unknown, with no data reported during pregnancy. Both fatty acids are thought to be involved in the signaling pathways regulating de novo lipogenesis and gluconeogenesis. This study examined the relationship between PA and cVA and maternal fat distribution.

**Methods**

Fifty women had blood drawn at 36 weeks in pregnancy and dual energy x-ray absorptiometry (DXA; iDXA GE Healthcare) was completed at 2 weeks postpartum. Central fat mass (FM), peripheral FM, visceral adipose tissue (VAT) and subcutaneous adipose tissue (SAT; trunk region) were calculated using enCORE software (version 13.5). Blood was analyzed for red blood cell phospholipids using gas chromatography. Gestational weight gain (GWG) was included as a confounder in the regression analysis and group differences were explored by maternal pre-pregnancy BMI group where normal was the reference group.

**Results**

Maternal central FM (kg; R²=0.68) was predicted by cVA (β=-10.4; p=0.019) and GWG (β=0.18; p=0.011) and group differences were found for overweight (β=4.02; p<0.001) and obese (β=11.11; p<0.001) BMI groups. Maternal SAT (kg; R²=0.67) was predicted by cVA (β=-1.3; p=0.048), GWG (β=0.03; p=0.020) and group differences were found for overweight (β=0.56; p=0.001) and obese (β=1.68; p<0.001) BMI groups. Neither PA nor cVA was related to peripheral FM or VAT.

**Conclusions**

cis-Vaccenic acid was negatively related to maternal central FM, which appears to be driven by a relationship to maternal SAT. Data are needed exploring how cVA relates to metabolic parameters during pregnancy.

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**T-2171-P: Food Insecurity and Maternal Feeding Practices**

Jessica C. Hummel, BA; Rosanna Watowicz, MS, RD, LD; Tracy L. Tylka, PhD; Rosara Milstein, MS; Julie C. Lumeng, MD; Ihuoma Eneli, MD, MS;

**Background**

The paradoxical co-existence of food insecurity and obesity has generated significant societal and research interest. While higher food insecurity is related to higher child weight, there is a lack of understanding regarding the specific factors responsible for this association.

**Methods**
We hypothesized that food insecurity would be associated with lower division of feeding responsibility (allowing children to determine what and how much to eat of offered meals while parents are responsible for where food is eaten, structured meal/snack times and providing balanced meals) and higher pressure to eat. A cross-sectional survey of 63 mothers (Mage 34.2±8.6 years; 49% White, 43% Black) of overweight/obese children ages 3 to 5 years were recruited from primary care clinics and child care centers. They completed the Caregiver Feeding Responsibility Scale, Child Feeding Questionnaire and the USDA 6-question food insecurity scale. We used regression analyses to analyze the data.

Results

71% of mothers reported at least mild food insecurity. Food insecurity was negatively associated with an adaptive feeding style characterized by division of responsibility ($\hat{R}^2 = -0.43$, $p = 0.001$). Food insecurity was positively associated with pressure to eat ($\hat{R}^2 = 0.27$, $p < 0.003$), a maladaptive controlling eating behavior. Food insecurity is linked to maternal feeding practices in a maladaptive fashion.

Conclusions

Future research needs to recognize the effect of food insecurity on maternal feeding behaviors, a potential risk factor for childhood obesity especially in young children.


Alana Ju; Melvin B. Heyman, MD, MPH; Andrea K. Garber, PhD, RD; Janet M. Wojcicki, PhD, MPH;

Background

Maternal obesity is a risk factor for preterm birth, a leading cause of infant morbidity and mortality and contributor to childhood obesity. Despite the high rates of obesity in Native Hawaiians, the association with preterm birth has not been examined in this population.

Methods

We performed a retrospective cohort study of 20,063 women mean (SD) age 27.98 (7.07) years with mean (SD) BMI 24.67 (6.46) using data collected by Hawaii’s Pregnancy Risk Assessment Monitoring System (PRAMS) from 2000-2011. Of the sample, 28.8% were Native Hawaiian (25.78 (12.17) years, BMI 26.03 (SD)). Our multivariable logistic regression model was weighted to account for non-response and state
demographics and adjusted for maternal age, pre-pregnancy BMI, race, socioeconomic status, and smoking during pregnancy.

Results

For all women, pre-pregnancy obesity was more common in Native Hawaiians than non-Native Hawaiians (22.0% and 12.2%, respectively; P<0.01). The risk for preterm birth was increased with obesity (BMI ≥30.0; aOR= 1.25, 95% CI: 1.07-1.46, P<0.05) and extreme obesity (BMI ≥40.0; aOR= 1.69, 95% CI: 1.21-2.35, P<0.01), compared with normal weight (BMI 18.5-24.9). Among Native Hawaiian women, risks for preterm birth (aOR= 1.32, 95% CI: 1.13-1.55, P<0.01) and low birth weight (aOR=1.24, 95% CI: 1.05-1.47, P=0.01) were elevated relative to White women.

Conclusions

The high rate of pre-pregnancy obesity among Native Hawaiian women confer increased risk of preterm delivery and low birth weight. Further data are needed to assess ultimate effects on long-term outcome.


Shin Kim; Milton Kotelchuck, PhD, MPH; Hoyt G Wilson, PhD; Hafsatu Diop, MD, MPH; Carrie Shapiro-Mendoza, PhD, MPH; Lucinda England, MD, MSPH;

Background

The risk of adverse outcomes associated with diabetes (DM) across pregnancies is limited. We estimate the prevalence of selected birth outcomes by diabetes status among women delivering sequential live singleton births.

Methods

We linked successive births to the same women from 1998-2007 using the Massachusetts Pregnancy to Early Life Longitudinal data. We restricted to singleton, live birth consecutive parity 1 and 2 pregnancies. We created 8 groups of diabetes status grouping deliveries with and without gestational (GDM) and chronic diabetes. Adverse outcomes included large-for-gestational-age (LGA)≥ 90th percentile, macrosomia>4,000 grams, preterm birth<37 weeks, and c-section. For each outcome, we computed unadjusted and standardized prevalence estimates by diabetes status. Standardized estimates used logistic regression models, adjusted for maternal age, race, insurance status, and time between births.

Results
Of 133,633 women, 6.6% had a DM-affected pregnancy. Adverse outcomes were highest in women with DM in both parity. Compared to women with no DM in both parity, there was high prevalence of adverse outcomes going from no DM to GDM: LGA(8.5% vs.15.6%), macrosomia(9.7%vs.15.4%), c-section(24.7%vs.30.6%), and preterm(7.7%vs.12.9%). Prevalence of adverse outcomes did not decrease going from GDM to no DM: LGA(10.0% vs.18.4%), macrosomia(10.6%vs.17.5%), and c-section(34.4%vs.37.0%). Standardization did not greatly change prevalence estimates.

**Conclusions**

Our results suggest that the prevalence of an adverse outcome does not always decrease in the subsequent pregnancy, even with improved diabetes status. These women should continue to be monitored and counseled in the second pregnancy for potential adverse birth outcomes.

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*Kai Ling Kong, PhD; Xioazhong Wen, PhD*

**Background**

Vegetable is a key component of healthy diet. But little information is available about vegetable consumption during infancy. We aimed to examine child/maternal predictors of vegetable consumption among U.S. infants (6 - 12 months old) and their role in infant growth.

**Methods**

We analyzed data (n = 1,862) from 2005-2007 Infant Feeding Practices Study II, a U.S. national pre-birth cohort study. Mothers reported their infant's vegetable consumption in past 7 days in monthly mail questionnaires, and weight and length measured at well-child visits. We used multivariable linear regression analyses to examine child and maternal predictors of infant vegetable consumption, and the associations between infant vegetable consumption at 6 months and physical growth from 6 to 12 months.

**Results**

At 12m, infants of Asian/Pacific Islander mothers consumed 0.42 (95% CI, -0.70, -0.14) serving/day fewer vegetables than infants of non-Hispanic white mothers. Infants of mothers who were post-graduate consumed more vegetables than infants of mothers who had high school or lower education. Vegetable consumption at 6m was associated with greater increases in weight-for-age z-score from 6- to 12m (beta per 1 serving/day, 0.07 [0.002, 0.14]), which diminished to null (0.04 [-0.03, 0.11]) after adjusting for 6-m intake of baby cereal and meat.

**Conclusions**
Infants with mothers of Asian/Pacific Islands race and low educational level had lower vegetable consumption. Vegetable consumption does not seem to impact infant growth independently. Research is needed to assess long-term impacts of vegetable consumption during infancy on later eating and growth.

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**T-2175-P_DT: Factors Associated with Knowledge of Excess Adiposity Risks during Pregnancy**

*Tracey Ledoux, PhD, RD; Pamela Berens, MD; Patrick Leung, PhD;*

**Background**

Excess adiposity during pregnancy is a risk. The purpose of this study was to determine psychosocial factors associated with knowledge of the Institute of Medicine's recommendations for gestational weight gain (GWG) and the risks related to excess adiposity during pregnancy (EADP).

**Methods**

Pregnant women (all stages) were recruited from obstetric clinics to complete a one-time survey. Survey items included basic demographics, pre-pregnancy weight and height, perceived pre-pregnancy weight status, whether they had a GWG goal, knowledge of IOM GWG recommendations, and knowledge of EADP risks. ANOVA and crosstabs were conducted to determine associations among study variables.

**Results**

287 diverse low income women participated. Average age was 25 (SD 5.3) and gestation age ranged from 7-40 weeks. 31% (n=88) had GWG recommendation knowledge. Average score on EADP risk knowledge measure was 3 out of 10. Women who had knowledge about GWG recommendations were more likely to know their pre-pregnancy weight status, not have a GWG goal, and have lower pre-pregnancy BMI (p's<.05). Those who had greater knowledge of EADP related risks were more likely to be older, married, have a GWG goal, and perceive themselves as obese (p's<.05).

**Conclusions**

In low income diverse pregnant women, knowledge of the risks associated with EADP and of GWG recommendations were poor. Several modifiable and non-modifiable factors are related to both types of knowledge and may have implications for how clinicians impart knowledge to pregnant women.
T-2176-P: Etiological Subgroups of Small-for-Gestational-Age Children: Differential Growth, Cognitive and Motor Outcomes at Age 5 Years

Xiuhong Li, MD, PhD; Chuanbo Xie, PhD; Xiaozhogn Wen, MD, PhD;

T-2177-P: Pre-Pregnancy Obesity and Excessive Gestational Weight Gain following Bariatric Surgery

Tiffany A. Moore Simas, MD, MPH, MEd; Leah Wilson, MD; Mary Lavoie, MD; Katherine Leung, MPH; Reshma Parikh, MD, FACOG; Heena Santry, MD; Molly E. Waring, PhD;

Background

Half of bariatric surgeries (BS) are performed on childbearing aged women, yet little is known about their subsequent pregnancies, particularly pre-pregnancy obesity and excessive gestational weight gain (GWG). We describe pre-pregnancy BMI and GWG among women with BS history.

Methods

Women aged 18-45 years with BS and subsequent singleton pregnancy were identified from (1) Minimally Invasive Surgery (1999-2011) and Obstetrics (2006-2011) clinical databases, and (2) billing database searched for relevant codes. 58 pregnancies to 53 unique women were identified; we excluded women missing critical data (n=1) and selected the first pregnancy for women with more than 1 (n=5 pregnancies among 5 women excluded); final analytic sample was 52 women. GWG was categorized per Institute of Medicine (IOM) pre-pregnancy BMI-specific GWG guidelines. Multinomial logistic regression used to evaluate GWG adherence by time from BS; p-value for time since BS reported.

Results

Women were 73% multigravid, 78% Caucasian, 73% non-Hispanic, 73% married and 54% employed. 85% and 15% had Roux-En-Y and gastric banding BS respectively, on average 3.1 (SD:1.8) years pre-pregnancy. Mean pre-BS and pre-pregnancy BMIs were 47.2 (SD:7.6) and 32.3 (SD:6.0) kg/m2 (p<0.01). Prepregnancy, 6% were normal weight, 31% overweight, and 64% obese. GWG was 30.7 (SD:21.4) lbs with 73.1% excessive, 13.5% adherent and 13.5% inadequate. Time since BS was not related to GWG adherence (p=0.59).
Conclusions

Women with BS history have prepregnancy BMIs lower than pre-BS BMI. However, pre-gravid obesity and excessive GWG rates are higher than general population. Given pregnancy complications associated with BS, obesity, and excessive GWG, further monitoring, investigation, and intervention are needed.

T-2178-P_DT: Maternal Consumption of Sweets during Pregnancy & its Association with Infant Feeding

Roberta Scheinmann; Rachel Gross, MD, MS, FAAP; Michelle Gross, MS RD CLC; Mary Ann Chiasson, DrPH; Janneth Bancayan, BA; Mary Jo Messito, MD;

Background

Prior research has shown an association between maternal diet and formula feeding. The purpose of this analysis is to examine the relationship between maternal consumption of sweet foods during pregnancy & its association with infant feeding.

Methods

Study of low-income Hispanic mother-infant dyad nested in an RCT of a childhood obesity prevention program beginning in pregnancy. The independent variable, daily calories from sweets & desserts >15%, was assessed during a baseline food frequency questionnaire. The calculation for % sweets consumed included calories from foods like cakes, ice cream, & candy. The cutpoint of 15% was used because it was the top quartile of the % of sweets (mean=11%, range=0-37%). The dependent variable, exclusive formula feeding (EFF) at 3 months, was assessed during a follow-up interview. The association was examined using chi-square & logistic regression adjusting for maternal age, parity, education, US born, knowledge of infant feeding, daily calories & infant gender.

Results

Mothers (n=220) had a mean age 27, sd 6, 40% primiparous, 33% <="" p=""

Conclusions

Women who consumed more sweets during pregnancy were more likely to exclusively formula feed their babies. These findings suggest the need for increased nutritional education during & immediately after pregnancy to improve the nutrition of mothers & infants.
T-2179-P: Timing of Complementary Food Introduction, Intake of Protein in Infancy and the Risk of Childhood Overweight

Camilla CS. Schmidt Morgen; Jennifer L. Baker, PhD; Anne-Marie N. Andersen, MD, PhD; Kim F. Michaelsen, MD; Thorkild IA A. Sørensen, MD, Dr Med Sci;

Background

Infant feeding may affect the risk of overweight and obesity in childhood. We aimed to examine whether the timing of the introduction of complementary food, the total intake of protein and intake of protein from dairy products during infancy were related to overweight at age 7 years.

Methods

The associations were analysed in a cohort consisting of live-born singleton children in the Danish National Birth Cohort, born between 1997 and 2003, \( n= 19 \, 088 \). Information on timing of introduction and type of complementary feeding (meat, fish and dairy products) and potential confounders (BMI z-scores at 12 months, duration of breastfeeding, maternal smoking, maternal pre-pregnancy BMI and maternal educational level) originated from interviews during and after pregnancy and from national registers. Overweight at age 7 years was categorised according to the IOTF reference. Logistic regression analyses were used to estimate the associations.

Results

Introduction of complementary food before 4 months was not statistically significant associated with an increased risk of overweight. A total daily intake of protein above the 90th percentile (28.5 grams) was associated with an increased risk of overweight at age 7 years; for boys: OR (95% CI) 1.45 (1.17; 1.79) but not for girls: OR 0.87 (0.69; 1.10). An intake of protein from dairy products above the 90th percentile (19.5 grams) was not statistically significant associated with childhood overweight.

Conclusions

A high intake of protein during the complementary feeding period may increase the risk of childhood overweight for boys.
T-2180-P: Associations of Maternal Protein Intake during Pregnancy with Early Linear Growth in the Offspring

Karen Switkowski, MS, MPH; Paul F. Jacques, D.Sc.; Aviva Must, PhD; Matthew Gillman, MD, SM; Emily Oken, MD, MPH;

Background

Prenatal nutrition contributes to programming future growth patterns, but dietary components, especially maternal protein intake, have been understudied.

Methods

Among 2,128 mother-child pairs in Project Viva, a Boston-area pre-birth cohort recruited 1999-2002, mothers reported dietary intake during the 1st and 2nd trimesters by food-frequency questionnaire. For consistency with dietary recommendations, we analyzed protein intake as g/kg/day using pre-pregnancy weight. We measured offspring length at delivery and in infancy (~6m) and height in early (~3y) and mid-childhood (~7y) and obtained clinical measurements throughout this period. We used a mixed model with the repeated length measures to predict individual slope of length gain from birth-6m and 6m-7y, then used these slopes as outcomes in adjusted linear regression models.

Results

Mean (SD) total protein intakes were 1.4 (0.4) and 1.4 (0.3) g/kg/d in 1st and 2nd trimesters, respectively, both above the RDA for pregnancy of 1.1 g/kg/d. Each 1SD (0.35 g/kg/d) increase in 2nd-trimester protein intake corresponded to 0.16 cm (95% CI: -0.29, -0.03) shorter length at birth and a 0.02 cm/mo lower (95% CI: -0.05, 0.01) rate of length growth from birth-6m, but no difference in the rate of length growth from 6m-7y (P: -0.00, 95% CI: -0.01, 0.00). Results were similar for 1st-trimester intake.

Conclusions

In a population of pregnant women with relatively high protein intake (76% with intake above 1.1 g/kg/d), higher intake was associated with shorter offspring length at birth and slower length growth from birth through 6 months.

T-2181-P: Association of Low Birth Length With Risk of Excessive Weight Gain During the First Year of Life
Background

Most studies evaluating the impact of body size at birth on health have focused on birth weight. The association between birth length and weight gain during infancy is poorly understood. Therefore, we investigate the risk of excessive gain weight among term babies born with lower length.

Methods

Pregnant women with appointments at participating health centers care in Porto Alegre, Brazil, agreed to enroll their children in a cohort study. Child anthropometric data were obtained at 6-9 months, 12-56 months, and 2-3 years of age. Term newborns with birth length <48 cm were considered small. Weight gain was analyzed based on BMI z-score variation in each of the three periods (subtracting each period's final BMI z-score from its initial BMI z-score) and values >0.67 were considered as rapid weight gain. Preterm babies were excluded from the analysis.

Results

At baseline, 514 children were assessed; 102 (19.8%) children had a birth length <48 cm. The average stature (cm) at 12-15 months (72.5±2.6 vs. 75.3±2.8) and 2-3 years (94.1±3.8 vs. 97.5±4.3) were lower in short children than those with normal/high birth length (p <0.001). A greater weight change (BMI z-score >0.67) from birth to 12-15 months was associated with a birth length <48 cm (RR 1.30; IC95% 1.07-1.59). The prevalence of short children was higher among those born to a smoking mother, but not significant (p=0.08).

Conclusions

We found that full term newborns with low length at birth were at increased risk of excessive weight gain during the first year of life suggesting that fetal linear growth may have a long-term impact on overweight and obesity. Support: FAPERGS and Ministry of Health, Brazil.

T-2182-P_DT: Nutritional Status and Cognitive Development during the First Four Years of Life in the CANDLE Study

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Background
The relationship between fat mass and cognitive function is speculated. Therefore, the aim of this study was to analyze the differences in cognitive outcomes between lean/normal (L/N) and overweight/obese (O/O) African American and Caucasian children at the ages of 1, 2, 3 and 4 years.

**Methods**

Demographics and anthropometric measurements were collected each year from birth until age 4 in the CANDLE study (n=1503 mothers). The child's cognitive development was assessed using the Bayley Scales of Infant and Toddler Development III at the ages of 1, 2 and 3 years and by Stanford-Binet at age 4. Logistic regression was used to test the effects of BMI on cognitive development at age 1 separately for African Americans (AA) and Caucasians (CA). ANCOVA was used to analyze differences in cognitive outcomes between L/N (<=84.99pct), and O/O (>=85pct) children at ages 2, 3, and 4 years. All models were adjusted for maternal IQ, pre-pregnancy BMI, education, income and gestational age.

**Results**

There were no significant differences in cognitive sub-scales between L/N and O/O in any of the races at the ages of 1, 2 and 3 years. At age 4 however, O/O group had higher mean values in the sum of the full (p=0.0265), non-verbal scale (p=0.0426) and verbal (p=0.0438) standard scores, and percentiles for the full (p=0.0238), non-verbal (p=0.0251) and verbal (p=0.0476) scales compared to the L/N group in the AA population. While non-significant, an inverse trend was seen among CA children.

**Conclusions**

Contrary to previous findings, our study revealed protective effects of O/O among 4-year-old AA children. While differences in cognitive outcomes were not significant, there was a trend for AA O/O children to have higher cognitive scores beginning at age 3. These results were inverse in CA children.

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**T-2183-P: Contribution of Beverages to Energy Intake During Pregnancy: Preliminary Results from the Decision-Making, Eating, and Weight Gain During Pregnancy (DEW) Study**

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**Background**
Excessive gestational weight gain is associated with negative maternal and child health outcomes. Beverages may contribute calories without producing satiety or needed nutrients. We describe the contributions of energy intake from beverages to total energy intake during pregnancy.

**Methods**

An ongoing prospective cohort study recruited pregnant women who were 18+ years, with singleton gestation <36 weeks (23.0 [SD: 5.8] weeks), pre-pregnancy BMI 18.5-40 kg/m2, and English-speaking. Women completed three 24-hour dietary recalls (2 weekdays, 1 weekend day) with trained dietitians. Energy intake (kcal) from beverages included added sweeteners (e.g., sugar in coffee) but did not include milk consumed with cereal. Participant characteristics were self-reported. Pre-pregnancy body mass index (BMI) was categorized as normal weight (NW) vs overweight/obese (OW/OB). Percent of total energy from beverages were compared by participant characteristics using t-tests or ANOVAs.

**Results**

Women (n=55) were 60% non-Hispanic White, aged 30.0 (SD:4.3) years, 42% were OW/OB pre-pregnancy, and 80% were partnered. 18% had <=high school education, 20% trade/Associate’s, 13% Bachelor’s, and 49% post-graduate. Average daily energy intake was 2,132 (SD:622) kcal; 286 (SD:185) kcal were from beverages, representing 13.4% (SD:7.3%; range: 0.6-28.0%). Percent energy from beverages differed by education (17.8%, 16.7%, 14.4%, 10.1% respectively, p<0.01) and BMI (11.7% NW vs 15.7% OW/OB, p=0.04).

**Conclusions**

Pregnant women consume a significant amount of energy from beverages. Limiting intake of energy-dense and low-nutrient beverages may be one strategy to limit gestational weight gain. Further research should explore what beverages contribute the most to excessive weight gain during pregnancy.

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**T-2184-P: US Infant Dietary Patterns: Socio-Demographic Differences and Potential Impact on Infant Growth**

*Xiaozhong Wen, PhD; Kai Ling K. Kong, PhD; Rina D. Eiden, PhD; Neha N. Sharma, BS; Chuanbo Xie, PhD;*

**Background**

Little is known about dietary patterns (inter-correlated foods) in US infants and their effects on infant growth. We aimed to identify dietary patterns in US infants at 6 and 12 months, socio-demographic differences in these patterns, and their associations with infant growth from 6 to 12 months.

**Methods**
We analyzed a subsample (760 boys and 795 girls) of the Infant Feeding Practices Study II (2005-2007). Mothers reported their infant's intakes of 18 types of foods in the past 7 days, which were used to derive dietary patterns at ages 6 and 12 m by principal component analysis. Six infant dietary patterns were identified at both ages 6 and 12 m: 'High sugar/fat/protein', 'Infant guideline solids', 'Formula', 'High dairy/regular cereal' (at 6 m only) or 'Breast milk' (at 12 m only), 'Soy solids/cereal', and 'Soy/rice/goat milk'. We fit multivariable linear regression models to examine the associations between 6-m dietary patterns and changes in clinical growth measures from 6 to 12 m.

Results

At 12 m, infants of lowly-educated or African American mothers had higher adherence to 'High sugar/fat/protein' pattern. Both 'High sugar/fat/protein' and 'High dairy/regular cereal' patterns at 6 m were associated with smaller increase in length-for-age z-score, but with greater increase in weight-for-length z-score (adjusted beta, 1.19 [95% CI, 0.21, 2.17] and 0.32 [0.08, 0.55], respectively). The 'Infant guideline solids' pattern (vegetables, fruits, baby cereal, meat) was associated with higher weight-for-age z-score only (0.08 [0.01, 0.14]).

Conclusions

Distinct dietary patterns exist among US infants, vary by maternal race/ethnicity and education, and have differential influences on infant growth. Moderate use of 'Infant guideline solids' with prolonged breastfeeding is a promising healthy dietary pattern for infants after age 6 months.

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**T-2185-P: Postnatal Weight Gain and Later BMI and Neurodevelopment: Do Timing, Gestational Age, and Intrauterine Growth Matter?**

*Xiaozhong Wen, PhD; Xiuhong Li, MD, PhD; Chuanbo Xie, PhD;*

**Background**

The role of fast postnatal weight gain in long-term obesity and neurodevelopment is still controversy. We examine if timing of postnatal weight gain, gestational age, and intrauterine growth could modify the associations of postnatal weight gain with BMI and neurodevelopment at 5 y.

**Methods**

We used data from U.S. Early Childhood Longitudinal Study-Birth Cohort. Researchers measured child's weight and height at 9 m, 2 y and 5 y; reading, math, gross and fine motor scores at 5 y. We divided sample into 4 groups by gestational age and intrauterine growth: preterm and small-for-gestational-age (SGA) (N=350), preterm and appropriate-for-gestational-age (AGA) (N=1,300), term and SGA (N=850), and term
and AGA (N=3,550). We used linear regression to examine associations of change in weight-for-age Z-score (WAZ) during 2 early timings (birth to 9 m or 9 m to 2 y) with 5-y BMI and neurodevelopment, adjusting for maternal socio-demographics, prepregnancy weight and height, and child's sex.

**Results**

Among all groups, WAZ from birth to 9 m and from 9 m to 2 y were positively associated with BMI Z-score at 5 y. Among preterm AGA group only, for each unit increment in WAZ from birth to 9 m, reading score at 5 y was higher by 1.16 (95% CI, 0.54,1.79), math score higher by 0.84 (0.41,1.27), gross motor score higher by 0.08 (0.00,0.16), and fine motor score higher by 0.07 (0.01,0.14). Among term SGA group only, for each unit increment in WAZ from 9 m to 2 y, 5-y gross motor score was lower by -0.17 (-0.28,-0.07). Other associations were null.

**Conclusions**

Fast weight gain from birth to 2 y universally predicts higher BMI up to age 5 y. Fast weight gain from birth to 9 m seems beneficial to neurodevelopment in preterm AGA children, but not in others. Fast weight gain from 9 m to 2 y is not beneficial, sometimes even harmful, to child neurodevelopment.

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**T-2186-P_DT: Excessive Gestational Weight Gain is Associated with Higher Weight and Adiposity in African American and Dominican Mothers at Seven Years Postpartum**

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**Background**

Excessive gestational weight gain (GWG) is associated with postpartum weight retention in African American women and possibly Hispanics; but whether effects persist beyond one year postpartum is unknown.

**Methods**

African American and Dominican mothers (n=302) were enrolled in pregnancy and followed at 7 years postpartum. Linear and Poisson regression were used to relate excessive GWG (> 2009 Institute of Medicine (IOM) Guidelines) to outcomes [obesity (BMI>30 kg/m2), weight change, and bioelectrical
impedance analysis (Tanita BC-418) estimates of percentage body fat (%fat), adjusting for covariates and prepregnancy BMI. For %fat, an interaction term between BMI and GWG was retained in the model.

**Results**

Prepregnancy BMI (mean±SD) and total GWG were 25.6±5.8 kg/m² and 16.6±7.8 kg (64%>IOM), respectively. Compared to GWG within IOM, excessive GWG was associated with 5.9 kg (p<0.001) weight gain from prepregnancy to 7 years postpartum and obesity [OR: 1.9, p=0.01]. Excessive GWG was associated with higher %fat among women with a BMI<25 but not among those with a BMI≥25 (interaction-p<0.01). For example, excessive GWG was associated with 3.9% (p<0.001) higher %fat for a BMI of 20 kg/m², but not associated with %fat for a BMI of 30 kg/m² (p=0.53).

**Conclusions**

Excessive GWG was associated with postpartum weight retention and obesity at 7 years postpartum. Among women with lower prepregnancy BMI, excessive GWG was associated with greater maternal adiposity at 7 years postpartum. Supporting healthy GWG may have long-term effects on maternal health.

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**T-2187-P_DT: Reducing Hispanic Children’s Obesity Risk Factors in the First 1000 Days of Life: A Qualitative Analysis**

*Jennifer Woo Baidal, MD, MPH; Shaniece Criss, MPH; Roberta Goldman, PhD; Meghan Perkins, MPH; Courtney Cunningham, MPH; Elsie M. Taveras, MD, MPH;*

**Background**

Modifiable risk factors during the first 1000 days of life (conception-age 2 yrs) mediate obesity disparities in Hispanic children. We aimed to elicit parents' explanatory models of childhood obesity and its risk factors and to identify intervention strategies that could be implemented in early life.

**Methods**

We conducted 7 semi-structured focus groups of Hispanic mothers at 3 life stages: 2 groups during pregnancy (n=17), 3 groups during infancy (birth to age 6 mo; n=15), and 2 groups during early childhood (>age 6 to < 24 mo; n=17). Domains included: 1) Perceptions of weight gain during respective life stage; 2) Explanatory models of childhood obesity; 3) Beliefs about obesity risk factors; and 4) Perceptions of potential future interventions in clinical and public health systems. We used immersion-crystallization techniques in iterative team discussions to analyze transcripts and identify emerging themes. We continued analyses until no new major themes emerged.
Results

Mean maternal age was 26 (SD: 6) yrs. Four themes emerged from data analysis: 1) Maternal belief that early life weight gain is not related to later life obesity; 2) Coping with pregnancy may trump healthy behaviors; 3) Fear of infant hunger drives bottle use and early solids introduction; and 4) Family beliefs about infant taste promote early solids introduction. Mothers identified physicians, WIC program, and relatives as important health information sources. Mothers had interest in interventions using mobile technology and group or home visits.

Conclusions

Opportunities exist in the first 1000 days to improve Hispanic mothers' understanding of childhood obesity risk factors and the role of early life weight gain in later life obesity. Interventions that link early life systems and include extended family may prevent obesity among Hispanic children.

T-2188-P: Differential Childhood Growth Trajectories of Etiological Subgroups of Large-For-Gestational-Age Newborns in the US

Chuanbo Xie, PhD; Youfa Wang, MD, PhD; Xiaozhong Wen, MD, PhD;

Background

Maternal diabetes, pre-pregnancy overweight or obese (ow/ob), and excessive gestational weight gain (GWG) are 3 leading risk factors of large-for-gestational-age (LGA). LGA predicts later obesity. We examined if etiological subgroups of LGA newborns have differential childhood growth trajectories.

Methods

We used data from a subsample of Early Childhood Longitudinal Study-Birth Cohort (ECLS-B). Researchers repeatedly measured childrenâ€™s anthropometries at ages 9 months, 2, 4, and 5 years. We divided LGA newborns into 8 etiological subgroups with none, single or co-existence of maternal diabetes, pre-pregnancy ow/ob, and excessive GWG. We used mixed linear regression models to compare growth trajectories (weight, height, weight-for-height [WFH] Z-score) across etiological LGA subgroups (N=700) and appropriate-for-gestational-age (AGA) reference group (N=2,800), adjusted for maternal socio-demographics, prenatal smoking, mode of delivery, breastfeeding, age of introducing solids.

Results
LGA subgroups free of the 3 factors (26.0%) or with excessive GWG only (23.0%) had a stable moderate high-
WFH Z-score trajectory. LGA subgroups with pre-pregnancy ow/ob only (10.4%) or with pre-pregnancy ow/ob and excessive GWG (35.3%) had an upward-stable WFH Z-score trajectory. LGA subgroup with maternal diabetes and pre-pregnancy ow/ob (1.4%) had a continuous upward WFH Z-score trajectory. LGA subgroup with all the 3 factors (3.3%) had a downward-upward-stable trajectory. At age 5 year, LGA subgroup with maternal diabetes and pre-pregnancy ow/ob had the highest WFH Z-score (mean, 1.56 [95% CI, 0.61-2.52]) across all LGA subgroups.

Conclusions

Etiological subgroups of LGA newborn have differential growth trajectories during early childhood. The LGA subgroup with co-existence of maternal diabetes and pre-pregnancy ow/ob seems to have the highest risk of childhood obesity.

T-2189-P: Do Maternal Socio-Demographics and Postnatal Factors Modify Subsequent High Risk of Obesity Among Large-For-Gestational-Age Children?

Chuanbo Xie, PhD; Youfa Wang, MD, PhD; Xiaozhong Wen, MD, PhD;

Background

Being born large-for-gestational-age (LGA) predicts later obesity. But LGA children are heterogeneous in later obesity risk. We examined if maternal socio-demographics and postnatal factors could modify the association of LGA with obesity risk at age 5 y using US nationally representative data.

Methods

We analyzed data of 4,950 US children from Early Childhood Longitudinal Study-Birth Cohort (2001-2007). LGA (N=450) was defined as birth weight >90th percentile by sex and gestational age in US birth reference population. Based on measured weight and height, obesity at age 5 y was defined as BMI >=95th percentile by sex and age in CDC Growth Chart. We used multivariable logistic regression models to test if the association of LGA with 5-y obesity risk could be modified by maternal race and education, breastfeeding duration, timing of introducing solids, parental rule about food type, the child's food consumption at age 4 y, and frequency of well-child checkups, adjusting for confounders.

Results
Overall, LGA children had higher risk of obesity at age 5 y than appropriate-for-gestational-age (AGA) children (23.3% vs. 15.5%; adjusted OR, 1.62 [95% CI=1.28, 2.07]). The risk of 5-y obesity related to LGA was significantly (P=0.015) modified by child's fast food intake at age 4 y: no difference in obesity risk between LGA and AGA children (adjusted OR, 1.29 [95% CI=0.95, 1.75]) in absence of fast food intake, but the difference increased with fast food intake. It is not modified by other postnatal factors or maternal socio-demographics.

Conclusions

In this US national sample, LGA was associated with high risk of childhood obesity. But limiting or eliminating fast food intake in early childhood could attenuate this association, and thus possibly reverse the high risk of obesity among LGA children.

T-2190-P: Cesarean Section in Relation to Offspring Obesity in Childhood, Adolescence and Early Adulthood

Changzheng Yuan; Audrey Gaskins, Sc.D.; Arianna Blaine, MS; Stacey Missmer, ScD; Alison E. Field, ScD; Jorge E. Chavarro, MD, ScD;

Background

Birth by cesarean section has been associated with higher risk of offspring obesity, but existing studies have been hampered by limited or absent control for shared risk factors for c-section and childhood obesity, such as maternal weight, fetal size and common pregnancy complications.

Methods

We conducted a prospective study of 22,077 individuals aged 9-28 years from the Growing Up Today Study (GUTS) and GUTS II, born to 15,257 women. We estimated the relative risk (RR) of obesity using logistic regression by generalized estimating equations to account for correlations among siblings, and to adjust for maternal age at delivery, ethnicity, previous c-section, region, year of birth, pre-pregnancy body mass index and smoking, gestational diabetes, preeclampsia, pregnancy induced hypertension, child sex, gestational age and birth weight. Analyses evaluating the relation of changes in mode of delivery for the same woman in successive pregnancies were also conducted.

Results

Being born through c-section was associated with a greater risk of obesity in childhood (age 9-12), adolescence (age 13-18) and early adulthood (age 19-28). For all participants combined, the adjusted relative risk (RR) for obesity comparing c-section to vaginal deliveries was 1.14 (95% confidence interval (CI) 1.04, 1.24; p=0.004). Among women with a previous c-section, offspring's obesity risk was 35% (95% CI: 9%, 53%) lower after vaginal delivery compared to delivery through a repeat c-section.
Conclusions

Cesarean delivery was positively associated with offspring obesity after adjusting for important confounding factors. This data suggest that offspring obesity may be an adverse outcome of cesarean deliveries that should be weighted when considering c-sections in the absence of a medical indication.

T-2191-P_DT: The Association Between Breastfeeding and Body Mass Index in Adolescence and Early Adulthood: A Comparison of American Indian/Alaska Natives and Non-Hispanic Whites

Anna Zamora-kapoor, PhD; Adam Omidpanah, MS; Dedra Buchwald, MD; Alice Kuo, MD, PhD; Raymond Harris, PhD; Lonnie Nelson, PhD;

Background

American Indian/Alaska Natives (AI/AN) exhibit higher obesity levels than any other racial group in the United States. Previous studies have argued that breastfeeding is associated with body mass index (BMI) during childhood, but we do not know whether the association between breastfeeding and BMI persists in adolescence and early adulthood. This study aims to: 1. Measure the association between breastfeeding and BMI in AI/AN and Non-Hispanic White adolescents and young adults. 2. Examine the extent to which socioeconomic variables might be influencing the association between breastfeeding and BMI; and 3. Determine the extent to which the association between breastfeeding and BMI fluctuates over time.

Methods

We conducted a longitudinal analysis with a population sample of 11,474 respondents from the National Longitudinal Study of Adolescent Health (Add Health). Our sample included 740 AI/ANs and 10,734 Whites.

Results

We had three main findings. 1. Breastfeeding is a protective factor against increasing BMI in AI/ANs and Non-Hispanic Whites. 2. Breastfeeding is associated with BMI independent from socioeconomic status. 3. The association between breastfeeding and BMI increases with age.

Conclusions
We found that breastfeeding is a protective factor against increasing BMI in adolescence and early adulthood. Our findings motivate future interventions to encourage breastfeeding among new mothers.

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**T-2192-P: The Association Between Neighborhood Retail Food Environment and Childhood Overweight and Obesity Using mRFEI in Monroe County, New York**

*Allyssa M. Abel; Todd A. Jusko, PhD; Kristin Evans, PhD; Aaron Blumkin, MS; Amina Alio, PhD; Stephen Cook, MD;*

**Background**

Obesity among children in the US is a great public health concern. Limited access to healthy food sources near children's homes may contribute to high obesity prevalence. The CDC recently proposed the Modified Retail Food Environment Index (mRFEI) as a possible measure for food environment exposure.

**Methods**

This study tested the association between mRFEI and rates of childhood overweight and obesity. We merged demographic and BMI data from 43,000 well child visits (2-18yo) from 21 pediatric practices in Monroe County seen in 2012, with data on local food sources open in 2012. Using ArcView GIS software, we mapped children's home addresses linked to BMI as our primary outcome and constructed individual mRFEI scores (# healthy food retailers / # total food retailers) as our primary exposure. Overweight and obesity were defined by CDC age/sex specific percentiles. We modeled weight status as a function of mRFEI using logistic regression, adjusting for children's age, race, gender, and urbanicity.

**Results**

Our sample included 7186 (16.22%) overweight and 6725 (15.18%) obese children, with 3/4 residing in the suburbs and 1/4 in the city. The mean mRFEI for a half-mile radius around the home in Monroe County was 8.2, meaning that for every 100 food vendors, only 8 provide healthy food options. We found that children with below average mRFEIs had 15.8% lower relative odds of overweight or obesity than those with above average mRFEIs. No significant associations were found between census tract or 1-mile radius mRFEIs and childhood BMI.

**Conclusions**
We were able to find an association between mRFEI and BMI at half-mile radii, but not greater geographic regions. Though limited by its cross-sectional design, our large, population-based study demonstrates that healthy food interventions are needed within children's immediate neighborhoods.

T-2193-P: Is the Relationship between Safety and BMI Mediated by Physical Activity or Screen Time?

Elaine S. Banerjee, MD; Neil Shah, BS; Marianna LaNoue, PhD:

Background

Safety and Body Mass Index (BMI) in children are consistently associated, thought to be caused by decreased physical activity and increased screen time due to perceived safety risks. Thus, we hypothesize that the relationship between safety and BMI is mediated by physical activity or screen time.

Methods

This study was a secondary analysis of the Public Health Management Corporation 2012 Southeastern Pennsylvania Household Health Survey of 1,973 6-18 year old children. Information was gathered from caregiver interviews. Primary outcomes were perceived neighborhood safety, BMI percentile, physical activity measured by average number of times per week child gets 30 minutes of PA (0-21), and screen time measured by average number of hours of television and computer use per week.

Results

Safety and BMI were significantly correlated, r=0.06, p=0.016. Screen time was significant correlated with safety, r=0.10, p<0.001, and with BMI, r=0.05, p=0.042. In the mediational analysis, BMI was regressed on safety alone with $\hat{R}^2=-1.99$, then regressed on both screen time and safety with a $\hat{R}^2=-1.97$ for the safety component. The $\hat{R}^2$ coefficients were not significantly different. Thus, screen time is not a mediator of the relationship between safety and BMI. Physical activity was not significantly correlated with either BMI or neighborhood safety.

Conclusions

In this sample, the relationship between safety and BMI was not mediated by physical activity or screen time. This finding suggests that there is another mechanism for the relationship between safety and BMI, such as chronic stress or access to healthy foods.
T-2194-P: Engaging Hospitals in North and South Carolina to Promote Healthier Choices: Nutrition, Physical Activity and Lactation Support Environments

Brook Belay; Amy Meador, MPH; Anne Thornhill, MPH; Elina Urli Hodges, MSPH;

Background

Hospitals employ more than 6 million individuals nationwide. However, there is little information on how hospitals provide environments that support healthier nutrition and physical activity for their employees. We describe the use of a web-based platform in North and South Carolina for this purpose.

Methods

WHA consists of 124 evidence-based questions on best policies and practices in these environments (36 nutrition, 23 physical activity). State hospital associations and leadership in NC and SC used WHA to self-assess their policies and practices at baseline and follow-up. Hospitals self-selected to participate in their self-assessments. These hospitals were provided with technical assistance on improving their policies and practices. Hospitals achieving all best practices for each environment were identified.

Results

At baseline, 154 and 141 hospitals assessed in nutrition and in physical activity, respectively. Approximately 69% re-assessed at follow up for nutrition and 64% in physical activity. Of these, 76% and 51% showed improvement in their scores, respectively. In addition, of those hospitals that assessed 11% (n=33) achieved all best practices in nutrition and 31% (n=17) in physical activity. Qualitative assessments and case studies of the participating hospitals highlighted several requirements for successful environment change.

Conclusions

Self-assessment tools can be used to track improvement in hospital environments. Leadership engagement, technical assistance and information sharing amongst hospitals are critical to success. This model could be used in collaboration with national partners to engage hospitals across the US.

T-2195-P: Influence of Thermal Exposure on Food Intake in an Office Setting
Background

There is a lack of information on how small changes in temperature exposure may affect food intake. We hypothesized that exposure to temperatures above the thermoneutral zone (TNZ) would decrease food intake in young adults (ages 19-35) in a sedentary office environment.

Methods

Participants wore standardized clothing and were randomized to either a colder (67-68°F) or a warmer environment (79-80°F) under the artifice of monitoring routine office work with abnormal temperature conditions over a 2 hour period. Thermal images of the inner canthus of their eye and middle finger nail bed, representing core and peripheral temperatures, respectively were taken at baseline, 1, and 2 hours. Each participant was presented a large, cheese pizza after 1 hour and directed to eat at their leisure and energy intake was quantified by converting weight of pizza consumed to caloric content using bomb calorimetry data on the pizzas.

Results

No significant difference in pizza consumption was seen between groups. Sex and age were significant predictors of food consumption in a linear regression model including room temperature, sex, age, BMI, race, and outdoor temperature. Room temperature and BMI were not significant predictors ($R^2 = 0.005 (-0.01, 0.003)$ and $R^2 = 0.011 (-0.0005, 0.022)$, respectively), but point estimates are in direction hypothesized (decreased consumption in warmer room and increased consumption with increasing BMI).

Conclusions

Further studies examining energy intake after subtle alterations of the thermal environment are needed to more fully characterize whether such effects exist and, if so, their magnitude and modifiers.

T-2196-P: Differences in the Type of Restaurant Patronized Influence the Association between Eating Out and BMI in Six Counties of Wisconsin

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Background
Eating out has been cited as a contributor to obesity; however, the role of eating at different restaurant types is little studied and controversial.

**Methods**

To investigate the relative strengths of associations between the frequency of eating at different restaurants (fast food (FF), fast casual (FC), all you can eat (AYE) and sit down (SD) restaurants) and measured BMI in six counties of Wisconsin, Survey of Health of Wisconsin surveyed 1418 adult individuals (age = 48.2±0.5 years) through CDC's Community Transformation Grant program. Eating out was calculated as a categorical and continuous variable. General linear model was used to establish associations between frequency of eating out and BMI. Age, sex, income, marital status, education and smoking status were included in each model.

**Results**

BMI averaged 29.4 kg/m², (39% obese) and eating out 2 times/week. Eating out >=3/week specifically at FF, FC, AYE and SD was reported by 8.2%, 1.6%, 0.5%, 2.4% participants, respectively. Compared to those consuming FF >=3/week, <=1-3/month and 1-2/week had lower BMI (-2.3, P=0.003; -1.7, P=0.05). With eating out frequency as continuous, every one meal/week increase in FF and SD, increased BMI by 0.8 (P=0.001) and 0.6 (P=0.04) kg/m² respectively. No association of BMI was found with FC or AYE.

**Conclusions**

Frequency of FF and SD meal consumption are one of the several factors that play an important role in weight gain in these six Wisconsin communities. The effects on BMI are more pronounced with FF and SD frequency however, more studies need to be done to extend our findings to other populations.

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**T-2197-P: Agent Based Model of School Environment Dynamic Furniture Intervention: Impact on Elementary School-Aged Children's Obesity and Overweight Outcomes**

*Jeri Brittin, MD; Ozgur M. Araz, PhD; Adrian Ramirez-Nafarrate, PhD; Terry T. Huang, PhD, MPH, CPH, FTOS;*

**Background**

There is widespread U.S. interest in leveraging school environments to address childhood obesity. It has been hypothesized that dynamic furniture can have desirable impact on energy balance via non-exercise activity thermogenesis. Our aim is to simulate such impact in elementary school students.
Methods

We built on an agent-based framework modeling childhood obesity, overweight, normal weight, and underweight outcomes over time, drawing parameters from relevant literature and the CDC growth charts for stature-for-age. We also used parameters from a recent lab-based study that found significant within-subject difference in activity levels using dynamic vs. traditional rigid furniture. We programmed an agent-based model, using NetLogo software, and designed experiments to simulate the impact of dynamic furniture in the school environment on weight status outcomes, comparing equivalent groups of male and female agents that were exposed or non-exposed through the elementary school years.

Results

We found that dynamic furniture in the school environment reduced the prevalence of overweight and obese child agents over time. Although the impact was minimal among males, there was a marked reduction in overweight and obese prevalence among the female intervention vs. control group over time. Gender differences in overall activity levels may explain the greater impact of dynamic furniture-related low-intensity physical activity among females.

Conclusions

Introduction of dynamic furniture in school environments may be a relatively easy and broadly-generalizable intervention toward reducing obesity and overweight prevalence across elementary school populations, at least among females. The simulated findings warrant a future empirical prospective study.

T-2200-P: A Prospective Study of the Impact of Holidays on Body Weight of University Students

Rolando G. Dáz, PhD; Mario Benson, BSNtr; Sue H. Montes, BSNtr; Julián Esparza-Romero, PhD; Rodolfo Cisneros, MD, M.Sc; Alejandro Zavala, BSNtr;

Background

Some studies have shown that holidays affect body weight. However, those results are questionable due to methodological limitations, such as small samples or selection bias. Additionally, the only research conducted on university students indicates no change in body weight during holidays.

Methods

To determine if holidays influence body weight, an observational-prospective study was performed. The research consisted of measuring the weight of students from two different institutions before and after a holiday season. Pre-holiday measurements were taken from November 15th to December 1st and post-holiday measurements from January 15th to February 1st. Even though the main objective of the study was
to observe changes in body weight, additional data related to diet and physical activity were collected to mask the primary outcome.

**Results**

During the pre-holiday phase 393 students participated, but only 330 students (84%) could be measured during the post-holiday phase. At the pre-holiday phase, mean (+-SD) age was 19.8 +/- 1.59 years and body mass index was 22.8 +/- 3.83 kg/m2. The students' weight increased significantly during holiday season (gain, 0.60 +/- 1.51 kg; p <0.0001). Over half (56%) of the participants maintained the same body weight (<1 kg change), while 34% gained more than 1 kg and only 10% lost more than 1 kg.

**Conclusions**

The holiday season has a significant impact on body weight of university students. This study suggests holidays could be a critical time to apply preventive actions.

**T-2201-P_DT: Correlates of Physical Activity Among Low-Income Overweight/Obese Children during and Outside of a Structured Physical Activity Program**

*Daniel P. Hatfield, MS; Virginia R. Chomitz, PhD; Kenneth Chui, PhD; Jennifer Sacheck, PhD; Christina D. Economos, PhD;*

**Background**

Overweight/obese (OW/OB) youth engage in less physical activity (PA) than normal-weight youth. Studies have linked adiposity, fitness, and perceived athletic competence (PAC) with PA, but few have examined these relationships both in and outside structured PA programs among OW/OB youth.

**Methods**

Children ages 8-14 were referred to a structured after-school PA program for OW/OB youth at 5 sites in a low-income community. Baseline measures included height/weight; aerobic fitness (laps in PACER test); PAC (Harter Profile); self-reported PA level (PAQ-C survey); and demographics (parent survey). Pedometers were worn in 10 of 59 2-hour PA sessions. Each child's step counts were standardized by session/site and averaged. Regression model A tested cross-sectional associations between baseline fitness, BMI-z, and PAC and self-reported PA. Model B tested associations between the same predictor variables and mean steps in program. Models were adjusted for age, sex, and other covariates.
Results

92 low-income, OW/OB children (54% male, 91% Hispanic) were included. In model A, perceived athletic competence, but not BMI-z or fitness, was significantly associated with self-reported PA among boys and girls (ΔŶ=0.31, p=0.03). In model B, among boys, fitness was positively associated (ΔŶ=50.2, p=0.001) with mean pedometer steps in program; PAC and BMI-z were not significant predictors. Among girls, fitness was positively (ΔŶ=69.3, p=0.03) and BMI-z inversely (ΔŶ=-923.5, p=0.03) associated with mean steps; PAC was not a significant predictor.

Conclusions

Among low-income, OW/OB youth, only perceived athletic competence was significantly associated with overall self-reported PA. In the structured program, fitness, but not perceived competence, predicted average steps. For OW/OB youth in structured programs, PA may not depend on perceived competence.

T-2202-P: Compliance by Normal and Overweight Chilean Children of the Daily Physical Activity Recommendation: Difference between School and Weekend Days

Juliana Kain, MPH; Lorena Moreno, MS EN NUTRICIÁ“N;

Background

Even though Chile has one of the highest childhood obesity rates in the world, physical activity has only recently being addressed.

Methods

Objective: compare childrenÁ’s degree of compliance of the WHO recommendation of 60 minutes daily of moderate and vigorous activity (MVPA) during school and weekend days, by sex and nutritional status (NS). Cross-sectional study of 250 children (6-9 y olds; 139 boys) attending 3 low income public schools in Santiago. MVPA was determined during 8 consecutive days with NL-1000 pedometers. With weight and height, we determined BMI and BMI z score. NS was determined using WHO 2007 reference: We categorized the sample into normal weight or N (40 and 45 boys and girls respectively) and overweight or OW (99 and 66)

Results
Daily MVPA during the week was significantly higher than on weekends (50.5 ± 17.6 vs 40.3 ± 20.0) with boys accumulating a greater amount (54.8 ± 19.3 and 42.3 ± 21.7 during week and weekend respectively vs 45.1 ± 13.5 and 37.7 ± 17.3 in girls). In both boys and girls, no difference was observed in MVPA by nutritional status. 33% of boys (11% N and 22% OW) and 15% of girls (6% N and 11% OW) met the recommendation during the week and 17% of boys (6% N and 11% OW) and 9% (5% N and 4% OW) on weekend days respectively.

Conclusions

The % of children meeting the daily recommendation of MVPA is extremely low. Why this proportion is greater among the OW is being investigated.

socioeconomic status

and obese status

and maternal body weight before pregnancy.

T-2204-P: The School Food Environment and Adiposity in Canadian Children

Allana G. LeBlanc, MSc; Jean-Philippe Chaput, PhD; Mike M. Borghese, MSc; Genevieve Leduc, PhD; Mark S. Tremblay, PhD;

Background

The school food environment in Canada is relatively underdeveloped and research in this area is limited. This work aims to understand the school food environment and how it relates to adiposity in 10-year-old children.

Methods

Data from the Canadian site of the International Study of Childhood Obesity, Lifestyle and the Environment (ISCOLE) were used for analysis. School, child, and home characteristics were obtained via questionnaire. Child anthropometrics were directly measured by ISCOLE study staff. Multi-level models,
controlling for sex, ethnicity, moderate to vigorous physical activity, and household income were run with 33 separate variables related to the school food environment.

**Results**

Data were collected in 26 schools on 567 children (57.1% female; mean age=10.0 years) from Ottawa, Canada. The majority of participants were normal weight (BMI z-score: mean=0.40, SD=1.20); after controlling for covariates, BMI remained significantly different across schools (p<0.05). We observed that 96% of the variance in BMI can be attributed to participant level characteristics and only 4% to school level differences. Eight of the 33 school variables were not applicable in any school. In the unadjusted model, significant associations were found with presence of healthy school breakfast program (B=-0.19, p<0.03), and availability of subsidized fruit/vegetables (B=-0.17, p<0.03). After adjusting for sex, ethnicity, and household income, significant associations were found with presence of a healthy breakfast program (B=-0.16, p<0.02), and selling pop as part of a school fundraiser (B=0.16, p<0.05). In the full model, no school variables were significantly related to obesity.

**Conclusions**

The school food environment is relatively under-developed in Canadian elementary schools. Data from this study show that the school food environment is not an important contributor of adiposity.

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**T-2205-P: Analyses of the Built Environments and the Perceptions Related to Physical Activity of Adolescents in Rural Low-Income Ethnic Communities**

Yijing Li; Tandalayo Kidd, PhD, RD, LPN; Erika Lindshield, MPH, RD, LD; Koushik Adhikari, PhD; Nancy Muturi, PhD; Kendra Kettelmann, PhD, RD, LN; Susan Zies, M.Ed;

**Background**

As part of a 5-year multi-state adolescent obesity prevention project, the resources and the perceived behaviors for physical activity (PA) were assessed in rural low-income ethnic communities in Kansas.

**Methods**

One control and one intervention communities in Southwest Kansas were randomly selected prior to program development. In-person audits of street segments (n1 = 3 and n2 = 5, respectively for the control and intervention communities) and parks (n1 = 4 and n2 = 2) were conducted by trained observers using validated Physical Activity Resource Assessment (PARA) and Active Neighborhood Checklist (ANC) to
systematically document and describe current neighborhood conditions. Questionnaires, which were designed to identify primary factors for barriers, perceptions, and motivations of PA, were distributed to 6th to 8th graders (n1 = 115 and n2 = 142) in two middle schools in both communities.

**Results**

There were no statistical differences in the mean PARA and ANC scores between the control and intervention communities (p > 0.05). The majority PA structures available were play sets (72.5%) and basketball courts (51.0%). Sidewalks (78.5%) and stop signs (69.0%) were present to promote neighborhood safety for walking and cycling. Demographic characteristics were similar (p > 0.05), with Hispanic populations (n1 = 60.9% and n2 = 69.6%) as majority. More than 70% of adolescents reported to be physically active for at least 1hr/d for 5d/wk.

**Conclusions**

The built environments and the perceptions of PA in both communities were similar. These findings suggest future interventions targeting PA improvement should integrate environmental and behavioral change which can provide insights into the overall health and well-being of communities.

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**T-2206-P: Increased Municipal Investment in Bicycle Commuting and Increased Tract-Level Commuting in Minneapolis over a 10 Year-Period**

*Katie Meyer, ScD; Le Zhang, MS; Daniel Rodriguez, PhD; Marc Peterson, MA; Penny Gordon-Larsen, PhD, FTOS;*

**Background**

Walking or biking to work is inversely associated with weight gain. Municipalities have invested in major infrastructure changes (e.g., greenways) to promote commuting by bicycle. The extent to which infrastructure changes influence commuting behavior is not known.

**Methods**

We used data from Minneapolis, where past-decade increases in commuting by bicycle have significantly exceeded the national average. Over the same period, Minneapolis has made major bicycle infrastructure changes, including a trans-city, off-road trail system (greenway) linking major residential and employment centers. Using decennial Census (1990, 2000) and American Community Survey (pooled 2007-2011) data, we quantified tract-level changes in commuting by bicycle with respect to greenway development. We controlled for tract-level covariates, such as sociodemographic indicators and street connectivity.
Results

In multivariable-adjusted random-effects tobit regression, among tracts 3 miles from the greenway the percentage of workers commuting by bike increased from 1.8% (95% CI: 1.2, 2.4) in 2000 to 3.4% (2.9, 4.0) in 2007-2011, while in tracts 6 miles from the greenway bike commuting (%) changed from 1.2 (0.1, 2.4) to 1.8 (0.7, 2.9).

Conclusions

Our findings suggest that municipal infrastructure influences bicycle commuting, which has been inversely associated with weight gain and cardiometabolic risk. (Grant support: R01HL114091)

T-2208-P: Diabetes Prevalence is Associated with Different Community Factors between the Diabetes Belt and the Remainder of the United States

Candice A. Myers, PhD; Tim Slack, PhD; Timothy Church, MD, PhD; Corby K. Martin, PhD; Stephanie T. Broyles, PhD; Steven B. Heymsfield, MD;

Background

Diabetes prevalence is not equally distributed across the United States (U.S.). The Diabetes Belt is a region of counties in the Southern U.S. with an 11% or greater prevalence of diagnosed diabetes.

Methods

This study used county-level age-adjusted diabetes prevalence estimates, i.e., the percent of people >=20 years that had diabetes within a county in 2010. County-level diabetes prevalence in the Diabetes Belt (Mean+SD, 11.8+-1.4%) was significantly higher (p<0.001) than the rest of the U.S. (8.7+-1.6%). A spatial regime model determined if diabetes prevalence was associated with different factors for counties in the Diabetes Belt (n=644) versus the remainder of the U.S. (n=2 465).

Results

Results revealed a number of significantly different factors between the regions. Counties outside of the Diabetes Belt demonstrated stronger positive associations for African American (p=0.034 for the interaction) and poor (p<0.001) populations with diabetes prevalence, and stronger negative associations for Hispanic (p=0.030) and 65 and older (p=0.001) populations with diabetes prevalence. Compared to
non-Diabetes counties, there was greater geographic clustering of diabetes prevalence among neighboring counties (p<0.001) in the Diabetes Belt.

**Conclusions**

Populations most at risk for diabetes are different between the Diabetes Belt and elsewhere. These factors go beyond the usual risk factors, e.g., obesity and physical inactivity. Prevention/treatment targets are geographically unique and public health efforts should acknowledge these disparities.

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**T-2209-P: Direct Observation of Obesity-Related Environmental Features (DOO-REF): A New Community Audit Methodology**

_Claudia Nau, PhD; Schwartz Brian, PhD; Annemarie Hirsch, PhD, MPH; Lisa Bailey-Davis, EdD; Thomas Glass, PhD;_

**Background**

Environmental audit tools to measure obesogenic environments have emerged as complements to surveys or secondary data. There are currently no audit tools for direct observation of the social, physical activity and food environments designed for a range of places from rural to urban.

**Methods**

We developed a comprehensive method for direct systematic observation of the social, physical activity (PA) and food environments (FE). We utilized an innovative ipad-based sampling and data collection strategy using radial observation around multiple randomly sampled residences to estimate community-wide metrics. This strategy yields comparable measures across urban, suburban & rural communities. Data collection is augmented with GIS mapping, geotagging and photos, and can be used to ground-truth food & physical activity establishments from secondary data. We evaluated inter-rater reliability and sensitivity to the number of sampled observation sites.

**Results**

We pilot tested the DOO-REF in 9 Pennsylvania communities (3 rural/suburban, 3 small town, 3 urban), yielding summary metrics for 1) PA promoting features, 2) safety, 3) aesthetic quality, 4) PA barriers, 5) food promoting features, and 6) social cohesion. Field audits took 20 minutes per site. To assess construct validity, we compared our direct observation metrics to secondary data and average child BMI. Simulation results show that 15 sampled observation sites per community were optimal.
Conclusions

The DOO-REF is a new, comprehensive, efficient method for sampling and data collection to characterize key features of the obesogenic environment that are hard to assess with surveys or secondary data, and offers the first direct observation tool for a range of areas from rural to urban.

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**T-2210-P: Multiple Pathways from the Neighborhood Food Environment to Increased Body Mass Index through Diet: A Structural Equation-Based Approach**

*Andrea S. Richardson, MPH;*

**Background**

Strategies to improve diet quality and reduce obesity have targeted neighborhood food resources, without considering simultaneous and separate pathways from fast food and non-fast food restaurants, supermarkets, and convenience stores to diet behaviors and to body mass index (BMI).

**Methods**

We used individual- and neighborhood-level data from CARDIA participants (n=5,114) over 20 years (1985-86 to 2005-06) and structural equation modeling to study the longitudinal pathways from neighborhood food resources to BMI comprising two steps: 1) direct association between resources and diet and 2) indirect association between resources and BMI through diet. Four latent (unobserved) diet factors were created using consumption of foods we considered, *a priori*, typically consumed or purchased at each type of resource (e.g., fries from FFRs, fruits from supermarkets).

**Results**

Non-fast food restaurants were directly associated with lower consumption of fast food-type diet (year 0: $\hat{\beta}=-0.31$, p<0.001, year 7: $\hat{\beta}=-0.12$, p<0.001, $\hat{\beta}=-0.08$, p=0.01) and indirectly associated with higher BMI through consumption of fast food-type diet (year 7: $\hat{\beta}=0.07$, p<0.001, year 20: $\hat{\beta}=0.13$ p<0.001). One SD increase in neighborhood non-fast food restaurants at year 0, predicted 0.31 SD lower consumption of fast food-type diet. Associations between neighborhood fast food restaurants, food stores, diet behaviors, and BMI were inconsistent.

**Conclusions**

Neighborhood non-fast food restaurants may play a comparatively stronger role in diet behaviors and BMI than fast food restaurants and food stores.
T-2211-P: The Importance of Activity at School

Mireille m. Roillet; Amélie Beghuin, Master Public Health; Jean-Michel Borys, MD; Julie Mayer, Ms Sociology;

Background

Games and toys encourage children's physical activity. We evaluated the games' preferences of children, and of their parents when they were young, in one primary school in a socially-deprived area of a Belgian town involved in the Viasano community-based program to prevent childhood obesity.

Methods

A questionnaire, with open questions related to types of games and toys used, play areas and sports activities, was completed in class by children attending the primary school (ages 6-12) and at home by their parents. A total of 213 of the school children (82.2%, 113 boys, 100 girls) and 144 parents (46 men [median age 46.6 years], 94 women [median age 38.6 years]) completed the questionnaire. Results were analyzed using Epi Info 3.5.4.

Results

The games preferred at home were largely (83.4%) passive or required little activity; the percentage of children who cited at least one preferred passive game at home increased with increasing age, from 37.7% in grade 1 to 89.6% in grade 6 (p<0.001). At school, however, 90% of the games preferred were active games (e.g., hopscotch, skipping, tag, football). 47.6% of children said they practiced a sport regularly; this percentage was just 28.4 for the older children (5th and 6th grades). Parents were much more active at home and at school.

Conclusions

Children's games today generally involve less physical activity than those used by their parents when they were young. The school is an important environment for encouraging active play amongst primary school children.

T-2212-P: Temporal Associations between Neighborhood Fast Food Restaurants and Fast Food Consumption: Does Residential
Mobility Make a Difference? The CARDIA Study

Pasquale E. Rummo, MPH; Sandra S. Albrecht, PhD, MPH; Katie A. Meyer, ScD; Catarina I. Kiefe, MD; James M. Shikany, DrPH; Penny Gordon-Larsen, PhD, FTOS;

Background

Little is known about how changes in the food environment for individuals who relocate may relate to fast food consumption and neighborhood food resources.

Methods

We used 25 years of longitudinal data (6 study exams) with linked time-varying geographic information system-derived food resource measures from the CARDIA study (n=4,832). Using repeated measures and fixed-effects regression, we examined the association between fast food restaurant availability (percent fast food restaurants relative to total food outlets within a 3-km street network distance from respondents' residence) and changes in the number of weekly fast food meals and whether this association differed between movers and non-movers. Models were adjusted for time-varying covariates, and stratified by baseline age (18-24, 25-30 years), given higher residential mobility at younger ages.

Results

Median fast food consumption was 1.0 (IQR=0.0, 2.3) meal/wk and mean fast food restaurant availability was 15.5% (SD=9.0). A 10% increase in fast food restaurant availability was statistically significantly associated with greater fast food consumption in movers ($\hat{\beta}$=0.28; 95% CI: 0.02, 0.54), but not non-movers ($\hat{\beta}$=-0.02; 95% CI: -0.12, 0.07) (p-interaction=0.03). Effects in movers vs. non-movers were comparatively stronger in individuals of younger vs. older age at baseline (p-interaction=0.003).

Conclusions

There are differences in the association between neighborhood fast food restaurants and fast food consumption by residential relocation and age, which may be due to changes in the food environment or characteristics of individuals who relocate.

T-2214-P: Healthy Foods Being Sold in Small Stores in Rural Maryland where
Customers have a High Prevalence of Overweight and Obesity

Myra Shapiro; Claire Welsh, MS; Elizabeth Campbell, B.A.; Donna Dennis, MS, RD, LD; Joel Gittelsohn, PhD;

Background

In rural areas, there is a low prevalence of supermarkets and small food stores serve as common food sources. We investigated the types of healthy foods being sold at small food stores in rural Maryland and the attitudes of storeowners towards stocking healthy foods.

Methods

Twenty-two small store owners were interviewed using structured interviews about their stocking and attitudes towards potentially stocking healthy foods.

Results

One hundred percent of stores carried regular soda and chips, 95% diet soda, 90% baked chips, 59% low fat milk, 36% fresh fruit, 27% fresh vegetables, 26% frozen vegetables, 23% low fat salad dressing, 22% low salt pretzels, 9% frozen fruit, 9% low salt canned vegetables. Approximately 90% said diet soda would sell well in their store, 68% said fresh fruit would, 36% said low fat milk would, 8% said fresh vegetables would, 0% thought frozen vegetables, low fat cheese, low salt pretzels, or low salt canned vegetables would.

Conclusions

Owners of small stocks tended to have narrow offerings of healthy foods and lower belief that healthy foods would sell well in their stores. In this area with a high prevalence of overweight and obesity, more work is necessary to make healthy foods available in small stores.

T-2215-P: Associations between Weight Status and Attitudes and Behaviors of Small Food Store Users in Rural Maryland

Myra Shapiro; Claire Welsh, MS; Elizabeth Campbell, B.A.; Donna Dennis, MS, RD, LD; Joel Gittelsohn, PhD;
Background

In rural areas, typified by large distances and low population, small food stores are common food sources. We investigated the types of healthy foods being sold at small food stores in rural Maryland and the attitudes and knowledge of customers about these foods.

Methods

Using structured interviews, 75 regular adult customers were sampled about their food purchasing, knowledge, self efficacy, and behavioral intentions.

Results

Subjects were 24% of normal weight (NW), 32% overweight (OW), and 44% obese (OB). In the previous 30 days, 44% NW subjects bought low fat milk, 50% OW, and 33% OB. Fresh vegetables were bought by 81% of OB, 83% OW, and 83% NW. Fresh fruit was bought by 91% of OB, 88% OW, and 94% NW. In knowledge questions, 17% of NW answered all correctly, 8% OW, and 12% OB. In self efficacy, 27% of OB had high self efficacy in healthy diet choices, 21% OW, and 50% NW. In behavioral intent to make healthy choices, 11% of NW had high intent, 8% OW, and 3% OB.

Conclusions

The high purchasing of fruits and vegetables across all weight categories should be emphasized to small store owners for stocking. More work is necessary to improve knowledge, self efficacy, and behavioral intentions to improve healthy eating among overweight and obese consumers in rural Maryland.

T-2216-P: Lifestyle and Consumer Behaviors Associated with Frequent Farm-to-Consumer Outlet Use among US Adults

Chelsea Singleton; Olivia Affuso, PhD;

Background

Farm-to-Consumer (FTC) outlets (i.e. farmers markets, community gardens) have been cited as a potential community-level obesity prevention strategy. Scientific evidence specifying the health implications of FTC outlets is limited and information describing the sub-population of US adults that regularly patronize these outlets is scarce. The aim of this cross-sectional analysis is to identify lifestyle and consumer behaviors associated with frequent FTC outlet use in order to gain insight on the population that utilizes these outlets to purchase produce.
Methods

Data on 3,188 US adults that completed the National Cancer Institutes' Food Attitudes and Behaviors Survey in 2007 were analyzed. Participants that indicated they purchased fruits and vegetables from FTC outlets at least once a week during the most recent market season were considered frequent FTC outlet users. Multivariable adjusted logistic regression models were used to examine associations between consumer and lifestyle behaviors and frequent FTC outlet use.

Results

There were 896 (27.96%) participants identified as frequent FTC outlet users. After adjusting for age, sex, race/ethnicity, educational attainment and body mass index, behaviors such as number of fruit & vegetable servings consumed per day (OR = 1.11; 95% CI = 1.07 - 1.15), number of days physically active per week (OR = 1.09; 95% CI = 1.05 - 1.13) and monthly shopping for high quality produce (OR = 2.78; 95% CI = 2.04 - 3.79) were significantly associated with frequent FTC outlet use.

Conclusions

Lifestyle and consumer behaviors mostly related to health living are associated with frequent FTC outlet use among US adults.

T-2217-P: Mixed Land Use (MLU) is Associated with Increased Walking for Leisure of Women Living in an Urban Area of Brazil

Angela Trude, MS; Anna Kharmats, MA; Joel Gittelsohn, PhD, MS; Gabriela Vedovato, MS; Maria Aparecida de Oliveira, PhD; Paula Martins, PhD;

Background

Physical inactivity is one of the risk factors for many chronic diseases. Despite its importance, little is known about the relationship between built environment and physical activity in mid/low-income countries. MLU reflects the availability of destinations to which people can walk affecting PA.

Methods

We conducted home interviews with women living in urban neighborhoods of varying socioeconomic levels in Santos, Brazil (n = 526), using the short version of the International Physical Activity Questionnaire (IPAQ) to assess leisure-time activity. The Pedestrian Environmental Data Scan (PEDS) was used to calculate neighborhood walkability scores through exploratory factor analysis and to construct a
Mixed Land Use (MLU) indicator based on the spatial distribution of residential, retail and commercial establishments. Geographical Information System (GIS) and thematic maps were utilized to explore the spatial relationship between PA (walking for leisure-time) and land use patterns.

Results

MLU scoring included residential mix (factor loading 0.66) and high density of trees (factor loading 0.55) when running a factor analysis. A large proportion of the women were inactive (43.7%) and 89.5% reported not walking for leisure. Using a spatial analysis, high-density neighborhoods of mix of land use appeared to have more women walking for leisure-time, than low-density neighborhoods of land use mix.

Conclusions

MLU appears to play an important role in increasing PA in Brazil urban. Further research is needed on newly conceptualized variables with a systematic attention to measuring social and cultural environments. Including these variables may lead to better understand PA behavior in different populations.

T-2218-P: The Socioeconomic Gradient of Obesity-Related Chronic Diseases among Obese Adults in South Africa

Olufunke A. Alaba, PhD; Lumbwe Chola, PhD;

Background

Unknown is the relationship that exists between Socioeconomic status (SES) and chronic diseases among the obese. This study examines the relationship between obesity-related chronic diseases and SES among obese South African adults.

Methods

The data of non-pregnant adults from age 18 to 70 years (14925) were taken from the National Income Dynamics Survey of 2013. Measured weight and height were used to generate obesity status. Obesity-related chronic diseases were self-reported physician diagnosed diabetes mellitus, high blood pressure, asthma, stroke and cancer. The indicators on socioeconomic status used were household income, education and an asset score generated using multiple correspondence analyses (MCA).

Results

From the analysis, more than half of South African adults are either overweight or obese (26% overweight and 27% obese) and the prevalence of at least one chronic diseases was highest among obese individuals. Among the obese individuals, obesity without any chronic disease was concentrated among those who had
higher education, while prevalence of at least one of the obesity-related chronic diseases was concentrated among those with lower education.

Conclusions

Our study confirms the suggested positive relationship between obesity and socioeconomic status. However, an inverse relationship is observed when obesity-related chronic diseases are taken into consideration.

T-2219-P: Severe Obesity Among Adolescents: Social, Personal and Behavioral Correlates

Katherine W. Bauer, PhD; Marsha D. Marcus, PhD; Dianne Neumark-Sztainer, PhD MPH RD;

Background

The proportion of adolescents in the US with severe obesity is rapidly growing. Adolescents with severe obesity are at risk for many physical health co-morbidities. Less is known about the social, personal, and behavioral experiences of youth with severe obesity.

Methods

A cross-sectional analysis of data from middle and high school-aged participants in the EAT 2010 study (n=2740) was conducted. Adolescents completed in-class surveys. Height and weight were measured. Severe obesity was defined a BMI >= 120% of the 95th percentile or >= 35; moderate obesity was defined as a BMI percentile >= 95 but below severe obesity cut points. Nine percent (n=249) of adolescents were categorized as severely obese and 15% (327) of adolescents were categorized as moderately obese. Linear regression models identified differences in characteristics between youth with moderate and severe obesity adjusted for gender, socio-economic status, race, US nativity, and age.

Results

Compared to adolescents with moderate obesity, those with severe obesity experienced more frequent weight talk and teasing by family (ps=0.002) and weight teasing by peers (p<0.001). Adolescents with severe obesity also reported lower self-esteem (p=0.03) and body satisfaction (p<0.001). No differences were observed in self-reported intake of soda, snack foods, fruits and vegetables, or fast food between youth with severe and moderate obesity. Similarly, no differences were observed in sleep duration, television use, or physical activity.

Conclusions
Compared to adolescents with moderate obesity, adolescents with severe obesity are more likely to be the target of teasing and report lower self-esteem and body satisfaction. These experiences may contribute to psychosocial morbidity and poorer quality of life.

**T-2220-P: Exploring the Relationship between Weight Stigma and Self-Compassion in College Students**

*Tosca D. Braun, MD; Crystal Park, PhD:

**Background**

Weight stigma (WS) is a theorized contributor to the obesity epidemic. Self-compassion (SC) may represent a feasible strategy to combat weight stigma, although no research to date has assessed their relationship. This study examined associations between SC and WS in college undergraduates.

**Methods**

283 participants (152 females; m. age=19.12+/-.1.63; m. BMI=23.73+/-.4.29) self-reported BMI and completed the Self-Compassion and Fat Phobia (a measure of weight stigma) scales. One-way ANOVA tested differences in fat phobia by BMI category and gender. Multiple regression analyses were then performed to assess how self-compassion related to fat phobia, after controlling for gender and BMI.

**Results**

No significant differences in fat phobia were detected by BMI category or gender. Multiple regression analyses revealed no significant prediction of fat phobia by BMI or gender. Self-compassion significantly predicted fat phobia (f²=-.192, p=.002), R²=.037.

**Conclusions**

SC was related to less WS in college undergraduates. Because WS may be detrimental to health behaviors and weight even among normal-weight individuals, future research should assess whether SC mitigates the adverse effects of internalized WS on mental, physical, and behavioral health over time.
T-2221-P: How We Talk About People with Conditions: Trends Over Time Using Google Ngrams

Andrew W. Brown, PhD

Background

People first language (PFL) involves referring to a person separately from one's condition. The Obesity Action Coalition supports 'People-First Language for Obesity' as more respectful to individuals. However, PFL can make for awkward prose and may make clinically relevant terms seem stigmatizing.

Methods

Trends in descriptions of four conditions (asthma, autism, diabetes, and obesity) were investigated using the Google Book nGram Viewer (GBNV). GBNV includes millions of books tagged with parts-of-speech. Five categories of descriptors were investigated: condition-defining ('diabetics'), condition-adjective ('obese patients'), PFL-adjective ('women who are autistic'), PFL-neutral ('men who have asthma'), and PFL-negative ('girls suffering from obesity'). Each descriptor-condition pair was investigated in the English GBNV corpus from 1800-2008 (latest year available). Data were extracted using GBNV and custom R code, and visualized using adaptations to the GBNV interface.

Results

The proportion of books referring to these four conditions increased 30 fold over 200 years, with diabetes having the greatest increase. The use of PFL-neutral language increased over time, particularly since 1980, for all conditions except obesity. People with obesity are consistently referred to with PFL-adjective and condition-adjective language. Condition-defining language was used to describe people with diabetes more than other conditions, with a notable decrease in condition-defining language since 1980.

Conclusions

Language used in books to describe individuals and their conditions has varied markedly across time and among conditions. How these changes are related to condition stigma over time is unclear from these data and should be further studied.

T-2222-P: Do We Use What We Know? Examining the Relationship between Food Knowledge and Eating Behaviors
Background

The prevalence of obesity has increased dramatically throughout the United States, particularly from 1990 through 2010 (Center for Disease Control, 2013).

Methods

This study used data from a parent longitudinal, randomized controlled trial, which examined the effectiveness of an interactive weight management model. Secondary analyses include a Pearson correlation to examine the relationship between nutrition knowledge and food intake, and a one-way between-groups analysis of variance (ANOVA) to determine BMI class differences regarding nutrition knowledge.

Results

A Pearson correlation revealed a small, positive correlation between participants' calorie weight knowledge and their healthful food habits ($r = 0.253$, $n = 695$, $p > 0.01$). A one-way ANOVA showed no significant differences in nutrition knowledge across BMI classes, $F (3, 687) = .868, p = .457$.

Conclusions

Nutrition knowledge has a small positive effect on food habits and, across BMI classes, individuals indicated similar levels of nutrition knowledge. These initial findings offer support for expanding the scope of weight loss programs, beyond nutrition education.

T-2223-P: How Communication, Roles and Outcome Expectancy Affect Obesity Counseling and Practices within Primary Care at the VA

Melanie Jay, MD, MS; Sumana Chintapalli, JD, MA; Allison Squires, PhD, RN; Scott Sherman, MD, MPH; Adina Kalel, MD, MPH;

Background

Veterans Affairs (VA) uses Patient-Aligned Care Teams (PACT) to deliver primary care. PACT conducts obesity screening, brief interventions, and referrals to MOVE!, a weight management program. A qualitative study assessed barriers/facilitators to delivery of weight management care by PACT members.
Methods

We recruited 25 PACT team members (11 MD/NP, 5 RN, 2 RD, 5 LPN, 1 Program Assistant, 1 Psychologist) for individual key informant interviews using a combination of convenience and snowball sampling. Each audio-recorded interview lasted 30-60 minutes and was conducted in a private office. Recordings were professionally transcribed, cleaned, de-identified, and then coded by two independent reviewers using an iterative coding process. The coders modified the codebook as new codes emerged, and met to harmonize codes and synthesize developing themes.

Results

Emerging themes included 1) managing communication and information dissemination; 2) role expectations; and 3) outcome attitudes and expectations. Clinical reminders shaped team practices. Barriers to treatment included time, competing demands, and lack of information about MOVE!. Facilitators included motivational interviewing training and personal interest in nutrition and exercise. Perceptions about role responsibility and counseling competency varied within and between different professions.

Conclusions

We found a diversity of opinions, attitudes, and practices within PACT, and identified factors that can inform design of PACT-based weight management interventions and improve the local MOVE! program. Findings may be site-specific. Replication at other sites is necessary to identify common issues.

T-2224-P: Motivation for Eating and Intuitive Eating in Military Service Members

Renee E. Cole, PhD, RD; Heidi L. Clark, MS, RD; Jeffery L. Heilesen, MS, RD; Jordon O. DeMay, MS, RD, LD; Martha S. Smith, EdD, RD, CHE;

Background

Military healthcare costs associated with obesity were $1.9 billion in 2009. Current weight management models emphasize nutrition education over behavior change. The study purpose was to identify differences in motivation for eating between normal and overweight service members.

Methods

Cross-sectional, descriptive study of active duty service members (n=295) recruited from Texas (70%) and Washington (30%). Participants were predominantly white (57%), Army (91%), enlisted (72%), males (71%), with a mean age of 30.1 ± 8.6 years and mean BMI of 27.0 ± 4.2 kg/m2. BMI (m/kg2) was dichotomized as normal (18.5-24.9 kg/m2) or overweight (≥25 kg/m2). Two validated surveys were
administered: Motivation for Eating Scale (MFE) and Intuitive Eating Scale (IES). Descriptive, correlation, and t-test analysis were conducted for BMI category with MFE, IES and subscores ($\alpha = 0.05$; 80% power).

**Results**

Males and females had a mean BMI of 27.8 +/- 4.2 kg/m2 and 24.8 +/- 3.4 kg/m2, respectively ($p<0.001$). The predominant MFE was physical (77% normal vs. 66% overweight BMI; $p=0.001$). Normal weight participants relied on internal cues ($p=0.023$); males ate for physical rather than emotional reasons ($p=0.009$). Only 1/3 of participants attained 5 days/week, 30-plus minutes of aerobic activity (73% men vs. 27% women; $p=0.012$). Overall 30% skipped meals and 52% reported trying to lose weight (65% overweight BMI; 67% females; $p<=0.001$).

**Conclusions**

Disparity existed between gender, intuitive eating characteristics, and lifestyle behaviors. Increasing awareness of eating influences may inform future nutrition interventions and improve dietary behaviors to support weight management.

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**T-2225-P: Weight Perceptions in Military Service Members**

*Renee E. Cole, PhD, RD; Heidi L. Clark, MS, RD; Jeffery L. Heileson, MS, RD; Jordan O. DeMay, MS, RD, LD; Martha S. Smith, EdD, RD, CHE;*

**Background**

Two-thirds of military service members are overweight or obese, which diminishes readiness and costs the Department of Defense over $1 billion annually. This study assessed weight-related behaviors between normal and overweight service members.

**Methods**

A cross-sectional, descriptive study of active duty service members (n=295) assessing motivation for eating included descriptive analysis of weight status and lifestyle behaviors. Participants were predominantly white (57%), Army (91%), male (71%), with a mean age of 30.1 +/- 8.6 years. Thirty-six percent were normal BMI (22.7 +/- 1.6 kg/m2) and 64% were overweight/obese BMI (29.3 +/- 3.3 kg/m2). Subject BMI (m/kg2) was dichotomized as normal (18.5-24.9 kg/m2) or overweight (>=25 kg/m2). Cross-tabulation and chi-square were conducted with BMI category and weight perception, dieting behaviors, and physical activity ($\alpha=0.05$; 80% power).

**Results**

Normal BMI: no men and 29% of women perceived they were overweight; no men and 82% of women reported dieting ($p<0.001$). Overweight BMI: 66% of men and 63% of women were not dieting and 42% of
men and 6% of women perceived being at the right weight \( (p<0.001) \). Currently dieting: 27% of men and 15% of women perceived being at the right weight; however, 33% of men who perceived themselves to be overweight were not dieting \( (p<0.001) \). Dieters (72%) were more likely to meet the 3-day aerobic activity recommendation compared to non-dieters \( (p=0.047) \).

**Conclusions**

Incongruence between actual and perceived weight status and lifestyle behaviors reveals an opportunity for nutrition education and reiteration of public health messages.

**T-2226-P: The Association of Eating Disorders and Obesity with Migraine Among Young Adults**

*Alison E. Field, ScD; Nasim Maleki, PhD; Bernard Rosner, PhD; Tobias Kurth, MD, ScD;*

**Background**

Migraine headaches affect approximately 16-19% of 18-54 year old adults in the United States and are 2-3 times more common among women than men. Several large studies have observed cross-sectional associations with obesity, but large studies on associations with eating disorders are lacking.

**Methods**

A cross-sectional examination of 7737 young adults, aged 19 to 30 years, in the Growing Up Today Study. Participants were classified as having migraines if they reported headaches with \( \geq 2 \) of the following characteristics: unilateral, pulsating, pain prevents regular activity, and pain gets worse when physically active. Participants also had to report nausea and/or vomiting or sensitivity to light or sound. Purging disorder was defined as using laxatives or vomiting \( \geq \) weekly for weight control and no binge eating. Binge eating disorder (BED) was defined as overeating \( \geq \) weekly and feeling out of control during binges and no purging. Maternal history of migraine was reported by the mother.

**Results**

Approximately 25.3% of women and 12.1% of men were classified as having migraines. Independent of age, age at menarche, BMI, and family history of migraine, participants with purging disorder were more likely than their peers to report migraines (Women: odds ratio (OR)=1.6, 95% confidence interval (CI) 1.1-2.2; Men: OR=7.1, 95% CI 1.2-42). BED was unrelated to migraine in both genders. In addition, obese women (OR=1.5, 95% CI 1.3-1.8), but not men, were significantly more likely than their peers to report migraine.

**Conclusions**
Eating disorders and migraine may have shared neurologic pathways, common genetic predisposition, similar susceptibility to neurotransmitter/hormonal imbalances, or overlapping risk factors. Clinicians treating young adult women with an eating disorder should assess headache history.

T-2227-P: Age and Attitudes of Obese Adults Towards Obesity and Weight Control

Angela G. Fowler-brown, MD; Sarah Chiodi, MSPH; Christina C. Wee, MD, PhD;

Background

The purpose of our study was to examine the attitudes of obese adults toward weight loss and weight loss treatments and whether such attitudes vary by age.

Methods

Data from 337 patients with body mass index (BMI) greater than or equal to 35 kg/m²; 18 to 65 years of age (18-39 years of age, 40 to 60 years of age, and greater than 60 years old). Percent weight loss desired, willingness and perceived difficulty with changing weight-related behaviors was collected via a telephone survey.

Results

Average desired weight loss was 30% of current BMI, which did not vary by age. Adjusted analyses found that seniors were significantly less likely to report difficulty limiting calories or carbohydrate intake than their middle-aged counterparts; a similar pattern was observed for younger adults compared to the middle-aged adults. Seniors seemed less willing to take a medication for weight loss compared to middle-aged adults, but this difference was not statistically significant.

Conclusions

While there is controversy surrounding recommendations for weight loss for obese seniors, the vast majority of moderate-to-severely obese, seniors desire weight loss. Seniors are no more likely to report difficulty using dietary weight loss strategies than their younger counterparts.
T-2228-P: Relationship between Body Mass Index (BMI) and Risky Sexual Practices in Adolescent Women

Lonna P. Gordon, MD; Angela Diaz; Nicolas Schlecht; Robert D. Burk, MD; Howard Strickler, MD, MPH; Christopher Ochner, PhD;

Background

The psychological impact of obesity has led to study of the effect of obesity on adolescent sexual risk taking behaviors. Heterosexual anal intercourse is understudied in adolescents, despite its increased risk of STI acquisition, particularly HIV, compared to vaginal intercourse when unprotected.

Methods

This was a cross-sectional study of 860 sexually active adolescent women (mean= 17.7 ± 1.4[SD] yrs) receiving healthcare at an urban adolescent health center. Participants were 96% minority and BMI ranged from 15.6 to 55.1 (mean= 26.3±6.2[SD])kg/m2. Self-reported data on sexual practices, including their participation in anal intercourse, age they first participated in anal intercourse, number of partners with whom they engaged in anal intercourse over their lifetime as well as the last six months, and condom use while engaging in anal intercourse. Multivariate regression models controlling for age, race, and socioeconomic status were employed to relate BMI to sexual practices.

Results

BMI was positively correlated with a history of having attempted anal intercourse (p=0.002), and inversely correlated with age of first anal intercourse (p=0.04). It was positively correlated with number of lifetime and recent partners for anal intercourse (p=0.003, p=0.006 respectively). There was no association between BMI and condom use during anal intercourse, however the majority of participants who engaged in anal intercourse did not report consistent condom use.

Conclusions

In a vulnerable population of adolescent women increases in BMI are associated with participation in heterosexual anal intercourse at a younger age with increased numbers of partners. Future studies investigating if body image or self-esteem influences this relationship may be warranted.

T-2229-P_DT: Food Preference and Ability to Understand a Food Label
Among Person's™ Living with HIV/AIDS in Atlanta, Georgia

Dominica Hernandez; Seth Kalichman, PhD;

Background

To examine food preferences and food label literacy among persons living with HIV/AIDS (PLWHA).

Methods

Person's living with HIV/AIDS (n= 533; 158F, 354M) were recruited from a holiday food basket donation in Atlanta Georgia. Participants were given measures to complete that included food preference, ability to understand a food label, and other nutritional and food intake. Height, weight, and body composition was assessed using a TANITA BIA scale.

Results

Body composition and body weight were collected on 468 participants (137F, 478M); 27% of the participants were found to be overweight [BMI >25 kg/m²], with 29.1% obese [BMI >30 kg/m²]. There were no significant differences between ratings of food preferences on health, mood, sensory appeal, price, natural content, or familiarity between normal, overweight, and obese participants. Overweight and obese participants were more likely to rate weight control as being very important to their food choice in food intake ?²=.01 and convenience ?²=.01.

Conclusions

Results suggest that weight control and convenience may be a concern for overweight and obese PLWHA in their food preferences. No differences were found in ability to read a food label; however, low food label literacy was found over the entire sample, where mean score was less than 40%.

T-2230-P: Association of Trait Anxiety and Depressive Symptoms with Exercise Dose, Compliance and Response in the Training Interventions and Genetics of Exercise Response (TIGER) Study

Matthew P. Herring, PhD; Richard C. Shelton, MD; Rodney K. Dishman, PhD; Molly Bray, PhD;
Background

Exercise improves anxiety, depression, and adiposity; however, the mechanisms underlying this association are not clear. Thus, we examined associations between trait anxiety and depressive symptoms and exercise dose, compliance, and obesity-related outcome responses.

Methods

Trait anxiety (State-Trait Anxiety Inventory; STAI-Y2), depressive symptoms (Quick Inventory of Depressive Symptomatology; QIDS), and obesity-related outcomes were measured in 510 TIGER Study participants (159M; 351F), aged 18-35 (21±3) y, before and after 15 weeks of aerobic exercise training. Regression adjusted for relevant covariates examined the association of baseline STAI-Y2 and QIDS with baseline levels of and change in adiposity, exercise dose, intensity, and compliance. Because women were significantly more likely to report elevated depression ($p<.02$) or high trait anxiety ($p<.03$), models were stratified by gender.

Results

At baseline, 246 participants (48%) reported QIDS>5, indicative of depression; 87 (17%) reported STAI-Y2 >1SD above the norm. Among women, higher STAI-Y2 ($\hat{R}^2$ range=.13 to .16; all $p<.02$) and QIDS ($\hat{R}^2$ range=.19 to .22; all $p<.001$) were associated with greater baseline BMI, weight, waist and hip circumferences, and skinfold percent body fat. STAI-Y2 and QIDS were not associated with dose, intensity, or compliance. Higher STAI-Y2 and QIDS were associated with more favorable changes in BMI and weight among women ($\hat{R}^2$ range: -.21 to -.26; all $p<.001$).

Conclusions

Trait anxiety and depressive symptoms were associated with baseline adiposity and change in response to exercise among young women. Importantly, trait anxiety and depressive symptoms were not associated with reduced exercise dose, intensity, or compliance among men or women.

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T-2231-P: Objectively-Measured Impulsivity and Its Relationship to Obesity and Obesity-Related Behaviors

Kristin N. Javaras, PhD; Emily R. Schaefer, BS; Cynthia M. Bulik, PhD; Richard J. Davidson, PhD

Background

Existing research has found a positive association between impulsivity and obesity and theorized that impulsivity affects obesity-related behaviors (e.g., diet, physical activity, sleep). However, few studies have directly examined the relationship between impulsivity and obesity-related behaviors.
Methods

We assessed impulsivity, obesity-related behaviors, obesity, and potential confounders in a sample of 123 women 18-25 years old. We created a composite measure of 'Impulsivity' based on performance on computer tasks tapping impulsivity (Cantab Affective Go/No-go, Cambridge Gambling, and Information Sampling Tasks). We also created a composite measure of 'Obesogenic Behavior' representing low consumption of recommended foods, high consumption of non-recommended foods, low levels of physical activity, and short sleep duration, based on responses to the Nurses' Health Study Food Frequency Questionnaire, International Physical Activity Questionnaire - Short, and Pittsburgh Sleep Quality Index.

Results

Analyses were performed for participants with complete data (n = 108), 24.1% of whom were overweight/obese (body mass index (BMI) >= 25). As expected, Impulsivity predicted significantly higher BMI and waist circumference, and higher odds of being overweight/obese, even after adjustment for potential confounders (e.g., age, socioeconomic status, IQ). Impulsivity was also positively correlated with Obesogenic Behavior, and this association accounted for one-quarter to one-third of the association between Obesogenic Behavior and obesity.

Conclusions

Impulsivity appears to be positively associated with obesity-related behaviors.

T-2232-P_DT: Acculturation and the Moderating Influences of Neurocognitive Processes on Sugar-Sweetened Beverages among Adolescents

Chris M. Johansen; Kim Reynolds, PhD; Susan Ames, PhD; Bin Xie, PhD;

Background

Sugar-sweetened beverages (SSB) have been linked to obesity. Positive associations have been observed between acculturation and SSB but few moderators of this relationship have been examined. We tested the moderating influence of two neurocognitive variables on the acculturation to SSB association.

Methods

Adolescents (n = 198), aged 14-17 years, predominately Latino (77.8%) at low-SES public high schools were recruited. Acculturation was assessed using Unger's Acculturation, Habits, Interests Multicultural Scale for Adolescents, affective decision-making (ADM) using the Iowa Gambling Task, impulsivity using
a Go/No Go task and SSB consumption and percent calories from sugar using the Youth Adolescent Questionnaire. Participants completed cross-sectional assessments on laptops. Multiple linear regression was used to examine the main effect of acculturation and the interaction of acculturation with ADM and impulsivity on the outcomes: SSB consumption and percent calories from sugar.

**Results**

Acculturation was significantly associated with SSB ($\hat{\beta} = .301; p < .01$). As acculturation increased, the daily servings of SSB increased. Further, the interaction of acculturation x impulsivity was significant ($\hat{\beta} = .304, p < .01$). As impulsivity increased, those youth who were more acculturated consumed more calories from SSBs. The interaction of acculturation x ADM ($\hat{\beta} = -.159; p < .05$) was significant on percent of calories from sugar. As the level of acculturation increased, calories from sugar decreased, but only for good decision-makers.

**Conclusions**

Interventions targeting adolescents who are acculturated and impulsive may be an effective approach to reducing SSB consumption. Future research is needed to replicate current findings on moderation effects of impulsivity and ADM, and further explore the underlying mechanism.

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**T-2233-P_DT: Voices from the Community: Examining Factors Associated with Healthy Weight among Ethnically Diverse Youth and Parents**

*Chandria D. Jones, MPH; Ashley S. Lawrence, M.P.H.; Sharon M. Desmond, PhD;*

**Background**

Conversations about healthy weight in minority communities are shaped by issues as diverse as the meaning of health and cultural constructions of the role of food and physical activity. However, little is known about how perceptions of health, food, and physical activity vary among youth and parents.

**Methods**

This study examined African American, Latino, and American Indian youth and parents perceptions regarding factors that influence healthy weight. A secondary analysis of qualitative data comprising transcripts from 14 semi-structured focus group interviews with African American, Latino, and American Indian youth between the ages of 11-17 and adult parents over the age of 18 was conducted. Transcripts were imported into NVivo 10 for coding, sorting, and quantifying thematic content of interest within strata defined by ethnic group. Data was also stratified by youth and parents.
Results

Analysis of the data indicated that the lived experiences of youth and parents from different ethnic groups had many similarities in regards to ideas about healthy food and physical activity. However, differences existed in cultural influences, the role of friends and family, and how the community affects youth's ability to achieve and maintain a healthy weight. Comments from parents reinforced many of the ideas expressed by the youth.

Conclusions

Few studies allow researcher to hear directly from minority youth and parents. By adding their voices to conversations about healthy weight, we can create interventions that are culturally, politically, and socially successful for African American, Latino, and American Indian youth and parents.

T-2234-P: Food Craving as a Mediator between Addictive-Like Eating Behavior and Problematic Overeating Outcomes

Michelle A. Joyner, BA; Ashley Gearhardt, PhD; Marney White, PhD, MS;

Background

The idea that certain foods can be addictive has been gaining attention as an explanation for problematic eating behaviors, and craving is a core component of addiction. This study examines the role of food craving in the pathway from addictive-like eating behaviors to problematic eating outcomes.

Methods

420 participants completed an online survey assessing eating habits and behaviors. Mediational analyses were conducted testing food craving as a mediator in the relationship between addictive-like eating behaviors and BMI and between addictive-like eating behaviors and number of binge eating episodes.

Results

Food craving was a significant partial mediator in the relationships between addictive-like eating behaviors and BMI and between addictive-like eating behaviors and number of binge eating episodes. This indirect effect was stronger in the binge eating model than in the BMI model.

Conclusions
Craving appears to play an important role in the pathway from addictive-like eating to problematic eating outcomes, supporting the idea that an addictive-like process may be contributing to overeating. The strength of the binge eating model underscores the importance of examining behavioral outcomes.

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**T-2235-P: Small Weight Fluctuations Impact Impression Formation of Young Women**

Robin Kanarek, PhD; Jacqueline F. Hayes, B.A.; Kristen D'Anzi, PhD;

**Background**

Overweight and obese individuals are judged more negatively than their lean counterparts across a wide variety of domains. Less is know about impression formation of individuals losing and gaining small amounts of weight as is common in daily life.

**Methods**

Using a between subjects design 105 normal weight (BMI=21.6) female undergraduates read one of three brief lifestyle descriptions of a fictitious female target with a BMI of 23.2. The only difference among the three descriptions was that the target had either maintained her weight or gained 15 pounds or lost 15 pounds over the past six months. After reading the description, the participants were asked to complete a 31-item scale rating their believes about the target's satisfaction with specific body parts and physical abilities. The participants also rated the target on a 38-item personality scale, and a 20-item scale measuring attitudes toward obese individuals.

**Results**

A negative bias was found toward the weight-gain target who was rated as less satisfied with weight-related physical characteristics (e.g. hips) and fitness-related (e.g. stamina) characteristics than the weight-maintenance or weight-loss target. Moreover, the weight-gain target was perceived more negatively on personality characteristics related to health than the weight-maintenance or weight-loss target. There were no differences in ratings between weight-maintenance and weight-lost targets.

**Conclusions**

The results indicate that gaining a relatively small amount of weight is perceived to negatively impact body satisfaction and reflects poorly on health-related personality characteristics. The data suggests that weight stigmatization may also exist for young women who have recently gained weight.
T-2236-P: Suicidal Ideation and Depression among Adults with Metabolic Syndrome: Data from the Korea National Health And Nutrition Examination Survey 2008-2010

Jun Goo Kang; Yang-Hyun Kim, Dr.; Ki Young Lee, MD; Chang Beom Lee, MD;

Background

Suicide and depression are one of the highest public health problems worldwide. Suicidal ideation represents an important phase in the suicidal process and often precedes suicidal attempts or completed suicide. Patients with chronic medical disease are more likely to report suicidal thoughts and depression. However the studies on relationship between these conditions and metabolic syndrome are rare. We aimed at investigating the prevalence of depression and suicidal ideation among adults with metabolic syndrome in Korea.

Methods

We analyzed data for 17924 persons (Men; 7516 persons & Women; 10408 persons) from 2008-2010 KNHANES who did not have cancer or hepatitis or liver cirrhosis. Each individual was assessed for the presence of metabolic syndrome according to the NECP-ATP criteria except for waist circumference, for which new criteria recently suggested by Korean Society for Study of the Obesity was used. The presence of depression or suicidal ideation and were defined by a self-reported questionnaire asking if the participants had ever been diagnosed with depression by medical doctor or had any suicidal thoughts.

Results

The prevalence of depression (17% vs. 14%, p<0.001) and suicidal ideation (20% vs. 17%, p<0.001) was significantly higher in participants with metabolic syndrome. Mean scores for the EQ-5D decreased significantly with participants with depression (0.80Â±0.22 vs. 0.91Â±0.13, p<0.001) and suicidal ideation (0.79Â±0.22 vs. 0.92Â±0.13, p<0.001) in the group with metabolic syndrome.

Conclusions

This study shows that metabolic syndrome is associated with depression and suicidal ideation and this relationship was negatively associated with health related quality of life.
T-2237-P: Ideal Weight: Does It really matter? A General Population Study

Ulla Käärikäinen; Linda L. Mustelin, MD, PhD; Anu A. Raevuori, MD, PhD; Jaakko J. Kaprio, MD, PhD; Anna A. Keski-Rahkonen, MD, PhD, MPH;

Background

We aimed to test in a prospective general population setting whether differences between actual and ideal weight predict weight change over 10 years.

Methods

Our study comprised 2651 women and 2313 men born in Finland in 1975-1979 from the prospective population-based FinnTwin16 study. Weight discrepancy was assessed using self-reported actual and ideal weight by questionnaires at age 25 (range 22-28) y and ten years later (attrition 24.6%). We examined the relationship of discrepancy between actual and ideal body weight and subsequent weight change with t-tests, χ² tests and analysis of variance.

Results

The discrepancy between actual and ideal weight at baseline was in average 1.42 kg/m² (95% CI 1.33-1.52) among women 0.36 kg/m² (95% CI 0.26-0.46) among men. All participants gained weight during follow-up irrespective of their ideal weight at baseline: women 1.74 kg/m², men 1.95 kg/m², p=0.03. Women who felt inclined to gain weight at baseline gained more weight (1.94 kg/m²) than women who were satisfied with their weight at baseline (1.45 kg/m²). In men, the discrepancy between actual and ideal weight at baseline did not predict subsequent weight change. At the end of follow-up, just 13.2% of women and 18.9% of men (p=0.0001) were at or below the ideal weight they had specified at 25y. Both women and men adjusted their ideal weight upwards during the follow-up: women in average 1.00 kg/m² (95% CI 0.92-1.07) and men 0.92 kg/m² (95% CI 0.84-1.00).

Conclusions

Compared to women, men tend to be more realistic about their ideal weight. Irrespective of their ideal weight at baseline, everyone gained weight during follow-up. Because reaching one's ideal weight proved quite difficult over time, participants tended to reevaluate their ideal weight to better correspond with reality.

T-2238-P_DT: Acculturation Orientation, Physical Activity Motivation and
Moderate-to-Vigorous Physical Activity among Hispanic Girls

En-Ju Kuo; CK Fred Wen, MPH; Jaimie N. Davis, PhD R.D; Donna Spruitt-Metz, MFA, PhD;

Background

PA decline disproportionately affect Hispanic girls. The influence of motivation to be physically active on moderate to vigorous PA (MVPA) has been noted in this group; however, the influence of the acculturation on the relationship between motivation and MVPA remains unclear.

Methods

A total of 109 Hispanic girls were overweight (mean age: 12.4±3.2, mean BMI percentile: 87.6±19.3) were included in the analysis. Multiple linear regression analyses were used to estimate the relationship between motivation measured by the Self-regulation questionnaire (SRQ), and MVPA measured by accelerometer. Covariates were acculturation orientation (integration, separation, marginalization and assimilation as measured by AHIMSA), age and BMI percentile.

Results

Age was significantly correlated with integration orientation ($r^2=0.49, p<0.001$) and external motivation ($r^2=0.281, p<0.005$). Integration orientation was correlated with external motivation ($r^2=0.24, p<0.05$). A negative association between external motivation and MVPA remain significant (-0.30, $p<0.05$) after adjusting for integration orientation, and age. Intrinsic motivation was not associated with MVPA in this sample.

Conclusions

External motivation to be physically active may have a negative impact on PA in Hispanic adolescents, independent of acculturation orientation. Further investigation into the relationships between age, acculturation, motivation and MVPA is needed to curb PA decline in Hispanic girls.

T-2239-P: Perceptions Related to Nutrition, Physical Activity and Youth Development in 6th to 8th Grade, Rural, Limited-Resource Adolescents
Background

Adolescent obesity poses risks to both contemporaneous and long-term physical and mental health. The prevalence of adolescent obesity is significantly higher in minority communities.

Methods

As part of a community-based obesity prevention project, the baseline perceptions of nutrition, physical activity (PA), and youth development of adolescents were assessed in rural low-income ethnic communities in Kansas. One control and one intervention communities were randomly selected prior to program development. Questionnaires were distributed to 6th-8th graders from both communities (n1 = 115 and n2 = 142, respectively for the control and intervention community). Based on the Social Cognitive Theory, this study identified adolescents’ primary eating and PA habits; level of awareness and perceived self-efficacy of nutrition and PA; and the process of capacity development.

Results

The baseline characteristics in both the control and intervention communities were similar (p > 0.05), and Hispanics were the major ethnic populations (n1 = 69.6% and n2 = 60.9%). There were no significant between-group difference in eating behaviors and time spent on PA. Students were fairly sure about eating healthy when hungry or with friends (68.1%). Over 50% of students agreed with the psychological benefits of engaging in PA. Additionally 96.1% of the students indicated mild to strong agreement that they can positively impact their future.

Conclusions

Students were aware of the benefits of eating healthily and being physically active but fail to do so sometimes due to low self-efficacy. These suggest future interventions should engage youth in wellness program development to ensure the effectiveness of the program.

T-2240-P: A Worrying Picture of Childhood Obesity in China: A Qualitative Study Exploring Overweight Children's and Their Parents' Perspectives Towards Factors Contributing to Interventions

Gareth Marshall; Mona Sharifi, MD, MPH; Roberta Goldman, PhD; Courtney Cunningham, MPH; Richard Marshall, MD; Elsie Taveras, MD, MPH;

Background

Novel, family-centered strategies are needed in childhood obesity care. The perspectives of 'positive outlier' children, those who improved their BMI despite living in high risk neighborhoods, can guide interventions to focus on measures of success and outcomes that matter most to children.

Methods

We collected residential address and serial height/weight data from electronic health records of 22,657 children aged 6-12 years seen for well-child care in Massachusetts. We identified obese children (BMI >=95th percentile) and defined obesity 'hotspot' zip codes where >15% of children were obese. For each child with a history of obesity, we generated a BMI z-score slope using a linear mixed effects model. From the sub-sample with negative slopes living in hotspots, we recruited children aged 10-12 for focus groups. We analyzed group transcripts and discussed emerging themes in iterative meetings using an immersion/crystallization approach.

Results

We reached thematic saturation after 4 focus groups with 21 children of diverse ethnic backgrounds. Children identified bullying and negative peer comparisons related to physical appearance, clothing size and athletic ability as motivating them to achieve a healthier weight. Children noted positive relationships with friends and family as facilitating both the initiation and maintenance of behavior change. They measured success through progress in social acceptance, athleticism, and physical appearance.

Conclusions

The perspectives of positive outlier children can provide insight into children's motivations leading to successful obesity management, which can be integrated into future interventions to better engage families and children and accelerate progress in reducing childhood obesity.
T-2242-P: The Role of Food Responsiveness in Moderating the Association between Sleep Duration and BMI in Early Life

Laura McDonald, MSc; Abi Fisher, PhD; Clare H. Llewellyn, PhD; Jane Wardle, PhD;

Background

Shorter sleeping children consume more, and are at increased risk of obesity. This may be because they are exposed for longer to the environment, so have more opportunities for consumption. If so, children who are more responsive to food should be more susceptible to the effects of short sleep.

Methods

This study tested the hypothesis that a child's food responsiveness (FR) would moderate the association between sleep and weight in early life. Participants were from Gemini, a UK twin birth cohort. One child from each twin pair was randomly selected for analysis. FR was indexed using the Child Eating Behaviour Questionnaire at age 5 years. At the same age, sleep was reported by parents using the Children's Sleep Habits Questionnaire. Nighttime sleep duration was calculated from bedtime and wake time. Body mass index SD scores (BMI-SDS) were calculated from parent-measured heights and weights at age 5 years, using UK 1990 reference data.

Results

Shorter nighttime sleep was associated with higher BMI-SDS at 5 years (\( \hat{\beta} = -0.22; 95\% \text{ CI}, -0.06 \text{ to } 0.38 \)). Consistent with our hypothesis, associations between sleep and BMI-SDS were significant only among children who rated highly on FR. In those in the top half of FR, sleep duration was correlated -0.18 with weight, in those in the bottom half it was correlated -0.01. In fully adjusted multivariate linear models there was a significant interaction between sleep and FR in the prediction of BMI-SDS (\( \hat{\beta} = -0.13; 95\% \text{ CI}, -0.24 \text{ to } -0.02 \)).

Conclusions

Children who are more susceptible to overconsumption, by means of being more responsive to food, may be at a greater risk of weight gain when increasing time is spent in wakefulness. Shorter sleep may therefore contribute to adiposity, in part, by providing more opportunities for consumption.

T-2243-P_DT: Elevated Prevalence of Obesity among Children with Intellectual
Disabilities (ID): The Disparity Increases across Pre-Adolescent and Adolescent Ages

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Background

Children with developmental disabilities have a high prevalence of obesity, though it may arise through unique etiologic pathways. We sought to estimate the prevalence of obesity among children with and without ID, characterized by limitations in intellectual functioning and adaptive behaviors.

Methods

The 2011 National Survey of Children's Health, a cross-sectional nationally representative survey, collected current ID, height, and weight by parent-report as part of a telephone interview. Obesity status was defined by BMI z-score, per CDC guidelines as BMI>95th percentile. Analyses were restricted to 43,818 youth with valid measures of disability and obesity status ages 10-17, the years during which parent-reported child height and weight is considered to be valid. Individual standardized sampling weights were used in all analyses to correct for bias in the point estimates and the variances for the complex survey design.

Results

The prevalence of obesity in children with ID (24.9%, 95% CI 18.3%-31.4%) was significantly (p<0.001) higher than in children without ID (14.2%, 95% CI 13.4%-14.9%) and child age modified the prevalence differences. After adjusting for sex and race/ethnicity in a multivariate logistic regression model, the odds of obesity among children with ID compared to children without ID increased monotonically by year of age from 10 to 17, with odds ratios of 1.30, 1.46, 1.63, 1.82, 2.03, 2.28, 2.55, and 2.90, respectively.

Conclusions

This pattern arises due to stable high prevalence in subjects with ID and a decline in prevalence with advancing age in subjects without ID. Better understanding of the risk factors impacting the development of obesity in youth with ID is warranted to inform development of tailored interventions.

T-2244-P: Gains in Income during Early Childhood Are Associated with Decreases
in Body Mass Index Z-Scores among Children in the United States

Vanessa M. Oddo, MPH; Jessica C. Jones-Smith, PhD, MPH, RD;

Background

Children with low family income in the U.S. are disproportionately burdened by overweight and obesity compared to those with high family income. However, few studies have leveraged longitudinal data to investigate the impact of changes in family income on changes in children's body mass index (BMI).

Methods

We used longitudinal data from the nationally representative Early Childhood Longitudinal Survey Birth Cohort to assess whether gains in family income were associated with changes in BMI z-score among 2-6 year olds. Child anthropometrics and family income were assessed at 2-year, 4-year, 5-year and 6-year visits. Gender-stratified, fixed effects linear regression models compared children to themselves over time in order to control for time-invariant measured and unmeasured confounding factors. Models additionally controlled for time-varying confounders including number of siblings, household structure (two parent, one parent, unrelated guardian), age, and age squared.

Results

Children (n = 5,000) had an average BMI z-score (standard error) of 0.42 (0.26) at 2-years and an average change of +0.24 (0.026) over the study period. On average, family income increased by approximately $11,000 ($496). The association between gains in family income and change in BMI z-score varied by gender, but not by race/ethnicity. Among girls, each additional $10,000 gained was associated with a decrease in BMI z-score (β=-0.018; 95% CI: -0.033, -0.004). Among boys, this association was not significant (β=-0.003; 95% CI: -0.017, 0.010).

Conclusions

By comparing children to themselves over time, we overcome many barriers that typically impede causal inference in observational studies. In this way, our study provides stronger evidence that gains in income during early childhood may promote healthy weight outcomes among girls.

T-2245-P: Which Foods May Be Addictive?

Erica Orenstein, ; Ashley Gearhardt, PhD;
Background

Interest is growing in the hypothesis that some individuals may experience an addictive-like response to certain foods, such as loss of control over consumption, inability to cut down, and tolerance. Yet, little is known about which foods are most frequently implicated in 'food addiction' (FA).

Methods

College undergraduates (n=122) completed the Yale Food Addiction Scale (YFAS) to assess symptoms of FA. Individuals were then presented with a forced choice task where they selected which foods they were most likely to consume in an addictive-like manner. The number of times a food was chosen as problematic was indicated by a frequency count. Higher frequency counts reflect a greater likelihood that this food was reported as being consumed in an addictive-like way. Hierarchical linear modeling was used to evaluate the influence of nutritional characteristics and participant-specific idiographic influences on a food's frequency count.

Results

Level of processing, fat content, and glycemic load (GL) were significant nutritional predictors of whether a food was reported as being consumed in an addictive-like manner. Males and individuals with higher body mass index (BMI) were especially likely to experience problems with higher fat foods.

Conclusions

Processing, fat, and GL are predictors for whether a food is likely to be consumed in an addictive-like way. We propose to recategorize the broad title of 'food addiction' to 'ultraprocessed food addiction' to capture the nutritional profile of the foods most implicated in addictive-like eating.

T-2246-P: Cognitive Functioning and Daily Life Impairment in Pediatric Obesity

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Background

A hallmark of obesity is poor impulse control in eating behavior. Here we examined everyday life behaviors indexing impulse control and other psychopathology as well as a task assessing working memory, a process that enables impulse control, in the absence of food cues.

Methods
8-16 year-old obese (>95% height and weight) and not obese (<95%) children performed the N-back task with high (2-back) and low (1-back) working memory load. Accuracy on the N-back was assessed through a LoadxObesity ANOVA, controlling for SES, age, and N-back order. Additionally, parents completed two surveys: the Child and Adolescent Symptom Inventory (CASI) and the Behavioral Rating Inventory of Executive Functioning (BRIEF). The CASI is a rating scale for behavioral and emotional disorders in youth and was assessed through chi-square analyses. The BRIEF assesses impulse control behaviors at home and school and was assessed through one-way ANOVAs controlling for SES.

Results

N-back accuracy was worse for obese children for the higher but not the lower load. While the two groups did not differ in criteria met for clinical conditions on the CASI, parents of obese children reported more frequent life interference by symptoms than parents of not obese children. Additionally, obese children scored worse on the Behavioral Regulation factor (composed of Shift, Inhibition, and Emotional Control) of the BRIEF than not obese children, after controlling for SES.

Conclusions

Obese children had worse working memory and impulse control with more interference by clinical symptoms. This suggests pediatric obesity is associated with baseline cognitive and behavioral difficulties outside of the food context. Determining if weight loss reverses these findings will be valuable.

T-2247-P_DT: Academic Achievement and Weight: Insight from Philadelphia Grade-School Students

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Background

Obesity has been linked to lower academic achievement in some, but not all, studies. Previous work, however, has been limited by minimal inclusion of low-income, racial minority, and/or grade school-aged children.

Methods

To examine associations between body mass index (BMI) percentile and academic achievement among a low-income, racial minority population, data were obtained from 1113 4th-6th grade students from 16 public schools in Philadelphia (mean age=10.8 years, 53% female, 63% African American, 78% free/reduced meal eligible). Academic achievement was determined by subject-specific Pennsylvania System of School Assessment (PSSA) exam scores. Heights and weights were measured. Hierarchical linear regression models were used to identify associations between PSSA scores and BMI percentile.
among non-underweight students (n=1081) adjusted for race, gender, socio-economic status, and within-school variance.

Results

Among the study sample, 17.6% (n=190) of children were overweight and 22.7% (n=245) were obese. No associations were observed between BMI percentile and subject-specific assessment scores among the full study sample. After stratification by gender and grade, BMI percentile and math scores were positively associated (b=1.2(0.5), p=0.008) among 6th grade boys, while negative associations were observed between BMI percentile and math (b=-1.1(0.5), p=0.04) and writing (b=-1.3(0.5), p=0.01) scores among 6th grade girls.

Conclusions

Overall, BMI percentile is not associated with academic achievement. However, among 6th graders divergent relationships emerge between BMI percentile and academic achievement by gender. Further studies are needed to understand potential gender disparities in the obesity/achievement relationship.

T-2248-P_DT: Perceptions of Stress among African-Americans Affect Obesity Related Behaviors in their Children

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Background

One in five African-American (Black) children is obese, of which most will go on to become obese adults. Understanding parenting influences that impact obesity development in children may be useful for informing obesity prevention programs. The purpose of this study was to characterize parental perceptions of stress and identify whether and how they influenced children's eating, physical activity, and inactivity.

Methods

Thirty-three self-identified Black parents (parent/grandparent/legal guardian) of a child ages 3-7 years were recruited from a large urban Black church to participate in open-ended, semi-structured interviews. Interviews were audio-recorded, transcribed, and analyzed using a modified grounded theory methodology.

Results

Three depictions of parental stress emerged: a) responsibility and pressure, b) feeling overwhelmed, and c) change in routine. All of these sources of stress were felt to decrease child free play time, increase child screen time, but to have no effect on child participation in structured sports. In response to pressure and
feeling overwhelmed, parents increased their own consumption of high fat/sugar foods which, when observed by their children, was perceived to increase the child's high fat/sugar consumption. Feeling overwhelmed or a change in routine was associated with cooking less often, purchasing more prepared foods and eating away from home.

Conclusions

Understanding Black parents' perceptions of stress and how they handle stress will provide better insight to develop child obesity prevention/intervention studies centered on parenting related to food and sedentary behaviors. Additionally, the finding that structure in a child's routine may be less affected by parent stress is worthy of further exploration.

T-2249-P: Cultural Factors Contribute to Obesity Risk among Latino Preschool-age Children

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Background

Obesity rates among preschool-age children are a critical public health concern - about 15% of low-income preschoolers in the United States are classified as obese. National cohort data reveals that minorities are at higher risk for childhood obesity, with American Indian/Native Alaskan being the highest (31.2%), followed by Hispanic (22%). We explore cultural factors associated with nutrition and PA behaviors in Latino households in Massachusetts, to identify patterns that may contribute to overweight/obesity.

Methods

We recruited Latino parents of children who attended a family childcare home run by a Latino licensed provider to participate in focus groups (FG). A total of five groups took place; located among four geographic regions of MA. Topics comprised children's nutrition and physical activity (PA) behaviors at home and during time with care provider, weight status, and cultural perspectives associated with these issues. Sessions were translated, transcribed, and compiled into a report of outcomes using qualitative data analysis methods.

Results

We found that Latino parents have strong opinions about what their children should or should not eat; also that they are more concerned about quantity than nutrition recommendations. Work commitments are a barrier to food preparation and enforcement of mealtime and PA routines. Some parents tend to seek advice from family and friends rather than experts in matters of weight status and nutrition.

Conclusions
Interventions and training linked to parental education possess much potential to address cultural perspectives and to foster nutrition and PA practices at home being more comparable to those in care settings.

**T-2250-P: Weight Misperception among Overweight Adolescents Protective Against Excess Weight Gain**

*Kendrin R. Sonneville, ScD; Idia B. Thurston, PhD; Carly E. Milliren, MPH; Rebecca C. Kamody, BS; Holly C. Gooding, MD, MS; Tracy K. Richmond, MD, MPH;*

**Background**

Notifying overweight/obese youth of their elevated weight status is routinely done as part of clinical and school-based body mass index (BMI) screening. However, it is not known whether accurate weight perception predicts future weight trajectory.

**Methods**

We used generalized estimating equations adjusted for age, baseline BMI, parental education, percent federal poverty level, depression, race, and ethnicity to examine the prospective association between weight misperception (i.e., perceiving oneself to be under or normal weight) among 3,316 overweight/obese youth in the Add Health cohort (Wave II [1996]) and subsequent weight change (Wave II to Wave IV [2008-2009]).

**Results**

Overweight/obese youth had a mean age of 16.2 (1.7) years and a mean BMI of 30.3 (5.1) kg/m². 57% of males and 80% of females accurately perceived themselves as overweight, thus, 43% of males and 20% of females misperceived themselves as healthy weight or underweight. In fully adjusted models, weight misperception was associated with less weight gain among overweight/obese youth. Specifically, overweight/obese youth who perceived themselves as healthy weight or underweight had lower BMI gains (males: $\bar{F} = -0.91$ [95% CI= -1.54, -0.29]; females: $\bar{F} = -1.64$ [95% CI= -2.5, -0.77]) from Wave II to IV.

**Conclusions**

Contrary to commonly held assumptions, weight misperception among a non-clinical sample of overweight/obese youth predicted lower future weight gain. Efficacy of efforts to correct weight-misperception should be rigorously examined to assess for both intended and unintended consequences.
T-2251-P: The Association between Dietary Intake and Sleep in Preschool Children

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Background

Research suggests that sleep duration is related to energy intake in both school-aged children and adults, especially to intake of energy-dense foods and sugar-sweetened beverages (SSB). This relationship has not been explored in younger children yet.

Methods

Mothers reported on the sleep and diet on their preschool-aged child (2-5 years old). Sleep was measured using the bedtime resistance (BR) and sleep duration (SD) scales from the Children's Sleep Habits Questionnaire (CHSQ). Average total energy intake (kilocalories) was assessed during two 24-hour dietary recalls using the Nutrition Data System for Research (NDS-R) as well as with additional questions on daily frequency and serving size (in ounces) of SSB. Multivariate regression models, controlling for children's age, gender, and body-mass index z-score, were used to test the association between sleep scales and dietary intake. Energy take results were centered on the mean.

Results

No significant association was found between total energy intake and either of the sleep scales (BR: b=-0.54, SE=0.97, p=0.58; SD: b= 0.10, SE=0.48, p=0.84). However, there was a significant positive association between SSB intake and bedtime resistance (b=0.12, SE=0.02, p<0.0001) and negative association with SSB intake and sleep duration (b=0.02, SE=0.01, p=0.01).

Conclusions

These results suggest that increased SSB intake is related to shorter sleep duration and more bedtime resistance in preschool-aged children. While consistent with findings in older children and adults, this relationship is noteworthy because it is observed during at a very early when parents still exert a strong influence over their child's diet.

T-2252-P: Misperceived Body Weight in Adolescence Is Associated with the Development of Adult Obesity
*Background*

Adolescent body mass index (BMI) is a strong predictor of BMI in adulthood. In addition to objective BMI, subjective perceptions of one's own body weight may contribute to the development of adult obesity.

*Methods*

At Wave 2 (mean age 16) of the National Longitudinal Study of Adolescent Health (Add Health), participants reported how they perceived their body weight (from very underweight to very overweight) and were weighed and measured by research staff. At the most recent Add Health assessment (mean age 29), participants were weighed and measured again. We tested whether normal-weight adolescents who perceived themselves as heavier than their measured BMI were at increased risk of becoming obese between the two assessments, controlling for sex, age, race/ethnicity, adolescent BMI, and adult education.

*Results*

Across follow-up, 20% of the sample became obese. Participants who perceived themselves as heavier than their measured BMI in adolescence had a 30% increased risk of becoming obese between adolescence and young adulthood (OR=1.30, CI=1.14-1.48). For males, the associated risk was as strong as adolescent BMI as a predictor of adult obesity (misperception OR=1.55, CI=1.22-1.97; adolescent BMI OR=1.53, CI=1.48-1.58). The effect was significant, but more modest, for females (OR=1.23, CI=1.05-1.42).

*Conclusions*

Adolescent perception of overweight is nearly as strong a predictor of adult obesity as BMI measured in adolescence. Although research and practice usually focus on the consequences of body image for girls, boys may be more vulnerable to distorted perceptions that contribute to adult obesity.

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**T-2253-P: Is Weight Misperception Harmful or Helpful? The Longitudinal Relationship between Weight Misperception and Depression among Overweight and Obese Adolescents and Emerging Adults**

*Idia B. Thurston, PhD; Kendrin Sonneville, ScD, RD; Carly E. Milliren, MPH; Rebecca C. Kamody, BS; Holly C. Gooding, MD, MS; Tracy K. Richmond, MD, MPH;*
Background

Recognizing oneself as overweight has traditionally been viewed as important for weight loss success. However, recent studies have shown weight labeling may negatively impact weight-related outcomes. Less is known about the longitudinal psychological impact of weight labeling or weight perception.

Methods

We analyzed data from overweight/obese youth (BMI ≥ 85th %tile or ≥ 25), ages 11-21 from the National Longitudinal Study of Adolescent Health (n=4,121). Using generalized estimating equations, we examined the cross-sectional (at Wave II) and prospective (from Wave II to IV) associations of weight misperception in adolescence (considering oneself healthy or underweight) and depressive symptoms (Center for Epidemiologic Studies Depression [CESD] Scale scores). Nearly one-third (n=1,324/4,121, 32%) of overweight/obese youth considered themselves to be normal or underweight. Cross-sectional & longitudinal models controlled for age, measured BMI, parental education, poverty level, & race/ethnicity.

Results

In cross-sectional models, males (\(\hat{\beta}=-1.77, 95\% \text{ CI}=-2.42, -1.13\)) and females (\(\hat{\beta}=-1.55, 95\% \text{ CI}=-2.50, -0.60\)) who under-perceived their weight as healthy had significantly lower depression scores than accurate weight-perceivers. After adjusting for Wave II depression, change in BMI between Waves II and IV, and demographic variables, misperceiving one's weight as healthy was associated with lower depressive symptoms for males (\(\hat{\beta}=-0.38, 95\% \text{ CI}=-0.67, -0.08\)) but not for females (\(\hat{\beta}=-0.32, 95\% \text{ CI}=-0.76, 0.12\)) in longitudinal analyses.

Conclusions

Our findings suggest that weight misperception may act as a protective factor against depression in adolescents who are overweight/obese. Interventions should use caution when attempting to correct weight misperceptions among overweight and obese youth.

T-2254-P: Within-Day Momentary Comparison of Self-Report and Biological Measures of Stress

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Background

Psychosocial stress is related to elevated awakening salivary cortisol (SC) levels. SC may also be related to other stress-related emotional states. We aim to examine if stress-related emotional states are associated SC, which may help accurately measure stress in stress research.
Methods

88 minority adolescents (mean age=16.11+-1.20, mean BMI %ile=96.85+-3.05, 56.8% Hispanic, 48.9% male) completed a crossover design study with 2 8-hour observation lab visits that were 2 to 4 weeks apart. In the lab, they could choose to be active or sedentary. For the first 5 hours of each visit, SC samples were collected every 30 mins. The emotion states anxious, panicked, worried, nervous, and calm were assessed using Visual Analog Scale (VAS) together with SC. Stress values measured by SC and each VAS scale were standardized and used as dependent variables in repeated measures analyses to allow for between measurement comparisons. All models included the visit number as a covariate.

Results

When controlling for visit, there was no significant change in VAS anxiety over time, yet the stress biomarker SC did decrease significantly over time, compared to the VAS-anxiety (p=0.037). In a model that assessed the association between VAS nervousness and SC, both SC and VAS nervousness dissipated over time (p=0.027), and there was no significant difference between the two. Panic, worry and calmness measured by VAS did not change over time, and there were no differences observed between lab visits 1 and 2.

Conclusions

Only 'nervousness' may be related to SC as it exhibited similar decreases over time as SC. This suggests that not every stress-related emotional state corresponds to this stress biomarker and that they cannot necessarily be considered proxies for each other for measuring stress.

T-2255-P: Clustering of Adolescent Health Risk Behaviors: Tobacco, Alcohol, Illicit Drug Use and Obesity

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Background

Adolescent substance use and overweight/obesity each are public health priorities, with unique prevalences based on race/ethnicity. How these biobehavioral risks cluster together in today's youth is unknown, leaving critical gaps in prevention science.

Methods

Utilizing a national epidemiological sample of 10th grade students (N= 19,678; Mage=16.09 years; 69.5% White, 14.5% Black, 16.0% Hispanic; 2008-2009 Monitoring the Future), we examined prevalence of tobacco, alcohol and illicit substance for overweight (OVA), obese (OBA), or severely obese (SOA)
adolescents compared to healthy weight adolescents (HWA) for each race/ethnicity group. Controlling for gender and parental education, the impact of weight on substance use and whether weight moderated associations between smoking and other substance use were examined using logistic regression.

**Results**

White youth of excess weight had higher odds of early (before grade 9) substance use, recent smoking (past 30 days), and use of some illicit substances (inhalants, cocaine, amphetamines) within the past year, and, particularly SOA, relative to HWA. Among White early smokers, OBA and SOA had higher odds of other substance use, whereas White recent smokers had lower odds of other substance use. Few significant weight status based findings were identified for Black or Hispanic youth.

**Conclusions**

Adolescent health risk behaviors appear to cluster together uniquely for White youth by early adolescence. Understanding the downstream public health consequences and how risk pathways of excess weight, tobacco, and other substance use may uniquely unfold for each race/ethnicity group is imperative.

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**T-2256-P: Functional-Gene-Pathway Analysis Reveals that RYGB Surgery Alters Immune Function in Rats**

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**Background**

We used bioinformatics functional-pathway analyses to determine the effects of RYGB on small-intestinal gene expression in female rats, with the aims of identifying mechanisms through which RYGB alters gut-hormone secretion and discovering new physiological responses to RYGB.

**Methods**

Rats underwent RYGB or SHAM surgery and ovariectomy, and then were treated with E2 (2 mg/4 d) or sesame oil (OIL) for one month before sacrifice. Affymetrix gene-expression analysis was done on samples of the biliopancreatic limb, alimentary limb and common channel in RYGB rats and on anatomically corresponding duodenal, jejunal and ileal loci in SHAM rats. RYGB’s effects were analyzed separately in E2- and OIL-treated rats as models of pre- and postmenopausal women. We report here both individual genes whose expression changed (P < 0.001; > 2 fold) and functional-gene-pathway changes (P < 0.05).

**Results**
In E2 and OIL-treated rats, RYGB had the most effects in the alimentary limb. In E2- and OIL-treated rats, RYGB did not affect eating-control hormone genes, but up-regulated pathways responsible for their release. Interestingly, genes regulating both facilitated and ion channels glucose transporters were downregulated in RYGB E2-treated rats. Most strikingly, however, RYGB up-regulated pathogen responses and down-regulated pro-inflammatory responses, such as B cell signaling.

Conclusions

This preliminary bioinformatics gene-expression study reveals novel molecular-genetic effects of RYGB underlying gut-hormone secretion and immune-system function. These data provide platforms for further translational investigations of this important issue.

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**T-2257-P: The Effects of Different PPAR Activation upon Hepatic Remodeling in Diet-Induced Obese Mice**

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**Background**

The aim of this study is to investigate the effects of treatment with different PPARs agonists upon molecular and structural hepatic remodeling in diet-induced obese mice.

**Methods**

Male C57BL/6 mice were assigned to receive standard chow diet (SC, 10% energy as lipids) or high-fat diet (HF, 50% energy as lipids) during 10 weeks, when treatment started, forming the following groups: SC group, HF group, HF-BZ group (HF + Bezafibrate, pan-PPAR agonist), HF-WY group (HF + WY-14643, PPARalpha agonist) and HF-GW group (HF + GW1929, PPARgamma agonist). PPAR agonists were added to HF diet and treatment lasted four weeks. Liver remodeling was evaluated by biochemical and molecular approaches. One-way ANOVA and the post-hoc Holm-Sidak test were used ($P<0.05$).

**Results**

HF and HF-GW were overweight at the end of treatment. Conversely, HF-BZ and HF-WY presented body masses equal to SC. Insulin sensitivity was restored by all treatments as well as blood lipids and adiponectin. Hepatic steatosis was countered in HF-WY and HF-BZ as both of them provoked higher mRNA expression of PPARalpha and CPT-1a, favoring beta-oxidation. HF-GW, on the contrary, presented higher PPARgamma and FAS/CD136 mRNA expression, facilitating hepatic lipogenesis.

**Conclusions**
WY14643 and Bezafibrate treatments emerged as the most powerful approaches to overcome metabolic and hepatic constraints due to obesity and insulin resistance.

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**T-2258-P: Effects of Dietary Whey, Lactalbumin and Lactoferrin on Energy Balance, Body Composition, Glucose Tolerance and Hormone Responses in Diet-induced Obese Rats**

*Rizaldy C. Zapata, DVM; Adel Pezeshki, PhD; Arashdeep Singh, BTech; Mary T.-H. TH. Chou, PhD; Prasanth Chelikani, PhD;*

**Background**

There is limited information on the efficacy of individual components of whey protein that aid in weight loss. We determined the effects of the whey protein fractions - lactalbumin and lactoferrin - on food intake, energy expenditure, glucose tolerance and gut hormone in diet-induced obese rats.

**Methods**

Diet-induced obese OP-CD rats (n=32) were randomized to 4 isocaloric high fat (40%) diets (n=8/group): 1) control (CON, 15% protein, 45% carbohydrates), 2) whey (WH, 30% protein), 3) lactalbumin (LA, 30% protein) or 4) lactoferrin (LF, 30% protein) and followed for 8 weeks. Daily food intake and energy expenditure (EE) were recorded by the CLAMS system, and weekly body composition by MRI. A gut hormone panel was used to quantify meal-induced plasma concentrations of hormones including glucose-dependent insulinotropic polypeptide (GIP), leptin and insulin.

**Results**

Compared to CON: 1) LA and LF decreased food intake for 11 and 50 days, respectively. 2) LA and LF increased EE during the first 3 hours of the dark period after 3 weeks on the diet. 3) LF decreased body weight by 34%. 4) LA and LF reduced % body fat (12%, 30%) and increased % lean mass (6%, 10%). 5) LA, LF and WH improved glucose tolerance test by 34%, 38% and 46%, respectively. 6) LA, LF and WH decreased peak GIP (93%, 49%, 57%) and leptin concentrations (44%, 25%, 35%). LF also decreased peak insulin concentration by 54%.

**Conclusions**

Lactalbumin and lactoferrin reduce food intake, promote fat loss and lean mass retention, improve glucose tolerance and decrease plasma leptin, insulin and GIP concentrations. These components seem to be more beneficial than just whey itself in improving energy balance. Funding: ALMA, AI-Bio, AM
T-2259-P: Roux-en-Y Gastric Bypass Improves Postprandial Lipemia
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T-2260-P: The Effects of Resistant Starch or Their Fermented Short-Chain Fatty Acids on Lifespan and Intestinal Fat Deposition in C. elegans Model
Chenfei Gao, ; Melanie Kaltakjian, ; Cindy Kim, None; Roy Martin, J, PhD; Michael Keenan, PhD; Frank L. Greenway, MD; John Finley, PhD; Jeff Burton, PhD; William Johnson, PhD; Frederick Enright, DVM, PhD; Jolene Zheng, MD, PhD;

Background
Safe, effective, and new innovative treatments strategies are urgently needed to manage obesity, the increasing epidemic disease. Prebiotics resistant starch (RS) and their fermented products, short-chain fatty acids (SCFAs), reduced intestinal fat deposition (IFD) in wild type C. elegans (N2), dilute the energy density, stimulate the production of gut satiety hormone, and promote insulin sensitivity in humans and rodents. We tested that if RS or SCFAs will affect lifespan in C. elegans.

Methods
N2 received standard laboratory food source (E. coli OP50) only; experimental groups received additional high amylose maize RS2 (HAMRS2, 0.5%, 1.0%, & 3.0%) and/or 2% glucose (NGM agar culture). In a separate liquid culture of N2, sir-2.1 deficient mutants, and daf-2/16 double mutants, the experimental groups received additional sodium butyrate (0.3mM, 0.6mM), sodium acetate trihydrate (100mM), sodium propionate (0.3mM), and tributyrin (0.1, 1mM).

Results
HAMRS2 sustained the pharyngeal pumping rate (PPR) and lifespan in N2, but was abolished by 2% glucose. The lifespans of sir-2.1 mutants or daf-16 deficient mutants were reduced by HAMRS2 with or without glucose. The IFD indicated by Nile red staining was reduced by butyrate (0.3mM, P=0.002; 0.6mM, P=0.001), acetate (100mM, P=0.015), propionate (0.3mM, P=0.04), and tributyrin (0.1mM, P=0.005; 1mM, P=0.001) in N2; and increased in sir-2.1 deficient mutants (P<0.001).
Conclusions

These data indicate that HAMRS2 lifespan extension of *C. elegans* (N2) required *sir-2.1* or *daf-16* genes; SCFAs reduced IFD by the *daf-16/daf-2* or *sir-2.1* pathways and created a negative energy balance in the *C. elegans* model.

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**T-2261-P: Peptide Profiles as Biomarkers of Satiety: Different Profiles but Equivalent Satiety**

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**Background**

The role of gastrointestinal peptides is to organise the intestinal response to consumed foods. In the field of obesity, peptides are thought to play a major function in satiety/satiation. Previous studies have not examined numerous peptides simultaneously with subjective appetite and energy intake.

**Methods**

We compared responses of glucose, insulin, ghrelin (total and acylated), CCK, GLP-1 and PYY with profiles of subjective appetite (hunger/fullness) and *ad libitum* eating behaviour after consumption of normal iso-energetic meals varying in fat content. Peptides and subjective appetite were measured fasted and postprandially for 180min after consuming high fat (HF ->50% fat) or high carbohydrate (HCHO ->3% fat) meals of equal palatability, energy and weight (590kcal; 685g). *Ad-libitum* eating was also measured. Overweight/obese participants were studied (Age: 46y; BMI: 29.8kg/m2).

**Results**

The pattern of peptide release was different after the two meals indicating selectivity in response to macronutrients - glucose and insulin release was higher after HCHO (p<0.001), but CCK, GLP-1 and PYY responded more to HF (p<0.01;p<0.05); ghrelin was the same after both meals. Profiles of hunger/fullness were similar and *ad libitum* energy intake did not differ after the two meals. Ghrelin, GLP-1 and insulin (only after HCHO) showed significant relationships with appetite measures and energy intake, but CCK and PYY did not.

**Conclusions**

This result demonstrated that the same degree of satiety and satiation can be mediated by markedly different peptide profiles implying that no single peptide can be regarded as the sole biomarker of appetite. This has implications for understanding the physiological basis of appetite control.
T-2262-P: Mathematical Modeling of Energy Metabolism and Body Composition Dynamics Following Roux En-Y Gastric Bypass Surgery

Kevin D. Hall, PhD; Nana Gletsu-miller, PhD;

Background

Mathematical models of human energy metabolism and body composition dynamics have been previously validated using data from a variety of interventions resulting in weight gain and loss. However, such models have yet to be applied to bariatric surgery interventions.

Methods

We simulated the energy intake (EI), total energy expenditure (TEE), and body composition changes following Roux en-Y Gastric Bypass (RYGB) using two previously developed mathematical models of human metabolism. We compared the model simulations to the mean body weight (BW), fat mass (FM), visceral adipose tissue (VAT), and resting energy expenditure (REE) measured in patients at 1 month (N=38), 6 months (N=39), and 24 months (N=20) post RYGB.

Results

Over the first 6 months, EI decreased by ~2200 kcal/d from baseline whereas TEE fell by 700-1000 kcal/d, with REE decreasing by ~400 kcal/d. Thereafter, EI gradually increased to a persistent ~640 kcal/d reduction from baseline which was accompanied by a slow increase in TEE such that BW plateaued after ~16-19 months. The model-simulated dynamics of BW, FM, VAT, and REE matched the data.

Conclusions

Without any adjustment of model parameters, previously validated mathematical models of human energy metabolism and body composition dynamics accurately simulated energy expenditure and body composition data and predicted the time course of energy intake in the months following RYGB.
T-2263-P: Meal Pattern Affects Hunger and Glycemia after Roux-en-Y Gastric Bypass

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Background

Gastric bypass (GBP) results in significant weight loss. The reduced gastric pouch capacity after GBP lends itself to smaller, more frequent meals. We hypothesized that consumption of small mini-meals would elicit a more favorable metabolic response compared to a single larger meal.

Methods

Obese subjects (n=12) without diabetes were studied prior to and 1 year after GBP. Subjects consumed a single 600 kcal liquid meal administered at Hour 0 on one day, and 3-200 kcal liquid mini-meals administered at Hours 0, 2, & 4 on a separate day. Blood and visual analog scales (VAS) measurements (150mm) were collected after overnight fasting and during the 6 hour postprandial period. Paired t-tests were used for all comparisons.

Results

Body weight, fasting glucose and insulin were lower one year post-GBP (p<0.01). Postprandial hypoglycemia (<70mg/dl) was observed in 58% of subjects after the large meal (1 symptomatic). Spreading calories over 6 hours in 3 isocaloric mini-meals led to lower insulin levels (AUC, 28.6+ -11.3 vs. 48.7+-35.9 Î¼U/ml/min, p<.05), less postprandial hypoglycemia (27%, 0 symptomatic), and lower hunger ratings at the end of the experiment (10.7+-35.6 mm vs. 69.6 + 60.3 mm, p<0.05) than a single, larger meal.

Conclusions

Meal size and frequency have an important effect on insulin and glucose control. After GBP, spreading calories over the day rather than eating a single meal lessens the number and symptoms of reactive hypoglycemia, and results in better hunger control.

T-2264-P: Ingestion of Synbiotics Partially Ameliorates Cholic Acid-Induced Metabolic Disorders in Rats
Background

Aging and high-fat diet modulate bile acid (BA) metabolism, resulting in an increase in BA secretion into the gut. In this study, we investigated restoration of CA-induced disorders by synbiotics in rats.

Methods

After acclimation, Wistar rats (five-week-old) were divided into four groups, such as CA-supplemented control diet (AIN-93G-based), the diet with Bacillus coagulans (probiotic), soy pulp (prebiotics), or both (synbiotics) for eight weeks. We analyzed plasma adiponectin, triglyceride, total-cholesterol and liver lipids. We also measured BA composition in feces and gut permeability in vivo. Organic acid concentration in the cecal contents was determined.

Results

The probiotics influenced neither gut permeability nor the level of plasma adiponectin. The prebiotics and synbiotics partially recovered gut permeability and plasma adiponectin concentration, as well as an increase in short-chain fatty acid and organic acid concentration in the cecum. The prebiotics significantly increased BA concentration in feces. However, the synbiotics did not modulate fecal BA concentration including DCA.

Conclusions

The synbiotics did not increase fecal BA concentration although the prebiotics increased that, suggesting that the mechanisms of cholesterol lowering effect by the prebiotics and synbiotics appear different. These findings indicate that synbiotics is a better choice for health promotion.

T-2265-P: Glucagon-Like Peptide-1 Improves Lipoprotein Function after Roux-en-Y Gastric Bypass Independent of Body Weight

Background
Roux-en-Y gastric bypass (RYGB) reduces weight and cardiovascular (CV) risk in obese patients. The mechanisms of CV protection after RYGB are still unclear. Glucagon-like peptide-1 (GLP-1) levels increase after RYGB and seem to mediate several beneficial RYGB effects. GLP-1 exerts endothelial protective actions through endothelial NO-synthase (eNOS) activation. Here, we investigated the role of GLP-1 in the improvement of obesity-induced high density lipoprotein (HDL) dysfunction in rats after RYGB, before significant weight loss, and in human RYGB patients.

Methods

Diet-induced obese male Wistar rats underwent RYGB or sham operation. Sham rats were fed ad libitum (AL) or weight matched to RYGB (BWM). Some RYGB rats received vehicle or the GLP-1 receptor antagonist exendin-9-39 (Exe; 10ug/kg/h) for 8 days; they were compared to AL rats treated for 8 days with vehicle or the GLP-1 analogue liraglutide (0.2mg/kg BID). HDL was isolated and tested for its functionality and its vasoprotective effects.

Results

HDL isolated from RYGB rats stimulated endothelial NO production, reduced endothelial oxidative stress, inflammation, and apoptosis; HDL from RYGB rats stimulated cholesterol efflux from pre-loaded macrophages. These beneficial functions were not present in BWM. Liraglutide restored some HDL properties in AL rats but blockade of GLP-1 action with Exe had no effect. In human RYGB patients, HDL isolated 14 days after RYGB improved the capacity to stimulate endothelial NO release, to reduce oxidative stress, inflammation and apoptosis.

Conclusions

Our study shows that GLP-1 may be a crucial mediator of some improved HDL functions that are observed immediately after RYGB, and that are independent of weight loss. These GLP-1 effects, however, seem to be independent of the classical GLP-1 receptor.

T-2266-P: Vitamin D Kinetics After Bariatric Surgery: A Healthy-Volunteer Comparative Pilot Study

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Background

Vitamin D (VD) deficiency is highly prevalent in obese individuals. Little is known about vitamin D absorption after bariatric surgery (BS). We aim to evaluate the effect of BS on the rate and extent of absorption of a single oral dose of 50,000IU of vitamin D administered in fasting conditions.
Methods

6 healthy volunteers (Controls, C) and 6 BS-patients were studied. Cholecalciferol concentration (Hexane HPLC grade, and methanol LC-MS) was determined in blood samples obtained at baseline, and at 30, 60, 90, 120, 180, 300, 360, 420, 480, 540, 600 and 1440 minutes following VD intake. The ratio [90%CI] of BS/C was assessed for the log-transformed AUC and Cmax as a comparative index, and tmax was compared using non-parametric tests.

Results

BMI (BS: 28.6+-5.0 and C: 25.0+-4.0 kg/m2), and age (BS: 43.8+-7.0 and C: 39.0+-9.0 years) were similar between groups. Although no statistically differences were found for AUC(0-t), (mean+-SD: BS: 2719.6+-942.7 and C: 1759.6+-1584.3ng*ml^-1*h; p=0.266) and Cmax (C: 146.5+-41.2 and BS: 168.2+-76.9ng*ml; p=0.586), the ratio BS/C [90CI%] suggested a relevant increased magnitude for the former (2.5 [0.87-7.2]), and a similar effect for the latter (0.94 [0.58-1.52]). Tmax median difference was of 1.5h (median: BS: 7.0 (7.0-8.0) and C: 5.5 (5.0-6.0) h; p=0.378).

Conclusions

In summary, our pilot study shows relevant PK data for vitamin D associated with BS in a controlled setting but with insufficient precision due to unexpected high variability. The study results may be valuable for a proper design of a sufficiently sized trial.

T-2267-P: Distinct Transcriptomic Signatures Associated with Protection Against High Fat Diet-Induced Hepatic Steatosis in Rats with High Intrinsic Aerobic Capacity

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Background

Using a polygenetic rat model selectively bred for divergent intrinsic aerobic capacities, we reported high capacity runners (HCR) exhibit increased energy expenditure, whole-body fat oxidation, and resistance to 3 d high fat diet-induced hepatic steatosis compared to low capacity runners (LCR).

Methods
Here we examined global transcriptomic signatures in HCR/LCR rats challenged with 3 d high-fat diet (HFD)-induced to examine underlying mechanisms. HCR/LCR rats were fed low-fat diet (LFD, 10% kcal fat, Research Diet) prior to an acute 3 d HFD (45% kcal fat) challenge (Research Diet D12451). Hepatic microarray analysis (GeneChip Rat 230 2.0) revealed differential expression (+- 1.5-fold, \(p < 0.05\)) of 171 transcripts in the HCR and 75 transcripts in the LCR respectively, due to HFD. Gene ontology analysis identified genes involved in bile acid and cholesterol biosynthesis were enriched in the HCR rats, while LCR-HFD showed increased expression of genes involved in steroidogenesis.

**Results**

Gene-set enrichment analysis revealed that LCR-HFD rats showed decreases in components of oxidative phosphorylation and TCA cycle, while HCR-HFD decreased for transcripts involved in unsaturated fatty acid biosynthesis. Using qPCR, we confirmed increased mRNA expression of CYP7A1, SQLE, HMGCR in HCR-HFD \((p < 0.05)\) while CYP17A1 and HSD17\(^{12}\) were increased in LCR-HFD \((p < 0.05)\). Consistent with positive influence of bile acids in augmenting EE via signaling through FXR and TGR5, we observed increased FXR mRNA in HFD-fed HCR rat livers.

**Conclusions**

These data suggest that protection against HFD-induced steatosis in HCR is associated with transcriptomic signatures favoring bile acid biosynthesis; while impaired activation of mitochondrial related pathways in LCR livers during HFD may contribute to the progression of hepatic steatosis.

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**T-2268-P: Short-Term Changes in Biochemical Parameters Associated with Non-Alcoholic Fatty Liver Disease Following Laparoscopic Sleeve Gastrectomy**

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**Background**

Bariatric surgery may lead to improvements in certain co-morbidities, such as non-alcoholic fatty liver disease (NAFLD). There are limited data available on whether or not NAFLD improves following laparoscopic sleeve gastrectomy (LSG).

**Methods**

Using a prospective cohort study design, changes in the status of select biochemical parameters associated with NAFLD in patients undergoing LSG were assessed. A total of 159 patients underwent LSG between
May 2011 and October 2013, and consented to participate in this study. Of the 159 patients in the study sample, 71 patients had completed their baseline assessment and 3 and 6 months follow-ups. Select biochemical parameters, including liver enzymes (GGT, ALP, ALT), lipids (HDL, LDL, triglycerides) and total bilirubin were assessed at baseline and re-evaluated at 3 and 6 months post-LSG.

**Results**

Patients presented with a mean BMI of 49.06+6.7 and 80.3% were female. Average weight was reduced from 134.5+23.7 kg at baseline to 104.2+19.1 kg at 6 months post-LSG (p<0.05). The majority of patients (85.9%) presented with abnormal levels for one or more biochemical parameters at baseline, but improvements were observed post-LSG. At 6 months post LSG, fewer patients reported abnormal values (i.e., high or low) for ALT (11.4% - 0%, p<0.05), GGT (37.7% - 12.9%, p<0.001), HDL (28.6% - 15.9%, p<0.05) and triglycerides (41.4% - 5.8%, p<0.001).

**Conclusions**

Significantly fewer patients had abnormal values of biochemical markers associated with NAFLD at 6 months post-LSG. This improvement may be attributed to the significant weight loss observed at 6 months post-LSG and could suggest an improvement in NAFLD.

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**T-2269-P: Modeling Childhood Obesity and Nonalcoholic Fatty Liver Disease in Juvenile Ossabaw Miniature Swine Fed a Western Diet**

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**Background**

Pediatric obesity and nonalcoholic fatty liver disease (NAFLD) are on the rise in industrialized countries, yet our ability to mechanistically examine this relationship is limited by the lack of a suitable higher animal model.

**Methods**

Here we examine the effects of western diet (WD; high fat, high fructose corn syrup, high cholesterol) induced obesity on NAFLD in juvenile Ossabaw swine, a well characterized large animal model of adult metabolic syndrome. Juvenile (5-week old), female Ossabaw swine (n = 6/group) were fed either a WD or low-fat chow diet for 16 weeks. This age in swine is comparable to that of an adolescent child.
Results

The WD fed animals were fed ~2.5x the number of kcals as the low-fat group, resulting in greater body mass (47±2 vs. 25±1 kg, p<0.001) and body fat (30.4±1.4% vs. 20.4±2.4%, p<0.001). The obese juvenile pigs developed metabolic syndrome, including elevated serum TGs, cholesterol, and FFAs, as well as systemic insulin resistance assessed by intravenous glucose tolerance testing. In addition, the obese pigs developed severe NAFLD, with significant hepatic steatosis, hepatocyte ballooning, inflammatory cell infiltration, fibrosis, and elevated liver enzymes. Furthermore, compared with lean pigs, the obese animals had elevated hepatic expression of the inflammatory genes TNFα and IL-1β, the macrophage marker F4/80, and toll-like receptors 2 and 4, suggestive of a NASH phenotype.

Conclusions

Juvenile Ossabaw swine fed a WD develop an obesity phenotype leading to NAFLD/NASH with similarities to the pediatric/adolescent population. This model represents a powerful tool for advancing our understanding of the development and progression of childhood NAFLD and for designing optimal nutritional, pharmaceutical and exercise therapies to treat this disease.

T-2271-P: Salt and Metabolism: What's in the Feces?

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Background

In a recent study (currently unpublished), rats fed a high-fat diet gained more body fat than rats fed a high-salt high-fat diet. This research investigated the relationship between consumption and digestion of fats to better understand how fat and salt contribute to obesity.

Methods

24 female Sprague-Dawley rats were fed a high-fat (60% fat, 3% sodium), high-salt (10% fat, 8% sodium), high-fat/high-salt (60% fat, 8% sodium), and control (10% fat, 3% sodium) for 24 days beginning postnatal day 21. Each rat was weighed and fecal extractions collected daily. On postnatal day 45, the rats were euthanized; organs and renal fat were weighed, with tissue samples collected from the brain, liver, and kidneys for PCR testing. Renal fat was collected as an estimate for total fat overall. The feces from each rat were freeze-dried on day 33 and day 45 for complete lipid extraction. The lipid extraction was performed using chloroform, methanol, water technique.

Results
Data shows the total fecal lipid mass for rats on a control diet is 3.5%; this will be used as a standard for fecal lipid mass comparison between groups. Current work processing the samples from high-fat, high-salt, high-fat/high-salt research is in progress.

Conclusions

The examination of lipid excretion and metabolism with or without the consumption of high sodium may help scientists and medical professionals understand the effects of salt on fat metabolism and provide baseline understanding for future physiological and dietary research.

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T-2272-P: Hepatocyte Klotho Regulates Lipid Homeostasis but not Body Weight in Mice

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Background

Klotho is expressed in the liver, adipose tissue, pancreas etc. and plays a crucial role in Fgf15-induced suppression of bile acid (BA) synthesis: BA pool size is expanded in Klotho knockout mice (KO). Although KO are hypolipidemic and weigh less, the underlying mechanism has yet to be determined.

Methods

In KO fed low fat diet, plasma triglyceride instead of cholesterol level was decreased by 44% compared with control mice. The body weight of KO under high fat diet was decreased by 15%. To address a tissue-specific contribution of hepatocyte Klotho and subsequent change in BA milieu to the regulation of plasma lipid and body weight, we generated albumin promoter-driven hepatocyte-specific Klotho transgenic mice (Tg) and crossed with KO to produce KO/Tg. We analyzed BA levels, lipid profiles, expression of lipogenic and lipolytic enzymes, liver metabolome, acetyl CoA flux, and body weight and composition in KO and KO/Tg. BA excess in KO was recovered to the control level in KO/Tg.

Results

In KO liver, mRNA levels for SREBP2 and HMG CoA reductase were augmented while unchanged for SREBP1 and FAS. Moreover metabolome and 14C acetate tracer experiment have revealed augmented de novo cholesterogenesis in KO but not fatty acid/triglyceride synthesis. Considering that BA is the only clearance route for cholesterol, these data suggest a compensatory mechanism maintaining cholesterol but not triglyceride levels. Hypotriglyceridemia in KO was recovered to the control level in KO/Tg, while decreased body weight was not recovered in KO/Tg.

Conclusions
Hepatocye ßKlotho is both necessary and sufficient for BA and plasma lipid homeostasis, whereas ßKlotho in extrahepatic tissues is attributable for its role in body weight regulation. Enhanced cholesterol clearance in KO was compensated by de novo synthesis but with defective triglyceride levels.

T-2273-P: A Moderate Cholic Acid Supplementation Develops Fatty Liver in Rats

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Background

In a previous study, we found that a moderate supplementation of CA, which increased with high fat diet, regulated the composition of gut microbiota, though it does not disturb bile acid (BA) composition in the gut. Here, we examined whether the moderate CA supplementation affects liver functions.

Methods

WKAH/HkmSlc male rats (three weeks old) were fed an AIN-93G-based diet with or without the moderate concentration of CA (0.5 g CA/kg diet) for 13 weeks. We analyzed lipid parameters in the liver and plasma as well as damage markers, gene expressions, and bile acid distribution.

Results

The CA supplementation only increased some characteristic BAs such as deoxycholic acid and 12-oxo-lithocholic acid in feces. CA ingestion increased liver weight with high concentration of triglyceride and cholesterol, accompanied by gene expressions in cytokines, inflammasome-related molecules, and inducible nitric oxide synthase. In contrast, there is no difference in adipose tissue weights. We also detected an increase in some plasma parameters, such as cholesterol, NEFA, and transaminases (ALT and AST) in CA-fed rats.

Conclusions

The moderate CA supplementation not to disturb bile acid composition in the gut induces fatty liver disease-like symptoms.
T-2274-P: Topographical Changes of GLP-1 Secreting Cells After RYGB Surgery

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Background

The objective of our study was to understand the anti-diabetic effects of Roux-en-Y-Gastric Bypass (RYGB), especially the augmented response in post-prandial Glucagon-Like Peptide-1 (GLP-1). To examine this we looked at the topography of GLP-1 secreting cells in small intestine of rats after RYGB.

Methods

We used Sprague-Dawley rats and divided them into RYGB and control groups (n=6 per group). Two weeks after RYGB, tissue was harvested from bilio-pancreatic (BP), Roux (RX), and common (CM) limbs, as well as terminal ileum (TI) and compared with corresponding segments from the controls. The number of GLP-1 positive cells were quantified using immunohistology, counted manually by two blinded observers under 20x magnification and expressed as mean ± SEM. Co-localization of GLP-1 staining with chromogranin-A, another marker of EEC was confirmed. Plasma GLP-1 levels were also measured for both groups. Unpaired t-test was used for statistical analysis with alpha set at <= 0.05 for significance.

Results

As expected, GLP-1 positive cells increased cranio-caudally in control rats (BP=0.32±0.14, TI=4.2±0.61 cells/field; p=0.00), and this pattern was maintained after RYGB (BP=0.9±0.18, TI=5.26±1.16 cells/field; p=0.01). Compared with controls, the number of GLP-1 positive cells was significantly higher in BP (0.32±0.14 vs. 0.9±0.18 cells/field, p=0.03) and CM limb of RYGB group (2.39±0.28 vs. 3.83±0.56 cells/field, p=0.04). RYGB showed a 9-fold increase in plasma GLP-1 levels compared to controls (990±210 vs. 116±20.9 pg/ml, respectively; p=0.002).

Conclusions

GLP-1 cells increased cranio-caudally after RYGB, with a significant increase in BP and CM limbs compared to control. The disproportionate rise in plasma GLP-1 levels compared to cell count, suggests that including intestinal adaptation other pathways may be altered after RYGB modulating this hormone.
T-2275-P: Effects of Long-Term Calorie Restriction on Energy Expenditure in C57BL/6J Male Mice

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Background

Many individuals restrict their caloric intake in order to lose weight, and calorie restriction (CR) is known to induce alterations in energy expenditure (EE). The aim of this study was to investigate how different degrees of CR would alter EE and activity in obese C57BL/6J male mice.

Methods

All mice were ad libitum fed a high fat diet (45% calories) from 2-11 months of age, and then randomized to one of 3 conditions: continued ad libitum feeding (Ever Obese-EO; n=10 at 14.5mo, 8 at 24mo), ~15% Calorie Restriction (15CR; n=10 at 14.5mo, 10 at 24mo) or ~25% Calorie Restriction (25CR; n=10 at 14.5mo, 12 at 24mo). Total energy expenditure (TEE), resting energy expenditure (REE) and body composition were measured at 14.5 and 24 months of age. All statistical models for EE were adjusted for lean mass by ANCOVA.

Results

At 14.5mo, daily TEE was significantly different among all groups. EO had the highest and 25CR had the lowest TEE (p<=0.005). Daily REE was significantly higher in EO compared to CR groups (p<0.001). EO had lower total daily activity compared to 25CR (p=0.036). At 24mo, EO had significantly higher TEE compared to 25CR (p=0.006) and higher REE compared to CR groups (p<0.015). 15CR had significantly higher TEE than 25CR (p=0.020). EO had lower total daily activity compared to 25CR (p=0.026).

Conclusions

CR resulted in lower energy expenditure in aged mice when compared to ever obese animals. The reduction in energy expenditure was related to the degree of restriction. Similarly, 25% CR elicited an increase in activity when compared to ever obese mice.

T-2276-P: Weight Loss by a Novel Small-Molecule Ppc-1 Derived from Slime Mold

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Background

Although these agents are associated with an unacceptably high rate of significant adverse side effects, uncoupling is one of the best ways to control metabolic diseases. Trials to search for novel and safe uncoupling compounds are indispensable to the development of new drugs.

Methods

O2 consumption profiles were examined using mitochondria-enriched fractions with natural small molecules derived from microorganisms used for the screening. Effect on weight was assessed by direct injection into mice. Body fat levels were examined by CT scanning, and fatty acids were analyzed by mass spectrometry. Cellular effects were examined using cultured cells.

Results

Ppc-1 was selected as a novel uncoupling agent with no inhibitory effects on the ATP production system. Direct administration of Ppc-1 to mice suppressed weight gain without causing lesional changes in liver or kidney tissues or any tumor formation. Serum free fatty acid levels were high and body fat content was low in mice treated with Ppc-1. Although growth inhibition and a transient depression of ATP content were induced in cultured cells by high concentrations of Ppc-1, Ppc-1 is released from mitochondria immediately after washing out.

Conclusions

Ppc-1 suppresses weight gain in mice. It may be a leading compound for the development of new agents to treat metabolic abnormalities such as obesity and diabetes, and for use as a molecular probe for mitochondria research.

T-2278-P: Diet-Induced Obesity Induces Changes in Central and Peripheral Regulation of Protein Kinase A (PKA) Signaling in Mice That Promote Metabolic Dysfunction
Background

PKA mediates the effects of cAMP, a key regulator of energy metabolism, via many hormones and other molecules that activate G-protein coupled receptors. PKA comprises 2 regulatory (RIα, RIIα, RIÎ², RIIÎ²) and 2 catalytic (Ca, CÎ², Cg, PRKX) subunits in mice and humans; expression is tissue-specific.

Methods

Because disruption of PKA subunits RIIα, RIIÎ² or CÎ² causes a lean phenotype in mice, we hypothesized that the PKA system would be dysregulated in organs involved in energy homeostasis in diet-induced obese (DIO) mice. 12 week-old C57BL/6 mice were provided ad libitum access to high fat diet for 14 weeks (n=7-8/sex). Littermate controls had ad libitum access to regular chow for 14 weeks (n=7-8/sex). Hypothalamus, hippocampus and striatum, as well as gonadal adipose tissue and liver were assayed for PKA expression and activity.

Results

As expected, DIO mice had impaired glucose tolerance, increased body weight and adiposity, and fatty liver. Basal (without added cAMP) and total (cAMP-stimulated) PKA activity were increased by 100% and 300%, respectively in hypothalamus and by 40% and 100%, respectively in liver of DIO mice compared to lean controls. Expression of the PKA subunits was altered in adipose tissue of DIO mice and basal PKA activity tended to be lower in DIO mice.

Conclusions

DIO increased both basal and total PKA activity in hypothalamus and liver of mice. Further examination of this previously undescribed phenomenon including acute effects of diet on PKA signaling can expand our understanding of the role of PKA in the development of obesity and its comorbidities.

T-2279-P: Circadian Misalignment without Concurrent Sleep Loss Leads to Metabolic Dysregulation in Mice

Vetrivelan Ramalingam; Clifford B. Saper, MD, PhD;

Background

Circadian dysregulation and chronic sleep loss are associated with various adverse metabolic outcomes. As these two factors are closely interrelated, the relative contribution of sleep loss vs. circadian dysregulation in inducing metabolic deficits is not clear. We address this issue in a mouse model of recurrent circadian misalignment (RCM).
**Methods**

Under anesthesia, adult male wild type (C57BL6) mice were implanted with electrodes for recording electroencephalogram (EEG) and electromyogram (EMG) and a miniature transmitter for recording locomotor activity (LMA) and body temperature (Tb). Mice were then maintained either on a 10 h:10 h light:dark (LD) cycle to induce RCM or on regular 12:12 LD cycle (controls) for 12 weeks. LMA and Tb from all mice were recorded continuously (every 5 min) during entire 12-weeks whereas EEG/EMG (sleep-wake) were recorded for 48 h during the week 4. Food intake and body weight were monitored weekly. In addition, fat mass, glucose and insulin tolerance, plasma levels of metabolic markers were studied in all mice.

**Results**

The mice exposed to 10:10 LD cycle (RCM mice) displayed free running rhythms in body temperature (with a period of > 24 h) and thus experienced chronic misalignment between their internal rhythms and external LD cycle (20 h 'day'). However, their daily sleep amounts were not significantly different from control mice on 12:12 LD. RCM mice gained weight faster than controls (12.8+ -0.5 g in RCM mice vs. 8.3+ -0.9 g in controls), which was primarily due to an increase in fat mass. Although fasting plasma glucose levels were not altered in RCM mice, higher plasma insulin levels, insulin resistance and slower glucose clearance were observed.

**Conclusions**

Circadian misalignment can lead to weight gain and glucose intolerance in mice independent of concurrent sleep loss. However, a potential role for chronic sleep loss in exacerbating these adverse metabolic outcomes cannot be ruled out.

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**T-2280-P: Bombesin Receptor Subtype-3 Regulates Blood Pressure and Heart Rate via a Central Sympathetic Mechanism**

*Dalya M. Lateef, PhD; Cuiying Xiao, MD, PhD; Jurgen Schnermann, MD; Marc L. Reitman, ;*

**Background**

Bombesin receptor subtype-3 (BRS-3) is an orphan G-protein coupled receptor that regulates energy expenditure, food intake, and body weight. Older Brs3 knockout (Brs3-/-) mice were reported to have an increased blood pressure. In seeming contradiction, some BRS-3 agonists caused increased blood pressure and heart rate.

**Methods**
We studied the cardiovascular phenotype of Brs3-/y mice and effects of the BRS-3 agonist, MK-5046. Mean arterial pressure (MAP) and heart rate were studied in telemetered Brs3-/y mice, including the effects of blockade of sympathetic signals with propranolol and parasympathetic signals with atropine. The effect of MK-5046 was measured in both telemetered and anesthetized mice.

**Results**

In resting telemetered Brs3-/y mice the heart rate was lower than wild type, while the mean arterial pressure (MAP) was unchanged. However, with physical activity, heart rate and blood pressure both increased disproportionately. Upon ?-adrenergic blockade, there was no change in Brs3-/y heart rate, while control mice reduced heart rate to that of Brs3-/y. MK-5046 increased MAP and heart rate in wild type, but not in Brs3-/y mice. The increase was blocked by pretreatment with clonidine. Hypothalamic infusion of MK-5046 also increased MAP and heart rate.

**Conclusions**

The BRS-3 agonist MK-5046 increases MAP and heart rate via a central action, most likely via stimulation of sympathetic efferents; these actions are mechanism-based as they do not occur in Brs3-/y mice.

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**T-2281-P: Resistant Starch and Whey Protein Intake Enhances Postprandial Fat Oxidation and Satiation in Lean and Obese Women**

*Paul Arciero, PhD; Emery Ward, M.Sc.; Scott Connelly, MD; Allison Keller, BS Health and Exercise Sciences; Olivia Minicucci, Bachelor of Science class of 2016; Bradley Schuler, BS;*

**Background**

Ingestion of dietary resistant starch (RS4) increases fat oxidation in healthy lean males. Similarly, whey protein (WP) enhances postprandial metabolism and decreases hunger. the aim of the current study was to quantify RS4+WP on fat oxidation and subjective ratings of satiation and hunger in females.

**Methods**

A total of 16 women (Wt, 72.2±18 kg; %bodyfat, 32.4±11 %; Age, 46±10 yrs) participated in a randomized, cross-over intervention study with three different test meals (397 kcs) containing either waxy maize starch (WMS), RS4 from waxy maize starch or RS4 combined with whey protein (RS4+WP). Resting energy expenditure (REE), thermic effect of the meal (TEM), blood biomarkers (glucose, insulin, glucose dependent insulinoitropin polypeptide (GIP), and subjective ratings of quantity of food and desire to eat, fullness and hunger were measured at fasting and up to 180 minutes postprandial.
Results

TEM increased significantly following all three test meals, however fat oxidation was greatest with RS4+WP (P<0.01). Similarly, RS4+WP significantly reduced subjective ratings of the quantity of food and desire to eat (P<0.05) and increased feelings of fullness (P<0.05) and hunger ratings showed a strong trend to decrease following RS4+WP (P=0.053). Total area under the insulin curve was significantly lower following RS4+WP (P<0.05). All conditions similarly increased glucose and GIP.

Conclusions

Thus, dietary supplementation with RS4+WP enhances fat utilization and satiation in lean and obese females and therefore may provide an effective dietary strategy to enhance body composition and weight management. A diet combining RS4+WP may be suitable for large segments of the population.

T-2282-P: Impact of Glycemic Load on the Composition of Weight Regain

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Background

Glycemic load (GL) may be important for regulation of body weight and body composition after weight loss.

Methods

In a controlled nutritional intervention, 32 healthy men (26.0 ± -3.9 y, BMI 23.4 ± -2.0 kg/m2) followed 1-week overfeeding, 3-weeks caloric restriction and 2 weeks of hypercaloric refeeding at ±50% energy requirement. Four study groups were formed differing in carbohydrate intake (50%CHO, 65%CHO) and glycemic index (40 ±-3, 74 ±-3). Changes in fat mass were measured by quantitative magnetic resonance (EchoMRI), changes in protein were assessed by nitrogen balance.

Results

During overfeeding, participants gained +1.9 ±-1.2kg body weight, followed by a weight loss of -6.3 ±-0.6kg and weight regain of +2.8 ±-1.0kg. During caloric restriction, higher GL was associated with higher insulin and lower leptin levels and a higher regain in body protein during refeeding (all p<0.05). By contrast, during refeeding, higher GL was associated with impaired insulin sensitivity and fat oxidation and a higher regain in fat mass (all p<0.05).

Conclusions
A diet with a high glycemic load during weight loss and a low glycemic load during subsequent weight maintenance may help to antagonize metabolic adaptation and thus prevent the regain in fat mass.

**T-2283-P: Weight Loss and Improved Glucose Regulation after Roux-en-Y Gastric Bypass is Independent of and Complementary to Serotonin 2C Receptor Signaling**

*Jill Carmody, PhD; Scott Lajoie, LAT; Lee M. Kaplan, MD, PhD;*

**Background**

Melanocortin 4 receptor (MC4R) signaling is essential for weight loss (WL) after gastric bypass (GB). Serotonin 2C receptor (5-HT2CR) activation induces WL. Because 5-HT2CR agonists activate HT neurons that activate MC4R, we sought to determine whether 5-HT2CR signaling is required for WL after GB.

**Methods**

Diet-induced obese (DIO) male 5-HT2CR-deficient mice and their wild-type (WT) littermates underwent GB or sham operation, and body weight (BW) and parameters of glucose regulation (GR) were evaluated. In separate groups of GB- and sham-operated WT mice, the 5-HT2CR agonist meta-chlorophenylpiperazine (mCPP) was administered at 36mg/kg BW/day subcutaneously for 8 days via an osmotic pump, and BW and food intake were measured.

**Results**

GB induced substantial WL in both WT and 5-HT2CR-deficient mice, with no significant difference in surgical WL between the two strains. GB also induced improvements in glucose tolerance, insulin sensitivity, and oral glucose-stimulated insulin secretion in 5-HT2CR-deficient mice that were similar to the effect of this operation in WT animals. Administration of the 5-HT2CR agonist mCPP augmented WL to a substantial and similar degree (~4%) in both GB- and sham-operated WT mice.

**Conclusions**

GB-induced WL and improved GR are not dependent on 5-HT2CR signaling, suggesting that GB works through distinct mechanisms. The ability of a 5-HT2CR agonist to enhance the WL effect of GB in this model suggests the potential for complementation between these surgical and pharmacological treatments.
T-2284-P: Metformin Induces Mammary Tumor Regression in Rats on a High-Fat Diet

Allyson Checkley; Erin Giles, PhD; Elizabeth Wellberg, PhD; Susan Edgerton, MA; Pepper Schedin, PhD; Steven M. Anderson, PhD; Ann Thor, md; Paul S. MacLean, PhD;

Background

It is unclear whether the anti-diabetic drug metformin inhibits breast cancer growth by direct effects on cancer cells or indirectly via circulating systemic factors. To define clinically relevant mechanisms, a rat model of obesity and chemically-induced mammary carcinogenesis was used.

Methods

Rats were fed a high fat diet (from 5 weeks) to induce overfeeding/obesity (351+12g, n=14) and injected with N-methylnitrosourea (MNU, 60 mg/kg) at 8 weeks to induce mammary tumors. Tumors were monitored by manual palpation at weekly intervals from the time of MNU administration. Rats were randomly assigned to either a metformin (2mg/mL in drinking water, n=8) or control (water only, n=6) group after a minimum tumor volume of >1cm³ was reached. Treatment continued for 8 weeks, and tumors were collected for histochemical and biochemical analyses.

Results

At randomization, tumor multiplicity and burden were similar. At study end, 74% of tumors regressed with metformin versus 13.6% in the control group. There was no difference in new tumor development in either group. Within the metformin group, regressed tumors had significantly higher membrane expression of organic cation transporter OCT2 than tumors that progressed. Higher levels of activated AMPK and decreased signaling through mTORC1 were observed in tumors that regressed compared to tumors that continued to grow in the presence of metformin.

Conclusions

Metformin induces regression of mammary tumors in obese rats and may be dependent on OCT2 expression and disruption of mTOR as both were altered in tumors that decreased in size. These effects appeared to be direct, yet systemic effects on glucose and insulin regulation remain to be characterized.

T-2285-P: Low Protein-High Fat Diets Produce Divergent Effects on Energy
Balance, Body Composition and Hormone Secretion in Diet-induced Obese Rats

Rizaldy C. Zapata, DVM; Adel Pezeshki, PhD; Arashdeep Singh, BTech; Prasanth Chelikani, PhD;

Background

Protein restriction is often associated with increase caloric intake and weight gain. Diets moderately low in protein and high in carbohydrate promote hyperphagia. However, little is known of the effects of low protein-high fat diets on energy balance, body composition and hormonal responses.

Methods

Diet-induced obese OP-CD rats (n=32) were randomized to 4 diets with identical calories from carbohydrates (59%) but varying calories from protein and fat for 3 weeks: 1) very low protein (VLP, 1% protein, 40% fat), 2) low protein (LP, 5% protein, 36% fat), 3) moderately low protein (MLP, 10% protein, 31% fat) and 4) control (CON, 15% protein, 26% fat). Daily caloric intake (CI) and energy expenditure (EE) were recorded by the CLAMS system, and weekly body composition by MRI. A gut hormone panel was used to quantify meal-induced plasma hormone concentrations.

Results

Compared to CON: 1) VLP decreased CI by ~36% but LP and MLP increased CI by 18% and 20%, respectively. 2) VLP and LP constantly increased EE during the dark period. 3) VLP and LP decreased weights by 77% and 25%, respectively. 4) VLP and LP reduced lean mass by 43% and 21% and fat mass by 49% and 16%, respectively. 5) VLP and LP decreased the peak glucose-dependent insulinotropic polypeptide (GIP) secretions by 53% and 39% respectively, while trends for reduced leptin and amylin concentration were observed in VLP.

Conclusions

Low protein-high fat diets produce divergent effects on energy balance, body composition and gut hormones. Importantly, very low protein diets are hypophagic yet enhance energy expenditure whereas moderately low protein diets are hyperphagic without affecting energy expenditure. Funding: NSERC, ALMA

T-2286-P: Effects of Dietary Whey and Casein on Energy Balance and Behavioural Changes in Stroke-Prone Spontaneously Hypertensive Rats
Arashdeep Singh, BTech; Adel PezeshkI, PhD; Rizaldy C. Zapata, DVM; Ursula I. Tuor, PhD; Prasanth Chelikani, PhD;

Background

Diets enriched in whey and casein decrease weight gain; however, their cardiovascular effects are unclear. We investigated whether whey and casein improve energy balance and are protective against behavioural deficits associated with stroke in stroke-prone spontaneously hypertensive (SHRSP) rats.

Methods

In experiment-1, SHRSP rats (n=32) were randomized to 4 dietary groups: 1) control (CON; 14% kcal protein (7% whey and 7% casein), 33% fat), 2) whey (WHY; 40% whey, 33% fat), 3) casein (CAS; 40% casein, 33% fat) or 4) chow (CHW) for 10 weeks (wks). Measurements included behavioural assessment for stroke, blood pressure (BP), body weight (BW), food intake (FI), energy expenditure (EE), body composition, plasma hormones (MCP-1, leptin, PYY, insulin, amylin) and IP glucose tolerance tests. In experiment-2, following 4 conditioning trials, the preference for CON, WHY or CAS (n=8/group) diets was determined.

Results

Compared to CON: 1) WHY and CAS reduced FI by 24% and 16% for 3 wks; 2) WHY decreased BW by 6% and lean mass by 5%; 3) WHY reduced BP by 15% after 6 wks; 4) plasma hormones, EE, and glucose tolerance did not differ with WHY or CAS; 5) CHW had lower BW, BP and improved glucose tolerance. Importantly, 37% of CON but none of the WHY, CAS or CHW rats had sudden reduced motor behaviours or signs of morbidity. In conditioning-preference trials, WHY and CAS decreased FI by 25% and 22%, and preference by 91% and 67%, respectively.

Conclusions

Whey and casein decrease intake and are protective against onset of stroke-related behavioural deficits in SHRSP rats. Whey appears to be particularly effective in decreasing weight and blood pressure, and the whey-induced hypophagia may in part be due to reduced preference. Funding: ALMA, AIBio, AM

T-2287-P: Feeding Response to Moderately Low Protein Diets Is Mediated In Part by Serotonin Type-3 Receptors in Rats

Adel PezeshkI, PhD; Arashdeep Singh, BTech; Rizaldy C. Zapata, DVM; Nicholas Yee, N/A; Prasanth Chelikani, PhD;
Background

Moderately protein deficient diets increase food intake (FI) whereas very low protein diets decrease intake. Serotonin type-3 (5-HT3) receptors play a role in satiety effects of carbohydrates and lipids. We investigated the role of 5-HT3 receptors in the regulation of FI in rats fed low-protein diets.

Methods

Male obesity-prone (OP-CD) rats (n=8/group; ~ 155 g), were fed a high-fat diet for 10 days and then randomly allocated to 5 isocaloric diets (4.4 kcal/g) with egg albumin contributing to 20, 15, 10, 5 and 0% calories for 2 weeks (wks). The fat contributed to 33% of total calories for all groups. On day 8 of experiments, 30 min prior to feeding, all rats received an intraperitoneal injection of the saline or 5-HT3-receptor antagonist- ondansetron (1 mg/kg). Daily FI was monitored by the CLAMS system, body weight was recorded twice weekly, and body composition measured weekly by an MRI system.

Results

Compared to 15% protein (control) diet, 10% protein increased FI by 15-26% for 2 wks. The 5% protein diet induced a transient hyperphagia (9-26%) lasting a wk. The 0% protein diet decreased FI by 20-50% throughout 2 wks of the study. Ondansetron increased dark-period FI in rats on the 10% protein diet but did not affect intakes of other treatment groups. At 2 wks, 0% protein diet decreased weight, fat and lean mass by 37, 42 and 33%, and 5% protein diet decreased weight and lean mass by 14 and 15%, respectively.

Conclusions

Dietary protein deficiency produces differential effects on food intake. Very low-protein diets are hypophagic and moderately low-protein diets are hyperphagic. Serotonin type-3 receptor signaling is apparently essential for regulating intake on moderately protein deficient diets. Funding: NSERC, ALMA

T-2288-P: Effects of Weight Loss Via High Fat vs. Low Fat Alternate Day Fasting Diets on Free Fatty Acid Profiles

Vi Dam, BSc, RN;

Background

Cardiovascular disease risk is linked to excess body weight and elevated plasma free fatty acid (FFA) concentrations. This study examines how alternate-day fasting diets high or low in fat affect plasma FFA profiles in the context of weight loss, changes in body composition, and lipid profiles.

Methods
After a 2-week weight maintenance period, 29 women (BMI 30-39.9) between the ages of 25-65 followed an 8-week alternate-day fasting diet (ADF; 25% energy intake on fast days, ad libitum on feed days). The subjects were randomized to an ADF-HF (45% fat) diet or an ADF-LF (25% fat) diet. Body weight, BMI and waist circumference were assessed weekly and body composition was measured using dual x-ray absorptiometry (DXA). Total and individual FFA and lipid plasma concentrations were measured before and after weight loss.

**Results**

Body weight, BMI, fat mass, total cholesterol, LDL-C and triglyceride concentrations decreased (P<0.05) in both groups. Total FFA concentrations also decreased (P<0.001). In the ADF-LF group, reductions were found in several more FFAs than in the ADF-HF group. In the ADF-HF group only, FFA concentrations were positively correlated with waist circumference.

**Conclusions**

The macronutrient composition of a diet for weight loss with an ADF diet decreases FFA concentrations through potentially different mechanisms.

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**T-2289-P: A High-Fat Breakfast Enhances 24-h Fat Oxidation in Older Adults**

_Holly Resuehr, PhD; Laura Lee Goree, MS, RD, LD; Julie Locher, PhD; Molly Bray, PhD; Barbara A. Gower, PhD;_

**Background**

In mice, consumption of a high-fat meal vs. a high-carbohydrate meal early in the daily feeding period resulted in greater 24-h fat oxidation and better metabolic health. We examined whether the timing of intake of specific macronutrients in humans affected the daily profile of fuel utilization.

**Methods**

Participants were 30 healthy, sedentary 55-75 year old men and women with a BMI between 25-35 kg/m2. Each participant was randomized to receive either a high-fat (35%CHO:20%protein:45%fat) or high-CHO (60%CHO:20%protein:20%fat) breakfast for 4 weeks. All participants were counseled to eat a 'neutral' lunch, and to eat a dinner that had the opposite macronutrient composition of the breakfast, thus ensuring that 24-h diet composition was similar between groups. Whole-room indirect calorimetry was used to measure 24-h, resting, sleeping, and postprandial substrate utilization (RQ: Respiratory Quotient) at baseline and after 4 weeks of consuming the experimental diets.

**Results**
After 4 weeks, 24-hour RQ, lunch RQ, and dinner RQ were reduced (P<0.05) in the high-fat breakfast arm. In contrast, breakfast RQ increased, and dinner RQ decreased (P<0.05), in the high-CHO breakfast arm.

Conclusions

The macronutrient composition of breakfast has a lasting impact on substrate utilization. Consumption of a higher-fat, lower-CHO breakfast may reduce risk for metabolic disease.

T-2290-P: Lactate-Based Compound Containing Caffeine Effectively Decreases Fat Mass with Low Intensity Exercise Training

Takeshi Hashimoto, PhD; Takumi Yokokawa, BA; Kazuhiro Higashida, PhD;

Background

We examined whether a lactate-based compound containing caffeine, an activator of intracellular Ca2+ levels, could effectively elicit fat loss even with low intensity exercise, via increased fat mobilization and fatty acid oxidation.

Methods

Diet-induced obese (DIO) Fischer 344 male rats (13 weeks) were divided into sedentary control (Sed, n = 6), exercise training (Ex, n = 9), and lactate + caffeine supplementation with exercise training groups (LC, n = 9). Ex and LC rats were subjected to voluntary wheel running every other day for 5 weeks. Compound was orally administered to the LC rats every other day for 5 weeks.

Results

Food intakes were not different among the groups. Total running distance was not significantly different between Ex and LC rats. Body weight in the LC rats was significantly lower than that in the Sed rats (p < 0.01) and the Ex rats (p < 0.05). In addition, LC significantly decreased epididymal and scapula fat mass as compared to the Sed rats and the Ex rats. AUCs during an oral glucose tolerance test in the LC rats were significantly lower than that in the Sed rats (p < 0.05) and the Ex rats (p < 0.01).

Conclusions

These results suggest that administration of lactate-based compound containing caffeine can effectively decrease fat mass and improve glucose tolerance even with low intensity exercise training.
T-2291-P: Carbohydrate Overfeeding Causes Oxidative Stress

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Background

Nutrient surplus poses a strain on cellular metabolism and may contribute to the pathophysiological effects of obesity, including insulin resistance and diabetes. We tested the hypothesis that acute carbohydrate (CHO) overfeeding disrupts redox homeostasis and causes ER stress.

Methods

Healthy, non-diabetic obese (n=7; BMI=35.9 ± 3.8 kg/m2; M+SE) and lean (n=5; BMI=21.6 ± 0.4 kg/m2; M+SE) subjects consumed a eucaloric diet (70% CHO, 15% fat, 15% protein) for 1 week prior to the experiment. After an overnight fast, subject consumed bagels and glucose beverages (total CHO = 336 ± 34.9g; M+SE) over 1-2 h. Blood samples were collected at baseline and every 30 min over 4 hours for determination of insulin, glucose, and the GSH/GSSG ratio. Adipose tissue (AT) expression of ER stress genes including CHOP and XBP1s were determined from extracts obtained at baseline and 4-h post-CHO. Plasma redox potential (Eh) was calculated by the Nernst equation from GSH/GSSG.

Results

Glucose and insulin levels were higher in obese vs. lean (p<0.05). Plasma Eh increased over time for all subjects (-133.1 ± 4.3 mV to -114.7 ± 4.2 mV; M+SE, p<0.05) and was positively related to plasma insulin (r=0.26, p<0.05). ER stress gene transcripts were higher in obese vs. lean (p < 0.05). CHO overfeeding increased CHOP (p<0.05), which was more pronounced in obese vs. lean, though the group x time interaction was non-significant (p=0.09). XBP1s increased 1.4 fold in response to CHO overfeeding, but only in obese subjects (NS).

Conclusions

CHO overfeeding disrupts plasma redox homeostasis, indicative of oxidative stress. Limited data also suggest that excess CHO induces adipose tissue ER stress. Further research is warranted to determine whether the detrimental effects of nutrient surplus are more pronounced in obese vs. lean.
T-2292-P: Glucose and Insulin Response to Cephalic Stimulation of Sweetened Mouth Rinses

Keely Hawkins

T-2293-P: Hyperbaric Oxygen Therapy Increases Insulin Sensitivity in Overweight Men with and without Type 2 Diabetes

Leonie Heilbronn; David Wilkinson, FANZCA; Ian Chapman, MBBS PhD;

T-2294-P: Effect of Resistance Exercise Timing around a Meal on Metabolic Control in Type 2 Diabetics

Jill Kanaley, PhD; Timothy Heden, M.S.; Nathan Winn, BS; Andrea Mari, PhD;

Background

The best time to perform resistance exercise (RE) relative to dinner to improve metabolic control is unknown. This study compared the effect of pre-dinner RE to post-dinner RE on metabolic control in type 2 diabetics (T2D).

Methods

Thirteen T2D completed three trials in a random order in which they consumed a standardized dinner meal with 1) no RE (NoRE), 2) pre-dinner RE (RE→M), and 3) post-dinner RE beginning 45 min after dinner (M→RE). During each trial, blood samples were taken to measure glucose, triacylglycerol (TAG), acetaminophen (gastric emptying), endocrine responses, and mathematical modeling was used to assess Î²-cell function. Indirect calorimetry was used to measure post-dinner substrate oxidation.
Results

The post-dinner glucose iAUC was reduced (P<0.05) by 18% and 30% during the RE→M and M→RE trial, respectfully, compared to NoEX. No difference between exercise trials. The post-dinner total TAG iAUC was 92% lower (P<0.05) during M→RE compared to NoEX and RE→M, due to lower VLDL-1 TAG concentrations. RE→M and M→RE reduced the insulin iAUC by 35% and 48%, respectfully, compared to NoEX (P<0.05). RE→M and M→RE enhanced insulin clearance but M→RE also reduced insulin secretion. The GLP-1 iAUC was 49% lower (P<0.05) compared to NoRE and RE→M trials.

Conclusions

Gastric emptying, β-cell function, post-meal substrate oxidation, GIP, glucagon, and FFA were not different between trials. Post-dinner RE results in a better overall improvement in metabolic control compared to pre-dinner RE in T2D.

T-2295-P: Physiological and Metabolic Responses to a High-fat Meal Ingestion in Reduced Weight and Relapsed Weight Women: The Mind the Gap Study

Jacolene Kroff, PhD; Louise Clamp, BSc (Med) Honors Dietetics; David J. Hume, BSc; Estelle V. Lambert, PhD;

Background

Statistics reveal that 83% of those who successfully lose at least 10% of their initial body weight return to starting weight within 1 year after treatment. The aim of the present study was to explore for differences in resting and postprandial physiological responses among successful weight loss maintainers and weight loss relapsed individuals. Differences between these groups and weight stable BMI and age matched individuals with no history of weight loss may implicate specific physiological pathways for weight loss relapse.

Methods

56 women were recruited into 4 groups: reduced-overweight/obese subjects (RED, n=15) or BMI matched low-weight controls (LW-CTL, n=19), and relapsed-overweight/obese subjects (REL, n=11) or BMI matched high-weight controls (HW-CTL, n=11). Energy intake (EI), macronutrient intake, fasted and post-prandial metabolic rate (MR), substrate oxidation and thermic effect of feeding (TEF) were measured.

Results
No differences were found in average total daily EI, fasted or post-prandial MR and TEF among the 4 groups. RED, HW-CTL, REL ingested significantly less carbohydrates (% of total daily intake) compared to LW-CTL (P<0.02) and ingested significantly more fat compared to LW-CTL.

**Conclusions**

The metabolic homogeneity among groups implies that weight regain may be attributed to differences in psycho-behavioural factors rather than differences in metabolic profile. Indeed, between-group differences in macronutrient intake are evident suggesting that conscious behavioural modifications in dietary intake may play an integral role in successful weight loss efforts.

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**T-2296-P: Effect of Opuntia Ficus and Lycopersicum Esculentum Lipidic Extracts and Exercise in Oral Glucose Tolerance and Oxidative Stress Parameters in Wistar Rats**

*Patrick Mailloux-Salinas, BSc; Juventino Colado-Velazquez, PhD; Juana MarÃ­a de Lourdes Medina Contreras, PhD; Guadalupe Bravo, PhD;*

**Background**

Insulin resistance has been identified as one of the main causes of disease and a decisive factor in the development of metabolic syndrome. Natural extracts with antioxidant and glucose-modulating effects have been proposed as alternative treatments.

**Methods**

42 Male Wistar rats were randomized in 6 groups (n=7). The animals were fed with laboratory chow and water ad libitum for 28 weeks. An acute treatment with *Opuntia* 30% (5 ml/kg) and *Lycopersicum* 25% (2 ml/kg) was given and Oral Glucose Tolerance Testing (OGTT) was performed. The animals were subjected to subcronic treatment with the extracts at the same dose per day for 4 weeks; exercise was performed on a treadmill at speed of 10 cm/s for 20 min with 5 cm/s increments each week. At the end of the treatment, another OGTT was performed. The animals were sacrificed, blood and organs were obtained for MDA, total nitrites and histopathology analysis.

**Results**

Acute treatment with extracts significantly improved glucose tolerance compared to vehicle; Subcronic treatment and exercise also improved glucose tolerance in all conditions compared to vehicle. Nitrite levels were significantly decreased in groups treated with *Opuntia* and *Lycopersicum*. There were no significant
differences in MDA levels among the groups. *Opuntia* increased Langherhans islets and ß-cell number in pancreas while *Lycopersicum* did not have an effect, the extracts did not have effects in liver microarchitecture.

**Conclusions**

Both *Lycopersicum esculentum* and *Opuntia ficus* extracts have an effect in improving glucose tolerance, the mechanisms and specific active components have yet to be elucidated. These extracts are promising candidates for treatment of insulin resistance related disorders such as obesity.

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**T-2297-P: Effect of Topical Capsaicin and Exercise on Glucose Tolerance and Weight Loss in Female Wistar Rats with Hypercaloric Diet-Induced Obesity**

*Juana MarÃ­a de Lourdes Medina Contreras, PhD; Juventino Colado-Velazquez, PhD; Patrick Mailloux-Salinas, BSc; Fabian Meza-Cuenca, PhD; Guadalupe Bravo, PhD;*

**Background**

Insulin resistance is a metabolic disorder that occurs in obesity, and the prevalence of this disease is higher in females. Exercise and capsaicin have been reported to increase insulin sensitivity and reduce body weight. But it's unknown whether the combination can improve the individual effects.

**Methods**

28 Female Wistar rats were randomized into 8 experimental groups. Obese animals received hypercaloric diet (30% sucrose in drinking water) for 29 weeks; controls only received water, all were fed with standard chow. After obesity induction capsaicin groups were treated with 0.5 mL of 0.075% capsaicin cream on shaved abdominal skin daily for 18 days. Exercise groups were subject to a regimen of walking on a treadmill at 10 cm/s for 20 min with speed increase every 5 days. Water, food consumption and animal weight were measured daily. Oral glucose tolerance tests were performed prior and after treatment. Blood, and organs were excised for oxidative stress assays and histological analysis.

**Results**

Acute treatment with capsaicin, significantly improved glucose tolerance. Subchronic treatment with capsaicin as well as exercise showed a significant improvement of glucose tolerance and weight loss; however the combination of both reversed this effect. There were no significant differences in nitrite and MDA levels. We observed damaged pancreatic beta cells as well as hepatic steatosis in obese animals; treatment with capsaicin and exercise improved the microarchitecture.
Conclusions

Capsaicin and exercise alone have significant effects in improving glucose tolerance, pancreatic and liver microarchitecture and weight loss. This improvement is reversed when both treatments are combined.

T-2298-P: Intrinsic High Aerobic Capacity Is Associated with Reduced Food Intake, Weight Gain and Adiposity Following 1-Week High-Fat Diet Challenge

E M. Morris, PhD; Grace ME. Meers, BS; Lauren G. Koch, PhD; Steven L. Britton, PhD; John P. Thyfault, PhD;

Background

We previously reported a novel model in which rats were artificially selected over several generations to produce high and low capacity runners (HCR and LCR) with contrasting intrinsic aerobic capacities.

Methods

This divergent aerobic capacity produces increased whole-body fatty acid oxidation, decreased adiposity, and decreased peripheral tissue triacylglycerol (TAG) accumulation in the HCR compared to LCR rats. Herein we examined the hypothesis that increased aerobic capacity associated with increased fatty acid oxidation of the HCR rat would protect against weight gain and increased adiposity following a 1-week HFD challenge. HCR/LCR rats were fed open source low-fat diet (LFD, 10% fat, Research Diet) prior to initiation of a 45% fat or 60% HFD (Research Diet D12451 or D12492) for 1 week.

Results

Both HFDs resulted in significantly increased weight gain and body fat percentage in both HCR and LCR rats compared to LFD. However, HCR HFD-induced weight gain and increases in body fat percentage were less than the LCR. Both HCR and LCR significantly increased energy intake (EI) on the 45 and 60% HFDs, however, the HCR had a significantly reduced increase in EI compared to LCR, an effect that was driven by reduced food intake in the HCR compared to LCR during the HFD condition.

Conclusions
HCR rats are partially protected against 1-week HFD-induced weight gain and body fat percentage increase due in part to reduced HFD-induced increases in food intake and EI compared to LCR. These data suggest that intrinsic aerobic capacity plays a role in HFD-induced EI regulation.

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T-2299-P: The Effect of Weight Loss in Obesity on Brown Adipose Tissue Activity

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**Background**

Brown adipose tissue (BAT) is the tissue responsible for adaptive thermogenesis or modulation of energy expenditure during cold exposure and overfeeding. BAT activity is significantly higher in lean than obese individuals. However, it is not clear whether this is a cause or a consequence of obesity.

**Methods**

We studied 19 overweight and obese adults during overnight admissions in the Clinical Research Unit: 1) before weight loss, 2) immediately after a 10% weight loss during negative energy balance, and 3) following two weeks of weight stability at a 10% reduced body weight. Weight loss was achieved using a very low calorie diet (800 kcal/day). At each timepoint, testing included measurement of cold-activated BAT activity (18F-FDG PET-CT), core body temperature (CorTemp system, HQ Inc.), skin temperature (Thermochron iButtons), resting energy expenditure (REE; by indirect calorimetry), body composition (DEXA), and fasting levels of glucose, insulin, total T3, free T4, and leptin.

**Results**

A standardized uptake value (SUVmax) of $\geq 2$ g/mL was considered indicative of activated BAT. Before weight loss, 3 of 19 subjects (15%) had active BAT. At visit 2, during active weight loss, one BAT- subject became BAT+ and one BAT+ subject became BAT-, so that 15% had active BAT ($p=0.051$ for comparison with visit 1). At visit 3, at a reduced but stable weight, 6 of 19 subjects (31.6%) were BAT+ ($p=0.021$ for comparison with visit 2, NS vs visit 1). 4 of the 6 subjects who were BAT+ at visit 3 did not have BAT at visit 1. Mean SUVs did not change significantly with weight loss.

**Conclusions**

With weight stabilization at a 10% reduced body weight, the prevalence of BAT activity was significantly increased compared to during active weight loss. Further study is warranted to explore the potential role for BAT as a targetable modifier in obesity prevention and treatment.
T-2300-P: Acute Partial Sleep Deprivation Increases Body Weight Gain by Reducing Energy Expenditure in Rodents

Jennifer A. Teske, PhD; Jennifer A. Barbee, Bachelors of Science;

Background

Insufficient sleep promotes obesity and metabolic syndrome. In a validated rodent model of partial sleep deprivation (PSD) by random pre-recorded environmental noise, chronic PSD increased feeding and body weight gain. However, the initial acute feeding and body weight gain response to PSD was different. Thus, we hypothesized that acute PSD reduced energy expenditure.

Methods

To test this, 3-month old male Sprague-Dawley rats were surgically implanted with EEG/EMG electrodes connected to a radiotelemetry transmitter (F40-EET, Data Sciences International), to record future EEG/EMG and determine sleep/wake states. Following recovery (10-days) and acclimation (3-days) to indirect calorimetry chambers (Promethion-Continuous, Sable Systems International), rodents were subjected to acute PSD by pre-recorded environmental noise during the 12h light cycle followed by a 36-hour recovery period to resume normal sleeping patterns. Body weight was measured daily. Energy expenditure, physical activity and feeding were measured continuously.

Results

Body weight gain was significantly greater during acute PSD (P < 0.02) and remained elevated during recovery from PSD (P < 0.16) despite no similar food intake relative to before PSD. Total energy expenditure was significantly lower during acute PSD and during the recovery period relative to before PSD in both the light and dark cycles (P < 0.05 for all comparisons) relative to before PSD. Acute PSD reduced the overall amplitude of circadian rhythmicity in energy expenditure due to rest and physical activity.

Conclusions

These data suggest that enhancing non-resting energy expenditure would prevent weight gain due to acute PSD and underscores the significance developing therapeutic modalities for sleep deprivation-induced obesity.

Diana Thomas, PhD; Syeda Islam, Undergrad; Kofi A. Armah, BSC (In progress); Jenie Kunnipparampil, Diploma; Krishna Patel, BS; Leanne M. Redman, PhD; Carolyn Salafia, MS, MD;

Background

Because of the unreliability of self-reported intake little is known about the true influence of energy intake on weight gain during pregnancy.

Methods

Data from the Pregnancy, Infection, and Nutrition (PIN) study of 1368 women who had simultaneous measurements of age, pre-pregnancy weight, height, and gestational weight gain. These inputs were entered into a validated dynamic energy balance model that predicts weight gain during pregnancy.

Results

Average height (165.0 ± 6.9 cm), average age (29.4 ± 5.5), and average pregravid weight (69.8 ± 19.3 kg) were entered into a model that predicts weight gain from changes in energy intake during pregnancy. The intake to achieve the average weight gain (15.2 ± 6.0 kg) was back calculated. Self-reported energy intake was 2180.5 ± 926.6 kcal/d while predicted energy intake resulting from measured weight gain was 2960 kcal/d. Actual weight gain was above IOM recommendations while weight gain arising from self-report was below the IOM guidelines.

Conclusions

On average, women under-report their energy intake during pregnancy. The dynamic energy balance model can be used to examine the influence of intake on weight gain to set energy intake recommendations for women during pregnancy.
T-2303-P: Brown Adipose Activity Detection Threshold for PET/CT Images in Healthy Young Men

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Background

Brown adipose tissue (BAT) is a thermogenic tissue typically measured by 18F-fluorodeoxyglucose Positron-Emission Tomography-Computed Tomography (PET/CT). We compared mean BAT activity at different PET thresholds with resting energy expenditure (REE) at thermoneutral (TN) and cold room temperatures.

Methods

We measured REE in a room calorimeter in fourteen healthy men (age: 22.0±4.6 yr, BMI: 23.3±1.9 kg/m2, body fat: 20.4±5.5%) in standardized clothing (clo=0.36). They were exposed to TN (27.2±0.6°C) and a cold room temperature just above individually determined shivering threshold (20.8±1.8°C) for 5 hours on separate days. Cold-induced thermogenesis (CIT) was defined as the difference of the 2 conditions (EEcold - EETN). PET/CT was performed after the cold day and activated BAT was quantified using standard uptake value thresholds (SUVT) of 1, 1.5, and 2 mg/ml with the CT range fixed between -300 and -10 HU. BAT activity and volume were related to EEcold and CIT by multiple linear regression.

Results

After adjusting for fat-free mass and motion, mean BAT activity using SUVT value of 1 mg/ml was not significantly correlated with either EEcold or CIT; but using SUVT of 1.5 mg/ml, it was positively correlated to both EEcold (ΔY=1.6, adj. R²=0.402, p=0.044) and CIT (ΔY= 0.7, adj. R²= 0.394, p=0.046). Increasing the SUVT to 2 slightly improved both relationships (adj. R²= 0.407 and 0.400, respectively). However, the activated BAT volume was not related to EEcold and CIT regardless of SUVT.

Conclusions

While PET/CT is considered the current gold standard for detecting activated BAT in humans, there are few image analysis standards. As a sensitivity analysis, our data suggests that SUV thresholds of either 1.5 or 2 mg/ml better represent BAT activity related to CIT as compared to SUVT of 1 mg/ml.

T-2304-P: Carbon Isotopes in Obesity Research
Joseph Kehayias, PhD;

**Background**

We are currently using four carbon isotopes, two stable and two radioactive, in the research of obesity, metabolism, nutrient kinetics and body composition. With the advent of modern, highly sensitive analytical methods, carbon isotopes have become valuable research tools.

**Methods**

C-11 is used in positron emission tomography, mainly for brain functional imaging. An example is the study of dopamine receptors to understand the relationship between cerebral mechanisms and behavior leading to obesity. C-12 is measured in vivo in humans using neutron inelastic scattering for direct assessment of %fat and fat distribution. C-13 is used in conjunction with breath CO2 as a tracer to measure energy intake and metabolism of fatty acids and carbohydrates. C-14 is used safely in vivo as a tracer thanks to the development of accelerator mass spectrometry methods that have improved sensitivity for C-14 detection by 5 orders of magnitude. Wet biological sample analysis is also feasible.

**Results**

The first two isotopes are already well established and have produced results in brain function and fat distribution studies. Use of C-13 and micro-use of C-14 are relatively new and the results are limited to initial isotope kinetic studies. C-13 can be used with room calorimetry to test the 'set point' hypothesis for energy metabolism. The natural abundance of C-14 is a trillion times lower than C-13 and can be used for long-term metabolic, liver function, and fuel management studies.

**Conclusions**

Modern PET imaging, neutron scattering, mass spectrometry and laser resonance analytical methods have improved the utility of the four carbon isotopes. Future studies will include the metabolic details of nutrients and the investigation of energy regulation.

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T-2305-P: Whole-Organism Water Flux: A Neglected but Important Parameter in Metabolic Measurement

John Lighton, PhD;

**Background**

In metabolic phenotyping, water vapor is generally scrubbed from analyte air streams in order to eliminate its dilution effect on respiratory gas concentrations. This discards an important data modality, blurs temporal resolution and reduces the accuracy of indirect calorimetry measurements.
Methods

By Dalton's law of partial pressures, the diluting effect of water vapor can be mathematically corrected if water vapor and total gas pressures are accurately measured. Applying this insight from basic physics in a Promethion metabolic phenotyping system should remove unreliable gas scrubbers, eliminate CO2 capacitance in chilled condensers, decrease the response lag of the system and allow higher throughput and finer temporal resolution. I derive the necessary corrective equations, apply them to variable incurrent O2 concentration data, derive equations for direct measurement of metabolic water production in vivo, and test for reduced hydration errors in food mass-energy conversion.

Results

Contributions to incurrent O2 data variance from barometric pressure and water vapor partial pressure fluctuations (dataset from Vanderbilt MMPC, DK059637) were practically eliminated (99.94%) by application of the corrective equations that remove the dilution effect of water vapor without the use of chemical or thermal scrubbers. In another dataset, using whole-cage VH2O, metabolic water production was successfully calculated and food intake records were corrected for fluctuations in food hydration levels, improving energy intake accuracy.

Conclusions

Measuring rather than discarding water vapor data improves metabolic measurement accuracy, allows direct calculation of metabolic water production, improves the accuracy of energy intake measurements, and opens the door to non-invasive acquisition of other parameters such as respiratory water loss.

T-2306-P_DT: Resting Energy Expenditure in Obese Pregnant Women with Different Degrees of Adiposity

Marcela Perez-rodriguez, Jessica de Haene, MSc, PhD; Diana Castaneda Gameros, MSc; Naomi Stotland, MD; Elizabeth Murphy, MD, DPhil; Juan Talavera, MD, MSc, DrSc; Janet King, PhD;

Background

Some authors have stated that in healthy non-pregnant and non-lactating women, those with FM >40% of body weight have lower REE than women with FM <40% of body weight. It is unknown if the same effect occurs during pregnancy given the active metabolic role of adipose tissue during gestation.

Methods

We included 69 pregnant women with a BMI >= 25 at entry (20 wks). REE was measured by indirect calorimetry, air plethysmography was used to determine maternal body density and volume and those values were entered into pregnancy-appropriate formulas to estimate FM and FFM. All measurements were
performed at 20, 28 and 34 wks gestation. Our aim was to study the effect of different degrees of adiposity (body fat < or >=40%) on REE in the second (20 and 28 wks) and third trimesters (34 wks).

**Results**

REE ranged from 1112 to 2140 kcals/day at 20 wks, 1095-2468 at 28 wks and 1250-2600 at 34 wks in all participants. Unadjusted total REE was greater in the group with >=40% at 20 wks (1486 vs 1631 kcals/day, p<0.05); there were no differences between groups at 28 and 34 wks. When REE was adjusted for body weight and age there were no differences in REE between women with different degrees of adiposity. When REE was expressed as kcal/kg body weight, there were no differences for unadjusted or adjusted data at any time point.

**Conclusions**

It seems that in pregnancy the threshold of >=40% of body fat does not influence REE, and the higher REE observed in the women with more body fat reflects a higher energy expenditure of a heavier body independently of the degree of fat mass.

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**T-2307-P: Characterization of Hypothalamic Gene Expression in a Rat Model of Roux-en-Y Gastric Bypass**

**Pernille Barkholt; Philip J. J. Pedersen, DVM; Sarah Paulsen, PhD; Anders Hay-Schmidt, DSc; Niels Vrang, MD, PhD; Jacob Jelsing, MSC, PhD; Henrik B. Hansen, PhD;**

**Background**

Roux-en-Y gastric bypass (RYGB) promotes robust weight loss and resolution of type II diabetes. Here, we aimed at identifying adaptations in hypothalamic gene expression pattern of neuropeptides known to be involved in the homeostatic regulation of energy balance in a rat RYGB model.

**Methods**

Lean male Sprague-Dawley rats underwent either RYGB or SHAM surgery (n=9 per group). Body weight and food intake was monitored daily and animals were terminated 60 days post-surgery. Semi-quantitative in situ hybridization using 33P-labelled probes against AgRP, NPY, CART, POMC and MCH mRNA was applied to systematic uniform randomly sampled sections of the hypothalamus in the RYGB and SHAM animals, and in ad-libitum fed and food restricted Sprague-Dawley rats.

**Results**

RYGB led to a sustained 35% weight loss compared with SHAM. The expression of the orexigenic AgRP and NPY was significantly upregulated in the arcuate nucleus (ARC) of RYGB rats (by 83% and 95%
respectively) versus SHAM, whereas no changes were seen in the CART and POMC expression. A similar pattern was seen in food restricted versus ad-libitum fed rats. In the lateral hypothalamus (LHA) the expression of MCH was upregulated in food restricted versus ad-libitum fed animals, whereas RYGB did not alter MCH mRNA compared with SHAM.

Conclusions

RYGB leads to an upregulation of orexigenic AgRP/NPY expression in the ARC, but inhibits hunger associated MCH expression in the LHA. The data indicates that yet unidentified central mechanisms are triggered to overrule hunger-associated hypothalamic signaling after RYGB surgery.

T-2308-P: Using Induced Pluripotent Stem Cells to Investigate CNS Neuro-Molecular Phenotypes of Prader-Willi Syndrome

Lisa M. Cole; Carlos R. Sulsona, BS; Daniel Driscoll, MD, PhD; Dieter Egli, PhD; Rudolph L. Leibel, MD PhD;

Background

PWS is a syndromic obesity; 70% of PWS cases are caused by an ~5 Mb deletion on paternal 15q11.2-13. The maternal 15q11.2-13 is imprinted, thus, 5 MB deletion PWS patients are functionally null for twelve coding and non-coding genes. Causative gene(s) and mechanisms of CNS phenotypes remain unclear.

Methods

Efforts to understand central nervous system defects in PWS have been hindered by failure of PWS mouse models to fully recapitulate the human phenotypes, as well as limited access to relevant human biological material. The reprogramming of human fibroblasts to induced pluripotent stem cells (iPSC) enables novel approaches to PWS. PWS fibroblast lines were obtained from 3 patients with ~5 Mb deletions on 15q11.2-13. Fibroblasts were reprogrammed to iPSCs. PWS iPSCs and iPSC-derived neurons were investigated to determine if maternal methylation on 15q11.2-13 remained intact.

Results

Genes within the PWS region, including SNRPN and NDN, showed persistence of DNA methylation after iPSC reprogramming and differentiation to neurons. In both iPSC and iPSC-derived neurons, SNRPN and SNORD116, remained unexpressed. These data indicate that PWS iPSC retained maternal methylation status in the PWS region. PWS iPSC-derived neurons express neuronal markers including MAP2, TUJ1, Nefl, and NES. iPSC-derived neurons from PWS patients show a 58% decrease in mean cell body size and a 49% decrease in the number of mean processes per cell.
Conclusions

Because PWS imprinting and gene expression patterns were preserved after reprogramming, it may be anticipated that PWS iPSC-derived neurons may be used to model PWS in vitro. Qualitative and quantitative aspects of the transcriptional repertoire of these cells are under investigation.

T-2309-P: Î²3 Agonist-Induced Lipolysis Activates Sensory Nerves in White Fat

John T. Garretson; Timothy J. Bartness, PhD;

Background

Sensory nerves innervating fat project to brain sites controlling peripheral metabolism. White adipose tissue (WAT) lipolysis is principally initiated via the sympathetic nervous system (SNS); therefore, we tested if lipolysis increases trigger increases in WAT sensory nerve activity.

Methods

Nine Siberian hamsters were anesthetized, nerves innervating left and right inguinal WAT (IWAT) were resected, cut, and decentralized distal trunks attached to electrodes for afferent nerve electrophysiological multiunit activity measures. CL316,243, a specific Î²3 receptor agonist, was infused into IWAT simultaneously with saline into the contralateral fat pad to test if Î²3 agonism-induced lipolysis increases IWAT afferent nerve activity using each animal as its own control. Fat pad-specific spike frequency was assessed and analyzed as percent change from baseline activity over time compared with saline vehicle-injected IWAT. Body temperature was maintained at 36-37°C.

Results

CL316,243 (0.2ng/kg) trigged rapid (<10 min) increases in IWAT afferent nerve multiunit activity nearly 2-fold versus the saline vehicle control in the contralateral IWAT. This effect waned after 20 min, and did not affect heart rate or blood oxygen saturation at any time point.

Conclusions

These results indicate that direct stimulation of WAT lipolysis appears to be sensed by WAT sensory spinal nerves in a rapid-onset, but transient fashion. Future experiments testing afferent nerve sensitivity to the byproducts of lipolysis (e.g. glycerol, free fatty acids) are in progress.
T-2310-P: Brain-Derived Neurotrophic Factor (BDNF) in the Regulation of Human Energy Homeostasis: Body Composition and Energy Expenditure (EE) in Human BDNF Haploinsufficiency (BDNF +/-)

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Background

Pair-feeding experiments in Bdnf+/- mice suggest BDNF primarily regulates energy intake. However, VMH BDNF injections increase EE in wild-type rats, indicating a potential role for BDNF in regulating EE. The EE of humans with BDNF haploinsufficiency (BDNF +/-) has not been previously examined.

Methods

Deletion boundaries were determined by oligonucleotide array comparative genomic hybridization in 54 patients with WAGR/11p deletion syndrome (age 13.0 +/- 8.3 y; 44% female; 87% non-Hispanic White). Body composition was assessed by dual-energy X-ray absorptiometry. Parents completed a hyperphagia questionnaire. Resting energy expenditure (REE) was measured by indirect calorimetry after an overnight fast; total energy expenditure (TEE) was determined over 7 days using doubly-labeled water. Patients with deletions causing BDNF haploinsufficiency (+/-) and deletions sparing BDNF (+/+) were compared by ANCOVAs (covariates: age, sex, race, body composition; adjusted means shown in results).

Results

BDNF +/- (n=30) and BDNF+/+ (n=24) subjects were similar for age (p=0.65), sex (p=0.85), race (p=0.44), and lean body mass (p=0.25). BDNF +/- subjects had significantly greater BMI-Z (1.68 +/- 0.11 vs. 1.14 +/- 0.19, p=0.01), percent body fat (41.1 +/- 2.8 vs. 35.6 +/- 3.5%, p=0.02), and hyperphagia score (25.4 +/- 1.5 vs. 17.1 +/- 1.8, p=0.002). After adjusting for differences in body composition, BDNF +/- and BDNF+/+ did not differ significantly in REE (p=0.30) or TEE (p=0.48).

Conclusions

Human BDNF haploinsufficiency is associated with greater adiposity and hyperphagic behaviors. EE was similar in patients with and without BDNF haploinsufficiency. The obesity associated with human BDNF insufficiency appears to be driven primarily by hyperphagia rather than diminished EE.
T-2311-P: Effect of GALP on Lipid Metabolism and Body Weight Regulation

Satoshi Hirako; Haruaki Kageyama, PhD; Fumiko Takenoya, PhD; Nobuhiro Wada, MS; Ai Kimura, no graduate; Mai Okabe, MS; Seiji Shioda, PhD;

Background

Galanin-like peptide (GALP), a 60-amino acid neuropeptide that was originally isolated from porcine hypothalamic extracts and is well known as a neuropeptide regulating feeding behavior and energy metabolism. In this study, we examined anti-obesity effect of GALP by focusing on lipid metabolism.

Methods

Mice were i.c.v. injected saline or GALP (2nmol), and removal of the liver and adipose tissue at 100 minutes after the administration of GALP. Then, we studied hepatic and adipose tissue lipid metabolism related gene expression by use of real-time quantitatively PCR analysis. Next, mice were fed high-fat diet to induce obesity, and were i.c.v. injected GALP once. Moreover, to investigate the anti-obesity effect of chronic administration of GALP, mice were fed a high fat diet to induce obesity and were intranasal administrated of GALP for 2 week.

Results

The respiratory exchange ratio (RER) of GALP group was lower than that of the saline group at 1 hour after administration. In the GALP-treated group, fatty acid synthesis-related gene mRNA levels were decreased. In obese mice, RER of GALP group was lower than that of the saline group, and the hepatic fatty acid synthesis-related gene mRNA levels were decreased in the GALP group compared with the saline group. In chronic infusion study, the body weight gain was decreased by GALP treatment.

Conclusions

The present study indicates that GALP stimulates the hepatic lipid metabolism and anti-obese effect of GALP may be caused by anorexigenic effect and improvement of lipid metabolism in the liver with both lean and obesity mice.

T-2312-P: Synphilin-1 Binds ATP and Regulates Intracellular Energy Statues

Tianxia Li, MD; Jingnan Liu, PhD; Timothy H. Moran, PhD, FTOS; Wanli W. Smith, PhD;

Background
Recently studies have suggested that synphilin-1, a cytoplasmic protein is involved in the regulation of energy homeostasis. Overexpression of synphilin-1 in neurons results in hyperphagia and obesity phenotypes in animals models. However, the mechanism is still unknown.

**Methods**

Here we used cell models and biochemical approaches to investigate the cellular functions of synphilin-1.

**Results**

Synphilin-1 was pulled down by ATP-agarose beads, and addition of ATP and ADP reduced this binding, indicating that synphilin-1 binds ADP and ATP. Synphilin-1 also bound GMP, GDP and GTP but with a lower affinity than it bound ATP. In contrast, synphilin-1 did not bind with CTP. Interestingly, overexpression of synphilin-1 in HEK293T cells significantly increases cellular ATP levels. Genetic alteration to abolish predicted ATP binding sites of synphilin-1 or knockdown of synphilin-1 by siRNA reduced ATP to a baseline level.

**Conclusions**

Together, these data demonstrate that synphilin-1 binds and regulates the cellular energy molecule, ATP. These findings provide a molecular basis for understanding the actions of synphilin-1 in regulating energy homeostasis.

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**T-2313-P: Synphilin-1 Activates AMPK Signaling in Fly and Mouse Obesity Models**

_Tianxia Li, MD; Jingnan Liu, PhD; Dejun Yang, MD; PhD; Alexander Moghadam, BA; Pique Choi, BA; Xueping Li, PhD; Sheng Bi, MD; Timothy H. Moran, PhD, FTOS; Wanli W. Smith, PhD;

**Background**

Synphilin-1 is a cytoplasmic protein with enriched expression in neurons. Our previous studies have suggested that synphilin-1 is involved in the regulation of energy homeostasis. Over-expression of synphilin-1 in neurons induces hyperphagia and obesity phenotypes in both fly and mouse models.

**Methods**

Here we demonstrate that the expression of synphilin-1 increases AMPK phosphorylation.

**Results**
Synphilin-1 is associated with AMPK in co-expression cells and in mouse brains. Knockdown of AMPK in transgenic flies expressing human synphilin-1 reduced food intake and prevented body weight gain. In human synphilin-1 transgenic mice, there was a significant increase of p-AMPK in hypothalamus. In normal non-transgenic mice, fasting increases and refeeding decreases hypothalamic AMPK phosphorylation. In contrast, fasting and refeeding has only slight effects on AMPK phosphorylation in synphilin-1 transgenic mice.

**Conclusions**

Taken together, these findings demonstrate a novel cellular function of synphilin-1 in the maintenance of energy homeostasis.

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**T-2314-P: A Novel BDNF Gene Mutation in an Obese Patient Presenting Eating Disorder**

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**Background**

Brain-derived neurotrophic factor (BDNF) has been found to play a fundamental role in energy homeostasis. In humans, deletions and chromosomal rearrangements leading to BDNF haploinsufficiency have been associated to hyperphagia, obesity and cognitive and/or behavioral impairment.

**Methods**

With the Diagnostic and Statistical Manual of mental disorders version IV (DSM-IV), we selected 76 subjects (74 female and 2 male) with a diagnosis of eating disorder (45 Binge eating, 8 anorexia nervosa, 23 bulimia nervosa). After informed consent, we performed genetic screening of Melanocortin 4 receptor (MC4R) and BDNF coding sequences by direct sequencing using BigDye terminator chemistry. 100 healthy subjects were enrolled as controls. The two variants identified in the BDNF gene that were then cloned in pcDNA3.3 in order to evaluate their cis/trans position.

**Results**

We identified a new genetic variant in BDNF gene: this variation, G31V, was present in an heterozygous state in a 26 years-old female presenting early-onset obesity (BMI= 38.11 Kg/m2) and Binge Eating Disorder associated to a pharmacologically treated major depressive disorder. The G31V missense mutation was absent in 100 control subjects and in silico analysis through SNAP and SIFT algorithms predicted this aminoacid change as NON-tolerated. In the same patient was also present the variation V66M that resulted to lie on the other allele.
Conclusions

We describe a patient presenting obesity, eating disorder and depression who is compound heterozygous for a newly described G31V mutation and the common polymorphism V66M. Both variants are located in the pro-peptide and functional studies are ongoing to evaluate implications on protein processing.

T-2316-P: Visceral Fat and Fat Mass are Associated with Brain Volumes in Middle-Aged Adults

Deborah Schwartz; Melissa M. Pangelinan, PhD; Charlie Foster, BSc; Bruce Pike, PhD; Louis Richer, PhD; Zdenka Pausova; TomÁ; Paus, MD, PhD;

T-2317-P: Spexin Analogues Bind to Galanin Receptors, but Do Not Decrease Food Intake or Body Weight in Diet Induced Obese Mice

Kirsten Raun, MD; Birgitte S. Wulff, PhD; Johan F. Paulson, PhD; Jacob Kofoed, PhD;

Background

Spexin is a novel highly conserved, 14 amino acid amidated neuropeptide interacting with GALR2 and GALR3 receptors. It is expressed both centrally and peripherally suggesting an array of functions as evidenced by reports of effects on appetite, nociception, cardiovascular, and renal function.

Methods

The in vitro activity for spexin and a fatty acid acylated spexin analogue on GALR2 receptors were determined by binding to cell membranes expressing the GALR2 receptor and by a calcium mobilization assay at Discoverx Leadhunter services. Spexin and the spexin analogue were tested in diet induced obese (DIO) male C57BL6j mice. The average bodyweight of the mice were 41 g with a standard deviation of 2.9 g. Groups of n=8 mice were dosed once daily 30 min before onset of dark with vehicle spexin (70 ug/kg), spexin analogue (2 mg/kg) and comparator the GLP-1 analogue liraglutide (1 mg/kg). Food intake was monitored continuously for 4 days in a BioDAQ system and bodyweight was monitored daily.
Results

Spexin and the spexin analogue were activating the GALR2 receptor with similar potency as galanin. In the binding assay galanin was more potent than spexin and the analogue, that both had similar binding affinity. In DIO mice the comparator liraglutide reduced food intake with more than 50% during the entire test period. This resulted in a bodyweight loss of 11% compared to vehicle treated mice. In contrast to this neither spexin nor the spexin analogue resulted in any decrease in food intake or bodyweight.

Conclusions

Despite functional activity and binding of spexin and the spexin analogue to the GALR2 receptor, the compound did not cause decrease in food intake or bodyweight in DIO mice. Further studies are needed to clarify the physiological role of spexin.

T-2318-P: Estrogen Receptor-Î± in Medial Amygdala Neurons Regulates Body Weight in Both Genders

Pingwen Xu, PhD; Xuehong Cao, MD, PhD; Liangru Zhu, MD; Fang Zou, PhD; Yongjie Yang, PhD; Kenji Saito, PhD; Xiaofeng Yan, MD, PhD; Antentor Othrell Hinton Jr., BS; Hongfang Ding, MD; Yan Xia, PhD; Chunmei Wang, PhD; Chunling Yan, MD; Yong Xu, PhD;

Background

Brain estrogen receptor-Î± (ERÎ±) prevents obesity in both genders. However, the critical ERÎ± neural populations regulating body weight remain to be fully illustrated. We hypothesized that the medial amygdala (MeA) is an important brain site where ERÎ± mediates effects of estrogens on body weight.

Methods

Co-localization of ERÎ± and singly-minded-1 (SIM1) was first examined in the brains. We then recorded the electrophysiological responses of MeA SIM1 neurons to propyl pyrazole triol, an ERÎ± specific agonist. Cre-Lox recombination was used to generate male and female mice lacking ERÎ± only in MeA SIM1 neurons. In these mice, energy expenditure and physical activity were recorded on chow, while food intake and body weight was characterized on both chow and HFD. We also generated mice with ERÎ± over-expressed only in the MeA, and characterized their body weight on HFD. Finally, the body weight-lowering effects of GLP-1-estrogen conjugate and GLP-1 were examined in mice with diet-induced obesity.

Results

Here we showed that SIM1 neurons in the MeA express ERÎ± and are activated by the ERÎ± agonist. Deletion of ERÎ± from MeA SIM1 neurons causes hypoactivity and obesity in both male and female mice.
fed with regular chow. Further, loss of ERÎ± in MeA SIM1 neurons increased susceptibility to DIO selectively in males but not in females, while over-expression of ERÎ± in the MeA partially prevents DIO in male mice. Finally, we showed that anti-obesity effects of the GLP-1-estrogen conjugate are partly mediated through ERÎ± in MeA SIM1 neurons.

**Conclusions**

Collectively, we demonstrate that ERÎ± in MeA SIM1 neurons regulates physical activity and energy balance in both genders. This ERÎ± function is an important defending mechanism against DIO in males.

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**T-2319-P: Molecular Mechanism of the Intracellular Segments of the Melanocortin-4 Receptor in NDP-MSH Induced Biased Signaling**

_Yingkui Yang, MD., PhD; Vinod Mishra, PhD; Min Chen, MD; Reed Dimmitt, MD; Carroll M. Harmon, MD, PhD;_

**Background**

The melanocortin-4 receptor (MC4R) plays a key role in the regulation of food intake and body weight. Different MC4R agonists can activate cAMP, calcium or RK1/2 distinct signal pathways. In this study, we examine the molecular basis of MC4R responsible for different ligand mediated biased receptor signaling.

**Methods**

Methods: The third intracellular loop mutation and partial C terminal deletion of the MC4R were constructed. The entire coding region of the mutated receptors was sequenced to confirm that the desired mutation sequences were present. Student t test was used for statistical analysis, with \( p < 0.05 \) considered to be statistically significant.

**Results**

1). Cells expressing MC4R were treated with MC4R agonist NDP-MSH and cAMP production and ERK1/2 activity were measured. NDP-MSH is able to activate MC4R-WT by increasing cAMP production and enhancing ERK1/2 activity. The partial C terminal deletion of the MC4R did not alter NDP-MSH mediated cAMP production and ERK1/2 activity; 2). However, the mutation of MC4R third intracellular loop, the behavior of ERK1/2 activity mediated by agonist is differentiated. NDP-MSH was able to increase cAMP production but not increase ERK1/2 activity.

**Conclusions**
our findings suggest that the C terminus of the MC4R is not involved in agonist mediated cAMP and ERK1/2 signaling. The third intracellular loop plays an important role in NDP-MSH mediated ERK1/2 signaling; suggesting that third intracellular loop of MC4R plays an important role in peptide agonist NDP-MSH mediated biased receptor signaling.

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**T-2320-P: Molecular Basis of MC2R Responsible for Ligand Selectivity**

*Yingkui Yang, MD., PhD; Vinod Mishra, PhD; Min Chen, MD; Reed Dimmitt, MD; Carroll M. Harmon, MD, PhD;*

**Background**

The adrenocorticotropic hormone (ACTH) receptor, known as the melanocortin-2 receptor (MC2R), plays an important role in regulating adrenocortical function. The overproduction of ACTH, such as Cushing's disease, ectopic ACTH syndrome and congenital adrenal hyperplasia, can result in obesity, excessive morbidity and mortality. At present there is no effective medical treatment that would directly block the action of ACTH. MC2R is therefore, a potential therapeutic target for adrenal disorders. In this study, we examined the molecular basis of MC2R responsible for ligand activity.

**Methods**

ACTH analogues were synthesized. The chimeric receptors were constructed. The entire coding region of the mutated receptors was sequenced to confirm that the desired mutation sequences were present. Student t test was used for statistical analysis, with $p < 0.05$ considered to be statistically significant.

**Results**

1) substitution of Phe7 with DPhe7 or DNal (2')7 in ACTH1-24 caused a significant decreased in ligand activity. Substitution of Phe7 with DNal (2') in ACTH1-24 did not switch ligand from agonist to antagonist at MC2R; 2) Substitution of Phe7 with DPhe7 in ACTH1-17 resulted in the loss of ligand activity. 3) Molecular analysis of the MC2R indicates that only substitutions of TM3 of the MC4R with MC2R resulted in decrease in ligand activity.

**Conclusions**

Our results suggest that Phe7 in ACTH is important for ligand selectivity and the TM3 of the MC2R is crucial for the ACTH analogue potency. Our results provide the molecular basis of MC2R for the development of selective MC2R antagonists for the treatment of adrenal disorders.
T-2321-P: The Differential Roles of Circadian Gene Bmal1 in Regulating Food Intake and Body Weight Gain in Male and Female Mice

Fang Zou, PhD; Yan Xia, PhD; Xuehong Cao, MD. PhD; Chunmei Wang, PhD; Yong Xu, PhD;

Background

Recent studies have shown that circadian disruption caused by shift work or sleep disorders substantially contribute to obesity epidemics. However, the mechanisms for this connection are largely unknown and interventions to treat or prevent metabolic dysfunctions by circadian disruption are limited.

Methods

In this study, we investigated the role of circadian clock located in the ventral medial hypothalamic nucleus (VMH) in obesity, using the Bmal1lox/lox/SF1-Cre mice which have lacked the circadian gene Bmal1 in SF1 neurons (the majority neuronal population exclusively expressed in VMH). Housing these transgenic (TG) and their corresponding wild type (WT) mice under either constant light or normal Light-dark condition for 10 weeks, we measured their body weight and food intake weekly. At the end of the 10 weeks housing, we also measured fat mass by quantitative nuclear magnetic resonance (QMR), then sacrificed them and collected all adipose tissues.

Results

We found that the male TG mice had larger food intake and gained more body weight in both circumstances, compared to WT mice; however, the food intake and body weight gain in female TG mice were not different from that of the WT females in neither conditions. QMR results indicate that the male, but not female, TG mice had significant higher fat mass than their WT control. In addition, the weight of brown adipose tissue, inguinal white adipose tissue, gonadal white adipose tissue of these male TG mice were all significantly higher than WT mice.

Conclusions

These results indicate that circadian rhythm in VMH may be essentially involved in food intake behavior and body weight homeostasis only in males. Whether this effect is mediated by regulating the transcription of metabolic-related gene is under investigation.
T-2322-P: Family Cost of Participation in a Stage 3 Hospital-based Weight Management Program

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Background

Few studies have reviewed the costs for families to participate in comprehensive multidisciplinary intervention (Stage 3) weight management programs. The purpose of this study is to determine the total costs to families who participated in the six month Teens Working on Wellness (Teen WOW) program.

Methods

This is a retrospective chart review of 42 patients who were referred to or participated in Teen WOW between January 1, 2011 and December 31, 2011. Insurance charges, residuals billed to patients, and co-pays were obtained for each provider (physician, dietician, psychologist, or physical therapist) the patient saw in clinic. Other associated costs, such as the cost of parking and cost of gas, based on distance traveled from home zip code to the medical center, were also determined.

Results

There were a total of 312 appointments attended by all participants in the Teen WOW program. Of the 42 patients included in the study, 55% had Medicaid, 29% had CHIP, and 17% had private insurance. Overall total costs for families with private insurance, CHIP, and Medicaid were, $249.72, $103.91, and $75.31 respectively. Those with private insurance had a higher percentage of physician visits than Medicaid or CHIP, however Medicaid and CHIP patients had more mental health and physical therapy appointments than private insurance.

Conclusions

It is essential to consider costs for families who are participating in Stage 3 interventions as excessive out of pocket cost may prevent involvement in these programs.

T-2323-P: Body Composition from Age 3 months to 6 years of Children Born to Lean, Overweight and Obese mothers
Background

The association between higher maternal pre-gravid body mass index and greater risk of later life obesity in the offspring has been hypothesized to be mediated in part via developmental programming. However, most studies have relied on cross-sectional analyses and anthropometric data thus far.

Methods

We prospectively investigated the association between self-reported maternal pre-gravid BMI and offspring body composition at ages 3, 6, 9, 12, 24, 36, 48, 60 and 72 months in 328 mother-infant pairs while controlling for gestational age, birth weight, sex, race and early infant feeding. Body composition was assessed using Dual-energy X-ray Absorptiometry (Hologic QDR 4500 with discovery upgrade, Bedford, MA) using the infant software (3-12 months) and the pediatric software (>=24 months).

Results

Significant differences were found in fat mass (FM), fat free mass (FFM), trunk FM and peripheral FM among the three groups, demonstrating higher adiposity in offspring born to obese mothers throughout childhood (P<0.05). A strong sexually dimorphic effect emerged demonstrating that boys (N=160) born to obese mothers have greater body adiposity (total and regional) and lower %FFM throughout the first 6 years life (P=0.0011); whereas, girls (N=168) %FM and %FFM did not differ between the maternal BMI groups (P=0.2350).

Conclusions

Results also suggest that boys born to obese mothers gain significantly greater adiposity after age 2 years compared to boys born to lean or overweight mothers. These data are consistent with numerous experimental studies demonstrating maternal programming has a stronger effect in male offspring.

T-2324-P: An Adolescent Bariatric Surgery Program: A Review of the Short-Term Outcomes

Sigrid Bairdain, MD; Nicole Kissane-Lee, MD EdM; Bradley C. Linden, MD; Nirav Desai, MD;

Background

The current estimates of the prevalence adolescent morbid obesity and severe morbid obesity are 21% and 6.6%, respectively. Obesity, if left untreated, may result in a variety of comorbid conditions. Similar to adults, those comorbid conditions include: 1) hypertension; 2) insulin resistance and type II diabetes
mellitus; 3) obstructive sleep apnea; 4) hyperlipidemia; 5) polycystic ovarian syndrome (PCOS); and, 6) depression and anxiety. Thus, we aimed to describe a cohort of adolescent patients undergoing bariatric surgery to: 1) describe their surgical outcomes 12 months following surgery; and, 2) outline a model for an adolescent multidisciplinary bariatric surgery program.

**Methods**

We reviewed all adolescents, who participated in our bariatric surgery multidisciplinary program from January 2010 to December of 2013. Patients were included if they had at least 12 months follow-up following their surgery. Adolescents were evaluated by a multidisciplinary team consisting of a surgeon, pediatric gastroenterologist, dietitian, psychologist, and licensed social worker; each clinic visit was tailored to the individual patient. The number of preoperative clinical visits and time to surgery, anthropometrics, clinical variables and complications were recorded. Main outcome measure was the percentage excess body mass index (%EBMIL) lost.

**Results**

From January 2010 to December 2013, data from 11 patients were analyzed. Ninety percent (n=10) were female. Median age at surgery was 17 years (range: 14-20 years). 45% had insulin resistance and 100% had depression and anxiety. Median time to surgery was 6 months. Median number of visits per specialist was: Surgeon: 2 visits (range 2-4 visits); Pediatric Gastroenterologist: 5 visits (range 4-8 visits); Dietician: 6 visits (range: 3-11 visits); and, Licensed Social Worker: 4 visits (range 3-5 visits). Median preoperative body mass index (BMI) was 48.2kg/m2 (range: 40-58.2kg/m2). All patients underwent a laparoscopic Roux-en-Y Gastric Bypass (RYGB) and 45% (n=5) had a concomitant hiatal hernia repair. Median length of stay was 3 days (range: 2-4 days). There were no complications. At 1 year follow-up, median %EBMIL was 66.7% (range: 14.5%-92%) and all had resolve of their insulin resistance.

**Conclusions**

Adolescents followed in a multidisciplinary bariatric surgery program showed an improvement in their BMI, clinical conditions, and suffered no complications. Future studies on a large scale are needed to show a continued improvement in their medical and anthropometric profiles.

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**T-2325-P: Vitamin-D and Risk Factors of Cardiovascular Disease: Effect of Physical Activity-Based Lifestyle Only Intervention in Obese Post-Pubertal Children**

*Donald George, MD; Seema Kumar, MD; Jobayer Hossain, Md, PhD; Prabhakaran (babu) Balagopal, PhD;*
Background
Recently Vit-D deficiency has been suggested as a potential risk factor for cardiovascular disease (CVD) in adults. Little is known about the cardiovascular implications of obesity-related Vit-D deficiency and the effect of lifestyle-only interventions on its circulating levels in children.

Methods
The relationship between serum 25-hydroxyvitamin D [25(OH)D] and risk factors of CVD and the effect of a 3-month randomized lifestyle-only intervention on serum 25(OH)D in relation to risk factors of CVD were assessed in adolescents. A total of 21 adolescents (14-18 yr; Tanner stage>IV), 6 normal weight and 15 obese (BMI percentile < 85 and >95 respectively) were studied. The obese adolescents also underwent a randomized controlled 3-mo physical activity-based lifestyle only intervention. Baseline and post-intervention circulating levels of 25(OH)D (LC MS-MS), adiponectin, leptin, high sensitivity c-reactive protein, interleukin-6, glucose, insulin and body composition (DEXA) were measured.

Results
25(OH)D was lower (p<0.001) in the obese vs. lean adolescents. Correlations between serum 25(OH)D and risk factors of CVD (p<0.05 for all) persisted even after adjusting for fat mass (R2=0.74; p=0.001). Post-intervention improvements in risk factors of CVD (p<0.05 for all) and a non-significant increase (~32%; p=0.08) in 25(OH)D were observed, but the magnitudes of change in 25(OH)D and risk factors of CVD were unrelated.

Conclusions
Taken together, the modest increase in 25(OH)D post-lifestyle-only intervention and the favorable CVD risk profile merit future studies to understand the potential synergistic and/or additive effects of Vit-D supplementation in conjunction with physical activity in Vit-D deficient obese children.

T-2326-P: If You Build It, Who Will Come? Characteristics of Recruitment Source Patients and Enrolled Children in CDC-Sponsored Texas Childhood Obesity Research Demonstration (CORD) Project
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Background

Despite high prevalence of childhood overweight/obesity, recruiting to obesity intervention programs, especially among diverse, low-income populations, can be difficult. We describe a recruitment population from healthcare clinics in Texas CORD and compare it with referred and enrolled patients.

Methods

Designated clinics were the sole referral sources to a study that randomized children with BMI >= 85th percentile in 3 age groups (2-5 yr, 6-8 yr, 9-12y) to a 12-month community program (MEND/CATCH) vs. clinic-based care (Next Steps). De-identified electronic health record (EHR) data from all well child visits (WCV) for children ages 2.0 to 12.9 years Apr 2012-Mar 2013 in 5 Houston clinics were used to describe the healthcare recruitment cohort, including demographic characteristics and overweight status. The age, gender, and enrollment outcome of referred patients were tracked. We examined reasons for not enrolling and also the demographic characteristics of enrolled children.

Results

In 5 Houston clinics, WCVs from EHR numbered 6436 for 2-5 yr, 2787 for 6-8 yr, 3145 for 9-12 yr. Percent with BMI >= 85th %ile was 24.0, 37.3, & 44.4% respectively. About 65% had Medicaid/CHIP. Referrals to CORD in Houston and Austin numbered 881, 601, & 713 for the 3 groups. Percent of referrals enrolled were 20.5, 31.1, & 26.4%. Reflecting the healthcare source, 86% enrolled were Hispanic, balanced by gender. Among referred, 51.0, 40.3, & 30.0% declined enrollment or did not respond to contact efforts; the remainder did not meet study criteria.

Conclusions

In clinics with high prevalence of overweight/obesity (OW/OB), providers referred about 1/4 estimated OW/OB children in all age groups. However, children 2-5 yr had lower enrollment rate. Enrollment could be influenced by level of parent concern and barriers related to schedule & location.

T-2327-P: Agents of Change: Identifying Collateral Effects of Maternal Weight Loss on Child Weight

Katherine W. Bauer, PhD; Colleen Tewksbury, MPH, RD, LDN; Andrew Pool, MSc; Stephanie Vander Veur, MPH; Alexis C. Wojtanowski, BA; Gary Foster, PhD;

Background

Maternal behavior is a key determinant of children's obesity risk. Engaging mothers in behavioral weight loss has the potential to positively affect children's obesogenic behaviors and weight trajectories. However, the collateral effects of maternal weight loss on children are not well understood.
Methods

A pilot study was conducted among 17 overweight/obese mothers (mean body mass index (BMI) = 34.4 (SD=4.6), 65% white) and their 20 adolescent children (55% female, 60% white, mean age =14.6, mean BMI percentile = 76.6 (SD=23.1), and 55% overweight/obese). Mothers participated in a 1-year group-based behavioral weight loss trial testing the use of non-nutritive sweetened beverages. Groups met weekly for 12 weeks for the weight loss phase of the trial and monthly from weeks 12 and 52 for the weight maintenance phase of the trial. Weight was measured at baseline, 12, 24, and 52 weeks among mothers and adolescents. Height was measured at baseline among mothers and all times among adolescents.

Results

Mothers lost 7.8% (SE=0.9) of their baseline weight over 12 weeks. There was a significant decrease in BMI percentile among adolescents over 12 weeks (-2.6 points, SE=1.0, p=0.01). From weeks 12-52, mothers lost an additional 6.5% (SE=2.4), while adolescents' BMI percentile increased by 6.8 points (SE=2.5, p = 0.02). A correlation of 0.45 (p=0.10) was observed between maternal percent weight change and adolescent BMI percentile change between weeks 12 and 52.

Conclusions

Decreases in BMI percentile were observed over 12 weeks among adolescents during their mothers' participation in a behavioral weight loss program. Further studies are needed to test whether maternal weight loss is an effective mechanism to prevent excess weight gain among youth.

T-2328-P: Impact of Long-Chain Polyunsaturated Fatty Acids During Pregnancy and Lactation on Infant Body Composition up to 4 years of Life â€“ Results of the INFAT-Study

Christina Brei; Stefanie Brunner, PhD; Karina Pusch, M.Sc.; Daniela Much, PhD; Lynne Cresswell, PhD; Ulrike Amann-Gassner, PhD; Hans Hauner, MD;

Background

The ratio of long-chain polyunsaturated fatty acids (LCPUFAs) in the maternal diet may have an impact on offspring body composition. To investigate the effect of reducing the n-6/n-3 LCPUFA ratio in maternal diet during pregnancy and lactation on offspring growth and body composition up to 4 years.

Methods
The INFAT-study was designed as an open-label randomized, controlled trial. In total, 208 healthy pregnant women were randomized to receive a dietary intervention (daily supplementation providing 1.2 g n-3 LCPUFAs and dietary counseling to reduce arachidonic acid intake) from the 15th week of gestation until 4 months of lactation (intervention group) or follow their habitual diet (control group). To investigate long-term effects, a follow-up program up to 5 years was initiated. Multiple linear regression models adjusting for sex, pregnancy duration, ponderal index at birth and breastfeeding status at 4 months were performed to compare the two groups.

Results

Anthropometric measurements of n=107 infants (n=54 intervention group; n=53 control group) were available at 4 years postpartum; Except for BMI [intervention: 15.6 ± 1.1 kg/m2; control: 15.2 ± 1.2 kg/m2; mean difference: 0.4 kg/m2 (95% CI: 0.0; 0.8 kg/m2); p=0.05], the results showed no evidence of a difference between the two groups; neither in the sum of their 4 skinfold thickness nor the other anthropometric measurements.

Conclusions

Analysis of the 4-year follow-up data does not provide evidence that a dietary intervention to reduce the n-6/n-3 ratio during early life relevantly affects fat mass in the offspring. This finding is consistent with the results at earlier time-points.

T-2329-P: A Pilot-Study of Effects of Teacher Nutrition Training on Preschoolers' Packed Lunches in Early Care and Education (ECE) Centers

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Background

~The Lunch is in the Bag (LiitB) program helps parents pack healthier lunches for their preschoolers through parent handouts and classroom activities. ECEC Teachers participating in LiitB indicated a need for more training on nutrition for 3-5 year olds as well as how to interact with children and parents regarding nutrition. Thus, we developed a pilot teacher training (TT) to compliment LiitB. This study evaluates the effects of the TT, LiitB, and LiitB +TT as compared to a waitlist control.

Methods

Twelve centers were recruited from Austin, TX and randomized to one of four groups; TT only (n=3), LiitB only (n=3 ), LiitB + TT (n=3 ), waitlist control (n=3 ). LiitB centers received the intervention for 5
weeks. TT consisted of a 1-hr training on nutrition facts, creating a healthy eating environment, and engaging parents. Pre- and post-test (6 weeks later) assessments included teacher surveys (n=60) and lunch observations (n=190). Data were examined with multi-level regression accounting for clustering within centers.

**Results**

When compared to the other groups, teachers in the TT group thought there should be more emphasis on nutrition in the curriculum and reported talking to parents about nutrition (both p<0.10). Teachers in the LiitB+TT group reported more enjoyment teaching nutrition (p<0.05) and felt it was easier to discuss a child's eating habits with parents (p<0.10). Children in the LiitB and LiitB +TT groups were marginally more likely to have whole grains in their lunch (p<0.10) compared to the TT and control groups.

**Conclusions**

Results of this pilot study suggest the training is a promising strategy to encourage teachers to teach nutrition to preschoolers and empower teachers to engage parents regarding nutrition. The training did not appear to have an effect on packed lunches above the effect of the Lunch is in the Bag program.

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**T-2330-P: Barriers and Facilitators of Pediatric Weight Management to Consider in Health-Coaching Program Design**

*Jennifer K. Cheng, MD;*

**Background**

Health coaching holds promise to augment primary care capacity for weight management but limited data exists on key determinants of success among such programs including barriers, facilitators, and desired elements from the perspective of overweight children and their families.

**Methods**

We conducted thematic analysis of semi-structured interviews with a convenience sample of overweight children and their families during routine well care visits at a large urban pediatrics primary care practice serving a predominantly low-income, racial-ethnically diverse population in Boston, MA where 45% of children are overweight and 67% are covered by Medicaid.

**Results**
25 parents with children ages 3-17 years (mean 9.7, s.d. 4.7), 64% female, 96th BMI% (s.d. 4.3), 56% Black, 36% Hispanic participated. Social-cultural aspects (cultural background, child-parent dynamics), denial, as well as gaps in knowledge, access, time, and financial resources were significant barriers to successful weight management while sustained collaboration between children, parents, healthcare providers, and community partners was cited as a key facilitator. Desired health coaching elements including technology use were also detailed.

**Conclusions**

Multiple barriers and facilitators impact weight management among at-risk families and should be considered in future health coaching interventions.

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**T-2331-P: Effectiveness of Weight Management Programs for Very Young Children**

*Cathleen Odar Stough, MA; Meredith Dreyer Gillette, PhD; Ann Davis, PhD; William R. Black, MA; Kelsey Dean, MS, RD, LD; Julie Vandal, RD, LD;*

**Background**

Family-based behavioral group programs are effective for treating pediatric obesity. These programs often do not examine outcomes for young children. This study examines change in standardized Body Mass Index (BMIz) for children under 6 years old participating in a weight management program.

**Methods**

Children attended one of two family-based behavioral group programs, targeting change in child diet and physical activity through education (e.g., reading food labels, decreasing sedentary behavior), behavioral strategies (e.g., goal setting, rules and consequences), and child physical activity during the session. One treatment group lasted for 6 weeks and the other treatment group lasted for 12 weeks. Child height and weight were measured at baseline, post-treatment, and 6 months. Fifty-four children under 6 years of age participated in the programs and follow-up measurements ($M$ age = 4.86, $SD$ = .83; 67% female).

**Results**

Child BMIz reduced from baseline to post-treatment ($F (1, 52) = 18.28, p < .01$) and post-treatment to 6 month follow-up ($F (1, 23) = 8.55, p < .10$), and no differences were found between treatment groups. Younger children (2–4 years) showed greater BMIz reductions than older children (4–6 years) during treatment ($F (1, 52) = 7.64, p < .01$), but age was not related to BMIz change between post-treatment and follow-up. Change in BMIz did not differ by gender or ethnicity.

**Conclusions**
Young children showed significant BMIz reductions during treatment and additional reductions between post-treatment and 6 month follow-up. The youngest children showed the greatest reductions in BMIz during treatment. Pediatric weight management programs should continue to target young children.

**T-2332-P: LA Sprouts: Results from a Garden, Nutrition and Cooking Program for Low-Income Hispanic Children**

*Jaimie N. Davis, PhD; Lauren T. Cook, BS; Donna Spruijt-Metz, MFA, PhD; Nicole M. Gatto, PhD, MPH*

**Background**

School gardening programs have gained popularity, however, there is a paucity of randomized controlled trials (RCTs) examining the effect of garden-based educational programs on health outcomes.

**Methods**

The overall goal of this study is to conduct a RCT to assess the impact of a 12-week garden, nutrition, and cooking program (called 'LA Sprouts') on improving dietary intake and reducing obesity and related metabolic parameters in low-income Hispanic children. This 12-week RCT conducted in after-school settings with Hispanic children (3rd-5th grade students) from four elementary schools living in Los Angeles. The following measures were collected at baseline and post-intervention: demographic data, anthropometrics (BMI parameters and waist circumference), body fat via bioimpedance, blood pressure, dietary intake via screener, metabolic parameters via voluntary fasting blood draw.

**Results**

Pre and post-intervention data was collected on 320 children, with 113 of them completing pre/post voluntary blood draws. LA Sprouts participants (n=173) compared to controls (n=147) had reductions in BMI z-scores (-9.9% vs. -2.9%; p=0.01), waist circumference (-2.0% vs. + 0.1%; p=0.001), systolic blood pressure (-1.2% vs. no change; p=0.04) and increases dietary fiber intake (+5% vs. -14.5%; p=0.05) and vegetable intake (+1% vs. -25.3%; p=0.03), and a trend for an improvement in HDL cholesterol (+2.5% vs. no change; p=0.08).

**Conclusions**

Preliminary findings demonstrate that a gardening, nutrition, and cooking-based program results in improved dietary intake and reduced obesity parameters in low-income Hispanic children, where other programs have not been successful.
T-2333-P: Observed Parent-Child Feeding Dynamics in Relation to Child Adiposity

Cassandra M. Johnson, MSPH; Gina L. Tripicchio, MS,MSEd; Myles S. Faith, PhD;

Background

Parental feeding practices have been associated with increased child energy intake and weight status, but these practices are typically measured using parent-report questionnaires. Observational methods are needed to quantify parent-child feeding interactions and their relation to child adiposity.

Methods

Data come from a cross-sectional pediatric twin study (N=69 twin pairs), aged 3-7 years. Parent-child interactions during laboratory meals were video-recorded. Observed behaviors were coded using a Behavioral Coding Scheme (BCS) developed for this study. Five main categories of mother behaviors were coded (Encouragements; Discouragements; Satiety prompts; Hunger prompts; Manner statements). Four main categories of child behaviors were coded (Requests Food; Refuses Food; Hunger; Fullness; Mouthfuls of Food). Correlational analyses tested the association of BCS categories and subcategories with child adiposity measures.

Results

Child BMI z-score was significantly correlated with greater maternal encouragements and discouragements to eat. When examining subcategories, verbal encouragements specifically related to child health were associated with greater child BMI z-score and %body fat. Also, nonverbal encouragements were associated with greater child BMI z-score. Greater nonverbal discouragements were also associated with greater child BMI and %body fat. Child food requests were associated with greater child BMI z-score.

Conclusions

Objectively measured maternal encouragements and discouragements to eat were associated with greater child adiposity measures. This is consistent with and extends prior research, underscoring the potential role of nonverbal parenting cues in childhood obesity.

T-2334-P: Addictive Properties of Sugar-Sweetened Beverages among Adolescents

Jennifer Falbe, ScD; Elena Barbot-Wheaton, BA; Ely Niroomand, BA; Hannah Thompson, PhD, MPH; Kristine Madsen, MD, MPH;
Background

Evidence suggests that sugar and caffeine can induce symptoms of addiction similar to those seen with drugs of abuse. Potentially addictive properties of sugar-sweetened beverages (SSBs), which contain one or both of these ingredients, is concerning given their link with childhood obesity.

Methods

Eligible subjects were 13-18 years of age, drank >=36 oz/day of SSBs, and had a BMI>=the 85th %tile. Using a pre-post design that included 21 subjects, we examined symptoms of addiction in 2 study phases 1 week apart: (1) baseline, usual beverage consumption and (2) cessation of SSBs, when beverages were restricted to water or milk. Most measures were repeated on >=2 consecutive days during both phases, matching the day of the week. During each phase, we measured headache and withdrawal symptoms (via a modified Griffith's scale), cravings for SSBs, overall wellbeing, tiredness, and ability to focus (via the Stroop test).

Results

Subjects comprised 15 girls and 6 boys. For race/ethnicity, 14 reported black, 4 reported Hispanic, 1 reported Asian, and 2 reported white. Mean age was 15.8, and mean BMI %tile was 97. Subjects reported more headaches during cessation than during baseline (+0.61, p=0.01). A non-significant increase was observed in Griffith's score during cessation (+2.88, p=0.16). Also during cessation, cravings for SSBs and tiredness increased, and wellbeing and ability to focus decreased (all p's<0.05).

Conclusions

Among overweight or obese adolescents who typically consume large amounts of SSBs, we found preliminary evidence that SSBs may have addictive properties.

T-2335-P_DT: From Selfies to Self-Efficacy: Clinical Use of Photovoice to Promote Self-Esteem and Self-Efficacy Among Obese Adolescents

Cristina Fernandez, MD; LaShaune P. Johnson, PhD; Fiona Asigbee, PhD, MPH, M.Ed.; Meghan Stumpf, Medical Student; Jessica Najarian, Medical Student; Melissa Ripp, DO; Camilo Zapata, n/a; Shannon Hardy, MD; Lindsey Powers, DO; April Kassen, Master of Arts

Background
To increase a sense of self-efficacy and self-esteem among HEROES (obesity weight program) patients, our team integrated 'Photovoice'. It is a photography research method to empower and give voice to disadvantaged adolescents. The research modified Photovoice to complement the HEROES activities.

Methods

Ten adolescent volunteers from the program were given digital cameras and asked to take pictures. Discouraged from taking 'selfies', the participants were asked to photographically explore barriers and facilitators to healthy eating and physical activity and to explore the complex interplay between their weight loss journey and their comorbidities, relationships, life/career goals, self-esteem, and bullying. They presented their pictures once a week over a five-week period. Discussions were led by our team as we were familiar with participants. Participants were provided with a QoL survey prior to and again at the end of the Photovoice project.

Results

Team discussions and photographs: family members, other obese peers, and pets offered comfort and non-judgmental support during the weight loss period; obtaining and maintaining weight loss was an integral part of broader life goals; family and social network socializing with food sometimes made sticking to goals difficult; finding healthier food substitutes and activities were an ongoing struggle. Participants increased their scores in QOL. 90% had a very good experience with the project and will recommend it.

Conclusions

These results suggest that a Photovoice component has the potential to enhance weight management programs for teens. Results suggest overall improvement of perceived outlook of physical and emotional health within social and school environments. Participants had generally high ratings of the process.

T-2337-P: Elementary School Teachers’ Perceptions of Physically Active Lessons: Benefits, Barriers and Implementation and Dissemination Issues

Cheryl Gibson, PhD; Kate Lambourne, PhD; Taylor Young, MS; Joseph E. Donnelly, EDD;

Background

There is considerable interest in both improving academic achievement and reducing the rates of obesity in elementary school students. Increased physical activity (PA) offers a potential intervention to address both issues.
Methods

In a cluster-randomized trial of 17 schools, intervention classroom teachers (grades 3 - 5) were trained to deliver academic lessons using moderate to vigorous PA for 20 minutes each school day. After they completed one academic year of delivering physically active academic lessons, teachers were invited to participate in focus group discussions to share their experiences with the program.

Results

Twelve teachers (grades 4 and 5) participated in the discussions. Analyses revealed how teachers perceive the benefits of physically active lessons, for both themselves and their students. Teachers suggested active lessons helped students to focus and improved their ability to perform on tests. Barriers include primarily time constraints and pressure to adopt the new core curriculum standards. Suggestions for improvement included the use of iPads, video clips of teachers performing active lessons and more examples shared in newsletters.

Conclusions

Recommendations included suggestions for how to train teachers, and encouragement to use DVDs, apps and active links to support teachers to conduct active lessons. Focus groups discussion results will be instrumental in replicating the program in other schools and guiding overall dissemination plans.

T-2338-P: Effects of Resistance Exercise, Aerobic Exercise or Both on Body Image in Obese Adolescents: The HEARTY Exercise Trial

Gary S. Goldfield, PhD; Glen P. Kenny, PhD Professor; Angela A. Alberga, PhD; Steve Doucette, MSc; Heather Tulloch, PhD; Ronald J. Sigal, MD, MPH; Denis Prud'homme, MD

Background

Aerobic exercise has been shown to enhance body image in obese youth, but little is known about the effects of resistance exercise. We examined the effects of aerobic exercise, resistance exercise and their combination on various domains of body image in obese adolescents.

Methods

Participants were inactive, overweight or obese adolescents (n=304) aged 14-18 yr who volunteered for the HEARTY (Healthy Eating, Aerobic and Resistance Training in Youth) trial. After a 4-week run-in, participants were randomized into 4 groups for 22 weeks: aerobic exercise, resistance exercise, aerobic +
Results

Relative to Control from baseline to 6 months, Appearance Evaluation increased for Resistance Exercise (2.4 ± 0.1 to 2.8 ± 0.1; p=0.09) and Body Satisfaction increased for Aerobic Exercise (2.6± 0.1 to 3.0 ± 0.1, p=0.09) and Resistance Exercise (2.7± 0.1 vs 3.1± 0.1 p=0.08). No group differences emerged over time on Overweight Preoccupation or Self-Classified Weight.

Conclusions

Aerobic and resistance exercise may positively impact appearance-based aspects of body image but not weight-related perceptions. Findings indicate that resistance exercise may be a viable exercise modality to enhance body image in obese youth, a population known to report body image disturbance.

T-2339-P: Restrained Eating Mediates the Relationship between Insecure Attachment and Overweight/Obesity in a Community Sample of Canadian Youth

Gary S. Goldfield, PhD; Danijela Maras, MA; Annick Buchholz, PhD.; Katherine Henderson, PhD.; Nicole Obeid, PhD.; Mary Gick, PhD; Martine Flament, MD, PhD;

Background

Attachment style has been implicated in the development of obesity in youth, but the mechanisms remain unclear. This study examined whether disordered eating behaviors mediate the relationship between attachment style and overweight/obesity in a community sample of youth.

Methods

Participants included 2825 youth (Mage = 14.18 years, SD = 1.61). Participants completed self-report questionnaires, including the Adolescent Relationship Questionnaire and the Dutch Eating Behavior Questionnaire. Height and weight were objectively measured to calculate body mass index (BMI), and weight status was determined using IOTF criteria. Disordered eating behaviors (restrained, emotional, and external) were examined as possible mediating mechanisms in the relationship between attachment style and weight status, using a robust and parsimonious multiple mediation model (Preacher and Hayes), while controlling for age, sex, parental education, ethnicity, and school geographic area.

Results
Insecure attachment was significantly associated with overweight/obesity (B =.33, SE=.10, p<0.001), and disordered eating mediated this relationship, B=0.12, SE=0.04, 95% bias corrected and accelerated confidence interval [0.05, 0.19]. Restrained eating was the strongest mediator of this pathway, such that insecure attachment was associated with higher restrained eating, which in turn, was significantly associated with overweight/obesity.

**Conclusions**

Study findings suggest that it may be important to take attachment history and restrained eating into account when designing treatment and prevention strategies for obesity in youth.

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**T-2340-P: Promoting Child Health on Military Installations: The Development and Implementation of 5210 Healthy Military Children**

*Darcy Gungor; Ryan Rosendale, PhD, RD; Jennifer M. DiNallo, PhD; Daniel F. Perkins, PhD;*

**Background**

The Office of the Deputy Assistant Secretary of Defense for Military Community and Family Policy (MC&FP) approached the Clearinghouse for Military Family Readiness at Penn State (Clearinghouse) with a need for evidence-informed strategies to promote child health across a variety of Military sectors.

**Methods**

The Clearinghouse modeled 5210 Healthy Military Children after Let's Go!, a community-wide initiative promoting 5 or more servings of fruits and vegetables, 2 or fewer hours of recreational screen time, 1 or more hours of physical activity, and 0 sweetened beverages each day in children and their families. 5210 Healthy Military Children targets 15 sectors: 1) families; 2) Child Development Centers; 3) Family Child Care; 4) elementary schools; 5) middle & high schools; 6) youth centers; 7) after-school programs; 8) Military dining facilities; 9) on-installation eateries; 10) commissaries; 11) fitness centers; 12) community centers; 13) workplaces; 14) healthcare professionals; and 15) leaders.

**Results**

To date, 14 installations representing all branches of the Military are implementing 5210 Healthy Military Children. Each installation has a trained coordinator to distribute and promote the use of program materials by the targeted sectors, and provide installation-wide program support.

**Conclusions**
Implementation of 5210 Healthy Military Children has just begun, and the Clearinghouse and MC&FP plan to assess the program's impact at the pilot sites and broaden the reach of the program to additional Military installations in the future.

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**T-2341-P: Testing the Feasibility of a Low-Intensity, Parent-Only, Early Childhood Behavioral Treatment Program for Obesity**

*Thrudur Gunnarsdottir, PhD; Richard Boles, PhD; Urdur Njardvik, PhD; Ragnar Bjarnason, MD PhD; Denise E. Wilfley, PhD; James O. Hill, PhD;*

**Background**

Effective interventions to reduce obesity in early childhood are sorely needed. In early childhood, parenting and child behaviors are still developing, so that success may be seen with less intensive interventions than are required in older children.

**Methods**

Ten obese children (BMI-z >=3.3, 4-7 years), were referred to a tertiary care outpatient unit for obesity (mean child age: 5.98 (sd=1.04)). An eight week, low-intensity program was delivered; pre and post individual assessments with parents and children (1,5 hrs during weeks 1 and 8), parent-only individualized goal setting and planning sessions (20 min. during weeks 2 and 4) and 6 parent-only group sessions (1 hr sessions during weeks 2-7). The treatment model was adapted from an evidence-based family-based treatment model for 8-12 year-old children. Family demographics and measured heights, weights (BMI and BMI-z) were collected at baseline, post treatment and 12 weeks post treatment.

**Results**

Eight parent-child dyads completed the treatment and attended post-treatment follow-up. The mean BMI-z score at baseline for treatment completers was 4.21 (sd=0.71). All children who completed treatment reduced their BMI-z scores from pre to post treatment (mean BMI-z score post treatment=3.70, sd=0.49). At 12 week follow-up the mean BMI-z score remained lower than at baseline=3.85 (sd=0.45). Overall effects of the program from week 1 until 12 week follow-up were statistically significant (F(2,7)=11.15, p<0.01).

**Conclusions**

This low-intensity behavioral treatment program conducted in a clinical setting showed promising results among families of young children seeking treatment for obesity. Future studies will be necessary to demonstrate long term efficacy of this intervention.Â
T-2342-P_DT: Long-Term Outcomes of a Community-Based and Clinic-Linked Treatment for Low-Income Latino Children

Matthew A. Haemer, MD; Shauna Goldberg, MPH; Richard Boles, PhD; Suhong Tong, MS; Nancy F. Krebs, MD MS;

Background

Cost-effective obesity treatments are needed for Latino children from low-income families, especially young children. Linkage of clinical and community resources may enhance effectiveness and sustainability. Inclusion of the entire family may enhance acceptance and effectiveness.

Methods

An overweight (OW) / obesity (OB) treatment program (INT) was developed for low-income families with children 2-16 years. Participants were referred by community clinic providers trained in motivational interviewing to address childhood obesity. Promotoras, personal trainers, and nutrition educators delivered twelve 2hr evening group sessions at a rec center, addressing parenting skills, nutrition, cooking, meal planning, and fitness. Collaborative goal-setting emphasized self-monitoring. BMI-Z change at 12mo for INT and delayed-intervention controls (CON) was assessed by paired t-test. BMI-Z change within-subject was also compared for all participants from 12mo pre to 12mo post intervention.

Results

Mean age 10.5y (range 2-16y), 42% male, 27% OW, 73% OB, 87% Hispanic, 59% Spanish speaking only, 58% below federal poverty. INT n=27 and CON n=23, demographics and baseline BMI-Z were similar (p>0.05). Mean INT attended 8 of 12 sessions. Follow-up available for 70% INT, with no baseline differences with those lost to follow-up. INT BMI-Z was stable from baseline to follow-up: -0.002(0.12), while CON BMI-Z increased: +0.10(.24) p=0.048. BMI-Z trajectory within-subject decreased -0.14(0.06) from 12mo pre to 12mo post (p=0.02) Cost was $550/child.

Conclusions

This trial of a community-delivered and clinic-linked weight management program in low-income Latino families suggests a significant benefit on BMI-Z 12 months after treatment. This pilot provides rationale for a larger scale controlled trial of this potentially cost-effective strategy for treatment.
T-2343-P: Impact of Parent Shape and Weight Concerns on Change in Restrictive Feeding Practices during Family-Based Weight Loss Treatment

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Background

Reduced restrictive child feeding practices have been associated with greater child weight loss following family-based treatment (FBT). Attitudes may affect behavior, thus the present study examines how parent body concerns relate to restrictive child feeding and how this may change during FBT.

Methods

241 parents of overweight children (ages 7-11) were measured at baseline and post-FBT using the Weight and Shape Concern subscales of the Eating Disorder Examination Questionnaire and the Restrictive Feeding Practices subscale of the Child Feeding Questionnaire.

Results

At baseline, parent shape concern ($\tau^2=.138, p<.05$), but not weight concern ($\tau^2=.11, p=.085$), was associated with restrictive feeding practices. Post-FBT, weight concern, shape concern, and reported use of restrictive feeding practices had decreased (all $p<.001$). Reductions in parent shape concern ($\tau^2=.17, p<.05$), but not weight concern ($\tau^2=.025, p=.73$), predicted decreased use of restrictive feeding practices.

Conclusions

Parent weight and shape concerns improved during FBT and decreased shape concern was associated with decreased restrictive feeding practices. These results demonstrate the importance of parents as targets in FBT and establish that change in parent body concerns may contribute to overall success.

T-2344-P: Intima Media Thickness and Pulse Wave Velocity in Obese
Adolescents: How Effective is Aerobic Versus Resistance Exercise?

Katy M. Horner; Silva Arslanian, MD; Emma Barinas-Mitchell, PhD; SoJung Lee, PhD;

Background

Increased intima-media thickness (IMT) and pulse wave velocity (PWV) have been documented in obese adolescents. We examined the effects of aerobic (AE) versus resistance (RE) exercise without calorie restriction on IMT and PWV in obese adolescents.

Methods

Sixty-six obese (BMI >=95th percentile) adolescent boys and girls were randomly assigned to 3 months (3 x 1 hr per week) of AE (n=27), RE (n=23) or a control group (n=16). Outcome measures included change in cardiorespiratory fitness (CRF), carotid IMT, and PWV, and the relationships between them and lipid profile, insulin sensitivity (IS), blood pressure (BP) and visceral adipose tissue (VAT).

Results

At baseline, PWV correlated with body weight (r=.33, p<0.01) and BP (systolic: r=.30, p<0.05; diastolic: r=.30, p<0.05); and IMT correlated with body weight (r=.37, p<0.01), BMI (r=.25, p<0.05) and CRF (r=-.25, p<0.05). Neither was associated with VAT or IS. PWV, IMT, lipids and BP did not change significantly with either AE or RE compared with controls. However, changes in PWV and IMT were significantly associated with improvements in HDL cholesterol (r=-.26, p<0.05) and total cholesterol (r=.31, p<0.05) respectively.

Conclusions

At baseline PWV and IMT showed relationships with body weight, BMI, BP and CRF. Although CRF improved with AE and RE, no improvements in IMT or PWV were detected. Interventions of longer duration or significant weight loss may be required to improve these early subclinical CVD markers in obese youth.

T-2345-P: Measuring Success of Pediatric Obesity Treatment: Moving Beyond BMI

Hanna C. Jaworski, MD; Jared M. Tucker, PhD; Adelle Cadieux, PsyD; William Stratbucker, MD;

Background
Pediatric obesity treatment programs classically use BMI changes as the primary outcome. We hypothesize there are several other clinically relevant outcomes that may not directly correlate with BMI and would be important in reimbursement of services and evaluation for success of treatment programs.

Methods

A total of 99 children aged 12.3 ± 2.9 years old who completed at least 6 months of Stage 3 pediatric obesity treatment were divided into 2 groups based on whether their BMI was maintained or decreased (BMId) or their BMI increased (BMIi) over the treatment period. Changes in anthropometric indicators, cardiometabolic biomarkers, and aerobic fitness were compared within BMI groups using a within-subjects repeated measures ANOVA and between BMI groups using a between-subjects repeated measures ANOVA.

Results

During treatment, 51% (n=50) of patients decreased their BMI. At baseline, BMId and BMIi did not differ in age, sex, or BMI. On average, BMId and BMIi both improved in HDL (both p<0.01) and fat-free mass (both p<0.01), though BMId also improved significantly in percent body fat (p<0.01), waist circumference (p<0.01), fat mass (p<0.01), VO2max (p<0.01), and marginally in LDL (p=0.06). When compared to BMIi, BMId showed greater improvement in percent body fat (p<0.01), waist circumference (p=0.05), fat mass, VO2max (p<0.01), and HbA1c (p=0.01).

Conclusions

While the BMId group had more positive outcomes, the BMIi group also had improvements in several outcomes, supporting the hypothesis that BMI change alone should not define treatment success. Further study is needed to determine if such outcomes correlate with reduction in obesity-related diseases.

__T-2346-P: Musculoskeletal Pain, Quality of Life and Disability in the Teen Longitudinal Assessment of Bariatric Surgery (Teen-LABS) Cohort__

Sharon Bout-Tabaku, MD, MSCE; Marc P. Michalsky, MD; Todd Jenkins, PhD, MPH; Amy Baughcum, PhD; Thomas H. Inge, MD, PhD; Charles R. Buncher, ScD; Michael Helmrath, MD; Mary L. Brandt, MD; Meg H. Zeller, PhD; Carroll M. Harmon, MD, PhD; Mike K. Chen

Background

To assess baseline characteristics of musculoskeletal (MSK) pain, and associations with health related quality of life (HRQOL) and self-reported functional disability in a cohort of severely obese adolescents undergoing weight loss surgery (WLS).
Methods

A prospective cohort study was conducted at five adolescent WLS centers in the U.S. Consecutive patients <= 19 years of age were offered enrollment into a longitudinal observational study. MSK pain, Impact of Weight on Quality of Life (IWQOL-Kids) measured HRQOL, the Health Assessment Questionnaire (HAQ-DI) measured self-reported functional disability, demographics, anthropometrics, inflammatory markers (hs-CRP), and the Beck Depression Index (BDI-II) were examined. Out of 242 subjects, 233 were analyzed and 9 were excluded because they had a history of or current Blount's disease.

Results

The subjects mean age was 17.1±1.6 yrs.; median BMI was 50.4 kg/m². 76% reported MSK pain, 63% had lower back pain and 26% reported pain at all 4 sites (lower back, hip, knee, ankle/feet). Presence of MSK pain, greater BMI, presence of functional disability (HAQ-DI score>0), and greater depressive symptoms were independently associated with lower IWQOL-Physical Comfort scores. Presence of MSK pain, greater BMI, being female, being white, and greater depressive symptoms were also independently associated with functional disability.

Conclusions

MSK pain was common and negatively impacted HRQOL and functional disability. It may be a barrier to weight loss, with implications for exercise recommendations in this group. Longitudinal study of this cohort will assess improvements in MSK pain, function and joint health after weight loss.

T-2347-P: Accuracy of Self-Reported Weights following Bariatric Surgery in Adolescence

Tawny W. Boyce, MS, MPH; Todd Jenkins, PhD, MPH; Thomas H. Inge, MD, PhD; Charles R. Buncher, ScD;

Background

The accuracy of self-reported weights among severely obese adolescents following bariatric surgery is unknown. Difference between self-reported & measured weight has been associated with sex, race, weight, and age. Adults following bariatric surgery have been shown to underreport weight by ~1kg.

Methods

Teen-LABS is a prospective, multi-center study of 242 adolescents (< 20 yrs) undergoing weight loss surgery. This assessment was limited to 83 participants, 6 months to 6 years following surgery, who had a measured weight within 30 days of a self-reported weight. Difference in reported and measured body weight was evaluated across selected descriptive and anthropometric measures.
Results

Of the 83 participants included in the analysis: 70% female, 70% white, mean age 19.9 years and median BMI 36.1 kg/m². 64% had gastric bypass, 28% sleeve gastrectomy, and 8% adjustable band. Overall, participants underestimated their weight by -0.9 kg (range: -18.6, 15.2 kg), with measured weights obtained on average 14.9 days later (range: 0-30). Crude analyses indicated females (-1.3 kg) and males (-0.06 kg) similarly underestimated measured weight (p=0.33). Similarly, no significant differences were noted by race, age, or BMI.

Conclusions

Our findings indicate adolescent bariatric participants report reasonably accurate body weight values, underestimating measured weight by about 1 kg. Self-reported weight could be utilized as surrogate body weight measures when measured values are unable to be obtained.

T-2348-P: Vitamin A and D Deficiency in Severely Obese Adolescents in the Teen Longitudinal Assessment of Bariatric Surgery (Teen-LABS) Study

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Background

Obesity is a risk factor for micronutrient deficiency, particularly fat-soluble vitamins. Limited data are available about the prevalence and predictors of micronutrient deficiencies in severely obese adolescents.

Methods

Prior to bariatric surgery, pre-operative micronutrient abnormalities were assessed in a cohort of 242 adolescents (mean age 17.1 years; median BMI 50.5 kg/m²; 76% female; 72% white, 22% black) enrolled in Teen-LABS, an NIH-funded study of adolescents undergoing bariatric surgery. Prevalence of micronutrient abnormalities and associations with race, sex, BMI, and season were evaluated.

Results

Deficiencies were noted in vitamins D-25 OH (37.5%) and A (6.0%), ferritin (5.5%), and folate (1.7%). As BMI increased, presence of low ferritin decreased (RR: 0.90, p=0.03). Black subjects were more likely to have low vitamin A (13.5% vs 4.2%, RR: 3.86, p=0.01) and low vitamin D (<20 ng/mL in 62% vs
30\%, p<0.01) than non-blacks. Race effect on vitamin D was higher in summer (RR: 3.15, p<0.01) than non-summer months (RR: 1.51, p=0.02). Elevated PTH occurred in 8.1%, but did not vary by race (p=0.15). No deficiencies were associated with age or sex.

**Conclusions**

The most prevalent abnormalities in this severely obese adolescent cohort were low vitamin A and D and elevated PTH. Low vitamin A and D were more commonly observed in blacks. Future work should assess binding proteins for these vitamins to determine whether bioavailability differs by race.

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**T-2349-P: A Nutrition Education Mobile Game Impacts Snack Selection in Middle School Students**

_Craig A. Johnston, PhD; Jennette P. Moreno, PhD; Nicholas Yonko, RD; Joseph Potucek, IV; Jessica Satter; Maria A. Papaioannou, BS_

**Background**

There is evidence that videogames are effective in promoting health behaviors; however, the use of videogames to promote healthy snacking is relatively new. This study examined the impact of playing Fooya, an educational health video game on a mobile device, on the healthy snack selection in students.

**Methods**

Mexican American middle school students were randomized to either a healthy game group (HGG; n=70) or a control group (CG; n=71) condition. Children in the HGG condition played the Fooya game and then made 3 snack choices (carrots versus chips, apple slices versus cookies, and water versus soda), whereas children in the CG condition made 3 snack choices and then played the Fooya game. Snack choices were counterbalanced to control for order effects. Snack choice and consumption of snack was recorded. Children in both conditions completed a follow-up questionnaire regarding the acceptability of the game and use of video games and computers.

**Results**

Children randomized to the HGG made significantly more healthy choices of snacks compared to children in the CG condition (F=6.0, p=.015). There was a trend toward children in the HGG condition consuming a greater number of healthy snack options, but results were not significant (F=2.8, p=.095).

**Conclusions**
Playing a health videogame had a positive impact on the selection of healthy snacks. While no differences were observed in the consumption of the healthy snack options, the positive impact on healthy snacks choice suggests that mobile health education games may promote healthy snacking in children.

T-2350-P: A School-Based Obesity Prevention Program Extends Improvements to Parents’ Body Mass Index

Jennette P. Moreno, PhD; Maria A. Papaioannou, BS; Craig A. Johnston, PhD;

Background

There is evidence that school-based interventions have a positive impact on the weight status of children and there is growing evidence that children impact the health behaviors of their parents. This study assessed the impact of a school-based weight management program for Mexican American adolescents on the weight outcomes of their caregivers.

Methods

Caregivers of middle school students were randomized to either a child as agent of change intervention (CACI; n=70) or a self-help (SH; n=54) condition. Children of caregivers randomized to the CACI condition attended 12 weeks of daily classes focusing on nutrition education and physical activity followed by 12 weeks of bi-weekly follow-up sessions and caregivers attended monthly meetings. Research staff also encouraged children to discuss class topics with their caregivers. Caregivers in the SH condition were provided self-help materials and students attended a typical PE class for 12 weeks. Caregiver weights were measured at baseline and 6 months. A two-group (CACI vs. SH) repeated measures analysis of variance (ANOVA) was used to evaluate group differences in change in caregiver weight at 6 months.

Results

Caregivers in the CACI significantly reduced their weight when compared to caregivers in the SH (F = 5.276, p < 0.05) as indicated by a significant time by condition interaction.

Conclusions

A school-based obesity intervention with demonstrated efficacy to improve weight outcomes in Mexican American children also improved the weight outcomes of caregivers.

Myungkuk Kang, MBBS; Dimitri Pournaras, PhD, MRCS; Amit Bansal, MBBS; Edward Cheong, MD, FRCS;

Background

This literature review aims to provide an update on the safety and the effectiveness of adolescent bariatric surgery.

Methods

PubMed search of the English literature between 2010 and 2014 using terms Paediatric OR Pediatric AND Bariatric AND Surgery was performed. 1565 patients were identified with an age range of 11-21. Male: female ratio was 1:2.5. Body Mass Index (BMI) ranged from 31.4 to 77.2. Gastric bypass (47.1%) and gastric banding (45.2%) were most commonly performed.

Results

Serious surgical complications included splenic (0.2%) and vascular injury (0.2%). No 30 days post-operative deaths or thromboembolic events were reported. The nutritional deficiency rate was 3.3%. The most common additional operation performed within 2 years follow up was cholecystectomy (6.1%). Quality of life improved in all measured by SF-36 or Beck Depression Inventory or Pediatric Quality of Life Inventory. Hypertension resolved in 64.1% and dyslipidaemia in 69.8%. Mean weight loss after one year was 22.6% (BMI reduced from 48.7 to 37.7).

Conclusions

Adolescent bariatric surgery represents a safe and effective treatment modality to obesity resistant to medical therapy with good overall health outcome. Randomised studies comparing surgical and medical treatment with medical treatment alone are needed.

T-2352-P: Prediabetes Presents Late in Puberty in Obese Youth

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Background
Type 2 diabetes (T2D) incidence is rising in obese youth and peaks in puberty, suggesting a link with pubertal insulin resistance (PIR). If PIR leads to ß-cell failure, then hyperglycemia would present in late puberty. This study evaluated the prevalence of prediabetes by pubertal stage in obese youth.

Methods

Impaired fasting glucose (IFG) and impaired glucose tolerance (IGT) were measured using a 75g 2 hour oral glucose tolerance test, in 226 obese youth, aged 9-18 years, referred for weight management. Pubertal stage was assessed using Tanner and Marshall standards and by testicular volume estimation; Tanner 2 (T2) and T5 represent pubertal onset and completion, respectively. Prediabetes was defined as the presence of IFG (fasting glucose ≥100 mg/dl) and/or IGT (2hr glucose ≥140). The association between Tanner stage categories and glycemic variables was tested with the chi-square test or Fisher's exact test.

Results

The population was 67% female, majority Hispanic (57.5%), median BMI of 31.3 (98.5%ile). The total percent affected by IFG, IGT, and prediabetes was 4.9%, 27.2%, and 29.4%, respectively. There were significant puberty group differences in IGT alone and prediabetes (p=0.044 and p=0.017); prevalence of both of these was highest at T5 (34.8% and 38.3%, respectively). There was also a trend toward higher prevalence of IFG in T5 (8.3% affected). By comparison, the prevalence of IGT, prediabetes, and IFG at T2 was 22.0%, 22.0%, and 0%, respectively.

Conclusions

IFG was less common than IGT in this obese population. Prediabetes was more common at the end of puberty, suggesting a contribution of PIR to ß-cell failure. Longitudinal studies characterizing glycemia in obese youth during puberty will help to ideally target prevention of T2D in at-risk youth.
We reported a summer camp for obese youth (ages 9-13) did not predict post-camp success in a pediatric weight management (PWM) program. However it is not known if this camp experience results in improved post-camp weight status compared to those of similar age in a PWM program who did not attend camp.

**Methods**

A 6-day camp program was offered to obese youth (ages 9-13) in a PWM program. Height (HT) and weight (WT) were measured the first morning of camp, with WTs repeated at end of camp. The comparison group (n=56) was youth of a similar age range and distribution of weight status classification (e.g., over 60% severely obese, defined as >120% of the 95th %ile), who had a PWM clinic visit +/- 1 month of camp, but did not attend camp. Follow-up HTs and WTs were obtained at PWM clinic visits up to 6-months post-camp for campers and non-campers to compare long-term change in WT status.

**Results**

Of the campers, 56 (81%) enrolled in the study. At end of camp, weight status was significantly improved (median -2.1% of the 95th %ile for BMI; p<0.0001). At the last post-camp follow-up visit, percent of the 95th %ile for BMI remained significantly lower for campers (median -1.1%, p=0.008, n=33), while non-campers showed no change (median +0.46%, p=0.8, n=33). However, the two groups did not differ significantly (p=0.10) when change in weight status was adjusted for different follow-up times (median days post-camp = 86 vs. 105; p<0.05).

**Conclusions**

Attending camp did not improve change in weight status long-term compared to obese youth in the same PWM program who were not at camp. The challenge is identifying strategies that sustain the significant improvement in weight status resulting from the camp experience.

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**T-2354-P: Comparison of the Satiating Properties of Egg - Versus Cereal Grain-Based Breakfasts for Appetite and Energy Intake Control in Children**

*Tanja Kral, PhD; Annika Bannon, BSN; Jesse Chittams, MS;*

**Background**

Preliminary findings from studies with adults provide evidence of important satiety-enhancing effects of eggs. To date, few studies exist that have systematically examined the role of protein, and egg protein in particular, on appetite and energy intake regulation in children.
Methods

The aim of this laboratory study was to compare the effects of three different types of breakfast on appetite and energy intake at subsequent meals in children. Forty children (19 girls, 21 boys), ages 8 to 10 years, were served a compulsory breakfast (egg, cereal, or oatmeal) and lunch, consumed ad libitum, once a week for three consecutive weeks. Children's appetite and mood ratings were assessed repeatedly throughout the morning using visual analog scales. On each test day, parents completed food records, which captured children's intake for the remainder of the day.

Results

There was a significant main effect of breakfast condition on energy intake at lunch (P=0.02) indicating that children consumed ~70 fewer calories at lunch following the egg breakfast (696+/−53 kcal) compared to the cereal (767+/−53 kcal) and oatmeal (765+/−53 kcal) breakfasts. Calories consumed for the remainder of the day (away from lab) and children's daily energy intake did not differ across breakfast conditions (P>0.30). There also were no significant differences in children's appetite and mood ratings over time among conditions (P>0.43).

Conclusions

Consuming an egg-based breakfast significantly reduced short-term, but not longer-term, energy intake in children in the absence of differences in appetite ratings.

T-2355-P: Effect of a Summer Camp-Based Wellness Immersion Childhood Obesity Prevention Intervention on Physical Activity and Physical Activity Self-Efficacy in Youth.

Lorraine M. Lanningham-Foster, PhD; Randal Foster, BS; Christina Campbell, PhD, RD; Ruth Litchfield, RD, PhD;

Background

Physical activity (PA) levels are different for children when comparing school-year to summer vacation time frames. Strategies are needed to encourage children to be active consistently in order to maintain health and prevent obesity. In this study we examined the influence of a wellness immersion summer camp on PA and PA self-efficacy (one's belief that she/he can perform PA successfully) in youth.

Methods
The wellness immersion camp intervention was designed to incorporate different aspects of wellness (nutrition, physical activity, gardening, and culinary skills) by integrating interactive lessons and activities into a typical daily summer camp schedule. PA and PA self-efficacy were measured in youth (83 girls, 48 boys, 11 +/- 1 years of age) before camp, end of the camp week, and at 6 months post-camp using surveys. Youth participated in 1 week of traditional residential summer camp (n=80, control group) or 1 week of the enhanced wellness immersion residential summer camp (n=51, intervention group). At the time of camp registration, families did not know if the camp experience would be traditional or enhanced.

Results

There were no differences in PA between control and intervention campers. However, intervention campers had significant improvement in PA self-efficacy compared to control campers (change of 0.13 +/- 0.32 vs. 0.01 +/- 0.35, respectively, P < 0.02). For all campers, self-efficacy and PA options were significantly correlated with the duration and intensity of PA (R² = 0.27, P < 0.0001). Further, there was a weak but significant correlation with the home environment and PA (R² = 0.04, P < 0.02).

Conclusions

Childhood obesity prevention programs that provide a variety of physical activity options may improve physical activity self-efficacy.

T-2356-P: Effectiveness of a School-Based Physical Activity Intervention on Obesity in School Children

Xiao-hui Li; Shen-ting Lin, MSc; Li-jing Wu, MPhil; Zi-long Zhang, PhD; Jun Ma, PhD; Hai-jun Wang, PhD;

Background

Childhood obesity has been a serious public health problem. An effective school-based physical activity (PA) intervention is still lacking in China. This study aims to assess the effectiveness of a school-based PA intervention during 3 months on obesity in school children.

Methods

This study was a non-randomized controlled trial. Four public schools in Changping District, Beijing of China were selected and allocated to the intervention or control group (one elementary school and one middle school in each group). Altogether 921 children aged 7 to 15 years were recruited at baseline survey. Children in the intervention group (n=388) participated in a physical activity intervention during 3 months that included improvement of physical education class, extracurricular physical activities for overweight/obese students, physical activities at home, and health education lectures for students and parents. Children (n=533) in the control group did not receive any intervention.
Results

The change in body mass index in intervention group (reduction of 0.02±0.06 kg/m²) was significantly different from that in control group (increase of 0.41±0.08 kg/m²) (adjusted mean difference: -0.43 kg/m², \(P<0.001\)). The change in overweight/obesity prevalence was also different between two groups (intervention: -3.7%, control: 1.7%, adjusted OR: 0.83, \(P=0.017\)). The effects on triceps, subscapular, abdominal skinfold thickness and fasting glucose were also significant in intervention group compared with control group (all \(P<0.05\)).

Conclusions

The school-based, multi-component physical activity intervention significantly decreased overweight/obesity prevalence, levels of BMI, skinfold thickness and fasting glucose.

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T-2357-P_DT: A Comparison Between a Comprehensive Wellness-Based After-School Program and a Traditional YMCA After-School Program on Measures of Physical Fitness, Health-Related and Executive Cognitive Function Variables in Minority Elementary School Chil

Chantis Mantilla; Shayna Darnell, M.S.Ed.; Diana Marten, Bachelor's in Exercise Physiology; Brian Arwari, PhD Psychophysiology; Arlette Perry, Doctorate in Exercise Physiology;

Background

Although many intervention and prevention programs targeting physical activity and fitness in children and adolescents have been shown to be effective, few have targeted this in combination with changes in physical fitness, health-related variables, and cognitive executive function in a single study.

Methods

The Translational Health in Nutrition and Kinesiology (THINK), a comprehensive after-school program (n=50), was compared to a traditional YMCA program (n=52) on measures of physical fitness, health-related, and executive cognitive function in minority children (mean age= 9.8 years) after 10 weeks.
Executive cognitive function was measured with a flanker task. Physical fitness tests included: two-minute walk, handgrip strength, curl-up, shuttle run, vertical jump, wall sit, and sit-and-reach. Health-related variables included: body mass index, percent body fat, waist circumference, and sagittal height. Two way repeated measures ANOVAs were used to analyze dependent variables by time and group.

Results

All physical fitness, health-related, and cognitive executive function measures, with the exception of the sit-and-reach test (p= 0.14), were found to be statistically significant post the intervention period of 10 weeks (p< 0.01). Greater improvements in physical fitness, health-related, and cognitive executive function, with the exception of percent accuracy (p= 0.15), were observed in the intervention group compared to the control (p< 0.01).

Conclusions

The THINK after-school program was more effective in improving the dependent variables compared to the traditional YMCA program. This supports programs with a comprehensive approach to improve outcomes that may have positive effects on physical activity, health, and cognitive performance in children.

T-2358-P: Measuring Child Health Behaviors and Health Perceptions in Primary Care: Informing Management of Childhood Obesity

Margaret E. O’Neil; Jillian Hawkins, MS;

Background

Management of childhood obesity in primary care (PC) is critical for youth to achieve healthy weight. The purpose of this study was to examine child health behaviors and health perceptions to inform PC providers’ (PCPs) recommendations.

Methods

During a PC visit, parents and children (n=114) completed health questionnaires. Child BMI was calculated and health measures (heart rate (HR) and blood pressure (BP)) were documented. Average age for youth was 10.3 years (SD=1.8). The majority were obese (mean BMI percentile = 97.8, SD = 2.1). Descriptive statistics and correlations were conducted to describe child health and examine associations.

Results
HR (96.2 (SD = 14.3) and BP (114.5 (SD = 12.5) / 75.6 (SD = 11.8) suggest children were deconditioned. Surveys showed children participated in recommended physical activity (PA) 4.4 days/week (SD=2.2) and screen time > 2-3 hours/day. Most children (48.2%) rated overall health and PA abilities (59.6%) as very good to excellent. The majority (84%) wanted to improve health; many (62%) enjoyed passive leisure at school; most (61%) liked playing sports in gym and most (54%) participated in PA after school. Age and health were negatively correlated.

Conclusions

Findings suggest that PCPs should address youth health perceptions to improve ratings and motivate youth to engage in healthy activities. By identifying PA preferences, PCPs may help locate resources for youth to engage in these activities.

T-2359-P: Effects of Phentermine and Topiramate Extended-Release (PHEN/TPM ER) Treatment on Weight Loss (WL) and Metabolic Syndrome (MetS) Parameters in Subjects with Body Mass Index (BMI) $\geq$35kg/m2

Nancy Bohannon, MD; Robert F. Kushner, MD, FTOS; Sarah Odeh, BS; Roman Dvorak, MD, PhD;

Background

As BMI increases, so does the risk for obesity-related comorbidities. PHEN/TPM ER, in combination with lifestyle modifications, led to significant WL in EQUIP (obese subjects; BMI $\geq$35 kg/m2) and CONQUER (obese/overweight subjects; BMI $\geq$27 to $\leq$45 kg/m2 with $\geq$2 weight-related comorbidities).

Methods

Data from the two 56-week, double-blind, randomized, Phase 3 studies were pooled. Subjects received lifestyle modifications (LEARN program) and either placebo (PBO), PHEN 3.75mg/TPM ER 23mg (3.75/23), PHEN 7.5mg/TPM ER 46mg (7.5/46), or PHEN 15mg/TPM ER 92mg (15/92). This pooled analysis of the two studies examined weight and MetS parameters in subjects with a baseline BMI $\geq$35kg/m2 (n=2695) Changes in weight and MetS parameters (waist circumference [WC], systolic blood pressure [SBP], high-density lipoprotein cholesterol [HDL-C], triglycerides [TG], and fasting glucose [FG]) at week 56 were assessed.

Results
Mean values at baseline were: weight=114kg, WC=120cm, SBP=126mmHg, HDL-C=49mg/dL, TG=143mg/dL, and FG=100mg/dL.

At week 56, LS mean % WL was -1.8%, -5.1%, -8.6%, and -10.8% for PBO, 3.75/23, 7.5/46, and 15/92, respectively ($P<.0001$ vs PBO). Change in WC (cm) was -3.6, -6.1, -9.7, and -10.9, respectively ($P<.0001$ vs PBO). Change in SBP (mmHg) was -2.0, -4.5, -4.5, and -5.0, respectively ($P<.05$ vs PBO). HDL-C, TG, and FG were significant vs PBO for 15/92 ($P<.05$). The most common adverse events were constipation, dry mouth, and paraesthesia.

Conclusions

PHEN/TPM ER, as an adjunct to lifestyle modifications, can enhance WL and improve MetS parameters in obese/overweight patients with a BMI $\geq$35kg/m2.

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T-2360-P: Teaching Adolescents to Use the Built Environment to Increase Their Physical Activity: A Pilot Intervention Study

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Background

US adolescents do not achieve the recommended 60 minutes of daily moderate-to-vigorous physical activity (MVPA). Pediatric physical activity interventions have had limited success, resulting in a 4 minute increase, on average. Few trials have tested using the built environment (BE) to increase MVPA.

Methods

We are conducting a pilot intervention study testing the feasibility of using the BE to increase MVPA. The study is enrolling 60 adolescents ages 10-16 years who are overweight/obese and live in greater Boston. Subjects wear a GPS and accelerometer to record their physical activity and location. Control subjects receive standard of care lifestyle counseling. Intervention subjects receive maps detailing the locations of their activity along with personalized recommendations on using their BE to increase their MVPA, along with cash incentives and reminders. GPS-accelerometer data are collected at baseline[T1], after the intervention[T2], and again 3-4 months later[T3]. Outcomes are MVPA and BMI.

Results

We have successfully enrolled 44/60 subjects to date; of which 36 have completed T1, 28 T2, and 11 T3. At baseline, control and intervention subjects were, 41% and 42% male, 47% and 53% white, a mean ($\overline{X}$) of 11.8 and 11.8 years, a $\overline{X}$ of 93rd and 94th percentile BMI, with 27.6 and 27.7 $\overline{X}$ min/d MVPA, respectively. From T1 to T2, thus far the change in daily ($\overline{X}$ min/d) MVPA among control and
Interventions subjects has been +1.3 and +22.7, respectively (p=0.0004), with the change in % of subjects achieving 60 min/d of MVPA being 0% and +21.4% (p=0.2).

**Conclusions**

This pilot study demonstrates the feasibility of counseling adolescents on using the built environment to increase physical activity. Counseling adolescents on using the surrounding built environment is a novel and potentially highly effective way to increase adolescent physical activity.

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**T-2361-P: Fat Mass and Fat Free Mass in Newborns: Comparison of Two Methods**

*Charles Paley, MD; Tatiana Toro-Ramos, PhD; Dympna Gallagher, EdD;*

**Background**

This study aimed to investigate the level of agreement between the QMR, EchoMRI-Infantsâ„¢ and the Peapod.

**Methods**

Twenty eight healthy term newborns were measured on the infant QMR and Peapod 12-70 hours post birth. Weight and length were measured to the nearest 0.001 g and 0.1 cm. Paired T-tests were used to compare both methods. Infant QMR FM and FFM were regressed against Peapod values. A Bland-Altman Plot was constructed to assess agreement between methods.

**Results**

Average weight was 3.15 +- 0.37 kg. Mean FM was 0.53 +- 0.14 kg for the QMR and 0.35 +- 0.16 kg for the Peapod (mean difference 0.18 +- 0.09 kg, p<0.001) while FFM was 2.30 +- 0.25 kg for the QMR and 2.79 +- 0.29 kg for the PeaPod (mean difference -0.49 +- 0.09 kg, p<0.001). The correlation coefficient was R=0.84 for QMR FM regressed on PeaPod FM and R=0.95 for QMR FFM regressed on Peapod FFM. The differences between the values obtained with the Peapod and the QMR were not a function of the mean values for the two instruments (R= 0.10).

**Conclusions**

The correlation was high between FFM measures, but the absolute differences between the infant QMR and the Peapod for FM and FFM measurements were large. Additional studies to determine the validity of the infant QMR and the Peapod are necessary.
T-2363-P_DT: The Effects of a School Breakfast Policy Initiative on BMI and Breakfast Patterns among Low Income, Urban Students

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Background

Breakfast in the classroom is advocated to increase participation in the School Breakfast Program. However, the effects of in-classroom, versus cafeteria, breakfast on children's dietary behaviors and weight are unknown.

Methods

This study's purpose is to test the effects of a School Breakfast Policy Initiative (SBPI) on the body mass index (BMI) and breakfast patterns of low-income, 4th-6th grade children in an urban public school district. This research describes the intervention components and study sample at baseline. Sixteen K-8 schools were recruited to a 3-year randomized control trial to test the effects of the SBPI. The SBPI includes: 1) classroom breakfast; 2) breakfast nutrition education; 3) social marketing; 4) parent outreach; and 5) youth leadership. At baseline, trained research staff measured students' height and weight and students completed surveys regarding location and food eaten in the morning.

Results

Participants were 1,413 4th-6th graders (51.3% female, 65.9% African American, 78.3% eligible for free/reduced lunch). At baseline, 17.48% were overweight, 15.92% obese, and 5.31% severely obese. On the day surveyed, 12.9% reported that they skipped breakfast, 32.4% ate breakfast at school, and 31% ate breakfast from more than 1 location. Eighteen percent ate food from a corner store with commonly consumed items being chips, candy, and soda.

Conclusions

A substantial proportion of low-income children report skipping breakfast, eating multiple breakfasts, and consuming poor nutritional quality food. Considering issues of both over- and under-consumption, school breakfast policies need to be carefully considered.
T-2364-P: Differences at Presentation to a Pediatric Weight Management Program among Children of Parents with and without a Prior History of Bariatric Surgery

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Background

Pediatric weight management requires a full patient assessment for beneficial outcomes. With the rise in weight loss surgery, a retrospective study assessed whether differences are present among children of parents with and without prior weight loss surgery (PWLS) warrant a specialized approach.

Methods

WIRB approved retrospective review of intake data for children between the ages of 4 -19 enrolled in Weigh Smart, a stage III pediatric weight management program. Data reviewed included clinical data (self-reported history, anthropometry (standardized with CDC data), fasting labwork, physical examination), self-reported eating habits and physical activity, and self-reported parental BMI. Psychosocial parameters studied included age-stratified pediatric quality of life (Peds qL) in addition to the parent and child completed Behavior Assessment System for Children, Second Edition (BASC-2). Statistical testing used included t-test and fisher's exact test using INSTAT software and SPSS.

Results

PWLS kids comprised 7.8% of the clinic population. There was no difference in mean age, sex, BMIz, blood pressure, and fasting labs between PWLS and nonPWLS patients. Father's BMI was higher among parents with bariatric surgery (32.1 vs 34.6 p=0.022). PWLS kids reported headaches (p=0.009) and joint pain (p=0.035), had an individual education plan (p=0.0352), took ADHD meds(p=0.049), were teased/bullied(p=0.025), and a trend eating in front of the TV (p=0.051). Some differences in parent/child BASC-2 data but no difference in peds QL data.

Conclusions

Children of parents with prior bariatric surgery have a different profile at presentation for pediatric weight management with higher prevalence of headaches and joint pain in addition to psychoeducational services usage which may warrant a specialized multi-disciplinary approach for treatment.
T-2365-P: Induction of Negative Affect and Adolescent Girlsâ€™ and Boysâ€™ Eating in the Absence of Hunger

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Background

Eating in the absence of hunger (EAH), particularly in response to negative affective states, has been posited to play a causal role in excess weight gain during adolescence. Yet, there are limited experimental data on the impact of inducing negative affect on EAH.

Methods

We studied 177 non-treatment seeking adolescents (13-17y; 65% female; 60% White). After eating to satiation from a multi-item lunch buffet (10,000 kcal), participants were randomly assigned to a sad or neutral mood induction film condition. EAH was measured as ad libitum intake (kcal) of palatable snack foods immediately after the film. Adolescents completed state mood ratings throughout the paradigm. Cognitive and behavioral dietary restraint during the past month was assessed with the Eating Disorder Examination interview.

Results

Relative to those in the neutral condition, youth who viewed the sad film had acute increases in state depressed affect (p<.001). Controlling for lunch intake, age, sex, race, and body composition, youth did not differ by condition in EAH (p=.22). Yet, sex and dietary restraint interacted with condition (p=.01): In the neutral condition, girls and boys with higher dietary restraint had greater EAH. Although a similar pattern was seen for girls in the sad condition, among boys in this condition, dietary restraint was not associated with EAH.

Conclusions

Regardless of mood state, girls with higher dietary restraint had greater EAH. Boys' restraint related to EAH only in a neutral state. Sex differences may be evident in emotional eating. The unique, interacting roles of negative affect and restraint in adolescent eating behavior must be determined.

T-2366-P: A Primary Prevention Program Delays Onset and Peak
Prevalence of Obesity in a Pediatric Residency Teaching Practice

Jamie Jeffrey, MD; Stephen Sondike, MD;

Background

Longitudinal studies suggest that childhood obesity is linked to adult obesity, and earlier onset of obesity increases the risk for development of adult obesity. Delaying onset of obesity in pediatric populations, therefore, may have implications in reducing rates of obesity later in life.

Methods

Over a 5 year period we have instituted a robust, comprehensive obesity prevention program in our primary care clinic for all pediatric patients beginning at the first newborn visit. A retrospective chart review of 624 charts of active patients between the ages of 2-14 years was performed. The BMI was plotted on the 2000 CDC growth chart and percentile recorded. For patients who were overweight or obese, the BMI was tracked back to determine the specific age of onset of overweight and obesity (when BMI percentile crossed the 85th percentile). We compared these data to a similar chart review conducted five years previously.

Results

The overall prevalence of pediatric overweight and obesity from 2-14 years at was 36%, with a peak prevalence of 47% at 12 years of age. The peak age of onset of overweight and obesity or 'tipping age' was 5 years of age. This compares to the five year previous data where the prevalence of obesity was 43%, peak age of onset of obesity was 3 years, and the peak prevalence was 7 years.

Conclusions

A robust obesity primary prevention program beginning at the first primary care visit reduced prevalence of obesity in children aged 2-14, as well as delayed both the age of onset of obesity and the age of peak prevalence of obesity.

T-2367-P: Demographic and Longitudinal Trends in Children with Severe Early Onset Obesity at an Academic Medical Institution.
Background

The prevalence of severe childhood obesity continues to increase despite a decline in the overall rates of obesity. Severe obesity confers significant risk of co-morbidities. There is little information about the demographic and longitudinal trends in BMI of children with early onset severe obesity.

Methods

We designed an algorithm to identify patients with severe obesity (BMI 120% of 95th percentile for age) at an age < 6 years visiting the primary care and weight management clinics at Boston Childrens Hospital. The validated algorithm uses the hospital EHR via a data query system called Patient 360 for codified data and Natural Language Programming (NLP) for non-codified data. We excluded patients with pathological causes of obesity, such as tumor, steroid use, endocrine disease etc. using NLP. Demographic data, laboratory results and longitudinal trends of BMI were extracted for the patients identified over 4 months using the algorithm. Statistical analyses were performed using R studio.

Results

A total of 266 children with severe obesity were seen in primary care (76.3%) and weight management clinic (57.5%) over 4 months. The gender distribution was even (51% girls, 49% boys). The racial/ethnic mix in our cohort was predominantly from underrepresented minorities (39% African American, 48.2% Hispanic or Latino) with English as the primary reported language. The median age at visit was 89 months. The longitudinal trends in BMI show a faster velocity than predicted by the CDC curves, albeit without significantly altered laboratory data.

Conclusions

A hospital-based cohort shows high prevalence of severe early onset obesity in underrepresented minorities. Longitudinal trends in BMI indicate high long-term CVD risk and possibly genetic predisposition for obesity. Early identification and intervention is critical, with long-term follow-up.

T-2368-P: Changes in Adiposity and Health Outcomes by Age and Sex in a 12-month Clinical Pediatric Weight Management Program

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**Background**

Little is known regarding the efficacy of clinical pediatric weight management (PWM) among different sexes and ages. The purpose of this study was to compare changes in body composition and health parameters by sex and age among obese youth during a 12-month, multidisciplinary PWM program.

**Methods**

PWM consisted of 8 clinic visits with a multidisciplinary team over a 1-year period, and an optional group-based physical activity program led by an exercise physiologist twice weekly for 14 weeks. A total of 99 children aged 12.3 ± 2.9 years old completed PWM and were divided by sex and by age into younger (<12y) and older (≥12y) groups. Anthropometric measures included BMI z-score (BMIz), waist circumference, and percent body fat (%BF). Health indicators included aerobic fitness (VO2max) and cardiometabolic biomarkers, including mean arterial pressure (MAP), cholesterol, glucose and hemoglobin A1c. Changes during treatment were assessed both within and between sexes and age groups.

**Results**

Patients were 65% female and 58% were ≥12y. Both sexes and age groups significantly reduced BMIz, with no differences in BMIz changes between groups. Patients <12y increased waist circumference and ≥12y decreased %BF. Males decreased %BF while females did not due to greater fat-free mass gains in males. MAP increased in <12y and females, but did not differ between groups. HDL improved in all groups, but only males improved LDL. No group changes were seen in glucose or HbA1c. VO2max increased in both sexes, though gains were greater among ≥12y.

**Conclusions**

After PWM, obese youth reduced their BMIz regardless of age group or sex; however, this improvement did not translate into consistent changes in body composition among groups. Similarly, all groups experienced some health benefit, on average, but improvements were not consistent across groups.

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**T-2369-P: Prevalence and Risk Factors of Obesity Among Appalachian Adolescents in the United States**

Liang Wang, DrPH; Deborah L. Slawson, PhD; George Relyea, MA, MS; Jodi L. Southerland, DrPH; Youfa Wang, MD, PhD;

**Background**

The Southern Appalachian region ranks amongst the highest in the U.S for obesity rate. We examined obesity prevalence in Appalachian adolescents and potential risk factors associated with obesity.
Methods

Waves 1 (n=544) and 2 (n=965) baseline data collected between 2011-2012 in 10 schools were used from the NIH-funded Team Up for Healthy Living Project, a cluster-randomized trial targeting obesity prevention through a school-based cross-peer intervention in Southern Appalachia (n=1059). Appalachian adolescents aged 14.9 + 0.7 years. Weight status was determined using measured height and weight. Linear and logistic mixed models were used for identifying potential risk factors for BMI z-score, and obesity as outcome, respectively. The intercorrelation of students' outcomes within classes and schools was controlled in models.

Results

Overall, 46.4% were overweight or obese (26.6% obese). Being male (OR=1.79, 95% CI=1.40-2.29), having lower maternal education (OR=1.40, 95% CI= 1.06-1.85) or paternal education (OR=1.58, 95% CI= 1.18-2.21) were associated with obesity and elevated BMI z-score ($\bar{I}=0.13, 0.16, 0.04$, respectively, all $p<0.05$). Family income was not significantly associated with obesity or BMI z-score. When stratified by gender, only paternal education was associated with BMI z-score in boys while only maternal education was predictive of BMI z-score for girls.

Conclusions

Overweight and obesity rates in Appalachian adolescents are high, and males have higher rates. Lower education level of the same-sex parent was associated with higher body weight among the child.

T-2370-P: Initial Weight Loss is Related to Weight Loss After Four Visits in a Primary Care-Based Pediatric Weight Management Program

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Background

The 2007 Expert Committee identified primary care offices as a setting for treating obesity. Our objective was to evaluate initial patient weight outcomes that may predict success. Early identification of unsuccessful patients will allow for earlier referral for more intensive treatment options.

Methods
The Primary Care Obesity Network is a network of pediatric primary care physicians in Central Ohio who have received training in obesity treatment. Patients who are identified as obese are encouraged to schedule a monthly weight management visit with their physician. Chart review was conducted for 137 patients who had their initial 4 weight management visits within a 6-month time frame in 2012-2013. We compared initial outcomes (BMI and weight change between their initial weight management visit and their second visit) to their outcomes after 4 weight management visits. Independent samples t-tests and odds ratios were used for analysis.

**Results**

At baseline, mean age was 9.2 years, and mean BMI was 27.9. Patients who decreased or maintained their BMI at visit 2 had a significantly greater BMI decrease at visit 4 (-0.42 vs 0.46, P<.001). Those who lost weight at visit 2 had a significantly greater weight loss at visit 4 (-0.31 lbs vs 5.79 lbs, P<.001). The odds of decreasing/maintaining BMI at visit 4 if BMI was decreased/maintained at visit 2 was 3.9 (95% CI 1.9-8.2) compared with those who did not decrease/maintain BMI at visit 2.

**Conclusions**

Lack of weight loss or BMI decrease during the initial month of treatment may be predictor of less optimal outcomes in a primary care setting. These patients may benefit from a more intensive treatment option such as referral to a registered dietitian or a multidisciplinary obesity clinic.

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**T-2371-P: Parental Influences on Child Weight Loss: Perception, Willingness to Change and Barriers**

*David A. White, PhD; Dana L. Rofey, PhD; Andrea M. Kriska, PhD; Elizabeth M. Venditti, PhD; Bethany Barone Gibbs, PhD; Jere Gallagher, PhD; John M. Jakicic, PhD;*

**Background**

The purpose of this study is to examine relationships between parental perception of child weight, parental readiness to change weight control behaviors, and anticipated barriers to behavior change.

**Methods**

Forty-eight parents of overweight (OW) and obese (OB) 6-12 year old children were recruited to complete questionnaires on perception of their child's weight, stage of readiness to change behaviors for their child's weight, and anticipated barriers to changing child weight control behaviors. Child height and weight were objectively measured and subjects were categorized as 'OW' (<=85th-95th percentile) or 'OB' (>95th percentile) for age and gender. Spearman rank order correlations were used to determine relationships between parent perception of child weight, child weight category, and stage of readiness to change.
Results

Of the 48 parents, 77.1% underestimated their child's weight status and 54.2% perceived their child as normal weight. Older parents (p=0.045), and married parents (p=0.025) were more likely to perceive their child as overweight. Parental perception was significantly associated with parent stage of readiness to change weight control behaviors (r=0.358, p=0.012).

Conclusions

Increasing a parent's awareness of their child's weight status may benefit progression through the transtheoretical model stages of behavior change. Furthermore, older parents and parents who are married may be more conscious of weight related issues in the family.

T-2372-P: Child Maltreatment and the Severely Obese Adolescent: Implications for Clinical Care

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Background

Child maltreatment (CM) and severe obesity each are public health priorities due to their long-term impact on health and well-being. Child maltreatment increases obesity risk, but maltreatment rates among adolescents with severe obesity are unknown, leaving potential gaps in clinical care.

Methods

The present study characterized rates and psychosocial correlates of CM in adolescents with severe obesity seeking weight loss intervention (weight loss surgery [WLS], non-surgical lifestyle modification). Baseline (pre-operative) data from a prospective multicenter observational study of 139 WLS adolescents (Mage=16.9; 79.9% female, 66.2% White; MBMI= 51.5kg/m2) and 83 non-surgical comparisons (Mage=16.1; 81.9 % female, 54.2% White; MBMI= 46.9kg/m2) were utilized to document self-reported CM (Childhood Trauma Questionnaire) and associations with psychopathology, adjustment, high risk behaviors, and family dysfunction.

Results

Prevalence of a history of any moderate to severe CM was self-reported by 29% of females and 12% of males, similar to national self-reported base rates, with emotional abuse most prevalent. One in 10 females reported sexual abuse. CM rates were significantly higher for non-surgical females, yet regression analyses
revealed similar psychosocial correlates of CM, including significantly greater psychopathology ($p<.01$), risky sexual behavior ($p=.04$), alcohol use ($p=.02$), and family dysfunction ($p=.002$).

**Conclusions**

While a minority report a history of CM, they are a noteworthy minority with greater psychosocial burden and family stress in clinical settings. Determining trajectories of weight, health and adjustment for this subgroup is important to inform intervention efforts and optimize health outcomes.

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**T-2373-P: Intervention Based on Transtheoretical Model (TTM) for Promoting Physical Activity of Obesity Children**

*Leshan Zhou

Zhi Jiang

**T-2374-P: The Association Between BMI and Active and Sedentary Behavior Using the Youth Activity Profile**

*Kelly Allums-Featherston; Yang Bai, MS; Katelin Anderson, MS; Norma Candelaria, MS; Gregory Welk, PhD; Pedro F. F. Saint-Maurice, PhD;

**Background**

Sedentary behavior (SB) and low levels of physical activity (PA) have been associated with overweight and obesity in youth at the individual-level. The current study examined group-level associations between BMI and both SB and PA in a large cohort of youth.

**Methods**

Data were obtained from a participatory network, the NFL PLAY 60 FITNESSGRAM (FG) Partnership Project. A total of 73 schools had students complete the FG battery and the Youth Activity Profile (YAP), a 15 question self-report online tool that captures youth PA and SB. Grade by gender PA and SB scores from the YAP were matched with BMI Z averages from the FG battery. There were 344 grade level observations
with at least 15 responses per grade in the final dataset. Spearman correlations were computed between BMI and the behavior measures. Separate multiple regression models were used to examine the association of PA and SB with BMI after controlling for school level demographic factors.

**Results**

BMI Z scores were significantly correlated with SB (\( \rho = .22, p<.001 \)) but not with PA (\( \rho = -.02, p=0.69 \)). Regressions showed that BMIZ was positively associated with SB (\( R^2 = .23, p<.001 \)) and negatively associated with PA (\( R^2 = -.14, p<.05 \)). The combined model indicated that SB was positively associated (\( R^2 = .21, p<.001 \)) with BMI Z score independent of PA.

**Conclusions**

Average BMIZ score was negatively associated with group level PA and positively associated with SB independent of PA.

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**T-2375-P: Measuring the Effectiveness of Varying Dietary Macronutrient Composition in the Treatment of Overweight and Obese Children**

*Yara MS. AlMuhtadi, PhD candidate; Paul Gately, PhD*

**Background**

Few studies have examined the role of diet macronutrient manipulation strategies in treating childhood obesity. However, there is not conclusive evidence to support one diet approach over another. Therefore, this study aims to evaluate the most effective diet in treating overweight and obese youth.

**Methods**

A systematic review was conducted in three databases: PubMed, Cochrane library and PsycInfo between years 1990 and 2013. Keywords used for the search were: 'protein', 'carbohydrate', 'low-fat', 'glycemic index', 'weight control', 'weight management', 'weight loss', 'healthy weight', 'energy intake' and 'total energy intake'. The search was limited to randomised controlled studies (RCTs) in overweight and obese children aged between 6 and 18 years old. Additional inclusion requirement were for the study to be reported in English language and for the change in anthropometry measurements (i.e. body weight and BMI SDS) to be reported too.

**Results**
14 randomised controlled studies (RCTs) out of 780 studies met the inclusion criteria. The majority of studies found no significant weight loss between the varying diet composition in the short- and long-term. With the exception of Ebbeling et al., 2003 study that demonstrated significant decrease in BMI SDS in participants from the low glycemic index (GI) group compared to the conventional (low-fat) on the long-term.

**Conclusions**

The majority of studies found a significant reduction in body weight with no group differences seen between the different diets. These results suggest there is inconclusive evidence to recommend the adoption of a specific diet approach in treating overweight and obese children.

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**T-2377-P: Antidepressant Use is Associated with Increased Energy Intake and Similar Levels of Physical Activity**

*Elsbeth Jensen-Otsu, MD; Gregory Austin, MD;*

**Background**

Antidepressants have been associated with weight gain, but the causes are unclear. The aim of this study was to assess the association of antidepressant use with energy intake and physical activity using data from the National Health and Nutrition Examination Survey (NHANES).

**Methods**

Data from NHANES 2005-2006 for eligible adults 20-74 years who reported taking (n=223) or not taking (n=2850) antidepressants were used. Energy intake (kcal/day) and diet composition were obtained by dietary recall. Participants on a special diet for health-related reasons were excluded. Physical activity data included the frequency of specific activities in the preceding 30 days and a subjective assessment of activity compared to peers. Appropriate confounding variables were included in the models assessing energy intake and physical activity (age, gender, race/ethnicity, education, being overweight or obese, insulin, non-insulin diabetes meds, and total number of prescription meds).

**Results**

Antidepressant users reported consuming an additional 200±76 kcal/day compared to non-users (p=0.02). There were no differences in percent calories from sugars or fats between the two groups. Antidepressant users had nearly identical frequencies of walking, biking, and moderate/vigorous physical activity compared to non-users (all p>0.4). However, antidepressant users were less likely to rate themselves as more active (p=0.02) and were slightly more likely to rate themselves as less active (p=0.08) compared to their age/gender-matched peers.
Conclusions

The results suggest increased energy intake, rather than reduced physical activity, is the more likely cause of weight gain associated with antidepressant use. For patients on antidepressants, closer weight monitoring and lifestyle modification counseling may be important in mitigating weight gain.

T-2378-P: Snacking Patterns Associated with SSB Consumption in the United States

Sara N. Bleich, PhD; Julia Wolfson, MPP;

Background

There is limited evidence about whether snack patterns among U.S. children and adults differ between sugar-sweetened beverages (SSBs) drinkers and non-SSBs drinkers.

Methods

We analyzed 24-hour dietary recall data obtained from the National Health and Nutrition Examination Survey 1999-2010 among children (ages 2 to 19) and adults (aged 20 and older) (N = 46,932).

Results

For adults and children, the percentage of snackers (children: salty - 60% vs. 50%; sweet - 69% vs. 65%; adults: salty - 64% vs. 58%; sweet - 64% vs. 58%), calories from snacks (children: salty snacks - 258 vs. 213 kcal; sweet snacks - 322 vs. 291 kcal; adults: salty snacks - 261 vs. 236 kcal; sweet snacks - 370 vs. 350 kcal), and total calories (children: 2098 vs. 1804 kcal; adults: 2329 vs. 2049 kcal) was significantly higher among SSB drinkers than non-SSB drinkers (p < 0.05). All ages were more likely to consume snacks at home (p < 0.05).

Conclusions

Adults and children who drink SSBs are more likely to snack and consume more calories from snacks than non-SSB drinkers. The home is an important venue for reducing snack consumption.

T-2379-P: Aerobic Training Reduces Regional Fat Distribution and improved
insulin sensitivity in Young Adults
Matched for BMI and Gender

Tyler A. Bosch, PhD; Donald Dengel, PhD; Lisa Chow, MD;

Background

Little is known about differences in regional body composition between trained and sedentary normal weight adults. We hypothesized that trained humans would have less fat and be more insulin sensitive than sedentary human with the same BMI.

Methods

Twenty-one (10M/11F) aerobically trained (>45 minutes of running 5 days/week) participants were matched on age (22.5±3), and BMI (22.2±2.4) with sedentary (9M/9F) participants. We compared regional body composition, including visceral fat, measured by dual energy X-ray absorptiometry (DXA) and insulin sensitivity (Mlbsm) measured by hyperinsulinemic euglycemic clamp between activity groups.

Results

The sedentary group had a higher percent body fat (28.3±7 vs 21.5±6 percent, p=0.01) higher android fat (1.0±0.4 vs 0.7±0.4 kg, p=0.01) and gynoid fat (3.1±1.1 vs 2.4±0.8 kg, p=0.03) and lower insulin sensitivity (8.9±2.5 vs 12.4±2.8 mg/kglbsm/min, p = 0.002). Trained participants had higher fat free mass (49.8±11 vs 42.3±8 kg, p=0.02). There was no difference between the groups for leg fat mass (T= 5.2±1 vs S = 5.7±2 kg, p=0.06) or visceral fat (T= 0.1±0.1 vs S=0.1±0.1 kg, p=0.57).

Conclusions

Even though participants were matched on BMI, sedentary participants had higher total and regional fat mass and decreased insulin sensitivity. Higher percent body fat in sedentary humans, even with normal BMI, decreases insulin sensitivity which could result in development of metabolic complications.

T-2380-P: Objectively Measured Physical Activity, Sedentary Time and Sleep Duration: Independent and Combined Associations with Adiposity in Canadian Children
Jean-Philippe Chaput, PhD; Genevieve Leduc, PhD; Charles Boyer, MA; Allana G. LeBlanc, MSc; Michael M. Borghese, MSc; Mark S. Tremblay, PhD;

Background

The objective of this study was to examine independent and combined associations among objectively measured movement/non-movement behaviors (moderate- to vigorous-intensity physical activity (MVPA), total sedentary time and sleep duration) and adiposity indicators in a sample of Canadian children.

Methods

A cross-sectional study was conducted on 507 children aged 9-11 years from Ottawa, Canada. Movement/non-movement behaviors were assessed using an Actigraph GT3X+ accelerometer over 7 days (24-h protocol). Outcomes included percentage body fat (bioelectrical impedance) and waist-to-height ratio.

Results

After adjustment for age, sex, ethnicity, maturity offset, fast food consumption and socioeconomic status, MVPA was inversely and sedentary time positively associated with adiposity indicators while sleep duration was not. However, only MVPA remained significantly associated with adiposity after additional adjustment for the other (non)movement behaviors. Combined associations using tertiles of the three (non)movement behaviors showed that higher levels of MVPA were associated with lower adiposity, irrespective of sedentary time and sleep.

Conclusions

Higher levels of MVPA were associated with lower adiposity regardless of sedentary time and sleep duration. Future efforts of obesity reduction might want to focus more on increasing MVPA than on reducing sedentary time or increasing sleep duration to maximize the effectiveness of interventions.

T-2381-P: Gender Differences in Physical Fitness in Preadolescent Children Ages Eight to Eleven

Shayna Darnell, M.S.Ed.; Chantis Mantilla, PhD; Arlette Perry, Doctorate in Exercise Physiology;

Background

Gender differences may be important to consider when designing effective physical fitness programs aimed to motivate children to be more physically active. This study assessed gender differences in several physical fitness measures in prepubescent elementary school children.
Methods

A sample of 105 healthy second through fifth grade students (mean age= 9.8 years) enrolled in a YMCA after-school program was recruited. Physical fitness measures included: two-minute walk, handgrip strength, curl-ups, wall sit, vertical jump, shuttle run, and sit-and-reach. A two-way multivariate analysis of variance was used to assess differences in physical fitness measures by gender (boy and girl) and age (8, 9, 10, 11, and 12 years). A Wilks Criterion examined the effects of gender and age on the multivariate response variable consisting of the combined physical fitness measurements. An Alpha priori [image inserted here] 0.05 was chosen for significance.

Results

The main effects of gender on fitness variables was statistically significant in curl ups (p= 0.032), vertical jump (p=.002), sit-and-reach (p= 0.001), wall sit (p= 0.018), and right handgrip (p= 0.022). Results showed that muscular endurance and power performance was greater in boys and flexibility was greater in girls. The main effects of age on the fitness variables and the interaction of age and gender on the fitness variables were not statistically significant.

Conclusions

Results showed that gender differences were present in preadolescent children. This emphasizes the importance of creating gender specific physical fitness programs to allow for greater gains in fitness outcomes.

T-2382-P: Relationship Between Self-Reported Activity, Objectively-Measured Activity and Treadmill Performance in Severely Obese Subjects

Lance Davidson, PhD; Michael J. LaMonte, PhD; Kristen A. Ouellette, PhD; Steven C. Hunt, PhD; Ted D. Adams, PhD, MPH;

Background

Typical daily physical activity (PA) reported in recall questionnaires is commonly used to assess PA energy expenditure and estimate fitness in severely obese individuals. The extent to which objective or subjective measures of PA predict submaximal treadmill performance needs to be evaluated.

Methods
A subset of 156 participants (45+10 yrs, 127+24 kg, 82% female) from the Utah obesity study, a 10-year prospective cohort trial of gastric bypass patients and severely obese controls, wore a pedometer (Digiwalker) and accelerometer (Caltrac) for at least two consecutive weekdays and one weekend day at baseline for the purpose of validating a self-reported physical activity questionnaire. Timed, graded exercise tests were also performed to 80% of estimated maximal heart rate.

**Results**

After controlling for age and sex, Digiwalker steps \((r=0.21, p=0.009)\), but not Caltrac kcals, were associated with treadmill duration. Digiwalker and Caltrac were associated with each other \((r=0.23, p=0.004)\), but neither were significantly related to self-reported moderate-vigorous daily PA. Subjective recall of typical light, moderate, or vigorous PA were not associated with either objectively-measured PA or treadmill duration.

**Conclusions**

Questionnaire-based, self-reported assessment of PA in severely obese subjects does not appear to represent accelerometer or pedometer-based measurements of daily PA or energy expenditure. Average steps taken per day is the best, albeit poor, predictor of treadmill performance.

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**T-2383-P: Relation of Autism Spectrum Disorder Severity and Risk for Overweight and Obesity**

*Kelsey Borner, MA; Cathleen Odar Stough, MA; Katrina Poppert, BA; Meredith Dreyer Gillette, PhD; Rebecca Swinburne Romine, PhD; Cy Nadler, PhD; Ann Davis, PhD;*

**Background**

Youth with autism spectrum disorders (ASD) have an increased risk for overweight/obesity. The current study examined whether severity of ASD symptoms relates to increased risk for overweight/obesity and health behaviors related to weight management.

**Methods**

Caregiver-report of child height/weight, vigorous physical activity (VPA), and electronic device use for children with ASD between 10-18 years of age from the 2011-2012 National Survey of Children's Health was examined \((n = 95,677)\). Children were 82% male and 62% Caucasian \((M \text{ age} = 10.31, SD = 3.95)\). All variables were categorical, and logistic regressions were used in analyses.

**Results**
There was no difference in rate of overweight ($Wald = .29, p = .59$) or obesity ($Wald = .11, p = .74$) based on ASD severity. Children with moderate to severe ASD were more likely to engage in VPA zero days per week ($Wald = 6.81, p = .01$). Children with moderate to severe ASD were more likely to use electronic devices 4 hours or more per day ($Wald = 4.14, p = .05$), and children with mild ASD were more likely to use electronic devices 1 hour or less per day ($Wald = 6.67, p = .01$).

**Conclusions**

Severity of ASD does not predict overweight/obesity, but does relate to specific health behaviors (VPA and electronic device use). Even if ASD severity does not directly predict weight status, an increased risk for a less healthy lifestyle suggests a need for targeted prevention and intervention.

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**T-2384-P_DT: White Rice Intake, Abdominal Obesity and Diabetes Among Chinese Adults**

*Fei Dong; Annie-Green Howard, PhD; Amy H. Herring, ScD; Barry M. Popkin, PhD; Penny Gordon-Larsen, PhD, FTOS;*

**Background**

Studies examining associations between white rice consumption with abdominal obesity and diabetes have found inconsistent results. To address this association in high rice consuming areas, such as China, most studies have focused on a single city or province.

**Methods**

In this cross-sectional study of 7860 Chinese adults (18-98 years), we examined the associations between white rice intake with abdominal obesity and diabetes among adults living in 3 regions of China with variation in rice intake. We collected fasting blood glucose for diabetes (>=126mg/dl), measured anthropometry for abdominal obesity via Asian cutpoints (waist circumference>=90cm men; >=80cm women), and rice consumption via three 24-hour recalls. Odds of abdominal obesity and diabetes were estimated with logistic regressions comparing participants with high (>=250g/d), medium (150-<250g/d), and low (<150g/d) white rice intake, adjusting for sociodemographics, diet, and physical activity.

**Results**

Prevalence of abdominal obesity and diabetes were 43.5% and 7.5%, respectively. We found inverse associations between rice intake and abdominal obesity in the Central [OR=0.67 (95% CI: 0.50-0.89)] and Southern OR=0.70 (0.54-0.90) regions, and rice intake and diabetes prevalence in Central OR=0.48 (0.30-0.78) and Southern OR=0.50 (0.30-0.84) regions.

**Conclusions**
Elevated white rice consumption was associated with lower prevalence of abdominal obesity and diabetes in certain regions of China, which could have implications given that white rice is a staple food in many parts of China.

T-2385-P_DT: Dietary Quality and Socio-Economic Factors in Relation to White Blood Cell Counts and C-Reaction Protein in the Chinese Populations

Shufa Du, MD; Allison E. Aiello, PhD; Zhihong Wang, MD; Amanda L. Thompson, PhD; Barry M. Popkin, PhD;

Background

Socioeconomic stressors and poor nutrition may have detrimental impacts on the immune system and subsequently on overweight risk, suggesting that they may be important mediating factors in the pathways among social determinants, diet, and cardiometabolic health.

Methods

Data from a subgroup of 8,048 adults aged 18 and older who provided blood samples in the 2009 China Health and Nutrition Survey and were not pregnant or ill in last 24-hours were used to explore whether socioeconomic and dietary factors influence immune function (WBC and CRP) in a Chinese population. WBCs were counted with Beckman Coulter and high-sensitivity CRP measured with Hitachi 7600 automatic analyzer. Detailed dietary data were collected by using three consecutive 24-hour recalls in combination with weighing household inventory. General linear and logistic regressions were used to analyze the relationship between socioeconomic and dietary factors and immune markers.

Results

On average, 12.9% of participants had moderate CRP elevations (3-10 mg/L) and 3.1% acute elevations (>10mg/L). Those with higher income quintiles had lower WBC counts (p=0.0024) and were less likely to have elevated CRP (OR=0.802, 95% CI=0.658 -0.977, 4th quintile vs. 1st quintile) (similar results for higher education), controlling for age, sex, body mass index, smoking, and drinking status. Dietary quality was not significantly associated with WBC and CRP.

Conclusions

Lower income and education are associated with alterations in immune function as indicated by higher CRP and higher WBC. Further studies should assess whether CRP and WBC are on the pathways between low income and overweight and obesity in the Chinese population.
T-2387-P: Changes in the Consumption of Sugar-Sweetened Beverages and Sweets Among Children Enrolled in WIC, 2009-10 and 2012

Sally Findley, PhD; Mary Ann Chiasson, DrPH; Jackson Sekhobo, PhD; Natasha McLeod, BA;

Background

Increased consumption of sugar-sweetened beverages and sweets is linked with weight gain in young children. Since January 2009, New York WIC reduced the amount of juice purchases and enhanced recommendations not to give sugar-sweetened beverages and sweets to children.

Methods

1322 caregivers of infants participating in New York WIC were interviewed at randomly selected WIC sites in 2 waves, 2009-10 (n=664) and 2012 (n=658). Children averaged 21.2 months, 59% were Latino, 18% Black, 17% White. Caregivers were asked about their socio-demographic characteristics, child screen hours, infant feeding patterns, and child's current diet. We used backward stepwise logistic regression to estimate significant predictors (p<.05 or p<.01) of daily consumption of sugar sweetened beverages (n=879) and of sweets (n=856).

Results

Daily consumption of sugar-sweetened drinks dropped from 31.8% to 15.3%(Chi-2=37.6) and of sweets from 22.6% to 10.4%. (Chi-2=20.2) Being in WIC in 2012 (OR=1.13) and enrolled from birth (OR=1.06) were predictors of reduced consumption of sweet drinks, but not of sweets. Reduced consumption of sweet drinks was predicted by screen hours (OR=1.45) and not being breastfed(OR=0.68). Consuming sweets less often was also predicted by low screen hours (OR=-0.51) and by delayed introduction of solids(OR=2.73), and mother not foreign born(OR=0.53).

Conclusions

The changes to WIC appear to be having an impact on consumption of sweetened beverages and sweets, but the influence on each of these is mediated by different variables. WIC impact on sweetened beverage consumption is stronger in 2012, but has not changed for sweets.
T-2388-P: In Men, but Not Women, Dietary Quality is Associated with Cardiovascular Disease Protection but This Relationship is Accounted for by BMI

Alexis C. Frazier-wood, PhD; Jihye Kim, M.P.H.; Jennifer Davis, PhD; Su Yon Jung, PhD; Shine Chang, PhD, FTOS;

Background

The role of BMI in the association between overall dietary quality and cardiovascular disease (CVD) risk is not clear. We aimed to better understand the relationship between dietary quality, BMI and CVD risk while also correcting for gender-specific underreporting of total dietary intake.

Methods

Dietary quality was assessed by the USDA Healthy Eating Index (HEI) on 9,789 non-pregnant adults (ages>20y) from the nationally representative National Health and Nutrition Examination Survey (NHANES) 2005-2010. CVD risk factors included blood pressure, fasting glucose and insulin, homeostatic model of insulin resistance (HOMA-IR), total cholesterol, HDL- and LDL- cholesterol (HDL-C and LDL-C) and C-reactive protein (CRP). We residualized risk factors for covariates including age, and used the population ratio approach (which adjusts for underreporting of intake) to compare mean HEI score between the top and bottom quartiles. We present FDR corrected Q values to correct for multiple testing.

Results

In women, total HEI score (a measure of overall dietary quality) was not associated with any CVD risk factors (all Q>.11). In men, total HEI score was associated with covariate-adjusted residuals for fasting insulin (Q<.001), HOMA-IR (Q<.001), HDL-C (Q=.01), TG (Q=.03) and CRP (Q<.001). When we additionally adjusted these risk factors for BMI, however, the association with total HEI score was not significant (all Q>.10).

Conclusions

Overall dietary quality is associated with specific CVD risk factors in men, but not women. We also show that the association of BMI with CVD risk attenuates the relationship between CVD risk and diet, suggesting BMI, rather than overall diet quality, as the primary target for CVD prevention.
T-2389-P: Independent Associations of Physical Activity, Cardiorespiratory Fitness, Weight Changes and Diet Composition on the Metabolic Status of Overweight & Obese Young Adults over a 20 Year Follow-up

Michael Fung; Chris I. Ardern, PhD; Jennifer L. Kuk, PhD;

Background

The longitudinal and independent associations of modifiable risk factors on the transition to metabolically healthy overweight/obese (MHO) versus metabolically abnormal overweight/obese (MAO) are unknown.

Methods

We sought to determine the independent associations of changes in physical activity, cardiorespiratory fitness (CRF), body mass index, and diet composition on the transition to MHO versus MAO. Study participants were 1358 adults from the CARDIA study who had 20-year follow-up data, were healthy at baseline, and were overweight or obese at the 20 year follow-up. MAO was defined as 2 or more of the following risk factors at follow-up: high triglycerides, low high-density lipoprotein cholesterol, high low-density lipoprotein cholesterol, elevated blood pressure, high plasma glucose, or insulin resistance by the homeostasis model assessment.

Results

At follow-up, 53% of participants were MAO. Individuals who were un-fit at follow-up (un-fit to un-fit: OR(95%) = 3.4, 2.3–5.0; un-fit to un-fit: OR(95%) = 1.9, 1.4–2.8) were more likely to become MAO at follow-up compared with individuals who remained fit. Individuals who gained weight (OR(95%) = 3.3, 2.3–4.8) or cycled their weight (OR(95%) = 1.7, 1.1–2.6) from baseline to follow-up were more likely to become MAO at follow-up compared with individuals who maintained a stable weight or lost weight.

Conclusions

Focusing on having a high CRF and avoiding weight gain may be important in overweight and obese individuals in early–mid adulthood to prevent the transition to metabolically unhealthy.
T-2391-P: What’s Emotion Got to do with Eating and Drinking?

Marcia Greenblum, MS, RD;

Background

By exploring the realities of a specific populations' eating and drinking behaviors and the emotions that guide their food choices and lifestyle behaviors, experts may be able to develop dietary guidance that is informed, actionable, and achievable.

Methods

Americans between 18-80 years of age (balanced to be consistent with census data representative of the US population) completed a 23-minute, English only, online survey. Sample size included 2,856 respondents, which included 8,135 eating and drinking occasions during March 10th through April 14th, 2013. The population parameters used for weighting include: gender, age, income, education, Hispanic, race, marital status, region (four census regions).

Results

People are at least somewhat thoughtful about the food they ate and generally believe they ate the right amount despite their weight status. Over 40% of occasions leave the person feeling full, perhaps an indication of over eating, yet obese respondents show only a slightly higher tendency to over eat compared to other BMI groups. Feeling full was more frequently mentioned by non-Hispanics versus Hispanics. While only 10% of eating occasions leave a person feeling hungry, young adults are the most likely to report feeling hungry post consumption.

Conclusions

There are a variety of emotions associated with eating and drinking occasions. Knowing which emotions are most frequently associated with pre and post eating behaviors can help to predict behavioral challenges and potential opportunities for eating and drinking occasion satisfaction.

T-2392-P: Sugary Drink and Childhood Obesity in the United States: NHANES 2003-2010

Tung-Sung Tseng, DrPH; Hui-Yi Lin, PhD; Tzu-Hua Juan, MS, MPH; Lauren Griffiths, BS; Kaylee A. Doback, MPH; Nicole Pelligrino, MPH; Jovanny Zabaleta, PhD; John Estrada, MD; Melinda S. Sn, PhD;
Background

Studies show obesity prevalence for children increased dramatically since 1970. The association between sugary drinks and obesity in different childhood age groups remains inconclusive. Childhood obesity is alarming as lifetime eating and exercise habits are likely established during this period.

Methods

The primary objective of this study was to evaluate the association between childhood obesity and sugar intake from sugary drinks. The National Health and Nutrition Examination Survey (NHANES) 2003-2010 was used. A total of 3,527 children aged 2-5 years; 4,506 children aged 6-11 years; and 6,892 children aged 12-19 years were included. For each participant, daily total energy, daily total sugar consumption and intake frequency were calculated. All analyses were weighted to account for the complex sampling design.

Results

Prevalence of overweight/obese was lower among children aged 2-5 years (25.23%) compared to children aged 6-11 years (37.06%) and 12-19 years (37.57%). Overweight/obese children consumed a higher proportion of sugar from drinks than normal weight/underweight children, especially children aged 6-11 years (P<0.001). Mean sugar intake from drinks for overweight/obese and normal weight/underweight children aged 6-11 years were 67 (SD=1.3) and 60 (SD=0.8) grams a day, respectively. The 2-5 years age group had the lowest rate of overweight/obese.

Conclusions

Our findings confirm a positive association between sugar intakes from sugary drinks and obesity in children aged 6-11 years. Future obesity interventions for children may target reducing sugary drink intake, especially in children aged 6-11 years.

T-2393-P: Comparing the Effects of Drinking Diet Soda Versus Regular Soda on Type 2 Diabetes: Systematic Review and Meta-Analysis of Prospective Cohort Studies

Erik Hemmingsson, PhD; Katherine Trant, MSc;

Background
While studies show a consistent association between drinking regular soda and increased risk of type 2 diabetes, there is considerable uncertainty about the effects of drinking artificially flavored diet soda.

Methods

Systematic review and meta-analysis of prospective cohort studies that quantified independent risks of drinking diet soda and regular soda, respectively, for incidence of type 2 diabetes. Pubmed searches using the search terms 'diet soda', 'artificially sweetened beverage', 'metabolic syndrome' and 'type 2 diabetes' were carried out, resulting in four prospective cohort studies with seven separate cohorts (n=235,689). Both authors performed independent data extraction by using a predefined data template. We extracted and pooled hazard ratios from doses of drinking 1 (diet and/or regular) soda per day vs. drinking 1 per week using a random effects model.

Results

The hazard ratios of the seven individual cohorts ranged from 1.21-1.74 for regular soda, and from 1.59-2.21 for diet soda. Using the random effects model, the overall risk estimate for regular soda was 1.45 (95% CI: 1.30-1.62), and 1.82 (1.69-1.96) for diet soda, P=0.001 for comparison regular soda vs diet soda. Heterogeneity (I2) was 62% (P=0.02) and 70% (P=0.003) for regular and diet soda, respectively. Egger’s test for presence of publication bias was not significant (P=0.69).

Conclusions

Drinking one artificially-sweetened diet soda per day was associated with an 82% increased risk of type 2 diabetes, significantly exceeding the risk of drinking regular soda (45% increased risk).

T-2394-P: Childhood Obesity and Related Behaviors are High among Underserved, Minority Communities in Texas

Deanna M. Hoelscher, PhD, RD, LD; Nancy F. Butte, F, PhD; Sharma Shreela, PhD, RD; Sarah Barlow, MD, MPH; Elizabeth A. Vandewater, PhD; Eric Finkelstein, PhD; Terry T. Huang, PhD, MPH, CPH, FTOS; Stephen J. Pont, MD, MPH; Courtney E. Byrd-Williams,

Background

Recent NHANES data show the prevalence of childhood obesity has stabilized, with some age groups (2-5 yr) showing decreases in 2011-2012. NHANES data are nationally representative, but do not adequately represent underserved, minority populations in low-income communities.

Methods
The study objective is to report the prevalence of obesity and related behaviors among children from low-income communities in Austin & Houston, TX. As part of the TX Childhood Obesity Research Demonstration (CORD) study, community catchment areas with high numbers of Medicaid-eligible children aged 2-12 were identified in both cities. Children and their parents from Head Start centers (3-5 yr) & elementary schools (grades 2 & 5) in these areas were recruited to participate in a cross-sectional assessment in 2012. Child height and weight were measured; obesity was defined as a BMI >=95th percentile. Diet, physical activity, and other behaviors were ascertained by a validated parent survey.

**Results**

Study population included 685 preschool, 485 2nd grade, and 391 5th grade parent-child dyads, about 80% Hispanic, 15% African American; >80% of families reported ≤ $25,000 annual income. Obesity rates among 3-5 yr olds, 2nd and 5th graders were 19.0, 28.3, and 35.2%, respectively, and 8.1, 7.1, & 6.7% were ≥99th %ile. Over 60% of parents reported TV in the child's bedroom, and servings of sugar-sweetened beverages exceeded 1/day. In general, obesity-related behaviors were more prevalent among 5th graders compared to preschoolers.

**Conclusions**

Obesity prevalence among underserved, minority children aged 2-12 in Texas greatly exceeds national rates, reinforcing the need for integrated, community-based obesity prevention initiatives with systems-level support beginning in early childhood. Funded by CDC.

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**T-2395-P: The Relationship of User Preference to Compliance with a 24-Hour Dietary Recall and an Ambulatory Bite Count Method of Tracking Eating Activity in Non-Dieting Adults**

*Bjoern Horing, PhD; Jenna L. Scisco, PhD; Eric Muth, PhD;

**Background**

Lack of compliance with measurement protocols in recording eating behavior jeopardizes internal validity and therefore the assessment of causal factors. This analysis compares compliance with an established method (dietary recall) versus a validated ambulatory measurement device (Bite Counter, BC).

**Methods**

83 participants in a gender/age/BMI-representative sample recorded normal (non-dieting) eating behavior for two weeks. This resulted in a total of 4242 eating activities, with an average of 51 meals per person.
Meals were registered by 24-hour dietary recall (ASA24) to yield kcal estimates, and by BC to yield the number of bites taken. 475 activities were registered by ASA24 only, 360 by BC only, 3407 by both. Depending on mode of registration, meal characteristics (kcal or bites) were cross-compared. Compliance with both methods was examined with and without consideration of the participants' preferences for one or the other. Possible predictors of compliance and preference were analyzed.

**Results**

Meals registered only with BC took fewer bites than those registered with both measures (30 vs 40 mean bites; p<.001, d=0.65). Likewise, meals registered only with ASA24 had fewer kcal than those registered with both measures (461 vs 566 mean kcal; p=.002, d=0.44). There was a nonlinear association of compliance with either method with an asymptotic distribution: People neglecting one measure tended to more strongly rely on the other. Preference for one method was associated with compliance if the method was ASA24 (p=.018, d=0.57) but not BC.

**Conclusions**

Smaller meals seem less likely to be registered by non-dieting participants. Compliance with measurement protocol does not decline linearly; instead, non-compliance in one measure tends to be compensated by the other. Using methods complementarily could increase overall coverage of eating activities.

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**T-2396-P: Increased Meal Frequency and Breakfast Consumption Linked to Healthier Dietary Intakes and Decreased Obesity Risk in College Freshmen**

*Benjamin T. House; Natalie S. Poulos, MS, RD; Grace E. Shearrer, BS; Keryn E. Pasch, PhD M.P.H; Jaimie N. Davis, PhD R.D;*

**Background**

Previous research on meal frequency and breakfast consumption has yielded mixed results and limited data is available in college freshmen. This is an understudied population, particularly susceptible to poor overall health. Furthermore, behavioral choices formed during this period are likely to continue throughout adulthood and may affect chronic disease risk later in life.

**Methods**

A cross-sectional sample of college freshmen (n=1,086, age=19; 50% non-Hispanic White, 20% Hispanic, 22% Asian, 3% non-Hispanic Black, 5% other; 58% Female) from UT-Austin self-reported height and weight and variety of dietary behaviors including: meal frequency, breakfast, soda, fruit, and vegetable consumption via an online survey. Chi-square and binary regression analyses were run to investigate the
relationship between meal frequency and breakfast consumption with dietary intakes and BMI parameters. The following *a priori* covariates were included: study year, sex, and ethnicity.

**Results**

Subjects who always consumed breakfast compared to those who sometimes or never consumed breakfast had higher fruit and vegetable (FV) intakes ($p\leq0.01$), less soda intake ($p\leq0.01$), and a lower prevalence of overweight/obesity (ow/ob) ($p\leq0.01$). Similarly, those who ate 3 or more meals per day compared to those who ate 2 or less meals per day had higher FV intake ($p\leq0.01$), less soda intake ($p\leq0.01$), and a lower prevalence of ow/ob ($p\leq0.05$). Furthermore, after controlling for covariates, subjects who always ate breakfast were 2.3 times less likely to be ow/ob than those who never ate breakfast ($p\leq0.01$) and those who ate 3 or more meals per day were 1.4 times less likely to be ow/ob compared to those who ate 2 or less meals per day ($p\leq0.05$).

**Conclusions**

In a population of college freshmen, both increased meal frequency and breakfast consumption were associated with healthier dietary intakes and lower prevalence of ow/ob. These findings elucidate that increased meal frequency and breakfast consumption may be associated with a healthier lifestyle and decreased obesity risk in an understudied and high-risk population, thus further research in this area is warranted.

**T-2397-P: Risk Profiles for Weight Gain Among Postmenopausal Women: A Classification and Regression Tree Analysis Approach**

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**Background**

Risk factors for weight gain are typically evaluated individually while ‘adjusting for’ the effect of other confounding factors, and few studies have created clustered risk profiles. We identified subgroups of postmenopausal women homogenous in their clustered risk factors for gaining $\geq 3\%$ weight.

**Methods**

This study included 612 postmenopausal women 50-79 years old, enrolled in an ancillary study of the Women's Health Initiative Observational Study between February 1995 and July 1998. Classification and regression tree and stepwise regression models were built and compared.
Results

The factors significantly related to >= 3% weight gain were weight change in the past 2 years, dietary fiber, and smoking. In women of < 65 years, less than 4 kg weight change in the past 2 years sufficiently reduced risk of >= 3% weight gain. Different combinations of risk factors related to weight gain were reported for subgroups of women: women of >= 65 years (< 9.8 g/day dietary factor), African Americans (currently smoking), and white women (>= 5 kg weight change for the past 2 years).

Conclusions

Our findings suggest specific characteristics for particular subgroups of postmenopausal women that may be useful for identifying those at risk for weight gain. The study results may be useful for targeting efforts to promote strategies to reduce the risk of obesity and weight gain.

T-2398-P: Dietary Factors Impact the Change in Circulating Basal Glucose and Insulin Over Time

Sridevi Krishnan, PhD; Chad M. Paton, MD; Jamie A. Cooper, PhD;

Background

Basal insulin increases two-fold when a healthy individual becomes insulin resistant, type 2 diabetic (T2DM), or develops impaired fasting glucose. We aimed to identify dietary factors that impacted fasting insulin and glucose.

Methods

We obtained public-use dataset from Atherosclerosis Risk in Communities (ARIC) study from BioLINCC. Diet intake data were collected between the years 1989-1991 (baseline), along with fasting glucose and insulin. These fasting parameters were also measured at a 10-year follow-up. We used 3,683 non-diabetic (<100mg/dL fasting glucose at baseline) volunteers. Percent change in fasting glucose and insulin between baseline and follow-up were predicted using stepwise multiple linear regression using diet intake at baseline as input variables.

Results

Intake of select medium chain fatty acids (C6:0, C8:0) contributed to reducing insulin from baseline to follow-up (C6:0 - $\beta$-weight: -0.257, p=0.04, C8:0 - $\beta$-weight: -0.169, p=0.05). Dairy carbohydrate, lactose ($\beta$-weight: 0.076, p=0.02), and butyric acid ($\beta$-weight: 2.229, p=0.05), also found predominantly in dairy products, contributed to increases in insulin over time. Overall starch intake ($\beta$-weight: 0.074, p=0.05) as well as total fat intake ($\beta$-weight: 0.696, p=0.04) contributed to a positive change in insulin from baseline...
to follow-up. Circulating fasting glucose increased with trans-fatty acid intake ($\hat{I}^2$-weight: 0.048, p=0.04), while no other significant contributors were identified.

Conclusions

Trans-fat intake contributed to increasing fasting blood glucose. Select medium chain fatty acid intake reduced fasting insulin. However, intake of total fat and starch, and sugars and short chain fatty acids, primarily from dairy sources increased fasting insulin. Lactose and butyric acid intake may need to be evaluated with respect to circulating insulin concentrations.

T-2399-P: The Untold Story of BMI Variation among Canadian Adults

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Background

Previous analyses reported limited information whether the evolution of BMI is shared equally across Canadian populations and regions. We describe changes in BMI across all segments of the BMI distribution separately for women and men, and between provinces.

Methods

We used the Canadian Community Health Survey (CCHS, 2001-2012), to compute BMI of adults women (n= 225,323) and men (n= 203,781) comprised between 25 and 65 years old for each Canadian provinces. Quantile-Quantile plots were used to explore the evolution of the BMI percentiles between cycles.

Results

Preliminary results showed a large majority of groups increased in mean BMI, and BMI values at 95th percentiles over time. Much larger changes in BMI values were observed at the 95th percentile. Important differences were found according to sex, education level and provinces. The rise at 95th percentile was sometime larger among adults with the highest education level than less educated people from the same province. Although mean BMI is lower in Canada, trends in variation are similar to what was observed in the USA.

Conclusions

The population weight gain is occurring more importantly among those with already high baseline BMI levels. Studies that characterize population change should examine patterns of change across the entire distribution and not just global average trends.
T-2400-P: Relationship between Zinc Concentrations in Hair and Obesity in Chilean Older Men

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Background

Some researchers have studied association between Zinc (Zn) level concentrations and body composition in adults. Zn has important effects on metabolism in the development of obesity. The aim of this study was to evaluate the relationship between Zn levels concentrations in hair and obesity in Chilean older men.

Methods

Zn concentrations in hair were assessed in 67 older men (aged 60-83 y); 25 obese (BMI<30 kg/m2) and 42 non-obese men (37.3% and 62.7%; respectively). The concentrations level of Zn was measured using atomic absorption spectroscopy and body composition was calculated using dual energy x-ray absorptiometry (DXA). Abdominal obesity was defined as Android fat (upper-segment body fat distribution) and Gynoid fat (lower-segment body fat distribution). Logistic regression analysis was used to estimate associations between obesity and concentrations of Zn in hair.

Results

The mean ± SD age of participants was 66.6 ± 6.9 years. The mean ± SD BMI in obese and non-obese participants were 33.5 ±3.0 kg/m2 (95%CI: 30.1-40.8) and 25.8±2.0 kg/m2 (95%CI: 21.6-27.9); respectively. We found that the hair Zn concentrations in obese men were lower than in non-obese men (183.5±76.2 and 210.5±45.1 µg; respectively; p=0.057). Adjusting by age (OR=1.0; 95%CI: 0.89-1.10), percentage Gynoid fat (OR=0.9; 95%CI: 0.74-1.12) and percentage Android fat (OR=1.3; 95%CI: 1.03-1.52), the median of Zn (OR=10.6; 95%CI: 1.96-57.84) were associated inversely with obesity.

Conclusions

Our results suggest that Zn level concentrations may play an important metabolic role in the development of obesity in older men people.

T-2401-P: The Relationship between Fast Food and Breakfast Consumption and Selected Biomarkers in Adolescents
Leslie A. Lytle, PhD; Donald Dengel, PhD; Kian Farbakhsh, MS; Kara L. Marlatt, M.S.;

Background

Eating breakfast and reducing or eliminating the consumption of fast food are behaviors that are related to the risk of obesity. The relationship between these behaviors and biomarkers, including those related to diabetes and cardiovascular disease, is understudied in adolescents.

Methods

The relationship between eating breakfast and fast food consumption was examined in a sample of 367 adolescents participating in an etiologic study of obesity risk. The mean age of the sample was 14.7, and the sample was 51% male and 88% white. Breakfast and fast food consumption was assessed using a self-report survey. Anthropometrics were assessed at a clinic visit and lipids, glucose, insulin, and HOMA were assessed from a fasting blood sample. Multivariate analyses were conducted using each biomarker as the dependent variable and including breakfast and fast food consumption as independent variables and adjusting for calories consumed and demographic as covariates.

Results

Controlling for all covariates, consuming breakfast and eating fast food was significantly related to BMI, percent body fat, LDL-cholesterol, insulin and HOMA, all in the expected directions. Neither behaviors were found to be significant predictors for HDL-cholesterol or glucose. Eating breakfast was inversely related to triglycerides. Some gender differences were seen.

Conclusions

Breakfast and fast food consumption appear to be related to important biomarkers in a sample of healthy adolescents. The importance of this finding needs to be validated by examining the stability of this pattern over time and to assess the pattern in other population groups.

T-2402-P: Low Calorie Sweetener (LCS) Use among Adults in the United States: NHANES 2007-2010

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Background
Reported use of Low Calorie Sweetener (LCS) in beverages in the U.S. is increasing, however many other sources of exposure to LCS exist within the average diet. Using NHANES data we sought to assess LCS use more broadly in total reported U.S. dietary intake.

**Methods**

The first day of 24-hour recall data weighted to the US population from NHANES (2007-2010) was employed to assess the use of manufacturer-added (MA), consumer-added (CA) or both MA & CA (both) LCS in beverages and foods (items). All items consumed in self-reported eating occasions were assessed using the USDA *What We Eat in America* food files. The adult sample (n=11,241) was further investigated for trends. An estimated 221,440,869 items containing LCS were consumed. LCS users reported an average of 15.9+-0.2 items/day, with twice as many food (9.8+-0.1) as beverage (5.2 +-0.1) items consumed.

**Results**

LCS items were consumed by 50.9% of adults with 44.1%, 15.0%, and 8.3% consuming items with MA, CA and both LCS types, respectively. Over 60% of the LCS users reported consuming only 1 LCS item/day (58.5% MA; 67.1% CA). Females reported LCS items significantly more than males (P<0.0001), primarily related to intake of CA LCS in coffee, tea, and grain products (P<0.01) and MA LCS in fruit and sports drinks (not juices)(females: 62.9%; males:37.1%,P<0.01).

**Conclusions**

While the use of LCS beverages has been the focus of many reports, understanding overall LCS consumption behaviors, accounting for both food and beverage sources, may better inform research related to LCS use and health.

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**T-2403-P: Determinants of Weight Loss among Overweight and Obese Youth Over a 2-year Period**

*Jonathan Mcgavock; Andrea MacIntosh, BSc, BA; Brian Torrance, Mr, MSc;*

**Background**

The factors that contribute to weight loss in the absence of a structured intervention in overweight and obese youth are poorly understood. The purpose of this study was to determine predictors of weight loss as measured by change in BMI in overweight and obese youth.

**Methods**

This is a two-year prospective cohort study (n=171) of overweight and obese youth aged 9-15 years. The main exposures were accelerometer measured physical activity intensity and cardiorespiratory fitness. The
primary outcome measure was remission to healthy weight status. We defined remission as youth initially with a BMI classification of overweight or obese who, at the conclusion of 2 years, had a BMI classification of healthy weight. Secondary outcome measures included body weight, BMI Z score, and waist circumference.

**Results**

Among the 171 youth studied (11.7 years; BMI Z-score = 1.6), 38 (22%) experienced a decrease in BMI over the 2 year follow-up period. Participation in moderate to vigorous physical activity at baseline was associated with an increased odds of a change in BMI (OR: 1.03; 95% CI: 1.00-1.06), and the change in fitness over the 2 years was also associated with an increased odds of weight loss (OR: 1.51; 95% CI: 1.07-2.16), compared to youth that experienced weight gain.

**Conclusions**

A decrease in BMI was observed in 22% of overweight/obese youth, over a two year follow-up, without a structured intervention. A decrease in BMI was associated with higher levels of moderate to vigorous intensity physical activity and an increase in fitness levels over time.

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**T-2404-P: Association between Sedentary Behaviour and Abdominal Obesity in Preschool Children**

*Jorge Mota, PhD; Silva-Santos S of PhD; Susana Vale, PhD;*

**Background**

The aims of this study were to analyze the association between Sedentary Behavior (SB) and Waist-height ratio (WHR) in a sample of preschool children.

**Methods**

This study comprised 636 preschool children, aged from 4 to 6 years old. WHR was calculated as the ratio of waist (cm) and height (cm) and cutoff of 0.5 was used to define abdominal obesity (WHR>=0.5 - higher risk). SB was measured during 7 consecutive days using the GT1M ActiGraph accelerometer. Analysis of covariance was used in both sexes to determine the association between SB and WHR.

**Results**

Using the WHR, the prevalence abdominal obesity was 56.7% and 40.7% for girls and boys, respectively. Girls classified as having abdominal obesity (WHR >=0.5) spent more time (minutes) in SB, adjusted by age (p<=0.001).
Conclusions

Our data suggested that sedentary behaviour is higher among preschool girls classified as having abdominal obesity.

T-2405-P: Long-Term Impact of Egg Consumption on Lipid and Glucose Levels in Healthy Adults

Melanie M. Mott, RD; Martha R. Singer, MPH, RD; M Loring L. Bradlee, MS; Lynn L L. Moore, DSc, MPH;

Background

US Dietary Guidelines limit dietary cholesterol intake to <300 mg/day to reduce CVD risk. Since eggs are the primary source of dietary cholesterol, restricting intake is often recommended. This study examines the impact of egg consumption on fasting glucose (FG) and lipid levels in adults.

Methods

Subjects (n=1905), ages 30 to 64 with available 3-day diet record data in the prospective Framingham Offspring Study were included; those with diabetes or CVD or taking lipid-lowering drugs were excluded. Lipid levels (LDL, triglycerides (TG), the LDL:HDL ratio) and FG were assessed at baseline and 4 years later. ANCOVA models were used to control for potential confounding by age, sex, education level, height, physical activity, cigarettes/day, energy intake, percent of energy from fat, and other dietary factors. BMI was assessed both in stratified analyses and as a potential causal intermediate.

Results

Individuals in the highest to lowest quintiles of egg intake had similar adjusted mean LDL levels (mean: 126.3, 129.2, 129.4, 126.0, 127.6 mg/dL; p-trend = 0.851). Adjustment for BMI did not change the results (p-trend=0.980). Similarly, there was no trend across quintiles of log-transformed TGs or LDL:HDL ratio. However, mean FG in the highest egg intake quintile was lower than that in other groups (q5 vs. q1: 90.8 vs. 92.9 mg, p-trend=0.052). Adjustment for BMI strengthened the results (p-trend=0.011). Stratification by BMI had no effect.

Conclusions

This study suggests that higher egg intakes had no adverse effects on serum lipids in healthy adults. In contrast, there was a modest reduction in FG associated with higher consumption.
T-2406-P: Association between Water Consumption and Body Weight-Related Outcomes in Children and Adolescents: A Systematic Review

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Background

The consumption of water instead of sugar-containing beverages is suggested as a dietary strategy to decrease energy intake and prevent obesity in children. However, no evidence-based recommendation for water consumption exists as a means for pediatric obesity prevention.

Methods

In a systematic review we retrieved studies from four electronic databases (MEDLINE, EMBASE, CINAHL, and Cochrane), experts' recommendations, and cross-references through PubMed functions and hand-search. We included interventional or observational studies with children and adolescents aged 2 to 19 years. Studies were eligible if they investigated the association between daily water consumption and any body weight-related outcome, such as body weight, body mass index (BMI), or BMI categories. The registration number of the review at the International Prospective Register for Systematic Reviews is CRD42014009106.

Results

Out of 3032 retrieved records, we identified 13 studies consisting of four longitudinal and ten cross-sectional analyses. One non-randomized controlled study and two observational longitudinal studies showed that increased water consumption predicted a decreased risk of overweight or a lower BMI. One observational longitudinal study did not show this association. Six cross-sectional analyses found a direct association between water consumption and BMI or BMI category. Four cross-sectional analyses did not show an association.

Conclusions

On the cross-sectional level, higher water consumption seems to be associated with higher BMI. In contrast, longitudinal studies suggest a weight-reducing effect of increased water consumption. Due to the paucity of interventional studies the evidence for a causal association is still low.
T-2407-P: Levels of Physical Activity and the Prevalence of Diabetes Mellitus, Overweight and Obesity in Mexican Adults

Elvira-Ivonne Murillo-Rabago, MCS; Lucia-Margarita Valenzuela-Salas, DVM; Amanda Davila-Lezama, MC; Moises Haro, Estudant; Esteban Hernandez-Guevara, MC;

Background

The aim of this study was to evaluate the levels of physical activity (PA) on the prevalence of Diabetes Mellitus (DM), overweight (OW) and obesity (O) in a Mexican adult population.

Methods

The International PA Questionnaire (IPAQ) was applied in 789 participants. Information on their educational level (EL), civil status, age, sex and a previous diagnosis of DM were obtained. Weight and height were assessed by conventional methods and BMI (kg/m²) was calculated. The results were analyzed using the Spearman correlation coefficient with SPSS version 19.0. The mean age was 37.94, 28.4% males, 33.3% of the participants were single, 20.3% had university studies, 17% were diabetic. The average BMI was 27.4 (17.5-43.3), with 38.7% of OW and 25.3% of O. 27.4% were sedentary, 35.1% did light activity, 21.8% moderate activity and 15.7% vigorous activity.

Results

An association between any civil state except single with a prevalence of DM (p=0.001) and a higher level of BMI (OW or O) (p <0.001) was observed. The results indicated that with a higher LE a lower prevalence of DM (p<0.001), lower BMI (p<0.001) and higher levels of PA (p <0.001). The participants with higher PA had lower BMI (p<0.005) and lower prevalence of DM. Otherwise, those who had DM and O had a lower PA (p = 0.05).

Conclusions

These findings suggest that the educational level has a direct impact on PA levels and decreases the prevalence of DM, OW and O. It is possible that carrying out the PA recommendations could reduce the prevalence of DM.
T-2408-P: Level of Physical Inactivity in Children of Primary 'Plan of San Luis' from Tijuana, Mexico

Elvira-Ivonne Murillo-Rabago, MCS; Amanda Davila-Lezama, MC; Lucia-Margarita Valenzuela-Salas, DVM; Janneth-Jackeline Munoz-Vazquez, nursing student; Amaranta-Yaritza Morales-Suarez, nursing student; Maria-Carmen Hoyos-Luna, nursing student;

Background

The purpose of this study was to identify the level of physical inactivity and its impact on the prevalence of overweight and obesity in primary school 'Plan of St. Louis' in 2013.

Methods

A cross-sectional study was conducted to 110 scholars, where a survey was applied to gather information related to the level of physical inactivity. Height and weight were assessed by conventional methods and BMI (kg/m²) was calculated. The results were analyzed using the Spearman correlation coefficient with SPSS version 19.0. The mean age was 10.2 years, 59.1% were male, the average BMI was 18.44, 39% were overweight or obese (OW/O). The 6.4% of participants were cohabiting with a OW/O relative and in 84.9% of the cases it involved a parent.

Results

Regarding sedentary, participants spend an average of 10.69 (6-17) hours a day sitting, which were used on 2.71 (0-14) hours to play video games and 2.44 (1-5) hours to watch TV. An association was observed between the hours per day playing video games (p=0.01), the time devoted to watching TV (p<0.05), and time spent sitting (p=0.01) that coexist with familiar OW/O. No association was observed between BMI with the fact of cohabiting with a relative OW/O but an association was observed between higher BMI (p=0.01) and hours spent sitting per day.

Conclusions

These findings indicate that activities that fostered the level of physical inactivity were related with living in a family home with OW/O and it suggest that it is impacting indirectly on the BMI of children in this population.

T-2409-P: A Research Gap: Obesity in Children with Autism and Other Developmental Disabilities (ASD/DD)
Background

Continuing high rates of childhood obesity threaten life expectancy for most population subgroups, including those with ASD/DD, who experience substantial health disparities. Despite an explosion of research on childhood obesity, the issue has received far less attention in the ASD/DD population.

Methods

We explored research activity in the area of childhood obesity in ASD/DD by examining the extent to which publication activity has increased over the last 20 years (1994-2013). We used SCOPUS to search the literature to identify journal articles (including reviews) using relevant search terms: intellectual disability, developmental disability, autism, child, adolescent, youth, obesity, and overweight. A second search focusing on classic obesity risk factors included the aforementioned terms, except that obesity/overweight were dropped, and nutrition, diet, physical activity, exercise and sedentary behavior added. Many articles were excluded based on pre-established exclusion criteria.

Results

Over the last 20 years, we identified 66 relevant articles related to childhood obesity in ASD/DD; this number has increased steadily, from 1 article in 1994 to 17 in 2013. Articles related to diet and activity increased from 3 in 1994 to 30 in 2013 and totaled 149 over this period. By comparison, the total number of articles on childhood obesity overall published 1994 to 2013 exceeded 20,000 (and more than 30,000 when searching on childhood obesity risk factors). Large gaps in our understanding of risk factors in children with ASD/DD remain.

Conclusions

These gaps must be addressed in order to develop effective obesity prevention strategies for this population. Funding from the Maternal & Child Health Bureau created the Healthy Weight Research Network to implement a national research agenda to fuel this important area of public health research.

T-2410-P: Dietary Vitamin A, Retinol-Binding Protein 4 and Visceral Adiposity in Adolescence

Zdenka Pausova; Katie Goodwin, BSc; Michal Abrahamowicz, PhD; Gabriel Leonard, PhD; Michel Perron, PhD; Louis Richer, PhD; Suzanne Veillette, PhD; Daniel Gaudet, MD PhD; Tomas Paus, MD, PhD;
Background

Dietary vitamin A (retinol) may reduce adiposity through its impact on fat metabolism and adipogenesis; this effect may vary between visceral and subcutaneous fat and may be moderated by a variation in the retinol-binding protein-4 gene (RBP4), which regulates delivery of retinol to adipose tissue.

Methods

We studied a population-based sample of 987 adolescents in whom we assessed dietary intake of vitamin A with a 24-hour food recall (conducted by a trained nutritionist) and visceral and subcutaneous fat with magnetic resonance imaging. All participants were genotyped at the T/C variant of RBP4 (rs10882272) previously associated with circulating levels of retinol in a large genome-wide association study.

Results

Dietary intake of vitamin A was associated inversely with visceral fat (t=-2.5, p=0.01). This association was independent of age, sex, height and overall energy intake and remained significant after additional adjusting for subcutaneous fat (t=-2.8, p=0.005). When assessed separately according to the RBP4 genotype, the association was present only in homozygotes for T allele (t=-2.7, p=0.008), a variant previously associated with higher circulating levels of retinol.

Conclusions

Dietary intake of vitamin A may reduce abdominal adiposity and this effect may be specific to visceral rather than subcutaneous fat and may be present only in individuals with a particular RBP4 genotype. Further interventional studies are required to confirm these cross-sectional observations.

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T-2411-P: Packet Randomized Experiments for Eliminating Entire Classes of Unanswered Confounders

Gregory M. Pavela, PhD; Howard Wiener, PhD; Kevin R. Fontaine, PhD; David A. Fields, PhD; Jameson D. Voss, MD, MPH; David B. Allison, PhD;

Background

Although randomization is essential for causal inference, it is sometimes impractical or impossible to randomize in nutrition and obesity research. We present an alternative design that lies intermediary between ordinary observational association studies and pure randomized controlled trials.

Methods
Packet randomized experiments (PREs) improve causal inferences when randomization on a single treatment variable is not possible. PREs are useful when subjects are randomly assigned to a condition which varies in one hypothesized causal characteristic of interest, but also varies across many others. To date there has been no general discussion of this experimental design, including its strengths, limitations, and statistical properties. We review the application of PREs in obesity research, including random roommate assignments and adoption studies. We then provide a statistical framework to control for potential packet-level confounders not accounted for by randomization.

Results

PREs have successfully been used to improve causal estimates in multiple research areas. PREs have provided evidence that the contributions of biological and rearing environmental factors to obesity are approximately equal; that altitude is inversely related to weight change; and that among college freshman, a roommate's weight change is inversely associated with subject weight change. These findings are inferentially stronger than purely observational studies even though they are not based on pure randomized controlled trials.

Conclusions

Applying PREs to obesity-related research will improve decisions about clinical, public health, and policy actions insofar as it offers researchers new insight into cause and effect relationships among variables.

T-2412-P: Associations of Dairy Intake with Glycemia and Insulinemia, Independent of Obesity, in Brazilian Adults (The Longitudinal Study of Adult Health: ELSA-Brasil)

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Background

In Brazil the consumption of dairy products has been declining, while diabetes rates have been increasing. The purpose of this study was to describe the association of dairy intake with measures of glycemia and insulinemia in Brazilian adults without known diabetes.

Methods

The Longitudinal Study of Adult Health enrolled 15,105 adults, ages 35-74 years in six Brazilian capital cities from 2008-2010. After excluding participants with known diabetes, cardiovascular disease, and
cancer, 10,010 subjects remained. Dairy consumption (servings/day) was assessed by a food frequency questionnaire. Multivariable linear regression analysis was performed to test the association of servings of dairy products with fasting plasma glucose (FG) and insulin (FI), 2-hour post-load glucose (2HG), and insulin (2HI), glycated hemoglobin (HbA1c), while adjusting for demographic, behavioral, dietary, and adiposity (waist) confounders.

Results

Dairy intake was inversely associated with all five measures (p for linear trend < .05). The adjusted means for the lowest (<1 sv/day) v. highest (>6 sv/day) dairy intake categories were as follows: FG = 109.9 v. 108.1 mg/dL, FI = 6.6 v. 5.8 ÅµIU/mL, 2HG = 128.5 v. 124.7 mg/dL, 2HI = 61.0 v. 55.3 ÅµIU/mL, HbA1c = 5.50 v. 5.46%. The findings were consistent across categories of sex, race, obesity, and dairy fat content (reduced v. full fat dairy). Fermented dairy products - cheese and yogurt - demonstrated the strongest associations.

Conclusions

Though cross-sectional, these findings suggest that higher dairy intake may improve glycemia and prevent diabetes, independent of obesity status, in Brazilian men and women.

T-2413-P_DT: Nutrient Intake of Homeless Women in Grand Rapids, Michigan

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Background

The Heartside neighborhood has been inhabited by the poor and homeless of Grand Rapids. The Food Access in Michigan Project is studying the relationship between food security and food environments in Michigan. This study aimed to determine the diet characteristics of homeless women in Grand Rapids.

Methods

Participants were female residents of Degage Ministries' Open Door program, an overnight shelter for adult women in crisis in Grand Rapids, MI. Demographics and food security information were collected from residents (n= 16). Nutrient intake was measured with three 24-hour diet recalls from 21 participants.

Results

The majority of the women at the shelter were 50-59 years old (31.3%) and predominantly African American/Black (43.8%). Most of the women had an annual income of less than $10,000 (87.5%) and 68.7% of the population had low food security. The median daily fruit, vegetable, sodium, and calorie
Intakes for the participants were 0.83 (1.1), 3.1 (1.2), 3,594.1mg (1,094.4) and 2,218.9kcal (1,283.6), respectively. The median portion of calories from carbohydrates was 49.4%, 12.5% from protein, 12.2% from saturated fatty acids, and 38.9% from fat.

**Conclusions**

Homeless women in Grand Rapids, MI suffered from low levels of food security. Their diet contained an overabundance of fat, carbohydrates, sodium, and saturated fatty acids and lacked adequate daily fruit and vegetable intake.

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**T-2415-P: Identification of Lifestyle and Weight-Related Behaviors among College Students to Prevent Obesity**

_Sahla Ray, PhD; Roshni Dhoot; Vishnu J. Alse;

**Background**

Weight gain among college students has been traced back to several factors, but the main focus of college weight gain research has been limited to the first year of college. The focus of this study was to determine if all college students with certain BMIs have identifiable behavioral patterns.

**Methods**

This IRB-approved study surveyed approximately eighty Indiana University students of different class standings. The questionnaire was developed based on a survey from Seventeen Magazine in 1989 called ‘May Obesity Survey.’ The questions were formulated to collect data related to college students’ age, body mass index, income, lifestyle (physical activity levels, food and beverage intake, stress), and behavior, such as influences by family and friends. The software SPSS was used to perform statistical analysis.

**Results**

Statistically significant differences were found in activity levels: students with normal BMIs exercise 4+ times/week, while overweight/obese students exercise 1-3 times/week $\chi^2 (3) = 8.95$, p<.05. A significant relationship was also found in hours spent using a television or computer: 2-3 hours for normal BMIs and 4+ hours for overweight/obese BMIs $\chi^2 (3) = 8.75$, p< .05. 73% of overweight/obese students reported that their busy schedule is the main attributing factor in preventing them from being healthier.

**Conclusions**

Identified lifestyles patterns among the overweight or obese college student can be used to educate and warn college students to abstain from behaviors that could potentially lead to weight gain.
T-2416-P: Association between a Healthy Lifestyle Score and Cardiometabolic and Neuroendocrine Risk Factors among Puerto Rican Adults

Mercedes Sotos-Prieto; Katherine L. Tucker, PhD; Shilpa N. Bhupathiraju, PhD; Luis M. M. Falcon, PhD; Josiemer Mattei, PhD, MPH;

Background

While individual healthy lifestyle behaviors may prevent cardiovascular risk factors, few studies have analyzed the combined effect of multiple lifestyle components as one all-inclusive measure on such outcomes, much less in minority populations. We aimed to develop a Healthy Lifestyle Score (HLS) that included several lifestyle recommendations and test its association with the metabolic syndrome (MetS) and allostatic load (AL), and their cardiometabolic and neuroendocrine factors in Puerto Rican adults.

Methods

In a cross-sectional study of 787 Puerto Ricans living in Boston (aged 45-75 y), we developed a HLS that ranged from 0-190 (highest scores indicative of healthier lifestyle) and included five guidelines-based components (diet, physical activity and sedentary behaviors, social support, tobacco use, and sleep).

Results

HLS showed adequate internal consistency (spearman rank=0.31-0.69). HLS was inversely associated with cortisol ($\beta +\text{SE} = -0.218+0.107$, p=0.042), epinephrine (-0.202+-0.085; p=0.017), norepinephrine (-0.264+-0.107; p=0.016), waist circumference (-0.014+0.004; p=0.003) and insulin (-0.296+-0.134; p=0.028) and positively associated with HDL-C (0.007+-0.003; p=0.021) after multivariate adjustment. Further associations with glycosylated hemoglobin and glucose were observed in sensitivity analysis excluding sleep from HLS. For each 20-units increase in HLS, participants had 19% (95% CI, 0.67-0.98) and 25% (0.64-0.89) lower odds of having MetS and high AL, respectively. Social support and tobacco were associated with AL (p<0.005); no other significant associations were observed for individual lifestyle components and the outcomes.

Conclusions

Following an overall healthy lifestyle that comprises a combination of multiple behaviors may provide stronger protection against the MetS and AL in Puerto Rican adults over individual components.
T-2416-P: Physical Activity Patterns of Latina Immigrants Living in Alabama

Katherine Sweatt, MAEd; Amanda Willig, PhD, RD; April Agne, MPH; Jamie Powell, MPH; Andrea Cherrington, MD MPH;

Background

Latinos living in the U.S. have a higher prevalence of obesity and metabolic diseases compared to non-Latino whites, particularly Latina women. The purpose of this study is to assess the patterns of physical activity (PA) in Latina immigrants in Southeastern U.S using self-report and accelerometer.

Methods

Participants included foreign-born Latina women age>= 19 years with BMI >= 25 kg/m2 living in Alabama. The Global Physical Activity Questionnaire (GPAQ) was used to assess self-reported physical activity. Accelerometer (GT1M, ActiGraph Health Services, Pensacola, FL) was used as an objective measure of physical activity.

Results

Of 44 overweight Latinas (BMI 33.3), 36.4% met PA recommendations by self-report. Only 20.5% met recommendations according to accelerometer. Self-report sedentary activity was underestimated (186 m/d self-report vs 575 m/d accelerometer) while moderate activity was overestimated (34 m/d self-report vs. 15 m/d accelerometer). Years living in the U.S. was associated with vigorous activity (r=.32, p=.03). There was a trend for an association between years lived in Alabama and sedentary and moderate activity (r=.28 p=.06; r=-.28 p=.06).

Conclusions

Latina immigrants living in Alabama overestimated the amount of time spent in moderate and underestimated time spent in sedentary activity. Physical activity levels may vary by region of the U.S.

T-2418-P: Physical Activity Patterns of Latina Immigrants Living in Alabama

Sarah K. Sweatt, PhD; Amanda Willig, PhD, RD; April Agne, MPH; Jamie Powell, MPH; Andrea Cherrington, MD MPH;

Background
Latinos are the fastest growing minority group in the Southeastern U.S. and have a higher prevalence of obesity and metabolic diseases, particularly Latina women. The purpose of this study is to assess physical activity (PA) patterns in Latinas in Southeastern U.S using self-report and accelerometer.

**Methods**

Participants included foreign-born Latina women age >= 19 years with BMI >= 25 kg/m² living in Alabama. The Global Physical Activity Questionnaire (GPAQ) was used to assess self-reported physical activity. Accelerometer (GT1M, ActiGraph Health Services, Pensacola, FL) was used as an objective measure of physical activity.

**Results**

Of 44 Latinas (BMI 33.3), 36.4% met PA recommendations by self-report while only 20.5% met recommendations according to accelerometer. Self-report sedentary activity was underestimated (186 min/day self-report vs 575 min/day accelerometer) while moderate activity was overestimated (34 min/day self-report vs. 15 min/day accelerometer). Years living in the US was positively associated with vigorous activity (r=.32, p=.03). There was a trend for an association between years lived in Alabama and sedentary and moderate PA (r=.26 p=.06; r=-.28 p=.06).

**Conclusions**

Latina immigrants living in Alabama overestimated the amount of time spent in moderate and underestimated time spent in sedentary activity. Years living in the US was related to increased PA while years lived in Alabama was related to reduced PA. PA levels may vary by region of the US.

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**T-2419-P: Blinder-Oaxaca Decomposition of Racial Disparities in Adolescent BMI: Are we Looking at the Wrong Behaviors?**

*Daniel Taber, PhD;*

**Background**

Blinder-Oaxaca decomposition is an econometric method of analyzing disparities. It partitions differences into 'endowment effects' (differences attributable to levels of covariates) versus 'coefficient effects' (differences in effects of covariates), but is rarely applied to obesity research.

**Methods**

Blinder-Oaxaca decomposition was used to study disparities between Blacks and Whites in BMI and 7 nutrition, physical activity (PA), and sedentary behaviors, using 9th-12th grade data in the National Youth Physical Activity and Nutrition Study (n=7000). Analyses were stratified by gender. Behavioral disparities
were decomposed into endowment and coefficient effects of 21 measures of the home, neighborhood, and school environment (e.g., PA facilities, food available at home, school vending machines). BMI disparities were decomposed into endowment and coefficient effects of 12 nutrition, PA, and sedentary behaviors; desire to lose weight; and the home, neighborhood, and school environment.

Results

Endowment effects of the home food environment accounted for 25-40% of nutrition behavior disparities in boys and girls, yet endowment effects of all behavioral and environmental measures accounted for none of girls’ BMI disparities. (Boys’ mean BMI did not vary by race.) In contrast, the coefficient effect of trying to lose weight accounted for >50% of girls’ BMI disparities. Post hoc analyses revealed that Black girls were more likely to report unhealthy weight loss methods (e.g., vomiting) but less likely to report healthy weight loss methods.

Conclusions

Racial BMI disparities in girls were largely attributable to unhealthy and ineffective weight loss methods, not having less desire to lose weight. Future longitudinal research should explore mechanisms behind this association. Common weight-related behavioral measures did not account for disparities.

T-2420-P: The Relationship Between Dietary Behaviors with Changes in the Incidence of Overweight and Obesity Among Adolescents from Ho Chi Minh City, VietNam

Hong Tang, Dr:

Background

The physical and social environments of Ho Chi Minh City, Vietnam have been changing quickly in response to rapid economic development. This study was to examine whether the incidence of overweight/obesity has increased in adolescents and the relationship between these changes with dietary behaviors.

Methods

A 5-year prospective cohort study, comprising 5 data collection points, one year apart was conducted between 2004 and 2009. Anthropometry and child information were collected from 759 junior high school students using questionnaires. BMI was calculated and overweight/obesity was defined using IOTF cutoffs. Dietary habits of consuming fruits/vegetables, soft-drinks, and snacks were classified as frequently; not
frequently or rarely/don't consume. The frequency of having breakfast was divided into three levels: daily, most days, and seldom/some days. Generalized linear latent and mixed models were used to analyze the data.

**Results**

The incidence of becoming overweight/obesity increased from 8.6% in the second year to 11.9% in the last year. The increase was significant in boys but little in girls. After controlling for other confounding factors, frequently consuming snacks and soft-drinks increased the risk of overweight/obesity (RR =1.5, 95%CI =1.0, 1.7; and RR = 1.6, 95%CI = 1.1, 1.8, respectively). In contrast frequently consuming fruit/vegetables and having breakfast daily decreased the risk of overweight/obesity by 20% and 10%, respectively.

**Conclusions**

Overweight and obesity increased among adolescents of HCMC over the 5-year period. Prevention program should promote consumption of fruits/vegetables and having breakfast and reduce the consumption of snacks and soft drinks.

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**T-2421-P_DT: Mediator and Moderator Effects of Sociocultural Factors and Weight Related Behaviors on Obesity in African American Adolescents**

*Nutrena Tate, PhD;*

**Background**

African American adolescents consume higher in fat and calories and are less physically active than their White counterparts. These factors as well as the sociocultural variables may be determinants of this obesity epidemic and disparity experienced within this population.

**Methods**

The primary purpose of this study was to determine the mediator effects of eating behaviors and physical activity and the moderator effects of ethnic identity and social group influences (media, peers, and family) on weight related measures (body mass index, waist circumference, and body fat) in African American adolescents. The secondary purpose of this study was to further refine Allen and Allen’s Social Ecological Framework through structural equation modeling. A sample of 145 African American adolescents was recruited from community clinics youth community organizations, churches, and professional networks from a Metropolitan Midwest City. Data was analyzed using AMOS 16.0.
Results

Media, peers, and family were direct determinants of weight related measures and physical activity. There was not a direct effect of eating behaviors or physical activity on obesity. Additionally, ethnic identity did not demonstrate a direct effect on eating behaviors, physical activity, or obesity. An indirect relationship was not observed among the variables. The structural model demonstrated a good fit ($\text{Chi Square} = 125.956, df = 111, p = .157$).

Conclusions

The weight related measures of BMI, waist circumference showed direct relationships with the latent variable of social group influences. Future research should examine other factors associated with eating behaviors, physical activity, and obesity within this population.

T-2422-P: The Effect of Liquid Versus Solid Carbohydrate Intake on Body Weight: New Insights from an Energy Balance Analysis

*Diana Thomas, PhD; Dylan A. Bailey, Expected Graduation Date-December 2014; Andrew McDougall, PhD;*

Background

In 2000, Dimeglio and Mattes published a landmark study investigating the response of body weight from liquid versus solid carbohydrate intake. Subjects consumed carbohydrates in the form of either liquids or solids. The study concluded that liquid carbohydrates promote positive energy balance.

Methods

In this analysis, we revisit the Dimeglio and Mattes study to compute the magnitude of positive energy balance using a validated thermodynamic based energy balance model. We additionaly coded forward studies which cite the Dimeglio and Mattes study. The forward citations were coded for types of citations and specifically claims that the Dimeglio and Mattes study provided definitive proof that liquid carbohydrate intake above baseline requirements result in substantial weight gain in comparison to increase in solid carbohydrate intake.

Results

Both groups were in positive energy balance. In the solid group the positive energy balance was 93 kcal/d and the liquid cohort achieved a positive energy balance of 143 kcal/d and actual weight gain fell short of
expected weight gain exhibiting compensation. Predicted weight gain was 4.3 kg while actual weight gain for the solid cohort was 0.3 kg and actual weight gain for the liquid cohort was 0.2 kg. Additionally, we found evidence of 'white hat bias' reporting of the Dimeglio and Mattes study.

**Conclusions**

While well intentioned, white hat bias can give the appearance of resolution despite gaps in knowledge. To address this still open question, we provide the critical measurements and experimental design to rigorously resolve this debate.

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**T-2423-P: Fruit Intake Is Inversely Related to Body Fat in Middle-aged Women**

*Larry A. Tucker, PhD; James D. Lecheminant, PhD; Bruce W. Bailey, PhD;*

**Background**

This study was designed to determine the extent to which fruit consumption explains differences in body fat in 272 middle-aged women. Another aim was to examine the effect of age, energy intake, education, objectively measured physical activity, fiber intake, and menopause status on the relationship.

**Methods**

A cross-sectional design was used. Diet and energy intake were assessed using weighed food records for 7 days. Servings of fruit were calculated using the ADA Exchange Lists program: 1 serving (S) of fruit was 15 g carbohydrate, 0 g protein, and 0 g fat, for a total of 60 kcal. According to the Exchange program, a fruit serving is 4 oz of fruit or ½ cup of canned or fresh fruit or unsweetened fruit juice. Servings of fruit were expressed per 1000 kcal. Fiber intake was treated similarly. Physical activity (PA) was measured for 7 days using Actigraph accelerometers. Body fat (BF) was estimated using the Bod Pod. Regression analysis with partial correlations were used to analyze the data.

**Results**

Mean fruit intake was 1.2 ± 0.8 S per 1000 kcal, BF% was 31.7% ± 6.9%, energy intake was 2052 ± 319 kcal/day, and mean age was 40.1 ± 3.0 yrs. For each additional S of fruit consumed per 1000 kcal, BF was 1.3 percentage points lower in the women (F=6.2, p=0.013). Age strengthened the association, and when controlled, BF was 1.7 percentage points lower per S of fruit per 1000 kcal (F=9.9, p=0.002). Controlling for PA weakened the relationship most, resulting in 1.2 percentage points lower BF per S of fruit per 1000 kcal (F=5.2, p=0.023).

**Conclusions**
Fruit consumption per 1000 kcal is a strong predictor of BF% in middle-aged women, independent of a number of potential confounding factors, including age, energy intake, fiber consumption, measured physical activity, education, and menopause status.

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**T-2424-P_D2T: The Role of Variety and Quality in Seasoning Ingredients on Intake of Beans and Rice Among Costa Rican Adults**

*Maya Vadiveloo, PhD; Hannia Campos, PhD; Josiener Mattei, PhD, MPH;*

**Background**

Increasing food variety, particularly sensory variety, may promote the enjoyment of healthful foods thereby encouraging weight control. We examined whether the variety and quality of ingredients used to season beans or rice affected intake of those foods.

**Methods**

Costa Rican adults (n=1025) from a population-based study were surveyed about the use of 8 seasoning ingredients, as well as salt, oils, and solid fat, when preparing beans or rice. Ingredients were categorized based on their dietary quality. We used multivariable linear regression to estimate the variety (i.e. mean number) of ingredients used, the quality of those ingredients, and a quality:variety ratio, across daily servings (<1, 1, or >1) of beans or rice, by sex and area of residence.

**Results**

Higher daily servings of beans were positively associated with the variety of ingredients used to prepare beans (p-trend<0.05) in female and urban residents. Among men and urban residents, higher daily servings of rice were positively associated with ingredient variety (p-trend<0.05). No differences in ingredient quality across increasing intakes of beans or rice were noted, and the quality:variety ratio did not change except among periurban and rural participants where the ratio increased across bean intake categories (p-trend<0.05).

**Conclusions**

Greater variety, but not quality, among ingredients used to season beans or rice was positively associated with intake. Increasing the variety of flavorings used to season healthful foods may help adults increase intake of those foods, and thus help promote healthy eating habits and weight control.
T-2425-P_DT: Does Weight-Related Behavioral Patterning Differ by Sexual Orientation Among Emerging Adult Women? A latent class analysis

Nicole A. Vankim, MPH; Darin J. Erickson, PhD; Marla E. Eisenberg, ScD, MPH; B. R. Simon Rosser, PhD, MPH, LP; Katherine Lust, PhD, MPH, RD; Melissa N. Laska, PhD

Background

Lesbian, gay, and bisexual females are more likely to be obese and engage in disordered eating behaviors than heterosexual females. Further, emerging adulthood (18-25 years) is a time for sexual orientation exploration and identification, as well as deterioration of weight-related behaviors.

Methods

The purpose of this study was to identify homogenous classes of female college students based on patterning of healthful weight-related behaviors and examine differences across sexual orientation. Data were from the 2009-2013 College Student Health Survey, a population-based survey of 2- and 4-year Minnesota college students (n=18,297). Latent class models were independently fit for each of the five sexual orientation groups (heterosexual, discordant heterosexual, gay/lesbian, bisexual, and unsure) using nine behaviors (soda, diet soda, fast food, restaurant food, and breakfast consumption, moderate-to-vigorous and strengthening physical activity, unhealthy weight control, and binge eating).

Results

Four classes were identified: 'healthier diet,' 'moderate diet,' 'unhealthy weight control,' and 'healthier diet, physically active.' Heterosexual and bisexual females exhibited all four patterns, discordant heterosexual did not exhibit a 'moderate diet' pattern, and neither gay/lesbian nor unsure females exhibited a 'healthier diet, physically active' pattern. Heterosexual females had half the prevalence of 'unhealthy weight control' of other groups (heterosexual: 7%, discordant heterosexual: 15%, gay/lesbian: 14%, bisexual: 18%, unsure: 13%).

Conclusions

These findings highlight important patterns in specific behaviors (e.g., physical activity) and the co-occurrence of behaviors (e.g., unhealthy weight control co-exists with low physical activity). Future interventions should consider the diversity of behavioral patterning across sexual orientation.
T-2426-P: Length of Moderate-To-Vigorous Physical Activity Bouts are Associated with Cardio-Metabolic Risk Factors in Elementary School Children

Erik A. Willis, M.S.; Lauren T. Ptomey, PhD, RD, LD; Amanda N. Szabo, PhD; Jeffery J. Honas, MS, MPH; Jaehoon Lee, PhD; Richard Washburn, PhD; Joseph E. Donnelly, EDD

Background

Accumulating moderate-to-vigorous physical activity (MVPA) in bouts of ~10 minutes is associated with improved cardio-metabolic risk factors (CRF) in adults. The purpose of this analysis was to assess the association between the lengths of MVPA bouts and CRF in elementary school age children.

Methods

We assessed aerobic fitness (Progressive Aerobic Cardiovascular Endurance Run-PACER), MVPA (ActiGraph GT3x+ over 4 days), BMI %ile, waist circumference (WC), total, HDL and LDL cholesterol, triglycerides, insulin, glucose and blood pressure in 396, 2nd and 3rd grade students (182 boys, 214 girls; age 7.6+0.6 yrs.; BMI %ile: 61.6+-9.3). MVPA bouts were defined as short (1-4min.), medium (5-9min.) and long (>=10min.). Latent profile analysis (LPA) was used to identify distinct subgroups (classes) based on the composition of short, medium, and long MVPA bouts. Bayesian probability-based Wald chi-square test was used to compare CRF between classes controlling for age, gender, and total MVPA min.

Results

Three classes of MVPA bouts were identified: A (n=78); 97% short, 2% medium, 1% long; B (n=174); 93% short, 5% medium, 2% long; C (n=144); 86% short, 9% medium, 5% long. Class A had significantly higher BMI %ile (70.9+-3.5), WC (61.0+-1.0 cm) and lower fitness (12.9+-0.7 PACER Laps-PL) compared with Classes C (BMI %ile=61.1+-2.4, p=0.022, WC=56.6+-0.6 cm, p<0.001, PL=15.8+-0.6, p=0.001) and higher WC (55.8+-0.5 cm, p<0.001) than Class B. No significant differences were shown in other outcomes.

Conclusions

Children who accumulated MVPA with a higher percentage of long bouts (>=10min.) had lower WC and BMI %ile, and higher fitness compared with children who accumulated MVPA with a lower percentage of long bouts. Long rather than short bouts of MVPA may be associated with improved health risk in children.
T-2427-P_DT: Consumption of Western Fast Food by Chinese Children: The Patterns and Association with Body Weight

Xiaoyu Wang, BA; Yang Wu, MS; Hong Xue; Huijun Wang, MD; Youfa Wang, MD, PhD;

Background

Obesity is a serious public health problem in China. The number of western fast food (FF) outlets has been growing rapidly in China since the 1990s; people's eating patterns have changed dramatically, but limited research has tested the association between Western FF consumption and weight gain.

Methods

Longitudinal survey data collected from a nationwide sample of children aged 6-18 between 2004 (n=1542) and 2009 (n=1114) was used in our cross-sectional and longitudinal analysis to examine FF intake patterns and associations with body status including BMI z-score in Chinese children and adolescents.

Results

During 2004-09, % of FF consumers in young children aged 6-12 remained stable (18.1% to 18.3%), but increased in older kids aged 13-17, from 17.9% to 26.3%, mainly due to increase in boys, 15.0% to 25.0%. Among minority group, % of FF consumers more than tripled (from 5.2% to 16.9%). The rise in % of FF consumers was faster in middle-income group than other income groups. We found a reverse association between FF intake and overweight/obesity in girls in 2009 (OR=0.29 (0.10,0.84)), but not in boys or in 2004.

Conclusions

In China FF consumption has increased in children. The % of FF consumers increased more rapidly in some groups such as minority, adolescent male, middle-income, and rural groups. Overweight and obese girls are likely to reduce their FF intake.

T-2428-P: Nutrition Knowledge and Fat Consumption: Is there a link?

najat yahia; Carrie Brown, MS Nutritional Epidemiology; Mei Chung, PhD, MPH; Melyssa Rapley, BS;
Background

Dietary Guidelines for Americans 2010 call for reductions in the consumption of unhealthy fats such as saturated fat, trans fats, and cholesterol. This pilot study aimed to explore whether increased nutrition knowledge can lead to a reduction in these fats among a sample of university students.

Methods

This study was a cross-sectional survey. A sample of 231 students (71% females and 29% males), with a mean age of 20 years, was selected randomly from a university campus during spring 2012. Students completed a validated questionnaire that included questions related to students' demographic information, nutrition knowledge, and daily fat consumption. Multiple linear regression models were used to examine possible association between nutrition score and fat consumption. A p-value <0.05 was considered a statistically significant difference.

Results

Female students have greater nutrition knowledge than male students. Nutrition knowledge was negatively correlated with fat and cholesterol intake. Students who consumed >35% calories from fat or >300 mg of cholesterol daily had lower mean nutrition scores than those students with lower fat or cholesterol intake (8 points lower and 7.9 points lower, respectively). Controlling for gender, height, weight and age, nutrition scores were negatively associated with saturated fat intake (-0.16, p <0.0001) and cholesterol intake (-1.43, p <0.0001).

Conclusions

Conclusions: Students with higher nutritional knowledge consumed less unhealthy fats and cholesterol. Thus, nutrition knowledge may be used as a target in health campaigns to improve diet quality among college students.

T-2429-P: Pediatric Metabolic Syndrome Study: Children and Adolescents with Abnormal Weight Gain Under Report Food Intake

Magie P. Young, ; Kelley L. Martin, MPH, RD, LD; Janet R. Carter, MS, RD, LD; Melissa Henshaw, MD;
Childhood obesity and its associated risk factors are well documented. In contrast, limited research exists regarding how they describe their food intake. The purpose of this study was to understand how a cohort of overweight children describes their food intake as compared to the population norms.

Methods

Compared to the normative population the PMSS participants reported consuming fewer calories even though they were overweight or obese. We recommend further analysis of this cohort's dietary patterns to better understand RD-deliverable interventions that may work best for this population.

Results

Based on CDC BMI-for-age growth charts, the average PMSS participant is obese (BMI-for-age >95th percentile). Mean energy intake of PMSS males was 1409 kcal/day ±484; 73% of the norm. PMSS females consumed a mean of 1353 kcal/day ±472; 76% of the norm. The largest variance was in males ages 12-19; on average they reported consuming 43% fewer calories per day (mean=1081 fewer kcal/day). While estimated daily intake of macronutrients for this population was lower than the norm, the distribution of intake was comparable and within normal limits.

Conclusions

Compared to the normative population, the PMSS participants reported consuming fewer calories even though they were overweight or obese. We recommend further analysis of this cohort's dietary patterns to better understand RD-deliverable interventions that may work best for this population.

T-2430-P: Leisure Time Activities Among Adolescents with Excess Weight

Jennifer Becnel, PhD; Yelena Wu, PhD; James Peugh, PhD; Jennifer Reiter-Purtill, PhD; Meg H. Zeller, PhD;

Background

Apart from television viewing and physical (in)activity, studies of how overweight/obese adolescents spend their time outside of school and work are largely absent from the literature. The present study examined leisure time activities of adolescents across the excess weight spectrum.

Methods

Considering leisure time activities are an important developmental context, we examined a variety of leisure time activities by gender for overweight (OVA), obese (OBA), and severely obese adolescents (SOA) relative to healthy weight youth (HWA). Using the 2008-2009 Monitoring the Future Study, prevalence rates of leisure time activities by gender (53% female) and weight status groups (CDC-defined BMI percentile) were determined for a sample of 23,209 10th grade students (Mage=15.61±0.58years).
Logistic regressions were used to predict adolescents' participation in leisure time activities from their weight status compared to HWA.

**Results**

Boys and girls of excess weight status were less likely to participate in structured (community affairs/volunteer work, active sports) and unstructured (party, visit with friends, date, go out without parental supervision, movies, mall) social activities as compared to same sex HWA. Girls with excess weight were also more likely to participate in solitary activities (internet use, time alone after school) compared to HWA girls.

**Conclusions**

These data demonstrate that teens with excess weight are not engaged in peer-normative activities, suggesting greater risk for psychosocial challenges (substance use, depression). Understanding what factors contribute to disengagement (avoidance, exclusion, negative experiences) is imperative.

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**T-2431-P: A Review of Instrumental Variables Models in Health and Medicine**

*John Cawley, PhD;*

**Background**

The method of instrumental variables (IV), which exploits naturally-occurring experiments to identify causal effects, has been increasingly applied in health research. This study conducts a systematic review of the use of the method of instrumental variables in research on health and medicine.

**Methods**

A literature search was conducted of the PubMed and EconLit research databases for English-language articles published after 1990 that satisfy the search terms ('instrumental variable' or 'instrumental variables') and ('health' or 'medical' or 'clinical' or 'patient'). A total of 1,241 hits were returned, 640 from PubMed and 601 from EconLit. We excluded duplicates, dissertations, working papers, books, and book reviews (N=387), leaving a total of 854 non-duplicated references that were then categorized as Commentaries, Methodological Pieces, Original Research Articles, and Reviews. Citations to each were extracted from the Web of Science through the Cited Reference Search function.

**Results**

Applications of IV in health and medicine tend to exploit natural experiments that relate to: distance of the patient to the provider, historic treatment preferences of the provider, day of the week of hospital admission, and genetic alleles (also known as Mendelian Randomization). For IV to produce unbiased
estimates, natural experiments must be both valid (uncorrelated with the second-stage error term) and powerful. The bias resulting from an invalid natural experiment is greater the weaker the IV.

Conclusions

The method of instrumental variables, correctly implemented, can identify causal effects when randomized experiments are infeasible. For unbiased estimates, natural experiments must be powerful and valid.

T-2432-P: Who is Consuming the Most Sugar-Sweetened Beverages (SSB) Among Low-Income Children?

Natasha Tasevska, MD, PhD; Michael J. Yedidia, PhD; Punam Ohri-Vachaspati, PhD, RD;

Background

Overweight and obesity remains a major health problem among children in the U.S., especially in low-income communities. Understanding determinants of high consumption of sugar-sweetened beverages (SSB), a highly prevalent obesogenic behavior, will contribute to effective public health interventions.

Methods

We used survey data on 835 boys and 800 girls aged 3-18 years living in five low-income cities in New Jersey. The data were collected in 2009-2010 using a random digit dial survey of households that asked the parent most knowledgeable about food shopping, questions related to their and a randomly selected child's food and physical activity behaviors and household, parent, and child level demographics. We assessed frequency of consumption of SSB (regular carbonated soda or soft drinks and fruit flavored drinks) over the previous month. Determinants of SSB consumption were investigated in a multiple linear regression model.

Results

Ninety percent of survey participants were SSB consumers; 44% consumed at least one SSB a day and 20% consumed two or more. Positively associated with child's SSB consumption were eating sweets (p<0.0001), watching TV, playing video games or using a computer (p=0.001), eating at fast food restaurants (p=0.001), parent's SSB consumption (p<0.0001) and child's age (p<0.0001), whereas mother's level of education (p=0.005), participation in WIC (p=0.036) and eating breakfast (p=0.013) were inversely associated.

Conclusions

Parents' and children's unhealthy behaviors were strongly associated with children's SSB intake. Participation in WIC, which has a strong education component, was inversely associated, as was eating breakfast. Educating parents to help make lifestyle changes for the family may be effective.
T-2433-P: Cumulative Weight Exposure is Associated with Different Weight Loss Strategies and Weight Loss Success in Older Adults

Jana Slaght, Candidate for MSc.; Martin Sénéchal, PhD; Danielle R. Bouchard;

Background

Older adults are prone to carrying extra body weight over their lifespan, resulting in high cumulative weight exposure (CWE) when they reach advanced ages. No study has identified if CWE influences weight loss strategies choices and weight loss success.

Methods

Using data from the National Health and Nutrition Examination Survey (NHANES) cycles: 1999-2010, 4,562 people age 50 years or older who recorded trying to lose weight in the last year were included in this study. CWE was measured as the accumulated BMI points above 25kg/m² at the age of 25, 10 years ago, 1 year ago, and now. Tertiles of CWE were computed for analyses purpose. Weight loss strategies were self-reported and weight loss success was defined as reaching a 5% weight loss in the last year.

Results

Once adjusted for confounders, older adults in the highest tertile of CWE were less likely to exercise OR (95% CI) 0.58 (0.67-0.77), but more likely to increase water consumption 1.48 (1.26-1.75), eat more fruits and vegetables 1.69 (1.29-2.23) and decrease carbohydrates consumption 1.69 (1.29-2.24), compared to the lowest CWE tertile. Older adults in the highest CWE tertile were five to eight times more likely to lose at least 5% of body weight in the last year when using these strategies, compared to those in the lowest CWE tertile (P <.05).

Conclusions

Strategies used to lose weight and weight loss success vary considerably across older adults CWE status. From an obesity management perspective, our results suggest that older adults might have to use different strategies to lose weight based on CWE.
T-2434-P: Construction of a Public-Use Synthetic, Public-Use Longitudinal Body Mass Index (BMI) Dataset Representative of New York City (NYC) Public School Students

Sophia E. Day; kevin konty; Tiffany G. Harris, PhD, MS;

Background

Lack of longitudinal BMI measurements among children is a barrier in obesity research. We created a public-use synthetic dataset using longitudinal BMI from NYC public school students’ NYC FITNESSGRAM (NYCFG) assessments. These can be used for the development of growth curve and systems models.

Methods

NYCFG includes annual measurements of height and weight for >700,000 students/year linked to student enrollment data, including demographic, meal type ('meal'), and school-level information. We used post-stratification to create weights and bootstrap a representative dataset of BMI trajectories. To ensure anonymity: measurements per student were reduced to only 5; a subset of height and weight values were modified with changes to height being cumulative and non-decreasing; all weights were further modified to match decimal distributions from 2012; all age data were adjusted using a kernel with a 21 day window; and implausible values (BIVs) were permuted with other BIVs within 1 deviation.

Results

Each sampled record is a realization from the empirical distribution of BMI trajectories of all students. The dataset matches marginal distributions for: age*sex, school area (area)*race, area*meal, and the number of years students were eligible to be measured. The dataset contains sex, race/ethnicity, and 2-5 measurements that include age-in-months, height, and weight; it is not linkable to NYCFG data. It maintains nearly identical obesity prevalence and transition probabilities as NYCFG.

Conclusions

We have produced a synthetic dataset of child BMI trajectories representative of NYC public school children that can be freely shared with researchers and can be used to develop longitudinal growth curve models and to construct systems models for hypothetical policy experiments.
T-2435-P: Understanding Obesity Dynamics in Children: Beyond Incidence

kevin konty; Sophia E. Day; Stuart Sweeney, PhD; Joseph Egger, PhD;

Background

A recent study (Cunningham) emphasized the importance of measuring obesity incidence in children. However, incidence fails to fully capture movement to, from, and within weight categories. Understanding childhood obesity requires a more comprehensive description of BMI trajectories.

Methods

We replicated Cunningham using a longitudinal dataset with 7 kindergarten cohorts from 2006-2012 containing annual height and weight measurements of NYC public school students. CDC growth charts were used to compute body mass index (BMI) percentiles and to identify biologically implausible values (BIVs). BMI measurements were classified as under-, healthy-, and overweight, and 3 levels of obesity using standard BMI percentile cut-points. Incidence models were developed and differences by cohort and race were analyzed. In addition to replicating Cunningham, models of transitions between weight categories over consecutive years were also developed and analyzed using standard log-linear models.

Results

There is evidence of considerable heterogeneity in incidence by race and cohort in our data and key differences compared to recent literature that mostly uses older data. This is confirmed with the log-linear models, with significant interactions of time period with age, race, and sex for all weight categories. There is also clear evidence of movement out of and among obesity categories. This movement and interactions are only captured within the log-linear approach.

Conclusions

Simple incidence is ill-suited to understanding childhood obesity dynamics including the need to characterize movement out of or within obesity categories. Alternative methods and data description can address this need and should be used to understand obesity dynamics.

T-2436-P_DT: « A Mari usque ad Mare » Twelve years of BMI Distribution with CCHS for Canadian Adults

Nahtalie Dumas; Ramona Fratu, M.Sc; Alexandre Lebel, PhD; Patricia Lamontagne, Dr.p.;
**Background**

In Canada, numerous documents tend to indicate a BMI rate seems to increase and only few tell the opposite. We studied the evolution of BMI distribution over the time between the Canadian Regions.

**Methods**

We used six cycles of Canadian Community Health Survey (CCHS), a representative cross-sectional Canadian survey administrated between 2001 and 2012. Our sample (N = 429,104) for twelve years of survey includes individuals living in the ten Canadian provinces aged from 25 to 64 years, statified by regions and sex. For each studied group, ordinary least squares (OLS) regression model, with age as adjustment covariate was achieved; followed by the addition of the grand mean to residuals from this model. In order to examine the change in the distribution of BMI over the time, a quantile-quantile (QQ) plot was constructed by plotting percentile of BMI from the most recent cycles to the baseline.

**Results**

All groups experienced increase in mean BMI over time, for every regions and sex. Much larger changes in BMI values were present at the 95th percentile. Generally the women mean BMI is lower than men mean BMI. There is more variation over the years in the value of the mean and the 95th percentile in the Prairies and the Maritimes comparatively to Quebec and British Columbia.

**Conclusions**

However the Canadian BMI distribution increase throught time, particularly at 95th percentiles. We will do further analysis to investigate the phenomena. Nonetheless, those results raise serious issues in the world of public health.

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**T-2437-P_DT: Accuracy of Self-Reported Weight in the Hispanic Community Health Study/Study of Latinos (HCHS/SOL)**

Lindsay Fernandez-Rhodes; Daniela Sotres-Alvarez, DrPH; Penny Gordon-Larsen, PhD, FTOS; Nora Franceschini, MD; Whitney R. Robinson, PhD, MSPH; Carmen Isasi, MD, PhD; Kari E. North, PhD;

**Background**

Hispanic/Latinos are the largest United States (US) minority. Yet there are limited data on diverse Hispanic/Latinos necessary to validate self-reported (SR) weight, a critical proxy used in constructing weight histories from dynamic populations such as US Hispanic/Latinos.
Methods

We investigated the accuracy of SR versus measured (M) weight among 14,282 self-identified Hispanic/Latino participants aged 18-74 years from HCHS/SOL, a community-based cohort from 4 US cities. We calculated the observed errorSR-M (kg), excluded outliers (<1st, >99th percentiles), and performed complex survey linear regression to obtain an overall correlation and mean errors adjusting for categories of acculturation (language preference, nativity), demographics (age, education, household income, gender), health behaviors and statuses (cancer, diabetes, body mass, SR physical activity and smoking), and cross-classification of Hispanic/Latino background and field center.

Results

SR weights were reported with digit preference (p<0.0001), but correlated strongly with M weights (r²=0.97, p<0.0001). The average SR weight was 0.43kg [95% confidence interval: 0.34, 0.52] greater than the average M weight. Whereas more under-reporting occurred in female or overweight/obese individuals, more over-reporting occurred in under-weight, diabetic or older individuals (p<0.05). Mean errors did not differ significantly by background, but did by field center.

Conclusions

Future studies of SR weight in HCHS/SOL should consider age, gender, diabetes, body mass, and field center as determinants of SR weight accuracy. The observed modest over-reporting in SR weight, which was invariant to background, supports the use of SR weight in this diverse US minority group.

T-2438-P: Projected Declines in Healthy Weight Prevalence and Associated Protective Behaviors by 2030: Are We Neglecting Healthy Weight Children?

Raquel G. Hernandez, MPH

Background

Though projections on the future burden of pediatric obesity have been proposed, there is a paucity of data surrounding projected trends in healthy weight prevalence. An assessment of favorable BMI trends in addition to projections of protective, weight-specific behaviors among school-age children is critical to continued understanding of the obesity epidemic.

Methods
Data from participants of the Early Childhood Longitudinal Study, K-5th grades (1999-2004, n=34,863) and Kindergarten cohort of 2010 (n=12,777) were used. Trajectories of key weight categories (1. Healthy weight, 2. Overweight, 3. Obese, and 4. Morbidly Obese) in 2020 and 2030 were calculated. Beta coefficients based on 1999-2004 BMI trends were used fitting multiple linear regression models where the coefficients served to estimate the average annual increase from the 2010 baseline year. Prevalence of protective weight-specific behaviors including frequency of breakfast, family meals, screen time and sleep duration by weight categories were estimated in a similar fashion.

Results

The prevalence of healthy weight (HW) declines significantly over the next 20 years among school-age children. In 2010, 68.6% of children were healthy weight compared to 42.4% in 2020 and 16.2% in 2030. Disparities in projections of healthy weight exist by gender and race/ethnicity with females, White Non-Hispanic and Asian children demonstrating the highest prevalence of HW in 2030. Though HW children demonstrated favorable trends in weight-specific behaviors between 1999-2010 (68-73% achieving target behaviors), fewer healthy weight children continued to have breakfast/dinner >5-7 days per week (55% and 42% respectively) or achieve >10 hrs of sleep per night (48%) in 2030.

Conclusions

A deliberate focus on healthy weight children and protective behaviors must balance existing efforts to prevent/treat pediatric obesity in order to prevent declines in favorable growth in the coming years. Identification of predictors of healthy weight is a necessary clinical and research priority.

T-2439-P_DT: Elevated Prevalence of Obesity among Children with Autism Spectrum Disorder (ASD): The Disparity Increases across Pre-Adolescent and Adolescent Ages

Aviva Must, PhD; Misha Eliasziw, MSc, PhD; Sarah M. Phillips, MS, MPH; Carol A. Curtin, MSW; Tanja Kral, PhD; Mary Segal, PhD; Nancy E. Sherwood, PhD; Linmarie Sikich, MD; Heidi Stanish, PhD; Linda G. Bandini, PhD, RD;

Background

Children with developmental disabilities have a high prevalence of obesity, though it may arise through unique etiologic pathways. We sought to estimate the prevalence of obesity among children with and without ASD, characterized by significant deficits in communication and social interaction.

Methods
The 2011 National Survey of Children's Health, a cross-sectional nationally representative survey, collected current ASD, height, and weight by parent-report as part of a telephone interview. Obesity status was defined by BMI z-score, per CDC guidelines as BMI>95th percentile. Analyses were restricted to 43,777 youth with valid measures of disability and obesity status ages 10-17, the years during which parent-reported child height and weight is considered to be valid. Individual standardized sampling weights were used in all analyses to correct for bias in the point estimates and the variances for the complex survey design.

Results

The prevalence of obesity in children with ASD (23.1%, 95% CI 17.8%-28.5%) was significantly (p<0.001) higher than among children without ASD (14.1%, 95% CI 13.4%-14.9%); and age modified the prevalence differences (p=0.047). After adjusting for sex and race/ethnicity in a multivariate logistic regression model, the odds of obesity among children with ASD compared to children without ASD increased monotonically by year of age from 10 to 17, with odds ratios of 1.00, 1.17, 1.36, 1.58, 1.84, 2.14, 2.50, and 2.90, respectively.

Conclusions

This pattern arises due to stable high prevalence in subjects with ASD and a decline in prevalence with advancing age in subjects without ASD. Better understanding of the risk factors impacting the development of obesity in youth with ASD is warranted to inform development of tailored interventions.

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T-2440-P: Trends in Overweight and Obesity Among Adolescents in Ho Chi Minh City, Vietnam, 2004-2010

Phuong Nguyen Ngoc Van

T-2441-P: Differences in the Associations of Anthropometric Measures with Insulin Resistance and Type 2 Diabetes Mellitus between Korean and US Populations: Comparisons of Representative Nationwide Sample Data
Background

Variation among ethnic groups in the association between obesity and insulin resistance (IR)/diabetes has been suggested, but studies reported inconsistent results in Asians. For clarification, we performed a study using representative sample data from Korea and the USA.

Methods

US and Korea National Health and Nutrition Examination Survey data for 2007-2010 were used. We performed statistical comparisons of area under the curve using each race/ethnicity group. Multiple linear regression analyses were used to determine the effect of ethnicity on the associations between 1) BMI and HOMA-IR, 2) WC and HOMA-IR, 3) BMI and HOMA-beta, 4) WC and HOMA-beta, 5) BMI and fasting plasma glucose, 6) WC and fasting plasma glucose, 7) HOMA-IR and fasting plasma glucose, and 8) HOMA-² and fasting plasma glucose. A cross-product interaction terms were included to test for ethnic differences in these associations.

Results

The ability of BMI and WC to predict IR and diabetes was highest in Whites, while the ability of HOMA-IR to predict diabetes was highest in Koreans. Multiple linear regression analyses showed that impact of increasing BMI and WC on HOMA-IR was pronounced in Whites and Hispanics, while the impact of increasing BMI and HOMA-IR on fasting glucose was highest in Koreans.

Conclusions

The relationships between BMI, WC, IR, pancreatic beta cell dysfunction, and fasting glucose levels are modified by ethnicity. Adiposity differently affects IR and type 2 diabetes. In addition, the effects of IR and beta cell dysfunction on diabetes also differed among ethnic groups.

T-2442-P: Trends in Overweight and Obesity in Soldiers Entering the United States Army, 1989-2012

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Background

The prevalence of overweight adolescents and adults in the U.S. is a matter of concern to the military services, which recruits its members from the civilian population.
Methods

We conducted a descriptive analysis of time trends of overweight, obesity, and compliance with Army weight-for-height screening criteria at time of entry into the Army, using data from 1,731,926 persons with complete sex, age, and anthropometric information. We also examined associations between demographic characteristics (e.g., race/ethnicity, marital status, education, and geographic home of record), and odds of overweight/obesity and weight-for-height criteria compliance within each year, and across the time period.

Results

From 1989-2012, prevalence of overweight increased from 25.6% (1989) to a peak of 38.0% (2011). The prevalence of obesity also increased over time, exceeding 10% from 2005-2010. Prevalence of exceeding the weight-for-height screening criteria increased from 19.4% (1989) to a peak of 32.8% (2007), decreasing from ~30% in 2005-2009 to ~25% in 2012. The most consistent and strongest demographic characteristics predicting overweight/obesity were male sex, older age, Hispanic or Asia/Pacific Islander race/ethnicity and being married.

Conclusions

Increased prevalence of overweight and obesity in Soldiers entering into the Army from 1989-2012 is consistent with trends in the U.S. civilian population. Whether weight status at entry negatively impacts health during a Soldier's military career deserves further exploration.

T-2443-P_DT: BMI and Waist Circumference as Measures of Obesity in Adolescents with Physical Disabilities

Brooks C. Wingo, PhD; Tapan S. Mehta, PhD; Peng Qu, PhD; James H. Rimmer, PhD;

Background

Obesity rates in adolescents with physical disabilities (APD) are 38% higher than in non-disabled peers. Measures such as BMI often underestimate adiposity in this group due to changes in body composition that occur with paralysis. There is a need to validate markers of obesity risk for use in APD.

Methods

Participants were non-ambulatory adolescents (N=29) with spinal cord injury (n=21), spina bifida (n= 7), or cerebral palsy (n=3). BMI, waist circumference, triceps skinfolds, arm circumference and leg circumference were measured for each participant. Each of these measures was compared to percent body fat measured by Dual-energy X-ray absorptiometry (DXA) using Pearson correlation. We used multivariate regression to determine which measures significantly predicted body fat as measured by DXA.
Additionally, scores from each measure were dichotomized into non-obese or obese to determine the level of agreement in classification between the measures and DXA.

**Results**

All measures were significantly correlated with DXA (BMI r=.73; waist r =.71; leg r =.68; arm r =.53; triceps r =.62, p<.001 for all). BMI, waist circumference and triceps skinfolds significantly predicted percent body fat as measured by DXA (BMI r2=.61, waist r2=.63, triceps r2=.42). Ten percent of participants were classified as obese by BMI, 17% obese by waist circumference, and 24% obese by triceps skinfolds, compared to 45% obese by DXA.

**Conclusions**

Common measures for assessing obesity significantly predict adiposity in APD, but current cut-points for classifying weight status are not sensitive for identifying obesity in this population. Future research should define disability-specific obesity classification standards for use in APD.

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**T-2444-P: Large Sex Difference in Overweight and Obesity Rates in China and Why?**

*Youfa Wang, MD, PhD; Vivian H.C. Wang, BS; Hong Xue; Huijun Wang, MD; Jie Mi, MD, PhD;*

**Background**

Overweight and obesity rates increased dramatically in China over the past 30 years; become a public health crisis; and affect some groups more. This study examined sex difference in overweight and obesity rates in Chinese children.

**Methods**

A systematic review of relevant research published in English and Chinese, especially based on national data, aiming to understand underlying causes of the sex difference, and to help guide future interventions and reduce health disparities.

**Results**

In 2010, 15.0 % (9.9% overweight; 5.1% obese) of school-aged children were overweight or obese in China, vs <3.0% in 1985. Nationwide 19.0% of boys and 10.9% of girls were overweight or obese. The sex-difference was larger in rich and large cities than in rural and poorer areas: eg, 32.6% boys and 19.1% girls in in rich and large cities were overweight or obese, vs 8.2% and 5.3% in poor rural areas.

Considerable sex-differences exist in factors such as dietary intakes, physical activity, ideal body image, weight perception, parenting, etc.
Conclusions

In China, boys were about twice more likely overweight or obese than girls. Many individual, familial, social and environmental factors contribute to the sex difference. Sex-tailored interventions are needed to fight the obesity problem in children and reduce the disparity.

T-2445-P: Reporting Error in Weight and its Implications for Estimates of the Effects of Obesity

John Cawley, PhD; Johanna C. Maclean, PhD; Mette Hammer, MSc.Econ; Neil Wintfeld, PhD;

Background

Much research on obesity classifies individuals as obese based on their self-reported weight and height. This study measures the extent to which individuals misreport their weight, how it differs across subgroups, and its impact on regression estimates.

Methods

Reporting error is calculated in pounds and as a percent of true weight using data from the National Health and Nutrition Examination Survey (NHANES) for 2003-2010, which includes both self-reports and measurements by health professionals of weight and height. The extent of reporting error (in pounds and percent) is regressed on observable characteristics. The extent to which use of self-reported weight biases coefficient estimates is determined by first estimating models using self-reported weight, and then estimating models of instrumental variables that instrument for self-reported weight using measured weight, and comparing the magnitude of the regression coefficients.

Results

On average, individuals underreport their weight by 1.65 pounds; this is greater among women (3.13 pounds) than men (0.2 pounds). Regressions indicate that underreporting is 2.1 pounds greater among the class 1 obese, 4.5 pounds greater among the class 2 obese, and 8.7 pounds greater among the class 3 obese. As a result, roughly 1 in 7 truly obese individuals are misclassified as non-obese. A comparison of regression coefficients suggests that in many cases this reporting error causes attenuation bias on coefficients of BMI and obesity.

Conclusions

Reporting error in weight differs across the population; e.g. it is greater among women than men, and rises with true BMI. The previous literature that uses self-reports of weight without correcting for reporting error may underestimate the correlation of obesity with various outcomes of interest.
T-2446-P: Health Claims and Nutritional Quality of Child-Oriented Ready-To-Drink Fruit and Milk Beverages in Guatemala

Aura Arevalo, RD; Violeta Chacon, RD, MPH; Joaquin Barnoya, MD, MPH;

Background

In Guatemala, sugar-sweetened beverages are allowed to include health claims (regardless of nutritional quality). We sought to describe health claims’ prevalence and type, nutritional quality and price of child-oriented fruit and milk beverages in Guatemala.

Methods

We purchased all child-oriented ready-to-drink (<=10-ounces per serving) fruit juice (100% juice), fruit drinks, milk and yogurt. Health claims were classified as nutrient content, nutrient function, or a combination of both. We used the UK Nutrition Profiling Model to classify beverages as healthy or less healthy. Mean (standard deviation) price was calculated for an 8-ounce serving.

Results

We purchased 116 beverages (62.1% fruit drinks, 19.8% milk, 15.5% yogurt and 2.6% fruit juices). Most had health claims (72.4%). Half (51.7%) were classified as less-healthy, 7.8% as healthy and 12.9% had incomplete nutritional information. Less-healthy beverages were more likely to have any type claim; healthy ones more likely to have a combination of claims (p<0.001). Beverages with a health claim (US$ 0.52 ± 0.25) were significantly (p<0.001) more expensive compared to those without (US$ 0.43 ± 0.16) a claim.

Conclusions

In Guatemala, health claims are widely used to promote poor nutritional quality beverages. Our data should support evidence based policies to regulate the use of health claims based on nutritional quality.

T-2447-P_DT: Fast-Food Customers Who Buy High-Calorie Drinks Are More
Likely to Underestimate the Calories They Buy

Christina Roberto, PhD; Jason P. Block, MD;

Background

Sugar-sweetened beverage consumption is associated with obesity and other chronic diseases, leading to numerous policy proposals designed to curb their intake. We assessed whether underestimating meal calories at fast-food restaurants was associated with purchasing high-calorie beverages.

Methods

From April to August 2010 and 2011, we surveyed 1877 adults (mean age 37 years, mean body mass index (BMI) 27.9 kg/m², 43% female, 62% non-White) exiting McDonald's, Burger King, Wendy's, Subway, and KFC restaurants in Boston and Springfield, MA, Hartford, CT, and Providence, RI. We collected their receipts, calculated the calorie content of their purchase, and queried their estimates of total calories purchased. Using linear regression, we assessed the association between purchasing a >=100 calorie beverage ('high-calorie beverage') and participants' estimates of calories in their meals, controlling for demographics, BMI, and total meal calories.

Results

On average adults underestimated the calories they purchased by 175 kcal. Underestimates were much greater among those who purchased a high-calorie beverage. Consumers who purchased a high-calorie beverage underestimated by 311 kcal on average, whereas those who purchased a low-calorie beverage or no beverage underestimated by 100 kcal on average. This difference remained significant (62 kcal, 95% CI: 1-124, p=0.04), after controlling for total calories purchased and other potential confounders. Data on adolescents will also be presented.

Conclusions

These data suggest the purchase of a high-calorie beverage is associated with a greater tendency to underestimate the calorie content of meals. This study provides support for public health policies specifically targeting sugar-sweetened beverages.

T-2448-P: Potential Adjuncts to Pediatric Weight Management

Allen F. Browne, MD; Nancy T. Browne, RN, PNP, MS, CBN;
Effective adjuncts to nutrition, activity, and behavioral therapy which will be acceptable to patients, families, primary care providers, and payors need to be identified. Weight loss devices, weight loss medications, or combinations of these modalities may meet this need.

Methods

We researched weight loss devices and medications. There are a number of weight loss devices available. There are a number of weight loss medications available. These possible adjuncts to pediatric weight management are based on our understanding of the physiology of obesity, the mechanisms of bariatric surgical procedures, and empiric observation.

Results

Weight loss medications and weight loss devices do not appear to be as effective as bariatric surgical procedures when used alone in adults. They may be more effective in children/adolescents. In combination they may be additive or even synergistic. They are safer than bariatric surgical procedures. Most are adjustable. All are removable or reversible. They may be more acceptable to patients, families, primary care providers, and payors as adjuncts to pediatric weight management.

Conclusions

We need an organized, cooperative effort involving clinicians, government, industry, and payors to study, approve, and make available effective multidisciplinary treatment algorithms incorporating devices and medications for the children/adolescents suffering from the disease of obesity.

T-2449-P: Prevalence, Nutritional Quality and Marketing Strategies in Fast Food ChildrenÂ’s Meals in Guatemala

Sofia Mazariegos, RD; Violeta Chacon; Joaquin Barnoya, MD, MPH

Background

Fast food chains are highly prevalent in Guatemala and promote children's meals that include toy giveaways and price promotions. We sought to assess the prevalence, marketing strategies, and nutrition information and quality, in children's meals in fast food chains in Guatemala.

Methods
We visited each fast food chain franchise (e.g., McDonalds, Burger King) in Guatemala to assess the prevalence of children's meals. We then purchased all children's meals available to assess the prevalence of toy giveaways, health claims, and the difference in delivery time and price between the meal and each food item purchased separately. Each item was then classified as 'healthy' or 'less healthy' using the UK Nutrition Profile Model. Nutrition information was collected on-site, restaurant website, or by calling the customer service phone number. Analyses were done in STATA.

**Results**

All fast food chains offered children’s meals. Out of 114 meals, 21 children's meals were identified (18.4%). All children’s meals included a toy giveaway and only 5 (23.8%) provided nutritional information. Those with nutrition information were classified as 'less healthy'. Five meals (23.8%) included health claims in the package. Meals were on average US$1.93 cheaper compared to purchasing each individual item (p = 0.01). It took 1.44” minutes longer to purchase the food items individually compared to purchasing the meal (p=0.19).

**Conclusions**

In Guatemala, fast food chains are using meals to target children. Price incentives, toy giveaways, and health claims are also being used to reach children. Guatemala should explore implementing policies to restrict the use of unhealthy children's meals as a strategy to halt the obesity epidemic.

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**T-2450-P: Exposure to TV Fast Food Advertising and Fast Food Consumption Among Preschool-Age Children**

*Madeline A. Dalton, PhD; Meghan R. Longacre, PhD; Keith M. Drake, PhD; Jennifer Harris, PhD, MBA; Kristy M. Hendricks, ScD, RD; Linda Titus, PhD, MA;*

**Background**

Background: Despite public health concern about ubiquitous TV fast food (FF) advertising, few studies have objectively measured young children's exposure to TV FF advertising and its influence on children's FF intake in a natural setting.

**Methods**

Methods: We examined the association between TV FF advertising exposure and intake among 3-5 year old children by surveying 537 parents recruited from pediatric and WIC clinics in southern NH. We asked parents whether their child had something to eat or drink from 14 different FF restaurants and which TV channels their child watched in the past 7 days. For each child, we combined parental report of children's TV viewing with commercial advertising data to calculate a FF advertising exposure score equal to the mean number of FF commercials aired per day on the channels watched. We used Poisson regression to estimate the adjusted association between FF consumption and TV advertising exposure.
Results

Results: Two-thirds (66%) of the children ate FF in the past 7 days. The most frequently visited FF restaurants were Dunkin’ Donuts (36%) and McDonald’s (34%). Among those who ate FF, 45% ate at more than one FF restaurant (mean=1.7). Children watched a mean of 4.8 TV channels, which resulted in a FF advertising score of 7.2 FF commercials per day per channel watched. The number of FF restaurants a child ate at increased by 2.2% (p=0.001) for each unit increase in FF advertising exposure score.

Conclusions

Conclusion: Preschool-age children’s exposure to FF TV advertising is associated with an increase in FF consumption. This association was significant even after adjusting for hours of child TV watching, parent FF consumption, and sociodemographic characteristics.

T-2451-P: Child-Targeted TV Advertising and Preschoolers’ Consumption of High Sugar Breakfast Cereal

Meghan R. Longacre, PhD; Keith M. Drake, PhD; Jennifer Harris, PhD, MBA; Kristy M. Hendricks, ScD, RD; Linda Titus, PhD, MA; Madeline A. Dalton, PhD;

Background

Background: Nearly $200 million per year is spent on child-targeted marketing of cereals, most of which are high in added sugar. The influence of child-targeted TV advertising on young children’s consumption of high sugar breakfast cereals (SBC) has not been quantified in a natural setting.

Methods

Methods: We examined the association between SBC advertising exposure on children’s TV channels and intake among 3-5 year old children by surveying 537 parents recruited from NH pediatric and WIC clinics. We asked parents whether their child had eaten any of 11 highly advertised SBC and which children’s TV channels their child watched in the past 7 days. We combined parental report of children’s TV viewing with commercial advertising data from those channels. For each child, we calculated a child-targeted advertising exposure score for SBC equal to the mean number of SBC commercials aired per day on the children’s TV channels watched. We calculated rate ratios using Poisson regression.

Results

Results: Sixty percent of the children ate SBC, of whom almost half ate more than one brand (mean = 1.8). The most frequently eaten SBC were Honey Nut Cheerios (21%), Froot Loops (19%), and Cinnamon Toast Crunch (12%). Overall, children watched a mean of 3.2 children’s TV channels, which resulted in a SBC advertising score of 7.2 SBC commercials per day per channel watched. The number of SBC restaurants a child ate at increased by 2.2% (p=0.001) for each unit increase in SBC advertising exposure score.
advertising score of 3.1 commercials per day per children's TV channel watched. The number of SBC a child ate increased by 2.5% (p=0.018) for each unit increase in SBC advertising exposure.

Conclusions

Conclusion: Exposure to child-targeted TV advertising for SBC is associated with increased SBC consumption among preschoolers. This association was significant even after adjusting for hours of child TV watching and sociodemographic characteristics.

T-2452-P: The Toy Story: Association Between Young Children's Knowledge of Fast Food Toy Offerings and Eating at McDonald's

Keith M. Drake, PhD; Meghan R. Longacre, PhD; Linda Titus, PhD, MA; Gail E. Langeloh, MS; Lauren P. Cleveland, MS, MPH; Madeline A. Dalton, PhD;

Background

Background: McDonald's accounts for over 2/3 of fast food (FF) advertising on children's TV and these advertisements emphasize cross-promotional toys instead of food. Many consider this marketing practice deceptive because young children cannot discern between the toy and the advertised product.

Methods

Methods: We surveyed 537 parents of 3-5 year old children, who were recruited from pediatric and WIC clinics in Southern New Hampshire. Parents were asked whether their child had something to eat or drink from McDonald's in the past 7 days; if their child usually knows what toys are being offered at FF restaurants; and how their child usually finds out about the toys. Poisson regression models were used to estimate the association between children's knowledge of FF toy offerings and their consumption of McDonald's, adjusting for parent FF consumption and sociodemographic characteristics.

Results

Results: One-third (34%) of the children ate at McDonalds during the preceding week. Sixteen percent of parents reported that their child usually knows what toys are offered at FF restaurants. Children were most likely to find out about specific toy offerings from TV (49%) and signs outside the restaurants (44%). Children who usually know about FF toy offerings were 59% (p<0.001) more likely to have eaten at McDonalds, compared to children who do not usually know which toys were offered.

Conclusions
Conclusions: Preschoolers who know which toys are being offered at FF restaurants are more likely to eat at McDonald's. TV advertising contributes to preschoolers' knowledge of toy offerings at FF restaurants.

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T-2453-P: Point-of-Purchase Marketing, Pester Power and Preschoolers’ Consumption of High Sugar Breakfast Cereals

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Background

Background: Point of purchase marketing (POP) for high sugar breakfast cereals (SBC) feature branded or cross-promotional characters on packaging. POP is designed to grab children's attention and trigger requests for the product while shopping.

Methods

Methods: We recruited 537 parents of children, 3-5 years of age, from pediatric and WIC clinics in Southern New Hampshire for a cross-sectional survey. We asked parents which cereals their child consumed in the past 7 days and identified SBC as those having >=9 grams of sugar per ounce of cereal. Parents used a 4-point Likert scale to indicate if their child chooses cereal based on the pictures on the box (POP receptivity) and whether they buy cereals their child asks for while grocery shopping (effective pester power). We collapsed parent responses into dichotomous variables to distinguish those who strongly disagreed with these statements from those who did not.

Results

Results: Two thirds of children ate SBC during the past week; 41% were receptive to POP and 62% had effective pester power. Parents of POP receptive children were more likely to succumb to pester power (p<0.001). After adjusting for sociodemographics, POP receptive children were 34% more likely to have consumed SBC (p<0.001); adding pester power to the model reduced this effect to 20%. Effective pester power was associated with a 49% increase in the likelihood of eating SBC (p<0.001).

Conclusions

Conclusions: POP influences children's cereal choices. Pester power influences parents' cereal purchases. Both factors are significantly associated with a higher consumption of SBC among preschoolers. Pester power partially mediates the association between POP receptivity and SBC consumption.
T-2454-P_DT: Impact of Education Interventions in Addition to Menu Labeling on Calories Purchased at the FFR

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Background

Fast-food consumption is associated with obesity. Menu labeling in fast-food restaurants (FFRs) may minimally impact calories purchased. Fast-food consumers may need additional interventions to help them understand and utilize the calorie information in FFR.

Methods

142 overweight or obese participants who went to FFRs at least once per week were recruited from municipal clinics in the Bronx NY, where menu labeling has been implemented. Participants were randomized to the C.H.E.K.S (Calorie Health Education Knowledge and Skills) intervention vs. control. The C.H.E.K.S. intervention focused on improving knowledge about calories and skills in using the calorie information i.e. creating under 600 calorie meals. The control arm received a handout about making lower calorie food choices in the FFR. Calories purchased from FFRs were determined by fast-food receipts and food logs. Intervention effects were assessed using non-parametric tests.

Results

Mean (SD) age of participants was 49 (12) years. BMI was 34(7) kg/m². 66% were Black, 49% Hispanic, and 31% had less than HS education. At baseline, intervention participants (n=62) purchased 911 (1240) calories and control participants (n=83), purchased 1307 (1990) calories. Four weeks post intervention, participants reported purchasing significantly fewer calories in the intervention (-500 (668) calories and the control arm (-679 (1528) calories), with no difference between arms (p=0.75). Calorie knowledge significantly improved in both arms.

Conclusions

Participants receiving either an intensive intervention or a handout about reducing calories in FFR significantly reduced their calories purchased at FFRs. Such interventions that support menu-labeling initiatives may be needed to help consumers reduce their calories at FFRs.
Background

We examined whether higher relative prices of high-energy density (HED) foods, compared to low-energy density (LED) foods, in local grocery stores are associated with lower BMI z-scores (BMIz) among children, and whether relative HED prices are lower in communities with higher minority and poverty rates.

Methods

We divided foods commonly consumed by 6-11 year-olds into HED and LED groups based on their energy density (calories per gram), and used multilevel linear regression to estimate the change in BMIz per 5% increase in the relative cost of HED foods in stores within 3 miles of children's homes (n=1049). We also compared relative HED prices between children in neighborhoods with different minority and poverty rates.

Results

The unit cost ($/kilogram) of HED foods was 51.2% higher than LED foods (interquartile range: 48.5-53.7%) in local stores among children in white neighborhoods, compared to 44.7% (42.9-45.9%) among children in minority neighborhoods (p<0.05). HED food costs were 48.3% (45.4-51.9%) higher than LED among children in low-poverty neighborhoods, compared to 44.7% (42.8-46.5%) among those in low-poverty neighborhoods (p<0.05). A 5% increase in relative HED costs was associated with a 0.28 decrease in BMIz (95% CI: -0.79, 0.23) among children in high-poverty neighborhoods, compared to a 0.02 increase (-0.12, 0.17) in low-poverty neighborhoods (poverty-cost interaction p=0.11).

Conclusions

The unit cost of HED foods is generally greater than that of LED foods, but the relative cost of local HED foods is lower among children living in neighborhoods with more minorities and higher poverty rates. Increases in relative HED grocery costs may have a greater impact on the weight status of children in higher poverty areas.

T-2456-P: Restricting Advertisements for High-Fat High-Sugar Foods During
Children’s Televisions Programs: Attitudes in a US Population-Based Sample

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Background

Children in the US are over-exposed to advertisements for high-fat, high-sugar (HFHS) foods. Exposure to such foods is linked to increased demand for and consumption of those foods. Understanding public support for policy changes related to limiting HFHS advertisements to children is warranted.

Methods

A secondary analysis of the 2012 Annenberg National Health Communication Survey (ANHCS) was conducted. To determine the degree of public support for restricting HFHS advertising to children, the percentage of respondents supporting and opposing the regulation was calculated. Logistic regression models were used to determine predictors of support. Potential predictors included age, race, gender, education status, support for smoking bans in public places, support for trans fat bans in restaurants, weekday and weekend television viewing behavior, and number of children in the household. Responses from 3,692 adults were analyzed.

Results

The sample was 53% female with a mean age of 49±17 years. Race/ethnic composition was 77% white, 8% black, 9% Hispanic and 6% other. Responses indicated that 23% strongly support, 33% support, 16% oppose and 8% strongly oppose restricting HFHS advertisement to children. 19% had no opinion. The greatest support was found among respondents who supported smoking bans in public settings (OR=3.7, 95% CI: 2.9-4.8) and supported banning the use of trans fats in restaurants (OR=1.8, CI: 1.5-2.2). Age also was a predictor (OR=1.6, CI: 1.3-2.0).

Conclusions

More than half of respondents supported restricting HFHS advertising to children; less than 10% strongly opposed such regulations. Findings indicate general public support for policies restricting HFHS advertising during children's television programs, which may be an obesity prevention strategy.
T-2457-P: Detection of Overweight and Obesity Through Controls in Healthy Kindergarten Children

Irene S. Ferrin, MD; Gladys Guarrera, MD;

Background

The increase in obesity leads design strategies of early detection to carry out targeted interventions; early detection of risk factors contribute to better diagnosis. In the screening conducted in 5 year kindergarten children, not only risk factors and obesity were sought but also family background was studied, in order to make interventions in the family. Our goal is to identify the most relevant factors, detect diseases in the family and describe public health actions that can help in controlling this disease.

Methods

44,450 5 year-old children from public schools of Buenos Aires city were revised; weight, height and BMI was assessed, and obesity was diagnosed according to WHO parameters.

Results

The School Health Program developed by the government of Buenos Aires, has among its objectives, the nutritional control. Obesity and overweight was detected in 37% of apparently healthy population in the 2010-2013 period. As for obesity, it was detected in 18.4% of the children in 2010-2011, 19.1% in 2012 and 18.1% in 2013. Regarding overweight, 19.4% of children were detected during 2010-2011, 19.6% in 2012 and 19.3% in 2013. The data obtained in the control of 5 year-old children, allow including them in nutritional programs for specific treatment. From these data, different strategies within and outside the school environment were designed.

Conclusions

In this paper we show that, through the control performed in a pediatric population, it was detected obesity and overweight in 4 of 10 children, and high prevalence of obesity and metabolic disease in their parents. Early intervention can mitigate the incidence of this disease in children and adults, as stated in the framework of the World Assembly May 2014. Course was given to public policies for prevention.

T-2458-P: Content Analysis of Food-Based Dietary Guidelines: A Comparison in the Spanish Caribbean
Melissa Fuster, PhD:

**Background**

Food-based dietary guidelines (FBDG) are important policy documents to tackle rising obesity concerns at the national level. This study analyzed FBDG in culturally-close yet economically and politically distinct countries to underscore the key role context and culture play in nutrition policy.

**Methods**

Comparative content analysis of current FBDG in Puerto Rico (PR, 2012), Cuba (Cu, 2009) and Dominican Republic (DR, 2009) using qualitative coding techniques and the Atlas.ti software, to assess differences in expert advice and priorities regarding diets in relation to local concerns over rising obesity rates. The analysis focused on key messages, pictorial representations, and how these are framed in the documents, including practical advice. The FBDG were contextualized in the local, current nutrition/food and socioeconomic situations, using available statistics. The comparative analysis is complemented by unstructured, open-ended interviews with local nutrition policy experts (n=4).

**Results**

The FBDGs differed in pictorial representations, number of messages (PR=7, Cu=9, DR=10) and food groups (PR/Cu=7, DR=10). Messages overlapped more between Cu and DR, both addressing breakfast and food safety (missing in PR). Similar food groupings were seen in PR and Cu, and specification concerning portion sizes. While Cu FBDG addressed specific cultural dietary habits (ex. fried foods), PR and DR had a more indirect/vague approach. These and other differences are discussed and contextualized through interviews and available nutrition/food data.

**Conclusions**

Despite cultural similarities, these FBDG presented variations in addressing healthy diets and dietary patterns, marking the contexts' political and economic differences. Results bring a new perspective to improve nutrition advice addressing obesity in these countries and its communities in the US.
**Background**

Consumption of fruit and vegetable is important to keep a healthy lifestyle. Intake of fruit and vegetable is recommended to be at least 5 portions/per day but nowadays less than 15% of children between the ages of 4-8 years reach that consumption level. How to promote and increase fruit consumption in children is still an open issue. The aim of this study was to experimentally assess the efficacy of an intense pro-fruit advertising on its actual consumption in children during a snacking occasion.

**Methods**

The study was conducted on 12 children exposed to a 9 minutes movie, filled with a total 3.30 minutes advertising (25% total time). Advertising was classified as healthy if the message was focused on fruit and vegetable consumption, and as unhealthy if focused on hyper-caloric foods. Children were randomized equally to have equicaloric snacks of apples (packaging of 80 grams) or chips (25 grams) available during TV watching.

**Results**

No significant differences (P=0.762) were found in terms of kcal intake deriving from fruit consumption among the group exposed to chips advertising (20.20 kcal, 95% C.I. 1.01-32.93) and fruit advertising (0 kcal, 95% C.I. 0.00-0.00). Overall children had a higher consumption of chips (11.35 grams, 0-22.86) compared to fruit (0 grams, 0.00-44.91).

**Conclusions**

Even an intense exposure to TV advertising of fruit and vegetables has not been able to increase the consumption of fruit during a snack time. More innovative approaches may be necessary to stimulate the intake of fruit and vegetable in children.

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**T-2460-P_DT: From Cupcakes to Sodas: A Review of Policies Regulating Calorie Dense Foods and Sugar Sweetened Beverages Across Multiple Sectors**

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**Background**
Policies regulating calorie dense food (CDF) and sugar sweetened beverage (SSB) consumption may contribute to improved diet and reduced obesity prevalence, but no comprehensive, objective measure exists to assess their existence and strength in places where children spend their time.

**Methods**

We developed the Policy Indicator Checklist (PIC) based on federal guidelines and recommendations for state and local policies. We used the PIC to evaluate policy environments in communities participating in the Childhood Obesity Research Demonstration (CORD) project. Coders assessed CDF and SSB policies in schools, early childcare centers, and community venues using the PIC. We used principal components analyses to group related policies across sectors and 3 separate t-tests to compare policy strength in communities dichotomized on racial/ethnic population, youth population, and educational attainment.

**Results**

5 CDF and 4 SSB policy components were identified. Communities with a larger non-Hispanic white population had significantly stronger policies in 'Guidelines & Regulations for Food Availability' and 'Healthy Beverage Promotion' components. Communities with a larger youth population had significantly weaker policies in 'Guidelines & Regulations for Food Availability,' 'Improving Food Quality in Neighborhoods & Public Venues,' and 'Healthy Beverage Promotion components' (ps<0.05). No policies were associated with community educational attainment.

**Conclusions**

The PIC is a useful method for comprehensively evaluating policies regulating CDF and SSB. Although communities may prioritize different strategies to improve child nutrition, policies could be strengthened across sectors to limit CDF and SSB in communities with larger minority and youth populations.

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**T-2461-P: Calories Sold in the U.S. Marketplace Decline between 2007 and 2012**

*Kiyah Duffey, PhD; Lisa Sutherland, PhD; Lori Kaley;*

**Background**

Given the growing obesity epidemic in the US, the food industry has received increasing pressure to make the foods and beverages they offer more nutritious and to reduce the number of calories they sell in the US marketplace. In 2010, 16 food and beverage companies participating in the Healthy Weight Commitment Foundation (HWCF) pledged to reduce the number of available calories by 1 trillion in 2012 and 1.5 trillion in 2015. We sought to analyze whether the interim 2012 goal was achieved.

**Methods**
Sales data, obtained from the Nielsen Company and Management Science Associates, Inc., were merged by Universal Product Code (UPC) with nutrition data obtained from Gladson and Mintel Group Limited. Total available calories as well as change in calories, was calculated for 2007 and 2012 by UPC and across HWCF companies.

**Results**

Results indicate that 6.4 trillion fewer calories were sold in 2012, already exceeding the 2015 pledge by more than 400 percent.

**Conclusions**

While calorie intake is complex, we observed key indicators to the calorie reduction including product reformulation, consumers choosing lower calorie options, and the availability of new products and packaging sizes in the marketplace. This latest evidence suggests that we are making progress toward reducing calories that are available, purchased and consumed and supports observed epidemiologic and observational trends in the decline of total energy intake among Americans.

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**T-2462-P: Are US Nutrition Surveillance Data Sufficient to Explain the Obesity Epidemic in the US?**

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**Background**

Using national nutrition surveillance data to develop public health policies presupposes that such data are valid. In this study we examined the validity of the USDA’s loss-adjusted food availability data series (LAFA) as a tool to estimate per capita trends in energy intake from 1971-2010.

**Methods**

NHANES I (1971-1974) through NHANES 2009-2010 data were used to estimate total daily energy expenditure (TEE) for US adults, aged 20-74. TEE was calculated via the Institute of Medicine’s equations using 'low-active' (L-ACT) and ‘sedentary’ (SED) physical activity level values. TEE estimates were subtracted from per capita caloric consumption estimates derived from LAFA data to create disparity values in kilocalories per day (kcal/d). Since the percentage of the adult population that was overweight/obese only increased during this time frame, one would expect the disparity between LAFA and TEE to be positive and likely increasing in every instance.

**Results**
From 1971-2010, the disparity between LAFA and TEE varied 394 kcal/d for L-ACT (trend, \( p < 0.001 \)), and 412 kcal/d for SED (trend, \( p < 0.001 \)). From 1971-1980 the disparities between LAFA and both assessments of TEE were negative, indicating that the population should have experienced weight loss during this period if the LAFA data were valid. Furthermore, although positive thereafter, the disparity decreased significantly from 2007-2008 to 2009-2010.

Conclusions

The disparities between LAFA and TEE were neither consistently in the same direction, nor consistently positive. These findings call into question the validity of using the LAFA data series as a basis for public health nutrition policy.

T-2463-P_DT: Differences in BMI, Consumption of High-Fat Foods and Importance of Restaurant Characteristics by Food Insecurity and Socioeconomic Status in Urban Women

Terri-Ann Kelly, MSN RN; Charlene W. Compher, PhD, RD, CNSC, LDN, FADA, FASPEN; Tanja Kral, PhD;

Background

The relationship between socioeconomic status and obesity prevalence has been documented (McLaren, 2007). The role of perceived food security (FS) and food insecurity (FI) in weight regulation and food consumption patterns is less well studied. The aim of this analysis was to assess the relationship between BMI, preferences for and consumption of high-fat foods, importance of restaurant characteristics and household income and FS/FI in an urban sample of predominantly African American women.

Methods

Sixty-three caregivers completed the 6-item USDA Food Security Survey, Fat Preference Questionnaire, and an Eating Out Questionnaire and had their height/weight measured.

Results

Participants' BMI significantly differed by FI/FS status (34.1±7.2 kg/m2 (FI) vs. 29.5±5.8 kg/m2 (FS); \( P=0.02 \)), but not by household income (\( P=0.93 \)). Women with a lower household income (<$25,000) reported consuming high-fat foods more frequently than women with a higher household income (> $25,000; \( P<0.004 \)), but they did not differ in their preference for high-fat foods (\( P=0.14 \)). A greater percentage (65%) of women with higher household incomes than with lower household incomes (30%)
perceived the quality of food served to be important when eating out (P=0.04). Availability of value pricing, however, was not important to greater percentage of women with higher (48%) than with lower (14%) household incomes (P=0.01).

Conclusions

The findings from this study indicate that participants' weight outcomes and behaviors and perceptions related to food consumption and eating out differ when analyzed by household income or FS/FI. These results highlight the importance of assessing different aspects of socioeconomic status in participants taking part in obesity research.

T-2464-P: Obesity Is Increasingly Viewed as a Community Problem by Both the Public and Healthcare Professionals

Ted Kyle; Diana M. Thomas, PhD; Adam G. Tsai, MD, MSCE, FACP;

Background

Weight bias and stigma complicate clinical and policy approaches to obesity. Appreciation of external causes for obesity can reduce weight bias. We found in 2013 that the public primarily views obesity as a personal problem of bad choices. AMA classified obesity as a chronic disease in June 2013.

Methods

Through a validated online survey, a representative U.S. sample of 48,325 adults (POP) and 3,828 healthcare professional (HCP) respondents was asked whether they viewed obesity primarily as a personal problem of bad choices, community problem of bad food and inactivity, or medical problem. Respondents were divided into 4 waves: Feb 2013, Mar 2013, Aug 2013, and May 2014. The HCP sample included registered nurses, physicians, dietitians and nutritionists, and healthcare policy or management professionals. We analyzed the changing views of POP and HCP respondents over time using ANOVA and examined demographic variables (age, gender, income, region, urban density) associated with these shifts.

Results

Significant shifts of perceptions occurred in 2014. Both POP and HCP respondents became more likely to view obesity as a community problem in 2014 (POP 38% v 25%; HCP 44% v 26%). HCPs became less likely to view obesity as a medical problem in 2014 (19% v 31%). In 2014, younger and higher income respondents more likely view obesity as a community problem. Older respondents more likely view it as a medical problem. Male and rural respondents more likely view obesity as a personal problem of bad choices. All differences are significant, p<0.0001.

Conclusions
These data suggest that views of obesity have shifted in 2014 away from obesity as a personal problem of bad choices and toward a community problem of bad food and inactivity. HCPs became less likely to consider obesity to be a medical problem, despite AMA defining obesity as a disease.

T-2465-P: Influence of Menu Labeling on Adolescents in Four Diverse Los Angeles Communities

Valerie Ruelas; Ellen Ellen Iverson, MPH; Eugene Nguyen, Bachelors of Arts, Psychology;

Background

The 2010 Federal Patient Protection and Affordable Care Act mandates that fast food/chain restaurants with over 19 outlets clearly display calorie content of all menu items. The impact of calorie menu labeling on adolescents is unclear, especially when comparing communities with significant differences in rates of overweight/obesity and access to healthy food choices.

Methods

Venue exit surveys assessed the impact of menu labeling on adolescent consumers of two fast food chain restaurants in four diverse socio-demographic Los Angeles County communities - East Los Angeles (ELA) South Los Angeles (SLA), Culver City (CC) and Manhattan Beach (MB).

Results

The majority of respondents ate fast food <= once a week (ELA- 80%, SLA 88%, MB & CC - <95%) with 57% considering the purchase a snack between meals. Over half (56%) noticed the menu labeling with 15% finding the information confusing. Noticing information was similar among gender and by venue, however, females were more likely to be confused by the menu labeling and have their order influenced. Overall, 12% noticing calorie information were influenced enough to make order changes. Nearly 18% of respondents stated they did not know how many calories they should eat (range: 200-16,000; mean: 1,498). When asked about weight, 21% of males and 38% of females reported being slightly overweight or overweight.

Conclusions

Calorie postings does not appear to significantly impact purchasing behavior. Limited knowledge of appropriate calorie intake likely impacts the meaning of posted calories. More calorie education and clearer posting is needed to adequately inform consumers.
T-2466-P: Application of Dynamic Loss Models to Estimate the Health Impact of an Innovative Sugar-Sweetened Beverage Tax Shows Reductions in Population Weight in New York City

Ryan R. Ruff, PhD; Chen Zhen, PhD;

Background

We convert expected calorie reductions from a new sugar-sweetened beverage (SSB) tax into population weight change in New York City using dynamic loss models. These simulate the effects of dietary perturbations on body composition change adjusting for physiological adaptation.

Methods

One- and ten-year simulations of body composition change were conducted using Berkeley Madonna dynamical systems simulation software. Calorie reductions as a result of a proposed sugar-sweetened beverage tax were derived previously using a fully endogenized distance-metric almost ideal demand system (DM-AIDS). Resting metabolic rates and body fat mass were estimated using the Mifflin-St. Jeor and Jackson methods, respectively. Obesity prevalence measured by BMI and percent body fat was estimated and compared for statistical significance over time.

Results

A .04-cent per calorie tax on SSBs reduced beverage energy intake by 5800 calories per capita. Baseline obesity prevalence determined by predicted body fat was 28.3% (95% CI=26.9, 30.0) compared to 23.7% based on BMI (95% CI=22.3, 25.1). Dynamic loss model results yielded a reduction of .46 kg of body fat in year one and .92 kg of body fat in year ten. Results show consistent but non-significant decreases in obesity prevalence over time. A secondary reduction of all SSB calories reduced obesity prevalence to 16.9% (95% CI=15.7, 18.2) in year ten.

Conclusions

Despite modest reductions in average body weight, a small calorie tax on sugar-sweetened beverages resulted in a ten-year reduction of 7,854 kilograms amongst NYC adults. While no single program may be the answer to the obesity crisis, synergistic interventions can have substantial effects on weight.
T-2467-P: Challenges in Development of the Childhood Obesity Policy Comparative Effectiveness Model (COPCEM)

Asheley Skinner, PhD; Nilay T. Argon, PhD; Wanyi Chen, Master of Science in Operation Research; Stephanie E. Hasty, BA; Gan Liu, MS;

Background

Childhood obesity is a complex phenomenon with many contributing factors. Policy makers need information about effectiveness, cost-effectiveness, and implementation options to best allocate limited resources. COPCEM is a simulation model being developed as a way to compare policy options.

Methods

COPCEM is an agent-based simulation model. We used school nutrition programs as an initial base for model development. We envisioned the model as multiple schools composed of many students. The agent-based simulation examines the strength of policy diffusion among students, both within and between schools. The goal is to determine the best allocation of resources, considering the obesity prevalence in a school and the interactions among children. Currently existing data and literature are used to define effect sizes. We have successfully created a base model which allows for hypothetical examination of effect sizes.

Results

Available data have allowed for adequate estimation of the prevalence of obesity given differing school demographics. Although there is a large body of literature on school nutrition policies, cost data is extremely limited. Minimal data exists on the strength of ties between children based on weight, and data on how peer networks influence interventions is virtually nonexistent. The focus on single intervention effect sizes without consideration of peer networks or reporting of costs hampers the ability to estimate policy effects.

Conclusions

Changes to childhood obesity incidence and prevalence will occur only with broad policy changes. Intervention researchers should consider how their design and reporting can promote translation to broad policy by providing data useful for simulation models such as COPCEM.
T-2468-P: Current Availability of Kidsâ€™ Meals with < 600 Calories at Leading Quick-Service Restaurants

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Background

Children frequently eat meals from restaurants. Past research showed that most kids’ meals were energy-dense and contributed to excess caloric intake. With a recent trend toward healthier kids’ meals, additional research is needed to examine the calorie (kcal) content of current offerings.

Methods

Children's menus and corresponding nutrition data were collected in May 2014 from websites of the top 10 Quick Service Restaurants (QSRs) (in sales) offering kids' meals. Trained coders double-entered children's menu items, coding each as a side, entrée, beverage, or dessert. Analysis included restaurants with calorie data for all meal components (n=9). For each QSR, kids' meal combinations were calculated (N=1066); calorie amounts for included items were summed for each combination; and average calories and percent of meals with <=600 kcal were calculated. 600 kcal represents ~33% of recommended daily intake for children ages 9-13 and aligns with RAND Corporation and Kids LiveWell standards.

Results

On average, kids' meals contained 500 ± 104 kcal, which varied by QSR (M(SD)=313(21) kcal to M(SD)=842(135) kcal). Across all meal combinations, caloric content ranged from 205 to 1080 kcal, and three quarters (75.7%) had ≤600 kcal. At four of nine QSRs, over 90% of meal combinations met this criterion. Ongoing analyses will consider total and saturated fat and meal components (e.g., beverage type), and will include current (May 2014) menu combinations at the top 10 Full Service Restaurants.

Conclusions

At present, kids’ meal combinations with ≤ 600 kcal are widely available at leading QSRs; however, variability in offerings across restaurants may hinder the widespread effectiveness of efforts to reduce children's caloric intake in these settings.

T-2469-P: An Investigation of Advice on Weight Loss through Dietary Modification Presented in the 5 Leading
US Health Magazines: Health, Men's Health, Women's Health, Prevention and Self

Risa J. Stein, PhD; Sydney Alexander

Background

The US population derives much of their nutrition and dieting information from the media. Magazines, which frequently attempt to integrate expert opinion on health and diet derived from medical journals, now constitute a primary source of health information.

Methods

This study reviewed articles pertaining to weight loss advice (WLA) involving dietary modification presented over the course of a one-year subscription from summer 2012-2013 in the top 5 health related magazines: Health, Men's Health, Women's Health, Prevention, and Self.

Results

The average number of WLA articles per issue ranged from a low of 1.5 (Prevention) to a high of 4.9 (Men's Health). WLA consistently advocated a low-calorie, low-carbohydrate, low-fat (especially low saturated-fat), low-sodium, and protein-rich diet. The greatest inconsistency between issues of the same periodical pertained to protein intake. The greatest inconsistency between the different periodicals pertained to low-carbohydrate intake. With the exception of Prevention, a majority of WLA involved endorsement of low-calorie approaches.

Conclusions

WLA through diet in leading US health magazines is outdated and restrictive, advocating for the consumption of little more than lean protein, vegetables, and fruit with a heavy emphasis on caloric reduction and a continued demonization of fat. Surprisingly, WLA was most abundant in Men's Health.

T-2470-P: Packaged Food Purchases and Nutrient Profiles by Store Types in the US: 2000-2012

Dalia Stern; Shu Wen Ng, PhD; Barry M. Popkin, PhD;
Background

The proportion of volume from mass-merchandisers and convenience significantly increased over time, and decreased from grocery chains and independent stores. However, little is understood about the dynamics of purchases and nutrient profiles of packaged foods purchases (PFPs) by store type over time.

Methods

US household purchase data at the UPC level from Homescan 2000-2012 (n= 659,372) were linked to Nutrition Facts Panel data to provide nutrient information on PFPs. Store type was classified using 2012 information into: 1) club(-warehouse); 2) convenience/drug/dollar; 3) ethnic/specialty; 4) grocery chains (>=10 stores); 5) mass(-merchandisers); 6) independent (<10 stores); and 7) other. We estimated the proportion of volume and the mean nutrient density (calories, total sugars, total fat and sodium per 100g) of PFPs by store type and compared using t-test between and within stores. Results were weighted to be nationally representative.

Results

Nutrient density within stores decreased from 2000-12, but differences across stores remained similar. In 2012, mean caloric density of PFPs from mass (121.0+/-0.6kcal/100g) and convenience (129.5+/-0.9kcal) were significantly higher than grocery (108.8+/-0.4kcal), while club (65.8+/-0.6kcal) and independent (61.1+/-0.6kcal) PFPs were significantly lower. Similar results exist for total fat, saturated fat and total sugars. Sodium density PFPs from club (146.6+/-3.6mg/100g) and independent (143.5+/-5.2mg) were lower relative to grocery (213.0+/-3.4mg).

Conclusions

Trends in growth from store types with poorer nutrient density (more energy dense, total fat, saturated fat, total sugars, sodium), such as mass-merchandisers and convenient stores, could pose a potential US public health concern.

T-2472-P_DT: Synergy of Food and Beverage Advertising in Different Contexts: Public, Private and Communication Media in Mexico

Lizbeth Tolentino-Mayo, MSc; Florence L. Théodore, PhD; Anabel Velasco-Bernal, MS; Juan A. Rivera, M.S and PhD International Nutrition, Cornell Un; Simón Barquera, PhD;

Background
Numerous research demonstrate the complex multifactorial etiology and nature of overweight and obesity, being implicated other elements in which individuals have little or no possibility to change, representing in many cases a higher risk for health at the epidemiological level.

**Methods**

600 hours were recorded from December 2012 and April 2013 of the 4 most viewed broadcast T.V. channels by Mexican population, between 7 am and 10 pm. In the same period of time an observation was conducted in a national representative sample regarding the marketing on the facilities of 117 elementary schools. In Mexico City advertising was observed in 21 supermarkets and 18 convenience store selected by mean of a criteria of population density. Also, the marketing of 10 main subway stations was registered. For analyzing data, all the food and beverages products were categorized in: added-sugar cereals, sugar sweetened beverages, sweet snacks, fast food, dairy products and others.

**Results**

The advertising by food group was different depending the location the product was announced, sweet snacks were the food product most advertised in T.V. media with a 28.1%, inside the elementary schools facilities the sugar-sweetened beverages had the most advertising with a 68% and in the convenience stores was of 26.1%. In the subway’s facilities the most advertised were dairy products (29%) and in supermarkets the added-sugar cereals dominate food advertising with a 50%.

**Conclusions**

Food products advertising with low or no nutritional value must be regulated due to the direct influence on general population’s preferences, intakes and diets, but particularly on children and adolescents health as it may modify their corporal composition and develop overweight or obesity.

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**T-2473-P: Marketing Characterization of Food and Beverage on Broadcast Television**

*Lizbeth Tolentino-Mayo, MSc; Simón Barquera, PhD; Florence L. Théodore, PhD; Anabel Velasco-Bernal, MS; Juan A. Rivera, M.S and PhD International Nutrition, Cornell Un;

**Background**

Mexico registered in a short period an unprecedented increase in the prevalence of non-communicable chronic diseases related to nutrition in different age groups. Assessment of food and beverages on the main broadcast television channels to document the marketing strategies used in television.

**Methods**
600 hours were recorded from December 2012 to April 2013 of Mexican broadcast T.V. in the channels with higher rating at a national level (channel 2, 5, 13 and 7). For each channel 10 days of recording were done from 7 am to 10 pm. The recording was done using 4 digital T.V. adaptors. For codification, a manual developed by the Rudd Center for Food Policy & Obesity was used. For the analysis, all food and beverages were categorized in 9 groups: sweetened cereals, sweetened beverages, sweet snacks, salty snacks, fast food, alcoholic beverages, dairy, water, and others.

**Results**

Variability in the percentage of food and beverage ads is differential by period and day of recording. In non-vacational period there is more publicity than in vacation period, 27.7 vs 20.2%. A total of 12,311 ads were registered from which 23.3% were of foods and beverages. Sweet snacks were the main food group marketed (27.3%); in second place sweetened beverages (11.5%) and in third place dairy products (9.5%).

**Conclusions**

Considering that food and beverage marketing has influence on consumption of food with very little or non-nutritional value regulation is required.

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**T-2474-P: Assessment of Marketing Television Exposure in School Age Children from Public Primary Schools in Mexico**

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**Background**

Television advertising targeted at children of high energy density and low nutrients foods is affecting food choices and intake, which combined with inadequate spaces for physical activity is contributing to the risk of obesity in Mexican school age children.

**Methods**

From a nationally representative sample of 110 public primary schools in 13 states in Mexico, four children were randomly selected from each school to complete a sample of 440 children from third to sixth grades to complete an interview. Random cluster design was used for sample selection. Frequencies and proportions were estimated.

**Results**
Children referred in 81% to watch television both on weekday and on weekends, 72% during the afternoon, and 38% at night when there are no restrictions to publicity. Preferred programs among children were cartoons 82%, TV series 46%, soap operas 44%, movies 41%, and 24% referred to watch sports. 68% of children said they buy the products they see on TV. Children's reasons to buy a product: 56% flavor, 44% craving, 3.5% hunger, and 11% for a gift.

Conclusions

Stronger policies are required to regulate marketing of food and beverages directed to children including night shows and other programs not classified to children. Marketing of food and beverages on TV can influence purchase decision affecting choices contributing to children obesity.

T-2475-P: Per Capita Energy Availability and Metabolic Disease

Jameson Voss; Stefani Ruiz, MHS;

Background

Over the past several decades, per capita physical activity and total energy expenditure have remained stable while energy intake has gone up. Some have hypothesized higher availability of food has caused the higher intake of food energy since these are temporally related in the United States.

Methods

Contrary to nationwide ecological data in the U.S., experiments providing free meals cause weight loss. Similarly, others have shown localized food insecurity is not associated with obesity protection in the U.S. Thus, we explored the ecological relationships between food availability and metabolic disease among other countries who have at least as much per capita food available as the U.S. did in 1965 (2926 kcal). Data on Food Energy Availability (FEA) were derived from the United Nations Food and Agriculture Organization (FAOSTAT) while data on the prevalence of obesity and of impaired fasting glucose (IFG) were obtained from the World Health Organization (WHO).

Results

When excluding countries with food availability lower than 1965 levels in the U.S. (FEA <2926 kcal), there were 67 countries with WHO modeled or actual measurements available for both FEA and metabolic outcomes. Paradoxically, among countries with FEA>2926 kcal, there was an inverse relationship between higher FEA and adverse metabolic outcomes (r= -0.13, p=0.30 for obesity and r= -0.42, p=0.0004 for IFG).

Conclusions
The paradoxical direction of association highlights the insufficient evidence for additional food availability over 2926 kcal as a necessary or sufficient cause of metabolic disease. We conclude by discussing probative methods to help close evidentiary gaps and precisely define important exposures.

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**T-2476-P: Thinking Big about Obesity: A Transdisciplinary Team Science Building Initiative**

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**Background**

As a health condition with complex causal pathways and varied intervention approaches, obesity can benefit from transdisciplinary 'team science' in which research agendas are devised and solved synergistically. Strategies need to be studied to guide institutions in facilitating team science efforts.

**Methods**

To catalyze obesity team science at a large, public university, we organized a full-day workshop (funded by a translational research institute), the objectives of which were to increase membership in an obesity research network, encourage the formation of teams, train teams for optimal functioning, and fund team projects through an intra-mural grant competition. Leading team science practitioners facilitated didactic presentations, experiential training, and breakout sessions focused on forming teams. We assessed whether the team science workshop objectives were met, compared to an earlier intra-mural obesity grant competition without a team science emphasis.

**Results**

93 individuals attended; 34% were members of the research network and 16 new members joined the network (14% increase). 87% of workshop evaluation respondents reported satisfaction with the event. 5 intra-mural grant proposals resulted (3 new collaborations, 31 investigators, 17 departments). Compared to proposals submitted in response to the earlier competition, these proposals were more transdisciplinary (5.4±0.9 vs. 2.7±1.8 departments per proposal, p=.01) and were more likely to have multiple PIs (80.0% vs. 14.3%, p=.02).

**Conclusions**

A workshop and grant competition promoting team science in obesity research were effective at educating researchers, connecting collaborators, and incentivizing new transdisciplinary research. We will support and track the teams' success in obtaining external funding and generating new findings.
T-2477-P: Increase of Fast-Food Industry in China and Its Influence on Obesity Epidemic

Youfa Wang, MD, PhD; Hong Xue

Background

Fast-food (FF) industry and obesity rate have increased rapidly in China. This study examined the increase and patterns of Western and Chinese style FF restaurants in China, factors contributed to the growth, and the association between FF consumption (FFC) and obesity.

Methods

Using data from multiple sources, we studied increase in FF restaurants and its employees, revenue, market shares, distribution, by major types. We studied between-group differences in FFC and association between FFC and obesity.

Results

FF industry in China is large, with over two million FF facilities throughout China, its total revenue (in million US $) increased from 10,464 to 94,218 during 1999-2013. KFC is the largest, fastest growing FF chain; opened its first restaurant in China in 1987; by Sep 2013, had 4,463 restaurants in over 850 cities throughout China. By Sep 2013, ‘Yum! China’ had 4,463 KFCs, 953 Pizza Huts, 185 Pizza Hut Delivery stores, employing about 460,000 workers. Increased income, urbanization, life style changes, FF service, marketing stimulated FF demand.

Conclusions

FF industry and obesity increased rapidly in China. Chinese governmental regulation on FF industry is light. Rapid expansion of Western FF restaurants stimulated growth of local FF industry. Government regulation and public health education need to address health consequences of FF industry growth.

T-2478-P: Exercise Training-Induced Increases in Fatty Acid Oxidation, IL15 and UCP1 Expression are Dependent on AMPKÎ±2 in Mice
Background

Obesity is a serious epidemic and focus has turned to the study of brown adipose tissue (BAT) for the prevention of obesity. Here we aimed to determine the role of AMPK, an important metabolic regulator, in mediating exercise-induced changes in fat oxidation and BAT markers.

Methods

Exercise has been shown to be a potential route to increase BAT, therefore, wild type (WT) and skeletal muscle (SKM) AMPKΔ±2 dominant negative (DN) transgenic mice underwent voluntary wheel running (VWR) for 6 weeks. After the VWR protocol, hindlimbs were perfused with [1-14C]palmitate and fatty acid oxidation (FAO) was assessed. Hindlimb muscles were collected following the perfusion protocol and mRNA expression levels for IL15, a myokine suggested to activate BAT, and the BAT specific marker UCP1 were measured by RT-qPCR.

Results

FAO increased 182% and IL15 mRNA expression increased 84% as a result of VWR in WT mice (P<0.05). VWR-induced increases in FAO and IL15 were mitigated in DN mice (P>0.05). Surprisingly, UCP1 mRNA was dramatically induced 1000-fold with VWR in WT mice (P<0.05). Although VWR increased UCP1 expression in DN mice (284%, P<0.05), the effects were blunted when compared to WT mice (P<0.05). Despite the dramatic increases in UCP1 mRNA expression, it is unclear if these alterations occur in the SKM cells or other surrounding progenitor cells.

Conclusions

Our data indicate a role for AMPKΔ±2 in the regulation of VWR-induced increases in FAO, IL15 and UCP1 expression. To provide potential therapies for obesity, further studies are warranted to establish a mechanism for AMPKΔ±2 in mediating IL15 expression and in turn increase BAT.

T-2479-P: Impaired Mitochondrial Oxidative Phosphorylation in Rectus Abdominis Muscle of Diabetic vs. Non Diabetic Obese Individuals

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Background
Skeletal muscle mitochondrial dysfunction in type 2 diabetes mellitus (T2DM) is widely recognized but mechanisms are poorly understood. This study examines oxidative phosphorylation (OXPHOS) in *rectus abdominis* of obese female patients with or without T2DM who were undergoing gastric bypass surgery.

**Methods**

Surgical samples were collected for OXPHOS analyses, satellite cell isolation, histological analyses as well as protein and mRNA determinations. Individual muscle fibers were saponin permeabilized for high-resolution respirometry (Oroboros O2k) to evaluate coupled and uncoupled respiration, flux control and activity of cytochrome c oxidase (COX). To date, analyses have been completed on tissue from 4 T2DM (51+-6yrs; 125.6+-24.5kg; 49.1+-10.0kg/m2) and 5 non-diabetic (49+-11yrs; 128.2+-11.0kg; 49.2+-3.7kg/m2) patients. T2DM was defined using criteria from the Canadian Diabetes Association as HbA1C levels of 7% or higher.

**Results**

Mitochondrial respiration rates are markedly reduced in T2DM vs. non-diabetic patients. This is observed during ADP-stimulated respiration with fatty acid (octanoyl carnitine) (3.8+-1.0 vs. 9.9+-1.4pmol/s/mg p<0.05), complex I (7.4+-1.9 vs. 18.6+-2.9pmol/s/mg) p<0.05), complex I+II-substrates (33.1+-3.2 vs. 56.9+-6pmol/s/mg) p<0.05), and maximal uncoupled respiration (FCCP) (35.3+-3.1 vs. 63.8+-7.1pmol/s/mg) p<0.05). There are no differences in leak respiration or isolated activity of COX.

**Conclusions**

Mitochondrial OXPHOS is impaired in *rectus abdominis* of obese patients with T2DM compared to obese non-diabetic patients. Analyses in this ongoing research will also probe the possible underlying mechanisms of these marked differences.

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**T-2480-P_DT: Feasibility of High Intensity Interval Training (HIIT) Exercise Program Carried at 75-90% Heart Rate Reserve In Obese, Pre-Menopausal, Non-Diabetic, Sedentary African American Women**

*Avigdor D. Arad, MA, RD; Naketa Thomas, MD; Jacqueline Tamis-Holland, MD; Richard Weil, M.Ed., CDE; JEANINE B. ALBU, MD;*

**Background**
HIIT has been recently recommended as a time-efficient exercise modality to improve cardiorespiratory fitness. It is unknown whether the modality and results are applicable to obese sedentary African American (AA) women, a group with high prevalence of obesity and low aerobic fitness.

Methods

Eight obese AA women (mean ± SD, age = 29 ± 4 years, BMI = 31 ± 3 kg/m2) completed 14-week HIIT program consisting of 3 x 16 minutes supervised exercise sessions/week. Each session involved 4 x 1 minute cycling at higher intensity ('work interval') with 3 minutes cycling ('active recovery') at 50% heart rate reserve (HRR) in between. Work interval %HRR progressed from 75% (week 1-3), 80% (week 4-5), 85% (week 6-7), to 90% (week 7-14). Women attended all exercise sessions. Success was defined as the number of working intervals carried at or above the prescribed exercise intensity. Aerobic fitness (VO2max test) and body composition (DXA) were assessed before and after 14 weeks.

Results

Success for 75%, 80%, 85% and 90% HRR intervals was 94% [86-100], 78% [46-100], 72% [13-100], and 29% [1-88], respectively, with average success of 57% [34-93]. While VO2peak did not improve significantly (n=7, baseline mean [95%CI], %change: 24 [19-29] ml/kg/min, +4%, p=0.4), there were significant improvements in termination time (1028 [899-1158] sec, +16%), peak workload (139 [125-155] W, +15%) and ventilatory threshold as a %VO2peak (53 [38-67] %, +41.4%), all p<0.05. Weight (-0.5%) and fat mass (-1.8%) did not change significantly (p>0.5).

Conclusions

16 minutes, three times a week of HIIT, carried at 75-90% HRR was feasible at 57% success rate and sufficient to improve cardiorespiratory fitness in AA obese sedentary women, without loss of weight or body fat. Strategies to increase success of HIIT protocols should be further developed.

T-2481-P_DT: Aerobic Capacity and Insulin Sensitivity Increased after 14-weeks of High Intensity Interval Training (HIIT) Exercise Program in Sedentary, Obese, Pre-Menopausal African American Women

Avigdor D. Arad, MA, RD; Naketa Thomas, MD; Jacqueline Tamis-Holland, MD; Richard Weil, M.Ed., CDE; JEANINE B. ALBU, MD;

Background
HIIT is a time-efficient exercise modality resulting in aerobic fitness and metabolic abnormalities improvement. It is unknown whether this applies to obese African American (AA) women, a group with high prevalence of obesity and insulin resistance (IR), and low fitness level and fat oxidation rates.

**Methods**

Eight obese AA women underwent a 14-week HIIT program (ExG, mean±SEM, age=29±2 years, BMI=31±1 kg/m²) and 9 were controls (CtrG, age=29±2 years, BMI=31±1 kg/m²). Both groups received same careful monitoring and dietary counseling for weight stability. HIIT consisted of 3 x 16 minutes supervised exercise sessions per week, for 14 weeks. Each session involved 4 x 1 minute cycling (‘work interval’) at 75-90% heart rate reserve (HRR) with 3 minutes cycling (‘active recovery’) at 50% HRR in between. VO2max test, a hyperinsulinemic euglycemic clamp (at 80mU/m² insulin infusion rate) with applied indirect calorimetry, and DXA were done in both groups, before and after 14 weeks, at weight stability.

**Results**

Weight (-0.4% vs. -1.3%) and fat mass (-1.8% vs. -2.5%) did not change significantly in ExG vs. CtrG (p>0.3 for both). Aerobic capacity improved significantly in the ExG but not in the CtrG (% change for VO2max termination time: 12.9% vs. -5.2% and peak workload: 12.1% vs. -5.5%, respectively, p<0.05 for both). IR improved significantly in the ExG (+17.1%, p=0.03) but not in the CtrG (+10.5% p=0.15). Fasting substrate utilization did not change significantly with training (FAT p=0.83; CHO: p=0.97), nor did it changed significantly in the CtrG.

**Conclusions**

Aerobic capacity and peripheral insulin sensitivity improved in obese AA women after 14 weeks of HIIT exercise program, without changes in weight or body composition. HIIT should be further studied in this population in combination with weight loss and other obesity treatments.

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**T-2482-P: Adaptation of Mitochondrial Enzyme Activities in Skeletal Muscle to Alternate-Day High-Fat Diet Feeding**

*Kazuhiko Higashida, PhD; Mitsuru Higuchi, PhD*

**Background**

Since mitochondrial dysfunction is associated with insulin resistance, interventions that are designed to increase in mitochondrial biogenesis help to prevent insulin resistance. Whereas a high-fat diet feeding induces mitochondrial biogenesis, it also causes obesity and insulin resistance.

**Methods**
To develop nutritional strategies that induces an increase in mitochondrial biogenesis without obesity, the present study was done to elucidate the effect of alternate-day high-fat diet feeding on muscle mitochondrial enzyme activities and abdominal fat mass. Four-week old male Wistar rats were divided into control (CON), high-fat diet (HFD) and alternate-day high-fat diet (ALT) groups. CON and HFD groups were fed a standard chow diet or high-fat diet for 4 weeks, respectively. ALT group was fed a standard chow diet and high-fat diet every other day for 4 weeks.

Results

Epididymal fat mass in the HFD group was higher than those of CON and ALT groups. Citrate synthase activity in plantaris muscle of rats in HFD and ALT rats was significantly higher than that in CON rats, whereas there was no difference between HFD and ATL group. Activity of 3-beta hydroxyacyl CoA dehydrogenase, the rate limiting step of fatty acid oxidation in skeletal muscle, was significantly higher in HFD and ATL group compared to CON group.

Conclusions

These results suggest that alternate-day high-fat diet feeding induce increases in mitochondrial enzyme activities in rat skeletal muscle without an increase in abdominal fat mass.

T-2483-P: Regulation of Muscle ATP Synthase $\beta$ Subunit mRNA Expression in Obesity

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Background

Previous reports have showed impaired ATP turnover in the skeletal muscle of obese, insulin-resistant, humans, and we have documented that such individuals have reduced abundance of muscle ATP Synthase $\beta$ Subunit (ATP$\beta$), which is the catalytic unit responsible for ATP generation in skeletal muscle.

Methods

We sought to evaluate the regulation of ATP$\beta$ mRNA expression in muscle in lean and obese subjects in the basal state and after increased plasma amino acid concentrations. Muscle biopsies collected from obese (mean+$\pm$SE; BMI, 35+$\pm$2; age, 37+$\pm$4; 3M/2F ) and lean (BMI, 21+$\pm$1; age, 31+$\pm$5; 3M/2F) subjects in the basal state and at 240 min after an amino acid infusion (245 mg/kgFFM/h) were analyzed for ATP$\beta$ mRNA expression by qRT-PCR. The quantity of ATP$\beta$ mRNA was normalized to that of GAPDH mRNA using the 2-$\Delta$$\Delta$Ct method.

Results
Obese subjects were insulin resistant based on the calculated 'Matsuda insulin sensitivity index' from an oral glucose tolerance test (obese, 3.0+0.6; lean, 9.2+1.3; \( P < 0.05 \)). At baseline, ATP\( \beta \) mRNA expression was higher in the obese (2.4+0.6) when compared to the lean (1.0+0.1) subjects (\( P < 0.05 \)). Amino acid infusion stimulated ATP\( \beta \) mRNA expression less in the obese (1.8+0.2-fold) compared to the lean (4.4+1.1-fold) subjects (\( P < 0.05 \)).

**Conclusions**

Given the reduced muscle ATP\( \beta \) abundance in obese individuals, these data imply reduced muscle ATP\( \beta \) mRNA translational efficiency in obesity. We also conclude that the respond of muscle ATP\( \beta \) mRNA expression to the anabolic stimulus of plasma amino acids is decreased in obesity/insulin-resistance.

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**T-2484-P: Acute Exercise Alters DNA Methylation in Human Skeletal Muscle**

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**Background**

The role of epigenetic factors in response to exercise is not well understood. Therefore, the purpose of our study was to determine whether a single bout of exercise influences the patterns of DNA methylation in skeletal muscle from lean normoglycemic volunteers.

**Methods**

Five subjects (age: 28.4+8.7 years; 3M/2F; body mass index: 23.6+3.3 kg/m2; fasting plasma glucose: 87.7+8.0 mg/dL) had a euglycemic hyperinsulinemic clamp with a baseline muscle biopsy to determine insulin sensitivity (glucose disposal rate: 7.5+1.8 mg/kg/min). All subjects completed a single bout of aerobic exercise on a stationary bicycle for 48 minutes, rotating between 70 and 90% of VO\( _{2\text{max}} \), with a muscle biopsy taken 24 hours after completing the exercise. DNA was isolated from the baseline and 24 hour-post exercise muscle biopsies. Next-generation reduced representation bisulfite sequencing (RRBS) was performed and the data were analyzed using methylkit in R and KEGG pathways.

**Results**

RRBS captured 760,151 methylation sites (3,105 were differently methylated following exercise, \( P<0.05 \) and absolute difference >=0.30). The most hyper- and hypo- methylated site following exercise was in ZFPM1 (pre: 0.24+0.15 vs. post: 0.98+0.02, \( P=0.006 \)) and GDF6 (pre: 0.89+0.09 vs. post: 0.18+0.09, \( P=0.015 \)), respectively. SIM2 had 14 sites (11 in the promoter) that were significantly hypomethylated (pre: 0.83+0.11 vs. post: 0.14+0.05, \( P=0.004 \)). KEGG analysis revealed significant enrichments for type 2 diabetes, MAPK and mTOR signaling.
Conclusions

Our data suggest that a single bout of exercise alters DNA methylation in skeletal muscle, specifically in genes related to insulin signaling, which may explain the improved insulin sensitivity. Future studies are warranted with metabolically different study populations (i.e. obese subjects).

T-2485-P: Mitochondrial Respiration in Rectus Abdominis from Obese Diet Sensitive Compared to Obese Diet Resistant Patients Undergoing Bariatric Surgery

Fiona McMurray, DPhil; A. Brianne Thrush, PhD; Ghadi Antoun, B.Sc.; Ruth MacPherson, MD, PhD; Robert Dent, MDCM; Mary-Ellen Harper, PhD, FTOS;

Background

We have previously shown that obese diet sensitive (ODS) women have a higher proportion of oxidative fibers and mitochondrial proton leak in quadriceps muscle compared to obese diet resistant (ODR) women. We are now studying the differences in rectus abdominis collected from morbidly obese patients.

Methods

Diet adherent women who completed the Ottawa Hospital Weight Management Program and demonstrated the highest (ODS) and the lowest (ODR) quintiles for rates of weight loss participated in this study. They are non-diabetic and do not have any medical conditions known to affect weight loss. We have obtained rectus abdominis biopsies from ODS (n=3, 39+-6yr; 129.6+-6.9kg; 49.9+-4.3kg/m2) and ODR (n=4, 45+-5yr; 144.2+-9.5kg; 59.0+-5.3kg/m2). Mitochondrial oxidative phosphorylation was assessed in permeabilized muscle fibers with high resolution respirometry (Oroboros O2K). Samples were also collected for satellite cell isolation, histological analysis as well as protein and mRNA determinations.

Results

Initial results suggest that there may be differences in high resolution respirometry between the ODS and ODR samples. Respiration rates in ODR samples are higher in a variety of State 3 conditions including complex I + II-dependant intermediate coupled respiration (25.2+-1.4 vs 36.7+-2.7 pmol/s/mg P=0.052), fully coupled respiration (30.4+-1.7 vs. 39.4+-3.7 pmol/s/mg P=0.18), and maximal respiration (in the presence of the chemical uncoupler FCCP) (30.6+-0.4 vs 46.2+-6.3 pmol/s/mg P=0.18).

Conclusions
We hope that this ongoing research investigating the rectus abdominis, a stabilising muscle, in morbidly obese patients will confirm and extend known differences in muscle bioenergetics between ODS and ODR patients, and lead to a greater understanding of the mechanisms involved.

T-2486-P: Comparison of Prediction Equations with Measured Peak Oxygen Consumption Oxygen Obtained During a Graded Exercise Test Before and After an Intensive Weight Loss Program

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Background

Measurement of peak O2 (VO2) during a graded exercise test (GXT) is the gold standard to measure cardiovascular fitness. It can be expensive, time consuming, and proper equipment is not always available. This research compared peak VO2 measured during a GXT to peak VO2 from prediction equations.

Methods

Obese adults (BMI=37.0+-7.1 kg/m2; 48.2+-9.4 yrs) were enrolled in a low calorie diet (LCD) proprietary program. Peak VO2 was measured during an incremental treadmill GXT at pre- and post-weight loss. VO2, VCO2, respiratory exchange ratio (RER), as well as maximal speed and grade were determined. Measured VO2 was compared to the American College of Sports Medicine (ACSM) metabolic calculations, the FAST equation, and VO2 estimated from single-stage treadmill walking (SSTW) test (post only). SSTW is a submaximal treadmill walking test performed at usual walking speed + 0.5 mph. Subjects walk at 5% incline x 4 min. Peak VO2 is predicted from end of test HR, speed, age, and gender.

Results

Weight loss at 12-wks was 11.2+-6.8% (BMI=34.3+-7.1 kg/m2). Measured peak VO2 was 19.5+-3.9 ml/kg/min, RER=1.17+-0.08 at pre and peak VO2 was 22.2+-5.2 ml/kg/min, RER=1.18+-0.07 at post. Predicted VO2 at pre- was 27.8+-7.1 ml/kg/min (ACSM) and 20.3+-3.7 ml/kg/min (FAST) which were both significantly greater than measured VO2 (p<0.05). Predicted VO-2 at post- was 36.2+-8.5 (ACSM), 24.1+-4.3 (FAST), and 35.8+-4.3 (PWS) ml/kg/min. Both ACSM and SSTW overestimated peak VO2 (p<0.05), with no difference between FAST and measured peak VO2.

Conclusions
Although peak VO2 increased after weight loss in all methods, the ACSM and SSTW overestimated peak VO2 compared to measured VO2. Of the prediction equations used, the FAST equation, provided the best estimate of peak VO2 in this cohort.

**T-2487-P: Aerobic Capacity Modulates Response of Skeletal Muscle to Calorie Restriction**

*Sromona Mukherjee, PhD; Addison Spriggs, Undergraduate student; Steven L. Britton, PhD; Lauren G. Koch, PhD; Colleen M. Novak, PhD*

**Background**

The variability in adaptive thermogenesis, the unaccounted decrease of energy expenditure (EE) due to weight loss, is partly due to differential changes in activity thermogenesis and skeletal muscle efficiency. How aerobic capacity impacts muscle response to calorie restriction (CR) is unresolved.

**Methods**

Using a rat model system developed by artificial selection for low (LCR) and high (HCR) aerobic capacity, we tested the hypotheses that 1) muscle molecular pathways important for thermogenesis decrease after CR, 2) CR enhances pathways important for energy conservation and lipid handling, and 3) these muscle responses are dependent on aerobic capacity. LCR and HCR rats were compared after 2-day or 21-day 50% CR. We used qPCR to examine quadriceps (quad) and medial gastrocnemius (gastroc) expression of uncoupling proteins (UCP) 2 and 3, beta-2 adrenergic receptor (ADBR2), and subunits of the ATP-gated K+ channel (K+ATP channel; KCNJ8, KCNJ11).

**Results**

CR increased quad UCP2 expression, but quad UCP3 increased only in HCR after 2-day CR; this is consistent with the putative role of muscle UCPs in lipid handling. CR increased K+ATP channel subunit KCJN11, with a significant increase at 2-day CR only in HCR, while quad KCNJ8 was higher in LCR relative to HCR after 2-day CR; thus supports the potential role for K+ATP channel subunits in adaptation to energy restriction and increased energetic efficiency. Lastly, CR resulted in elevated ADBR2 expression in quad but not gastroc.

**Conclusions**

CR modulates expression of muscle UCPs, K+ATP channel subunits, and ADBR2. The effects of CR depend on aerobic capacity and the length or severity of restriction. Short vs. long-term CR induces different energetic alterations in muscle. These changes may partly underlie CR-induced suppression of EE.
T-2488-P: Energy Expended during Aerobic Exercise Fully Accounts for Changes in Body Energy Stores in Overweight and Obese Adults over the Short but Not the Long Term

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Background

Aerobic exercise without diet is regarded as an inefficient weight loss strategy, but changes in body energy stores rather than body weight reflect long term energy imbalance. The ability of aerobic exercise to create energy imbalance for overweight subjects is reviewed.

Methods

We conducted a literature search identifying aerobic exercise interventions lasting at least 10 weeks with maintained or ad libitum energy intake in overweight and obese adults. The studies were to prescribe specific exercise-associated energy expenditure (ExEE) and provide a measure of exercise compliance. Body energy stores were calculated using equivalents for changes in fat (9500 kcal/kg) and fat free mass (1020 kcal/kg). The degree of compensation was calculated comparing changes in body energy stores with ExEE. Studies were categorized into short (10-26 weeks) or long term (>26 weeks). Due to differences in study sizes and durations data are expressed as weighted means per week.

Results

A total of 18 studies (n = 767 subjects) with 24 intervention groups were identified. In 13 short term studies (n = 320) with 15 intervention groups ExEE was 2210 kcal/week. Body energy stores were reduced 2510 kcal/week implying no compensation (-14%, P = 0.6). Also ExEE and energy imbalance were positively correlated (R² = 0.78, P < 0.001). But in 5 studies of longer duration (8 groups, n = 447) ExEE was 1010 kcal/week but energy stores were only reduced 360 kcal/week such that 64% of ExEE was compensated for (P < 0.001).

Conclusions

Only ~1/3 of the calories expended during aerobic exercise interventions with durations >26 weeks were translated into reduced body energy stores; however, ExEE fully accounts for changes in body energy stores in studies of shorter duration.
**T-2489-P: The Role of Aerobic Physical Fitness in Overweight Adolescents**

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**Background**

Obesity is low-grade inflammatory state that negatively influences health status. Physical fitness may influence health status independent of body composition. This study compares body composition, health status, quality of life, and inflammatory levels in fit and unfit overweight adolescents.

**Methods**

29 overweight adolescents (12 male, 17 female; 14.59 ± 1.77 years) completed 3 sessions: familiarization and 2 counterbalanced experimental [treadmill (TM) and DEXA]. BMI was calculated and subjects completed the Physical Activity Questionnaire (PAQ-C/A) and Pediatric Quality of Life Inventory (PedsQL 4.0). The TM session determined physical fitness status (Fit or Unfit) through a VO2 Max test using FitnessGram norms. Fasting labs were obtained for health status (glucose, insulin, HA1C, total cholesterol, HDL, LDL, triglycerides) and inflammation (CRP). The DEXA scan measured total, android, and gynoid body fat percentage. Additionally, strength and flexibility testing was performed.

**Results**

15 subjects were Fit and 14 were Unfit. Both the PedsQL total score and physical health summary score were significantly higher in the Fit group. The Fit group had a higher BMI z score, W:H ratio, total body fat %, android fat %, push-up strength, and self-reported physical activity (PAQ-C/A) than the Unfit group. The Unfit group had greater insulin resistance based on the HOMA-IR & QUICKI results. Across the entire sample, C-reactive protein (CRP) was positively correlated with BMI z score and A:G ratio but negatively correlated with VO2 Max.

**Conclusions**

Fit overweight adolescents have better body composition, lower inflammation, increased insulin sensitivity, and report better quality of life than Unfit. Overall, the increase in inflammation with overweight status is associated with more central adiposity and lower aerobic physical fitness levels.

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**T-2490-P: Fasting Induced Weight Loss Predicts the Extent of Obesity in C57BL/6J Mice**
Background

Inbred C57BL/6J mice have been used to study diet-induced obesity and the consequential physiological effects associated with it. Little is understood about predictive factors that predispose an animal to weight gain.

Methods

To assess the non-genetic component of obesity susceptibility, we examined the variation in weight gain in inbred mouse strains. We tested hormonal and physiological measurements prior to high fat diet treatment, then retrospectively examined the predictive ability of each of these measurements.

Results

We found no significant predictive ability in common glucoregulatory or appetite regulatory hormones, or pre-diet body weight. We did, however uncover a strong negative correlation between weight loss in response to food deprivation and weight gain during high fat diet.

Conclusions

Fasting induced-weight loss in young mice is predictive of high fat diet induced weight gain in C57BL/6J mice. This may have implications for our understanding of variations in weight gain in susceptible pediatric populations.

T-2491-P: Regional Differences in Direct Adipose Tissue Free Fatty Acid Storage at Low and High Free Fatty Acid Concentrations

Barbara G. Carranza Leon, MD; Michael D. Jensen, MD;

Background

We have suggested that direct free fatty acid (FFA) storage in adipocytes is regulated by plasma membrane proteins such as CD36 at low FFA concentrations and by intracellular trafficking steps such as acyl-CoA synthetase (ACS) or diacylglycerol acetyltransferase (DGAT) at high FFA concentrations.

Methods
We measured direct FFA storage rates in abdomen and thigh adipose tissue (AT) in 9 premenopausal obese women under low (insulin infusion) and high (somatostatin + epinephrine) FFA concentrations. Palmitate storage rates were measured using a bolus/biopsy technique - a continuous [U-13C] palmitate infusion to measure flux + 3H or 14C palmitate bolus exactly 30 min before the biopsies. Palmitate storage rates, CD36 protein content, ACS and DGAT activities were measured on both study days.

Results

Even in the face of very high palmitate concentrations (359±55 µmol/L) palmitate (µmol/L) correlated positively with abdominal and thigh AT palmitate storage rates (R²=0.74 and 0.53 respectively). We found that abdominal ACS activity (pmol/mg lipid/min) was greater during the high palmitate concentration day (42.5 IQR 38.5-51.3 low day vs. 54.5 IQR 47.5-70.5 high day p=0.02) whereas DGAT (p=0.2) and CD36 (p=0.3) were not different. At low palmitate concentrations (20±7 µmol/L) CD36 correlated with thigh adipose palmitate storage rates (r=0.76).

Conclusions

Conditions that raise FFA also increase ACS, but not DGAT activity or CD36 in abdominal adipose tissue. At very low FFA concentration CD36 (membrane protein) predicts FFA storage.

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**T-2492-P: Effect of Testosterone Supplementation on Oxidative Stress Parameters in Prostates from Wistar Rats with Hypercaloric Diet-Induced Obesity**

*Juventino Colado, PhD; Patrick Mailloux-Salinas, BSc; Juana Marío de Lourdes Medina-Contreras, PhD; Guadalupe Bravo, PhD;*

**Background**

The incidence and prevalence of prostate disease has been directly linked with obesity. The causal relationship between obesity and prostate alterations has yet to be elucidated. We tested the effect of testosterone on oxidative stress parameters in a hypercaloric diet-induced obesity model.

**Methods**

32 Male Wistar rats were randomized in 4 groups. Control animals were given standard laboratory animal diet and water while obese were given 30% sucrose instead of water ad libitum for 44 weeks. On the 36th week, testosterone enantate (4 mg/kg) or vehicle (corn oil) was administered by subcutaneous injection weekly for 8 weeks. After the treatment, the animals were sacrificed by decapitation. Blood was collected to perform biochemical parameter testing (glucose, triglycerides, HDLc, LDLc) and the prostate was
excised, weighed and homogenized to perform oxidative stress assays: Total nitrites, malondialdehyde, total glutathione and SOD activity.

**Results**

Obese rats had significantly higher prostate weight than control animals, while testosterone treated animals showed a significant increase compared to vehicle. Obesity increased LDLc and triglycerides, while decreasing HDLc significantly; testosterone supplementation exerted a more significant change in these parameters. Obesity induction showed significantly higher levels of nitrites and MDA, lower glutathione concentrations and SOD activity compared to control; testosterone significantly increased these changes compared to vehicle.

**Conclusions**

Obesity increases oxidative stress parameters while decreasing antioxidant capacity in prostate tissue; the effect of testosterone exacerbates oxidative stress which might be one of the main causes for prostate disease development in obese individuals.

**T-2493-P: Inhibition of Bromodomain Protein 2 Protects Lipid Metabolism in Pancreatic Beta-Cells and May Offer a Novel Therapy for Type 2 Diabetes**

*Jude T. T. Deeney, PhD; Barbara E. Corkey, PhD; Gerald V. Denis, PhD;*

**Background**

BET (Bromodomain and ExtraTerminal) proteins (Brd2,-3,-4), are novel coregulators of transcription, bind to acetylated histones and recruit factors to gene promoters. JQ1, a new pan-BET inhibitor, has garnered much attention as a new anti-cancer agent, but its potential value in metabolism is unknown.

**Methods**

We sought a new approach with the potential to prevent appearance or progression of Type 2 diabetes and its complications, particularly Ý-cell failure in obesity. We demonstrate for the first time that multiple BET proteins regulate distinct metabolic functions in the Ý-cell. We exposed INS-1 cells to JQ1 (50-400 nM) and measured cellular properties, including insulin secretion and lipid metabolism. We observed dose-dependent effects of (+) JQ1 (vs inactive enantiomer control) at concentrations as low as 50 nM, and at both 2 mM (basal) glucose and 8 mM (stimulated) glucose; we measured lipid droplets by microscopy.

**Results**
JQ1 treatment increased insulin gene transcription, content and secretion in pancreatic ß-cells; increased fatty acid oxidation in INS-1 cells in high glucose; increased glucose-induced oxygen consumption, respiratory leak and maximal respiratory capacity, and reduced intracellular lipid in lipid droplets. Brd2-specific siRNA decreased lipid content, whereas Brd4-specific siRNA increased insulin gene expression and insulin content in INS-1 cells.

Conclusions

Multiple BET proteins regulate distinct metabolic functions in the ß-cell. Brd4 (and -2) inhibition enhances insulin transcription, while inhibition of Brd2 alone improves lipid handling and increases fatty acid oxidation, thus protecting ß-cells from gluolipotoxicity in obesity.

T-2494-P: Insulin Sparing Action of an Adenoviral Protein: A Novel Template to Improve Insulin Resistance Linked with Obesity

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Background

Adenoviral protein E4orf1 (E4) may provide a template to improve insulin resistance linked with obesity. E4 enhances glucose uptake by cells of adipose tissue and skeletal muscle, and reduces glucose output by hepatocytes. E4 improves glycemic control in mice without influencing insulin sensitivity.

Methods

We tested the hypothesis that E4 improves glycemic control due to its insulin sparing action. About 8wk old male C57BL/6J mice fed a diet containing 60% kcal as fat, when injected with vector carrying E4 improved glycemic control vs those injected with a null vector (NV). In these mice, we determined serum insulin levels (fasted or fed state), islet cell size, and amount of insulin and glucagon in pancreatic beta and alpha cells, respectively. Next, rat insulinoma cell line (832/13) was infected with E4 or NV (50 or 100 microL/well) to determine changes in cellular morphology and glucose stimulated insulin secretion.

Results

Fasting serum insulin did not differ between E4 and NV mice. However, in fed state, E4 reduced serum insulin in mice by 86% (p<.05). This decrease in insulin was not due to pancreatic cell damage or impaired insulin secretion, as indicated below. E4 or NV groups neither differed in islet cell size, nor in the amount of insulin or glucagon in pancreatic beta and alpha cells, respectively. Also, E4 did not damage cellular morphology or impair insulin secretion in rat insulinoma cell line.
Conclusions

The reduction in serum insulin levels by E4 cannot be attributed to beta cell damage, glucagon, or impaired insulin secretion. Instead, enhanced glucose disposal by E4 appears to reduce the need for insulin. This insulin sparing action of E4 may be harnessed to improve insulin resistance.

T-2495-P: Chronic Exposure of Î²-Cells to Elevated Nutrients Causes a Left-Shift in the Insulin Secretion Glucose-Dose Response

Karel Erion; Jude T. T. Deeney, PhD; Barbara E. Corkey, PhD;

Background

An alternative model attributes a causative role to hyperinsulinemia in the progression and pathogenesis of insulin resistance and type 2 diabetes. Our goal was to identify the mechanism underlying hypersecretion of insulin at basal glucose upon exposure of Î²-cells to chronically elevated nutrients.

Methods

Clonal Î²-cells (INS-1) and isolated pancreatic islets were incubated in conditions to promote either lipid accumulation (FFA/high glucose) or depletion (low glucose). Isolated rat islets were cultured for 48 hours in either normal culture media or with added FFA. The insulin secretion glucose-dose response was then assessed and was normalized to the total insulin content (HTRF assay). Intracellular triglyceride was quantified using nile red staining. Glucokinase activity was measured in cell extracts via NADPH production and in intact cells using a fluorescent 2-deoxyglucose. Redox (NAD(P)H), O2 consumption (Seahorse) and Ca2+ (FURA-2) were assessed at relevant glucose concentrations.

Results

INS-1 cells and rat islets cultured in a high nutrient environment displayed a left-shifted insulin secretion glucose-dose response. An inverse relationship between triglyceride and the glucose-dose response S0.25 was observed suggesting a lipid component contributes to the regulation of Î²-cell glucose sensitivity. No differences in any of the classical processes controlling the insulin secretion glucose-dose response were observed, including glucokinase activity, respiration and Ca2+.

Conclusions
Î²-cells with high amounts of intracellular lipid display increased sensitivity to glucose-stimulated insulin secretion and decreased total insulin content. This enhanced sensitivity appears to be dependent on a mechanism other than the canonical insulin secretion pathway.

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**T-2496-P: Effects of Dietary Lipid Composition on Weight Gain and Body Composition in a Zebrafish Model**

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**Background**

There is debate over the roles of total dietary lipid and n-6:n-3 fatty acid ratios in obesity and associated co-morbidities. In this study, we use the zebrafish *Danio rerio*, a new model for obesity research, to evaluate these dietary lipid profiles on juvenile weight gain and adiposity.

**Methods**

Experimental diets were prepared by varying the ratios of n-6:n-3 fatty acids (1.2:1, 4:1, and 8.5:1) within three levels of total fat (9, 12, and 15%), resulting in a total of nine treatments. Newly hatched larvae were fed live feeds up until 21 days post fertilization, and then fed experimental diets *ad libitum* for 16 weeks (during the period of rapid juvenile growth and reproductive maturity) (*n*=14 fish per tank and 16 tanks per treatment). At the termination of the 16-week feeding period, each treatment was evaluated based on body weight gain and adiposity.

**Results**

Body weight gain was highest (mean weight gain ± SD = 451 ± 222 mg) in fish that were fed diets containing 9% total fat (20.6% of caloric intake), and body weight gain was lower with increased dietary lipid (409 ± 219 mg, *p*= 0.007). Adiposity (lipid/fat free mass) was lower in those consuming the low fat diet, and substantially lower in females consuming a low fat diet with a high n-6:n-3 ratio. Females exhibit higher sensitivity to n-6:n-3 ratios when fat consumption was low.

**Conclusions**

We hypothesize consumption of a low-fat diet may promote lean tissue production and reduce adiposity during juvenile growth. The zebrafish is a good model for the study of sex specific obesity and mechanisms therein. UAB NORC P30DK056336 and NIH T32HL105349.
T-2497-P: Preventing Menopause-Induced Weight Gain Decreases Tumor Growth in a Rodent Model of Obesity and Postmenopausal Breast Cancer

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Background

Obesity and adult weight gain are linked to increased breast cancer risk in post-menopausal women. The goal of this study was to determine if preventing ovariectomy (OVX)-induced weight gain could decrease growth of existing mammary tumors in a rodent model of obesity and postmenopausal breast cancer.

Methods

Female Wistar rats were injected with N-methylnitrosourea (MNU, 60 mg/kg) at 7 weeks of age to induce mammary tumors, and fed a high fat diet (46% kcal fat) to produce mature lean (L; 330±7g; 22% body fat) or obese (OB; 388±16g; 31% body fat) animals. Tumors were monitored by manual palpation and measured weekly with digital calipers. Once a tumor reached 1cm³, rats were ovariectomized and randomized to either ad libitum feeding (AdLib; n=10 L; 8 OB), or provided a daily provision of food to maintain their pre-OVX weight (WM; n=10 L; 7 OB), for an additional 8 weeks post-OVX. Prior to OVX, tumor multiplicity (2.6±0.2 tumors/rat) and burden (2.8±0.3g/rat) were similar for L and OB rats.

Results

In the 8 wks post-OVX, body weight increased by 25 and 32% in L and OB AdLib rats, respectively; WM rats were within 3% of their OVX weight. In all rats, tumor burden decreased during wks 1-4 post-OVX, as expected given that most tumors are ER+ in this model. In AdLib rats, tumors rebounded in wks 5-8 post-OVX. Preventing weight gain, however, prevented this increase in tumor growth, regardless of adiposity. Specifically, WM rats had more tumors that fully regressed (p=0.01), and developed fewer new tumors (p=0.04) over the 8 week follow-up.

Conclusions

Overfeeding and subsequent weight gain following OVX promotes mammary tumor growth, and preventing OVX-induced weight gain inhibits tumor growth and development of new tumors. These findings suggest that preventing weight gain during menopause could have similar benefits in women with breast cancer.
T-2498-P: Sequence of Expression of Features of the Metabolic Syndrome (MetSyn) Indicates Targets for Effective Early Prevention

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Background

The search for underlying mechanistic pathways linking the features of MetSyn has been stymied by the nonlinear relationships between the various components in the progression from normal weight to obesity to late IGT/prediabetes, and the environmental and experimental contributions to variability.

Methods

320 rhesus monkeys (Macaca mulatta), 237 male, ages 3-40 yrs, weights 4-33.5 kg were studied longitudinally under constant dietary and environmental conditions during development of obesity and MetSyn. Nonhuman primates (NHPs) express this syndrome fully as in humans, including features of: obesity, hyperinsulinemia/insulin resistance (with ß-cell hyper-responsiveness via Acute Insulin Response, AIR), hypertriglyceridemia, impaired glucose tolerance and hypertension, all measured in this study. Monkeys provide the ideal model for examination of these longitudinal interactions, clarifying the trajectories of each feature within animal and identifying early targets and the effects of prevention.

Results

Excess adiposity is a permissive factor for MetSyn in NHPs, and the key target for prevention. The AIR progressed in an inverted U shaped trajectory across time in all animals; exaggerated AIRs were not associated with increased adiposity. Reducing obesity in NHPs, nevertheless diminished the excessive ß-cell responsiveness (p<0.001). Blood pressure did not differ between MetSyn and diabetic monkeys, however, was 3-5 mmHg higher than in normals (p's <0.05). Adiposity indices showed minimal longitudinal relationships to MetSyn features.

Conclusions

The concomitancy of MetSyn features are that of general associations with aging and not specific to any underlying shared mechanism nor fixed sequence of occurrence, thus the fruitless search to date. Excess adiposity is permissive, not causal, and severity of obesity is minimally related to MetSyn.
T-2499-P: Effects of Obesity and Carbohydrate Refeeding on ChREBP Isoform Expression

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Background

Carbohydrate response element binding protein alpha (ChREBP-a) is a transcription factor involved in lipogenesis. A novel isoform (ChREBP-b) has recently been discovered and the purpose of this study was to determine the effect of different carbohydrates and obesity on ChREBP-b activity.

Methods

In the first study, mice were fasted for 24 hours and refed either a high glucose, sucrose, or fructose diet for 12 hours. In the second study, mice were fed a high-fat diet for 13 weeks to cause diet-induced obesity and compared to mice consuming chow. In vitro studies with HepG2 cells treated with a fructose-1,6-bisphosphatase inhibitor were also conducted to assess if fructose mediated de novo lipogenic gene expression occurs independent of gluconeogenesis. Cells and tissues were collected to assess changes in lipogenic and gluconeogenic expression as well as ChREBP-a and ChREBP-b induction.

Results

ChREBP-a decreased in all refed groups while ChREBP-b increased in all tissues assessed except muscle. Sucrose refeeding caused the largest increase in ChREBP-b gene expression followed by fructose, then glucose (24.4±11.1, 17.8±9.5, and 10.1±3.2 fold vs. fasting). Mice fed high-fat diet resulted in a 3.8±1.0 increase of ChREBP-b gene expression in the liver compared to chow-fed mice. HepG2 cells incubated in fructose and treated with a fructose-1,6-bisphosphatase inhibitor caused an increase in expression of ChREBP target genes.

Conclusions

Carbohydrate refeeding decreases ChREBP-a while increases ChREBP-b gene expression. The increase of ChREBP-b expression in the liver from obesity may increase risk of non-alcoholic fatty liver disease. The lipogenic nature of fructose appears to be independent of fructose conversion into glucose.

T-2500-P: Immediate Estradiol (E) Therapy Improves Metabolic Endpoints in Aged Surgically Menopausal Rhesus
Macaques Maintained on a Western Style Diet (WSD)

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Background

Hormone therapy (HT) in post-menopausal women may prevent central obesity and lower diabetes risk, but definitive prospective data are lacking. We hypothesized that early administration of estradiol-17β in a primate model of menopause would ameliorate effects of WSD.

Methods

Female rhesus macaques (17-20yrs) were placed on WSD 6 weeks prior to ovo-hysterectomy (OVH). Animals received s.c. an empty Silastic capsule (controls, C) or a capsule with crystallized E (n=8/group) and continued on WSD for 6 mo. Measurements of metabolism were conducted prior to and 6 mo after OVH and included: fat (FM) and lean mass by DEXA; visceral (VAT) and subcutaneous adipose (SAT) tissue area, intrahepatic (IHL), intramyocellular (IMCL) and extramyocellular lipid (EMCL) by MRI and spectroscopy; insulin sensitivity by hyperinsulinemic-euglycemic clamp (Rd=glucose infusion rate corrected for lean mass); and glucose clearance and insulin secretion by glucose tolerance test (IVGTT).

Results

After 6 mo of WSD+OVH, VAT was significantly less (P=0.02) in the E than C group, but there were no differences between groups in FM, SAT, IHL, IMCL, or EMCL. Rd was significantly higher in the E than C group (P<0.0001). Rd increased from baseline in the E group and decreased in the C group (P=0.013). IVGTT glucose levels (P=0.0009), but not insulin levels, were significantly higher at 6-mos from baseline in the C group; E group glucose response was unchanged and insulin levels were lower (P<0.05).

Conclusions

WSD rapidly impairs glucose metabolism in a post-menopausal nonhuman primate model. Early E therapy prevented VAT accumulation, improved insulin sensitivity, and preserved glucose clearance. These data provide mechanistic support for the observed reduced diabetes risk with HT in women.

T-2501-P: High Vitamin D and Calcium Intakes Decrease Adiposity and Increase Bone Mineral Content in Diet-Induced Obese (DIO) Mice
Background

DIO mice exhibit an increase in adipocyte number. Removal of these cells via apoptosis will result in reduction of body fat. 1,25(OH)2D3 triggers death of adipocytes via apoptotic Ca2+ signal. Obesity can be detrimental to bone health because it is often associated with low vitamin D and Ca status.

Methods

The effects of vitamin D and Ca supplementation on blood markers of obesity, bone status, and adipose tissue apoptosis in DIO mice were determined. Male C57BL/6J mice were fed for 10 weeks a high fat (60%) diets containing 1.2% Ca, 10000 IU/kg vitamin D3 and their combination. DIO mice fed high D3, high Ca, and high D3 plus high Ca diets demonstrated a decrease in body weight gain, weight and percentage of body fat, and improved markers of adiposity, vitamin D status and Ca2+ metabolism (a decrease in plasma concentration of glucose, an increase in insulin, adiponectin, 25(OH)D, 1,25(OH)2D and a decrease in PTH concentrations, as compared with DIO control mice).

Results

High D3 and Ca intakes were associated with induction of apoptosis (formation of oligonucleosomal fragments and ssDNA breaks) and activation of Ca2+-dependent apoptotic proteases (calpain and caspase-12) in adipose tissue of DIO mice. High D3 and Ca intakes also increased bone mineral (Ca and P) content and had no effect on bone collagen (hydroxyproline) content in DIO mice. The combination of D3 plus Ca was more effective than D3 alone or Ca alone in decreasing adiposity and increasing bone mineral content.

Conclusions

Increasing vitamin D and Ca intakes in obesity activate Ca2+-mediated apoptotic pathway in adipocytes resulting in decreased fat tissue mass and improved markers of adiposity. High vitamin D and Ca intakes also improve bone status in obesity by increasing bone mineralization via PTH/1,25(OH)2D3 axis.

T-2502-P: Urine Glucose and Urine Volume Increase with Age in Male but Not in Female Fatty Zucker Rats and also in Male and Female Rats with a Brown-Norway Chromosome 1 Congenic Region

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Background

Fatty Zucker rats are homozygous for the Leptin Receptor (Leprfa/fa) mutation on chromosome 4. Fatty Zucker rats develop type 2 diabetes and renal disease. We have previously reported results for male fatty Zucker and fatty congenic animals. We now report results for females from 9 to 28 weeks of age.

Methods

We bred a fatty ZUC.BN-Chr1 congenic homozygous for Leprfa/fa, which is about 95% identical to Zucker fatty rats except half of chromosome 1 is derived from Brown Norway (BN). We have previously reported results for male fatty Zucker and fatty congenic animals. We now report results for females from 9 to 28 weeks of age. Female fatty Zucker and fatty BN chromosome 1 congenic animals were phenotyped at 9, 15, 24 and 28 weeks of age for urine volume, urine glucose, urinary albumin excretion and weights of kidneys and fat depots at sacrifice.

Results

Males have higher urine glucose (mg/day) than females at all ages and for all genotypes. Fatty male Zucker animals increase urine glucose by more than 5-fold from 9 to 28 weeks. In contrast, female fatty Zucker animals exhibit a 5-fold decrease of urine glucose (mg/day) from 9 to 28 weeks of age. At 28 weeks of age, male fatty Zucker have 50-fold more urine glucose loss per day than females. Urine volume was higher in males than females for all ages and genotypes. Urine albumin excretion increased 50-100 fold from 9 to 28 weeks in both sexes.

Conclusions

Gender and gender x congenic genotype interactions were observed for phenotypes related to renal disease and type 2 diabetes. The gender effect was stronger for diabetes related phenotypes than for renal disease related phenotypes.

T-2503-P: Metabolomics Identifies Effects of Dietary Macronutrient Composition on Tissue Metabolism

Ann Wells; William Barrington, PhD Candidate; Stephen Dearth, BS; Shawn Campagna, PhD; David Threadgill, PhD; Brynn Voy, PhD;

Background

Differences in the composition and source of dietary macronutrients are associated with differential risk for obesity and its co-morbidities. Corresponding effects on circulating metabolic profiles are well-described through clinical measurements, but relatively little is known about the underlying effects on tissue metabolism that may play important roles in dietary benefits.
Methods

Therefore, the objective of this study is to identify tissue metabolite profiles associated with dietary patterns that are known to impact health and, ultimately, to associate these profiles to overlying traits associated with obesity and its consequences. Male C57Bl/6J mice were fed one of five isocaloric diets: Mediterranean (Research Diets Inc., D12052702), ketogenic (D12052706), Japanese (D12052703), Western (D12052705) or standard chow (D12052701). Each diet contained the following ratios of fat, carbohydrates and protein, measured in kcal %: Mediterranean (42.6, 44.69, 12.71), ketogenic (84, 0, 16), Japanese (11, 76, 13), Western (35, 50, 15), and standard chow (18, 63, 19). Abdominal adipose tissue metabolites were measured using liquid-chromatography mass spectrometry and peaks were chosen using MAVEN. Statistical differences in abundance between diets were identified using ANOVA (FDR p<0.05), followed by post-hoc tests using Tukey's HSD.

Results

Tissue from mice consuming the ketogenic diet was significantly depleted in intermediates of the TCA cycle when compared to the sucrose-enriched Western diet, although mice on both diets were hyperglycemic relative to those on standard chow (p<0.05). The Mediterranean and Western diets had reciprocal effects on tissue content of hydroxyproline, glutamate, and argininosuccinate, all of which were increased by ~ 3-fold with Western diet and decreased by ~ 3-fold with Mediterranean diet relative to mice consuming standard chow.

Conclusions

Collectively, these data illustrate that, independent of caloric intake, dietary composition significantly alters metabolic pathways within adipose tissue. Ongoing analyses are underway to link differences in metabolite profiles to overlying effects on metabolic health.

T-2505-P: Clot Behaviour is Independent of Glucose Tolerance Status of Obese Patients

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Background

Previous studies have shown difference in clot characteristics in among diabetic and non diabetic patients. Obesity with diabetes is expected to augment the difference
Methods

45 obese patients undergoing bariatric surgery (25 normoglycemic, 20 dysglycemic) were recruited. Blood samples were collected preoperatively. Independent sample t-test was used to compare patient demographics and clot characteristics. P-value of 0.05 was considered significant.

Results

Patient with normoglycemia had median age of 46 years compared to 48 years in dysglycemic group. BMI (36.1 v 38.6 in dysglycemics, p=0.386), waist circumference (123 cm v 118.50, p= 0.489) and waist-to-hip ratio (p=0.480) were comparable among the groups. No significant difference was found for LDL, HDL, cholesterol and triglyceride measurements. Glycemic status did not have any affect on hs-CRP (1.56mg/l v 1.68mg/l, p=0.550). Clot lag (p=0.362), maximum absorbance (0.153) and time to 50% lysis (0.957) were statistically similar among both groups.

Conclusions

Obesity takes control of clot behaviour irrespective of glycemic status of the patients.

T-2506-P: Association of Uncoupling Protein-3 Gene Variations with Body Weight, Waist Circumference and Gastric Motor Function in Overweight and Obese Adults

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Background

Uncoupling protein 3 (UCP-3) affects energy expenditure and increases fatty acid metabolism in muscle. In epidemiological studies, UCP-3 gene single nucleotide polymorphisms (SNP) were associated with higher BMI. However, it is unclear if rs1626521 SNP is associated with obesity and with food intake.

Methods

The 260 predominantly Caucasian overweight or obese subjects were 70% females [mean (+-SD) BMI 33.1+-5.1 kg/m2 and age 37+-12 y]. We studied: body weight, BMI, waist circumference (WC), gastric emptying (GE) of solids and liquids by scintigraphy; fasting and postprandial (PP) gastric volume (GV) by
SPECT; satiation by Ensure drink test ingested at 30mL/min; satiety by total kcal intake during buffet meal; and fasting and PP gut hormones (ghrelin, CCK, GLP-1, PYY). Genotyping of rs1626521 SNP (minor allele frequency 0.30, location in 3’ region) was by TaqMan assay. Associations of genotype and quantitative traits were based on a dominant genetic model [AA (n=54) - AG (n=111) vs. GG (n=91)].

**Results**

*UCP3* rs1626521 (GG) was associated with higher body weight (mean 4.7kg, p=0.025), BMI (Δ 1.4kg/m2, p=0.045), WC (Δ 3.66cm, p=0.019), fasting and PP GV (Δ 22.1ml, p=0.026; and Δ 42.2ml, p=0.009, respectively). There were modest associations of *UCP3* rs1626521 with higher PP change in GV (Δ 20.1ml, p=0.068). There were no significant associations with age, height, hip circumference, GE, satiation, satiety or gut hormones. *UCP3* rs1626521 was also associated with decrease in reported physical activity (Δ 11.4%, p=0.048).

**Conclusions**

*UCP3* rs1626521 gene variation is associated with higher body weight and WC, decreased physical activity, and increases in fasting gastric volume and postprandial gastric accommodation. Funding: NIH DK67071 to Dr. Camilleri.

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**T-2507-P: Expression Profiles of Extracellular Vesicle Marker CD14 and MicroRNA™s after RYGB In Vivo and In Vitro**

Joshua B. Alley, MD FACS; Magnolia Ariza-Nieto, PhD; Ying Li, Master of Engineering; Sanjay Samy, MD; Lynn Dong, PhD; Laura Fitzgerald, MPH; Michael L. Shuler, PhD;

**Background**

CD14 is a peptide antigen associated with microvesicles/ exosomes (Kranendonk MEG et al 2014). The aim of this study was to observe the relationship between the profiles of microRNA’s and CD14 in plasma and in tissue in a group of donors undergoing RYGB before and 12 weeks post-op.

**Methods**

This in vivo and in vitro study is compliant with ethics review, as an IRB approved clinical trial (GHS # 1207-27). Subjects enrolled were patients scheduled to undergo gastric bypass surgery for weight loss; all donors (n=43) signed informed consent. Liver, omental adipose tissue and mononuclear cells were profiled for microRNA’s, DNMT1 and CD14 transcript abundance following strict MIQE guidelines. Mesenchymal stem cells isolated from the same donors are being used in an attempt to study cell signaling interactions using both microRNA’s and CD14 as biosensors.
Results

McNemar's analysis revealed changes in profiles of mature circulating microRNA's 12 weeks post RYGB. The overexpression of 27 microRNA's changed to levels within boundary 4, whereas 45 are still upregulated. DC14 levels are not significantly different between group (p=0.9279). Patients (n=36) also demonstrated an average weight lost of 19.9% of their initial body weight, and 48.5% excess BMI lost (over 25) within the 12 weeks (p=0.0008*). Staining of liver and omental adipose tissue with anti-CD14 suggest differences among donors in microRNA profiles.

Conclusions

The number and global fold regulation level of mature secretory MicroRNA's is significantly decreased 12 weeks post op. Group CD14 profiles are not significantly different, with high variability observed among donors.

T-2508-P: Preferential Cardiometabolic and Endocrine Effects of Total and Segmental Body Fat in Healthy Men

Shannon Cohen, PhD, APRN, BC, FNP; Donna Lawson, DO; Krisann A. Oursler, MD, Sc.M; Ali Iranmanesh, MD;

Background

While consequences of increased total body fat are well known, selective cardiometabolic and endocrine effects of compartmental fat are not fully defined. This study assessed the impact of regional fat distribution on hemodynamic, metabolic, and endocrine measures.

Methods

69 healthy men age 19-78 yr and BMI 18-39 Kg/m2 were studied after overnight fast for: (1) circulating glucose, insulin, triglycerides (TG), HDL, leptin, adiponectin, free testosterone (FTe), estradiol (E2); (2) DXA to assess total body and android fat mass; (3) CT to measure subcutaneous and visceral fat area (VFA); (4) non-invasive cardiovascular assessment by SphygmoCor to evaluate arterial stiffness, left ventricular (LV) overload by augmentation pressure (AP), LV function by ejection duration (ED), and coronary perfusion by subendocardial viability ratio (SEVR); (5) peripheral insulin resistance (HOMA-IR). Fat mass index (FMI), android FMI, and free E2 (cFE2) was calculated.

Results

Backward stepwise multiple regression was used and coefficients were standardized (r²). The results (r²/p) revealed significant association of (1) android FMI with systolic blood pressure (0.38/0.001), diastolic blood pressure (0.47/0.0001), AP(0.32/0.009), HOMA-IR(0.51/0.0001); (2) FMI with ED (0.33/0.006),
SEVR (-0.32/0.009); TG (0.4/0.0008); HDL (-0.37/0.002); leptin (0.8/0.0001); (3) VFA with arterial stiffness (0.31/0.02), FTe (-0.53/0.0001), cFE2 (0.28/0.02).

**Conclusions**

This study identifies DXA derived total body and android fat as the cardiovascular, glucose homeostasis, lipid, and adipokine predictors, with visceral fat correlating only with sex steroids. Findings may be used in outcome-oriented selection of body composition methods in future clinical trials.

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**T-2509-P: High Dietary Fat is Associated with Impaired Nitric Oxide-Mediated Endothelium-Dependent Vasodilation**

*Caitlin Dow; Brian . Stauffer, MD; Jared J. Greiner, MS; Christopher DeSouza, PhD;*

**Background**

High fat diets are associated with an increased risk of cardiovascular disease. Endothelial dysfunction may be a potential underlying mechanism. The aim of this study was to determine whether a habitual diet high in fat negatively influences nitric oxide-mediated endothelium-dependent vasodilation.

**Methods**

Forty-four middle aged and older healthy sedentary adults with differing dietary habits were studied: 24 with a lower fat diet (LFD; 29+-1% calories from fat, age: 54+-1 yr) and 20 with a high fat diet (HFD; 41+-1% calories from fat, age: 52+-1 yr). Dietary fat intake was assessed by 4-day diet records and classifications based on American Heart Association's guidelines (<35% of total calories from fat). Forearm blood flow (FBF: plethysmography) was determined in response to acetylcholine (ACh) in the absence and presence of the endothelial nitric oxide (NO) synthase inhibitor NG-monomethyl-L-arginine (L-NMMA), as well as to sodium nitroprusside.

**Results**

FBF response to ACh was lower (~25%; P<0.05) in the HFD (4.1+-0.3 to 11.5+-1.2 mL/100 mL tissue/min) compared with the LFD group (4.6+-0.3 to 14.9+-0.9 mL/100 mL/min). L-NMMA resulted in a significant reduction in vasodilation (~15%) in the LFD but not the HFD group. FBF to sodium nitroprusside did not differ between groups.

**Conclusions**

These data indicate that a habitual diet high in fat is associated with endothelial-dependent vasodilator dysfunction due, in part, to diminished NO bioavailability. Impaired NO-mediated endothelium-dependent vasodilation may contribute to the increased vascular risk with diets high in fat.
T-2510-P: Impaired Endothelial Vasodilator Function in Lean Adults with Metabolic Syndrome

Grace M. Lincenberg, BA; Caitlin Dow; Jared J. Greiner, MS; Brian Stauffer, MD; Christopher DeSouza, PhD;

Background

Metabolic Syndrome (MetS) typically presents with obesity, however NHANES data suggests that obesity is not a requisite characteristic for MetS development and related vascular risk. We tested the hypothesis that MetS, independent of obesity, is associated with endothelial vasodilator dysfunction.

Methods

We studied 32 sedentary adults: 11 normal weight (NW; age 54+-2 yr; 9 M/2 F; BMI 24.0+-0.3 kg/m2); 11 normal weight with MetS (NW/MetS: 55+-2 yr; 9 M/2 F; 24.7+-0.3 kg/m2); and 10 obese without MetS (OB: 56+-2 yr; 8 M/2 F; 31.4+-0.5 kg/m2). All subjects were non-diabetic and free of overt coronary artery disease. MetS was established according to NCEP ATP III criteria. Forearm blood flow (FBF) responses to intra-arterial infusions of acetylcholine (8.0-32.0 Âµg/min) and sodium nitroprusside (2.0-8.0 Âµg/min) were measured by strain-gauge plethysmography.

Results

FBF responses to acetylcholine were ~20% lower (P < 0.05) in NW/MetS (from 4.0+-0.3 to 13.0+-1.0 mL/100 mL tissue/min) and OB (from 4.8+-0.2 to 12.2+-1.1 mL/100 mL tissue/min) compared with NW (from 4.6+-0.4 to 15.8+-0.7 mL/100 mL tissue/min) subjects. Of note, FBF responses to acetylcholine were similar between the NW/MetS and OB adults. There were no group differences in the FBF responses to sodium nitroprusside, indicating normal vascular smooth muscle function.

Conclusions

These data indicate that MetS, independent of obesity, is associated with diminished endothelium-dependent vasodilation. Endothelial vasodilator dysfunction may underlie the increased cardiovascular risk associated with MetS.
T-2512-P: Relationship of Insulin Secretion, Body Composition and Energy Expenditure during Weight Loss and Weight Maintenance

Bridget M. Hron, MD; Cara Ebbeling, PhD; Henry A. Feldman, PhD; David S. Ludwig, MD, PhD;

Background

Individual variations in the physiological responses to weight loss may vary by phenotype. Specifically, we hypothesized that insulin secretion may modify changes in body composition, total (TEE) and resting (REE) energy expenditure, and insulin sensitivity (IS) induced by weight loss.

Methods

Twenty-one overweight subjects achieved 10-15% weight loss, then received 3 weight maintenance diets (low fat, low glycemic index and very low carbohydrate) in random order for 4 weeks. Body composition was analyzed by dual-energy x-ray absorptiometry at baseline and following weight loss. Insulin concentration 30 minutes after oral glucose tolerance test (Ins-30), hepatic and peripheral IS, REE and TEE were measured at baseline and at the end of each maintenance diet. The associations of Ins-30 with body composition parameters were analyzed by multivariable linear regression, while those with hepatic and peripheral IS, and REE and TEE were analyzed by repeated measures mixed effects model.

Results

At baseline, Ins-30 was directly associated with BMI (r=0.47, P=0.03). Ins-30 predicted changes in % lean mass (Beta=-0.001%/pmol/L, P=0.05), % fat mass (Beta=0.001%/pmol/L, P=0.05) and trunk fat mass (Beta=1.08 g/pmol/L, P=0.006) after weight loss. Higher Ins-30 predicted lower hepatic IS during weight maintenance (Beta=-0.0007 unit/pmol/L, P=0.05), which was attenuated by body composition changes (P=0.13 for adjustment by % lean or % fat mass; P=0.17 by trunk fat). In contrast, Ins-30 did not predict changes in TEE, REE or peripheral IS.

Conclusions

High insulin secretion may have deleterious effects on body composition and hepatic insulin sensitivity during weight loss. The relationship between insulin secretion and hepatic insulin sensitivity may be mediated, in part, by changes in body composition.

T-2513-P: Four-Year Risk Prediction Based on Plasma Free Amino Acid
Profiles for Development of Metabolic Syndrome, Diabetes, Hyperlipidemia and Hypertension

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Background

Plasma free amino acid (PFAA) profiles are to be affected by visceral fat accumulation and hyperinsulinemia, and are associated with future development of diabetes. Although PFAAs have a potential for predicting future of development of other life style related diseases, little studies have been done.

Methods

PFAAs were quantified in total of 3,701 Japanese subjects using liquid chromatography - mass spectrometry. Of them, visceral fat area (VFA) was determined using computed tomography imaging in 835 subjects, two-hour post-challenge insulin level (Ins120min) after oral glucose tolerance test were determined in 1,160 subjects, respectively. Multivariate linear regression models using PFAA profiles as explanatory variables with variable selection were built that correlate with VFA or Ins120min. Total of 2,984 Japanese cohorts were followed-up for four years after baseline examination. The capabilities of the obtained models to predict risks of metabolic syndrome and related diseases were evaluated.

Results

The performances of the obtained PFAA models were confirmed by the validation data set in prior, being highly correlated with VFA and Ins 120min (r=0.59 and 0.44, respectively). Furthermore, standardized four-year excess relative risk of those models were approximately 2.04 for metabolic syndrome, 1.06 for diabetes, 0.98 for dyslipidemia, and 0.42 for hypertension after adjustments with potential confounding factors, respectively.

Conclusions

PFAA profiles were associated with visceral obesity and hyperinsulinemia, and the PFAA models can predict four-year risks of developing life style related diseases in a general Japanese population, suggesting the usefulness of those models as versatile marker for health monitoring.

T-2514-P: Visceral Adipocyte Hypertrophy Predicts Altered
Cardiometabolic Risk Independent of BMI or Total Body Fat Mass

Sofia Laforest, B.Sc; André Tchernof, PhD;

Background

Adipocyte hypertrophy either in the visceral or subcutaneous fat compartment has been proposed as a predictor of cardiometabolic risk. We hypothesized that visceral adipocyte hypertrophy better predicts metabolic risk than subcutaneous adipocyte hypertrophy when total adiposity is controlled for.

Methods

In a sample of 125 women (age 36.8 to 68.3 years; BMI 17.2 to 41.3 kg/m2) for whom visceral (omental) and subcutaneous adipose tissue was obtained by surgery, mature adipocyte size was measured by collagenase digestion. Women with visceral or subcutaneous adipocyte hypertrophy were individually matched to women with small adipocytes in the corresponding compartment but similar BMI or total body fat mass values. Cardiometabolic risk factors were compared by matched paired t-test analysis.

Results

Visceral adipocyte hypertrophy was related to higher total cholesterol, VLDL-triglyceride content, total cholesterol/HDL-cholesterol ratio and fasting glycemia (p<0.05 for all) independent of BMI, and to higher VLDL-triglyceride content, fasting insulin and HOMA-IR index (p<0.05 for all) independent of total body fat mass. Subcutaneous adipocyte hypertrophy was not related to cardiometabolic risk factors after control for BMI or total body fat mass.

Conclusions

Visceral adipocyte hypertrophy is a better predictor of cardiometabolic risk alterations than abdominal subcutaneous adipocyte hypertrophy when total adiposity is controlled for.

T-2515-P: The Central Fatness is Crucial to Menopause in Obese Women

Kyu Rae Lee, MD,PhD.; Hyun Hyi Choi, MD;

Background

Menopause is the major transitional period as well as impact metabolic threat to middle aged women. In addition hormonal imbalance might lead to body composition through climacteric state into menopause.
Whereas some suggest postmenopausal women are being more obese, others propose their bone mass contents into fatty component as women ages. Until now BMI was considered as the standard diagnostic indicator to obesity. In while different devices were considered in order to differentiate from menopausal state through measurement of fat. Therefore we would like to compare body composition between two groups according to menopausal state.

**Methods**

We measured body fat of 43 obese Korean women (42.55 aged, 28.95 kg/m²) visited the bariatric clinic of Wallace Memorial Baptist Hospital using by Body Impedance Analysis, Dual X-ray Absorptiometry, abdomen CT. In addition metabolic risk variables including insulin, free fatty acid, high density cholesterol, triglyceride, fasting plasma glucose, were collected from venous blood after overnight fasting. The SPSS package for windows (version 18) was performed for statistical assessment. Probability values under 0.05 were considered as statistically significant. Spearman's correlation coefficient analysis was done to evaluate the association between menopause and body composition devices, metabolic risk factors. The mean values of measured variables were compared according to two groups based on menopause through Students't-test.

**Results**

Visceral adipose tissue (.403**) and fat mass of leg (.588**) were very closely related with menopause. We compared the mean values of body composition between two groups according to menopausal state. The mean value of fat mass in legs* in premenopausal women (10829.46 mg) was significantly higher than that in postmenopausal women (8238.92 mg). (**: p<0.01, *: p<0.05)

**Conclusions**

While visceral adipose tissue was positively correlated with menopausal state, fat mass of leg was inversely with menopause. In conclusion menopausal state might lead to central fatness in Korean obese women. More controlled cohort studies would be considered.

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**T-2516-P: Sleep Less â€“ Sit More: The Effect of Experimental Sleep Restriction on Posture Allocation**

*James A. Levine, MD PhD; Shelly K. McCrady-Spitzer, MS; Andrew D. Calvin, MD; Virend K. Somers, MD PhD;*

**Background**

Short sleep duration is linked to obesity and weight gain. Also, excess sitting is associated with weight gain. Might sleep deprivation be linked to sitting more? We examined whether experimental sleep deprivation is associated with increased sitting time.
Methods

Healthy volunteers were in-patients on a clinical research unit for 15 days. After 3 days of baseline measurement, subjects were randomly assigned to either undergo 8 nights of sleep deprivation (30% decreased sleep compared to home monitoring) or to continue their normal sleep. Throughout the study, body postures (lie/sit/stand) and movements were monitored using a multi-sensor suit. Ad libitum food intake was measured (clinicaltrials.gov NCT01334788).

Results

Seven subjects completed 8 nights sleep deprivation and nine weight- and age- matched subjects were controls. Sleep deprivation was associated with increased sitting time from, 597 ± 196 to 697 ± 231 min/day (p=0.01) and (as expected) decreased lying time, from, 657 ± 190 min/day to 518 ± 249 min/time (P=0.002). In the control subjects sitting time (629 ± 135, cf 627 ± 134 min/day) and lying time did not change over the two phases of the study (663 ± 124 cf 672 ± 133 min/day). Sleep deprivation did not affect ambulation or total body movement.

Conclusions

Experimental sleep deprivation is associated with both greater sitting and energy intake. This phenomenon may contribute to the weight gain that occurs in people who are chronically sleep deprived.

T-2517-P: Determinants of Insulin Sensitivity in Women with PCOS vs. Healthy Women

Shannon Morrison, PhD; Amy M. Goss, PhD; Barbara A. Gower, PhD;

Background

The physiological basis for greater insulin resistance among women with PCOS is not fully clear. This study examined body fat distribution, endocrine factors, and markers of inflammation as determinants of whole-body and hepatic insulin sensitivity/resistance in women with PCOS vs. healthy controls.

Methods

Participants were 30 women with PCOS and 38 healthy women group-matched for BMI and age. Whole-body insulin sensitivity (WBIS) was assessed using a mixed-meal tolerance test. Hepatic insulin resistance was assessed as HOMA-IR. Body fat distribution was determined using CT scan. Partial correlation analysis, adjusting for total body fat, was used to identify determinants of insulin sensitivity/resistance.

Results
Among healthy women, WBIS was associated with subcutaneous (SQ) thigh fat (+), visceral fat (-), total abdominal fat (-), and adiponectin (+), whereas HOMA-IR was associated with SQ thigh fat (-), total abdominal fat (+), and adiponectin (-). Among PCOS women, WBIS was associated with total abdominal fat (-), SQ abdominal fat (-), thigh peri-muscular adipose tissue (-), and free testosterone (-), whereas HOMA-IR was associated with total abdominal fat (+), thigh SQ fat (-), thigh peri-muscular adipose tissue and total and free testosterone (+).

**Conclusions**

Determinants of insulin sensitivity/resistance differ among women with PCOS vs. healthy controls, with abdominal fat, thigh muscle-related fat, and testosterone potentially having greater adverse effects.

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**T-2518-P: Comparison of Serum Neuropeptides, Hormones Levels and Micro-Nutrient Intakes between Obese with or without Food Addiction**

*Pardis Pedram, MD; Wayne Gulliver, MD; Danny Wadden, BSc., MSc., MD (c); Farrell Cahill, PhD; Edward Randell, PhD; Guang Sun, MD & PhD;*

**Background**

We have shown that food addiction (FA) is indeed a contributing factor to obesity at the population level. Little is known on what makes obese with or without FA different. The study was designed to find potential biomarkers that can differentiate obese with and without FA using metabolomics method.

**Methods**

From a total of 737 adults from the general Newfoundland population, 58 FA overweight/obese (FAO) and NON-FA overweight/obese (NFO) were selected using BMI matched for age, sex, and physical activity. Gut hormones (amylin, ghrelin, leptin, GLP-1, GIP, PP, PYY, C-peptide and glucagon), pituitary polypeptide hormones (prolactin, BDNF, ACTH, CNTF, FSH, LH, GH and TSH), adipokines (adiponectin, lipocalin 2, resistin, adipins, PAI-1 and TNFÎ±), and neuropeptides (Î²-MSH, Î²-endorphin, cortisol, melatonin, neurtensin, orexin-A, oxytocin, substance P, MCP-1 and AgRP) were measured in fasting serum. FA was defined by Yale Food Addiction Scale. Dietary intakes came from Willet Food survey.

**Results**

FAO had lower levels of TNFÎ±, amylin and TSH but higher levels of prolactin as compared to NFO. Dietary intake of carbohydrates and fat (g/kg body weight or per BMI, per percent of trunk fat) and the percent calorie intake from fat was higher in FAO as compared to NFO. FAO consumed more sugar, mineral substances like sodium, potassium, calcium and selenium, fat and its components such as saturated...
fat, trans fat, mono unsaturated fat, omega 3, omega 6, vitamin D and gamma-tocopherol compared than NFO (p<0.05).

Conclusions

To the best of our knowledge this is the first study reporting significant differences in hormones levels and micro-nutrient intake between obese with and without food addiction. The findings provide valuable evidence towards to the mechanism of how FA causes obesity.

T-2519-P: Metabolomics Characteristics in Obese Human Subjects with Food Addiction

Pardis Pedram, MD; Weidong Zhang, PhD; Guangju Zhai, PhD, MD; Wayne Gulliver, MD; Farrell Cahill, PhD; Yuhua Zhang, Msc; Guang Sun, MD & PhD;

Background

Food addiction (FA) is a clinical trait in 5% of the adult population. However the metabolomics (chemical fingerprint of metabolism processes) methodology has not been applied to obese with FA. This study explored the potential differentiation of metabolites among FA and non-FA obese.

Methods

From a total of 737 adults recruited from the general Newfoundland (NL) population 25 FA overweight/obese (FAO) and 25 non-FA overweight/obese (NFO) matched for sex, age and physical activity were selected. Obesity was evaluated by BMI and FA was assessed using the Yale Food Addiction Scale. Serum metabolomics profile including 183 metabolites (Acylcarnitines (AC), sphingolipids (SP), amino acids (AA), biogenic amines (BA) and glycerophospholipids (GP)) were measured by high performance liquid chromatography (HPLC).

Results

FAO had lower citrulline, SM(OH)C20:2, Ac-Orn and nitrotyrosine vs. NFO. Moreover citrulline and histidine are positively and isoleucine negatively correlated to FA. AC (C16:1 and C16:2), SP [SM(OH)C20:2] and BA (Ac-Orn, dopamine, nitrotyrosine) are negatively associated with FA in obese. In FAO, C10 (r:0.43) was positively and C5-M-DC (r:-0.44) negatively among AC,GP (lysoPC a C16:0(r:-0.43) and lysoPC a C20:4(r:-0.408) and AA (asparagine (r:-0.40) were negatively correlated to FA symptoms. However no metabolites was related to FA symptoms in NFO.

Conclusions
We have discovered, for the first time, that a number of metabolites may be associated with overweight/obesity with food addiction. These metabolites are valuable candidates in the study of food addiction.

T-2520-P: Cortisol Response to Stress in Adolescents with and without Loss of Control Eating Following a Test Meal

Rachel M. Radin; Lauren B. Shomaker, PhD; Nichole R. Kelly, PhD; Courtney K. Pickworth, BA; Mariya Grygorenko, BS, BA; Sara E. Field, BA; Sheila M. Brady, MSN, CFNP; Amanda J. Krause, BS; Andrew Demidowich, MD; Tania Condarco, MD; Lisa M. Shank, M

Background

In studies of adults with binge eating disorder (BED), some, but not all, data indicate an exaggerated cortisol response to stress. Yet, there are no data in youth who report loss of control (LOC) eating, a key developmental precursor to BED.

Methods

We therefore studied cortisol reactivity in 163 healthy adolescent volunteers (age 15.4+-1.4 y; BMIz 0.72+-1.01; 66% female; 60% White) with and without LOC eating, as assessed by interview. Fasting salivary cortisol was collected in the morning, followed by a buffet lunch meal. In the afternoon, youth were randomly assigned to watch either a neutral or sad film clip. Salivary cortisol and state mood ratings were collected at 0, 30, and 50 minutes post-film. Analyses examining LOC differences in cortisol reactivity accounted for age, race, sex, height, adiposity, and % carbohydrate intake.

Results

Youth exposed to the negative film clip reported greater increases in state depression ($p<.001$) compared to those exposed to the neutral film clip. Yet, there were no effects of LOC, film condition, or LOC by film condition on cortisol reactivity, including area under the curve or slope of regulation ($p>.05$).

Conclusions

Physiological stress reactivity did not appear to differ between adolescents with and without LOC eating. Although we accounted for carbohydrate intake, future studies of LOC's association with cortisol reactivity to stress, separate from food intake, are essential.
Background

Diabetes is heterogeneous with respect to genetics, pathophysiology and disease course. We hypothesize that pancreatic islet enriched miRNAs (miRs) may be biomarkers of b-cell injury that will allow better differentiation of subtypes of diabetes.

Methods

A panel of 9 islet-enriched miRs collated from literature was measured in the plasma of healthy normal volunteers (HC) (n=12) and subjects with prediabetes (PD) (n=12), type 2 diabetes (T2DM, n=13, FPG>=126 mg/dL); latent autoimmune diabetes of adults (LADA, n=6), and type 1 diabetes (T1DM, n=7) by qRT-PCR. All subjects were matched for age, gender, and BMI. Plasma HbA1c levels were measured using a DCA 2000 Analyzer and C-peptide levels were measured by immunoassay (Meso Scale Discovery). Plasma levels of miRs in groups with diabetes were compared to those of normal volunteers and those that were significantly different were considered as potential biomarkers for subtyping diabetes.

Results

miRs including miR-375 (previously linked to b-cell injury) and miR-21 associated with vitamin D and Ca2+ homeostasis and islet inflammation were higher (p<=0.05) in subjects with PD, T2DM, LADA, and T1DM, compared to HC. Receiver operator characteristics (ROC) values of miR-375 alone were HC:T2DM: 0.589; HC:LADA: 0.629; HC:T1DM: 0.619 or in combination with miR-21 were HC:T2DM: 0.942; HC:LADA: 0.875; HC:T1DM: 0.797). Higher levels of miRs correlated with higher HbA1c and lower C-peptide levels.

Conclusions

Circulating miRs linked to b-cell injury and islet inflammation, alone or in combination, may be useful biomarkers to subtype diabetes. Prospectively, such markers could identify those at risk for clinical progression and be used to select optimal therapy to improve outcomes.
T-2522-P: Egg Breakfast More Satiating Than High Carbohydrate Breakfast and Results in Significantly Less Food Intake at Lunch

Angela Bonnema, PhD; Deena Altschwager, BS Nutrition; William Thomas, PhD; Joanne Slavin;

Background

Both protein and fiber have satiating properties, but few studies have examined whether they work additively to enhance satiety.

Methods

We conducted a randomized, controlled, crossover study (n=24) where 3 isocaloric test meals were consumed for breakfast: eggs with white toast; eggs with whole grain toast; and rice cereal with white toast containing 30, 20, 10 grams of protein and 1, 7, 1 grams of fiber, respectively. Visual analogue scales (VAS) were used to assess hunger, satiety, fullness, and prospective food intake Blood was drawn to measure glucose response. A pizza lunch was served to determine subsequent food intake.

Results

The egg/white toast breakfast significantly improved satiety rating for all VAS points compared to the cereal and egg/whole grain toast meals. Lunch intake was significantly reduced in both egg breakfasts compared to the cereal breakfast (866 kcals for egg/white toast, 932 kcals for egg/whole grain, 1001 kcals for cereal). Blood glucose rose significantly with the cereal breakfast. An egg based breakfast with high protein produced the highest satiety ratings when compared to a moderate protein and fiber egg based meal and a rice cereal meal.

Conclusions

Food intake at the subsequent meals was reduced for both egg breakfasts compared to the cereal breakfast. Egg based breakfast meals with high protein and low/moderate fiber produced greater satiety and reduced food intake compared to a cereal-based breakfast with low protein and low fiber.

T-2523-P: Effect of movie violence, on mood, stress, appetite perception and food preferences in a random population
Background

TV/movie watching has been associated with increased risk for obesity. Weight gain is promoted due to both the sedentary behavior aspect of watching TV/movies and the increase in energy intake while doing the activity. A distinctive feature of several recent TV series/movies is violence. Violence exposure has been shown to affect the psychological state and to impact acutely the body at a somatic level. Although extensive work has been done on the effect of media violence on attitudes, behaviors, and cardio-vascular health, very little is known about media violence and its effect on appetite, eating behavior and food preferences. The present study aimed at investigating the immediate acute effect of violence in movies, on mood, stress, appetite perception and food preferences.

Methods

Protocol: 447 subjects (F= 202; M= 239) completed a validated visual analogue scales questionnaire (VAS) to record their subjective feelings of hunger, satiety, and desire to eat immediately at their way out of a movie. Movies were divided into 3 categories: a) horror n=96 b) romance or comedy n=188 and c) drama/action n=163. The sample population was randomly chosen. Body weight and height and the time of last meal were also recorded.

Results

Average age was 21.7 y (±5.0) and average BMI was 23.4 Kg/m2 (±3.9). There was a significant difference between the 3 movie categories for stress, anxiety and the sleepy feeling and a preference to eat something Sweet (p=0.019; Romance>Action>Horror). The Hunger feeling was highly correlated with a high preference to eat something sweet, fatty, salty or savory (p=0.000 for all), but did not correlate with any of the tensed, stressed or anxious feelings. The Sleepy feeling correlated with a preference for Sweet (p=0.014) and Fatty foods (p=0.000).

Conclusions

This first of a kind study that elucidates the acute effect of violence and its consequent stress on food intake and preferences, is a step forward going beyond the classical energy balance theory of obesity. It allowed us to have a first vision on the impact of receiving violence passively on our stress level and therefore on our eating behavior and food preferences. The study is very basic in its design, and stems its strength in that it is integrated in real life situation. Horror/violence movie types impacted the subject by making him feel more stressed and anxious; however romance made him feel sleepier and less tensed. Movie types didn’t seem to affect directly hunger or appetite but rather triggered some food preferences, such as a preference for sweet after a romance movie, which was the opposite for a horror movie. The complexity of the mechanisms by which media violence can affect our body and mind and probably our appetite along with our results confirm the need of a more complex, randomized and controlled investigation in which eating during and after the movie will be measured along with different outcomes related to stress and food preferences. This help us understand and highlight the mechanisms behind this effect, thus allowing us to understand better the associated obesity and weight gained with TV/movie watching.
**T-2524-P: The Effects of Prenatal Stress and Coping Style on Binge Behavior.**

*Jennifer Albertz; Gretha J. J. Boersma, PhD; Kellie L. Tamashiro, PhD; Timothy H. Moran, PhD, FTOS;*

**Background**

Binge eating disorder (BED) is a feeding disorder involving repeated, sporadic over consumptions of food in brief periods of time. In BED patients, stress is reported as a main trigger for bingeing. Prenatal stress (PNS) in rats seems to alter aspects of brain development and behavior in offspring.

**Methods**

In the current study, we hypothesized that PNS would augment various aspects of binge behavior in rats. Pregnant rats were exposed to chronic variable stress during the last week of gestation. By PND40, the coping styles of the offspring were characterized as proactive or passive based on a defensive burying test. By PND50, rats were given sporadic (3 times/wk) limited access to a high-fat food (Crisco), in addition to continuously available chow. Crisco was available every Mon, Wed, and Fri for 1hr before dark onset. Rats were divided into 2 groups: those exposed to (PNS) and those not exposed to PNS (CON). Within both of those groups, there were equal numbers of passive and proactive rats.

**Results**

The rats exposed to PNS ate significantly more Crisco than the CON group (p=0.036). As a whole, the passive rats consumed similarly large amounts of Crisco regardless of treatment, while the proactive rats exposed to PNS ate significantly more Crisco than those in the CON group (p=0.002).

**Conclusions**

Overall, PNS appears to specifically augment the binge behavior of the proactive rats, while having little effect on the Crisco consumption of the passive rats.

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**T-2525-P: Striatal Dopamine D2 Receptor Expression, Physical Activity, and Weight Gain**

*Kavya Devarakonda, BS; Danielle M. Friend, PhD; Kevin D. Hall, PhD; Alexxai V. Kravitz, PhD;*

**Background**
Striatal dopamine D2 receptor (D2R) function has been linked to obesity. Striatal D2Rs are mainly found in indirect pathway medium spiny neurons (iMSNs), which inhibit movement when stimulated. Therefore we hypothesized that reduced D2R expression on iMSNs reduces movement, which may lead to obesity.

Methods

Male C57BL/6 mice were placed on 9 weeks of a high-fat diet, alongside weight-matched controls that remained on chow. Food intake, body composition, and physical activity were periodically measured in both groups. Physical activity was assessed through the open field assay and home cage running wheels. Striatal expression of D2R was measured at various time points during the diet with D2R autoradiography.

Results

On the high-fat diet, mice consumed more calories and gained more weight and body fat, compared to the chow controls. Additionally, the high-fat diet mice reduced their physical activity in both the open field assay and on home cage running wheels. We further examined the relationship between physical activity and weight, as well as the role of the striatal dopaminergic system in mediating that relationship.

Conclusions

D2R availability is associated with behavioral changes that may contribute to obesity. Our data will shed light on the relationship between D2R expression, physical activity and weight gain in obesity.

T-2526-P: Stimulating indirect pathway neurons increases anxiety and decreases movement: implications for obesity

Kimberly LeBlanc, PhD; Danielle Friend, PhD; Alexxai V. Kravitz, PhD;

Background

Obesity is linked to alterations in the striatum, and in particular in dopamine D2 receptor-expressing indirect pathway neurons (iMSNs). Since stimulation of these neurons is aversive, we hypothesized that striatal neurons may respond to anxiety, and stimulating iMSNs may have anxiogenic effects.

Methods

We used in vivo electrophysiology to investigate neural firing in the DMS while mice were on an elevated zero maze (EZM). The EZM is a circular maze with two open arms (no walls) and two closed arms. The percent of time a mouse spends in the open arms is considered a measure of anxiety. We analyzed the firing rate of neurons while mice were restricted to either the open or closed arms of the maze. We then used optogenetics to selectively stimulate iMSNs in the DMS while mice were on the EZM and analyzed
movement parameters and percent of time in the open arms. Finally, we used optogenetics to stimulate these pathways during an acoustic startle procedure, another test of anxiety.

Results

The firing rate of a subset of MSNs was substantially higher in either the open or closed arms of the EZM. Stimulating iMSNs decreased movement and also the percent of time mice spent in the open arms of the EZM. Limiting analysis to periods of movement still revealed a decrease in the percentage of time spent in the open arms, indicating that the anxiogenic effect of iMSN stimulation was dissociable from the movement effects. In addition, we found that stimulating iMSNs during an acoustic startle task increased the startle response.

Conclusions

Our results suggest that the firing of DMS neurons may be linked to anxiety state, and that stimulating iMSNs increases anxiety. Overall, our results indicate a role for striatal iMSNs in anxiety and movement, both of which could have serious implications for obesity.

T-2528-P: Lateral hypothalamic neurotensin neurons engage the mesolimbic dopamine system to regulate energy balance

Hillary Woodworth, BS; Raluca Bugescu, BS; Juliette Brown, BS; Gina Leinninger, PhD;

Background

The lateral hypothalamic area (LHA) acts via the mesolimbic dopamine (DA) system to regulate the motivation to move, drink and feed, but the roles for specific LHA neurons in these processes remains unclear.

Methods

We utilized tract tracing to examine how LHA neurons expressing the neuropeptide neurotensin (Nts) engage mesolimbic DA circuits to regulate behaviors relevant to energy balance. LHA Nts neurons project to the midbrain, where many DA neurons co-express neurotensin receptor-1 (NtsR1). Midbrain NtsR1-DA neurons synapse within mesolimbic sites that regulate intake and locomotor activity, such as the nucleus accumbens and olfactory tubercle. We next used DREADD technology to selectively activate LHA Nts neurons to determine whether they functionally engage the mesolimbic DA system and modify behavior.

Results
DREADD-mediated activation of LHA Nts neurons increases neuronal activation in the same mesolimbic regions that are targeted by midbrain NtsR1 neurons. While acute activation of LHA Nts neurons did not alter chow intake in sated mice, it dramatically increased their drinking and locomotor activity.

Conclusions

Collectively, these data suggest that LHA Nts neurons regulate mesolimbic DA circuits to increase movement and energy expenditure, which can potentiate weight loss. Disruption of the LHA Nts neuronal circuit may promote energy excess and development of obesity. Supported by NIH R00 DK090101 (GML)

T-2529-P: The Relationship between Striatal D2 Dopamine Receptors and Obesity

Danielle Friend, PhD; Kavya Devarakonda, BS; Julia Lemos, PhD; Alanna Kaplan, AB; Veronica Alvarez, PhD; Alexxa V. Kravitz, PhD;

Background

Obese individuals have decreased D2 dopamine receptor (D2R) availability and D2R-expressing neurons regulate movement and motivation, suggesting a role for D2Rs in obesity. It is unclear how reduced D2R availability affects activity of D2R-expressing neurons and behaviors contributing to obesity.

Methods

We used a conditional transgenic mouse model to selectively eliminate D2Rs from indirect pathway striatal neurons (Drd2-KO mice). We investigated the degree to which Drd2-KO mice exhibit changes in motor function by monitoring movement in an open field as well as in home cages equipped with running wheels. We used in vivo electrophysiology to record from striatal neurons in Drd2-KO mice to determine how the function of D2R-expressing neurons changes when the receptor is eliminated.

Results

Drd2-KO mice exhibited reduced movement compared to wildtype (WT) mice in both the open field and on running wheels, suggesting that D2R availability is involved in the motivation to move. We also examined whether decreased D2R expression results in alterations in striatal neuron firing. We found that average striatal firing rates were significantly lower in Drd2-KO mice compared to WT mice.

Conclusions

These data indicate that the striatal D2R plays an important role in movement. Specifically, low D2Rs may reduce physical activity and thereby promote weight gain. Current work is examining weight gain and motivation for food reward in Drd2-KO mice.
T-2530-P: Voluntary Physical Exercise Upregulates Dopamine Exocytosis in Brain Reward Systems

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Background

We have previously reported that central dopamine systems are depressed in dietary obese and inbred obesity-prone animals (e.g. Geiger et al., 2008; Geiger et al, 2009). The role of lifestyle interventions in reversing such deficits is still unclear.

Methods

We compared voluntary physical exercise in running wheels for at least 3 weeks in normal weight rats with injections of the psychostimulant d-amphetamine (1.5 mg/kg i.p.), a drug previously and successfully used as over-the-counter appetite suppressant, in inbred obesity-prone and obesity-resistant rats as interventions to try to assess effects on presynaptic dopamine plasticity in the mesolimbic system. Dopamine release in real time was assessed through carbon fiber amperometry in the nucleus accumbens and dorsal striatum, complemented by quantitative PCR to measure differences in mRNA expression of key regulators of dopamine exocytosis.

Results

At resting state, mean dopamine release was higher in the accumbens and striatum of exercised rats than in sedentary rats (7.38 x 10^7 ± 1.06 x 10^7 molecules vs. 15.98 x 10^7 ± 1.39 x 10^7 molecules, p<0.05). Average response to d-amphetamine and peak amplitude of dopamine release from the nucleus accumbens and striatum were significantly lower in 15 week-old obesity-prone rats than in obesity-resistant rats (9 ± 1 pA (n=45 stimulations in 9 slices) vs. 30 ± 6 pA (n=53 stimulations in 11 slices), p<0.05 by 1-way ANOVA).

Conclusions

1. Voluntary physical exercise upregulates central dopamine kinetics and induces similar effects to genetically programmed leanness on the neurochemistry of brain reward systems. 2. Three weeks of physical exercise are sufficient to upregulate rat dopamine exocytosis even at resting state.
T-2531-P: Hindbrain nucleus tractus solitarius glucagon-like peptide-1 receptor (GLP-1R) signaling reduces appetitive and motivational aspects of feeding

Amber L. Alhadeff, PhD; Harvey J. Grill, PhD

Background

GLP-1R signaling reduces food intake by affecting satiation, motivation, and reward. To date, the intake inhibitory effects of GLP-1R signaling in the medial nucleus tractus solitarius (mNTS) are solely attributed to interactions with vagally transmitted GI satiation signals.

Methods

Conditioned place preference and progressive ratio operant responding paradigms were used, along with mNTS microinjections of exendin-4, a long-acting GLP-1R agonist, to test the novel hypothesis that the reduction of food intake following mNTS GLP-1R stimulation results from effects on food-motivated appetitive behaviors in addition to interactions with satiation signals.

Results

mNTS GLP-1R activation reduced (1) intake of a palatable high-fat diet, (2) operant responding for sucrose under a progressive ratio schedule of reinforcement and (3) the expression of a conditioned place preference for a palatable food, without triggering malaise or alterations in activity.

Conclusions

These data demonstrate that the intake inhibitory effects of mNTS GLP-1R signaling extend beyond satiation and include effects on food reward and motivation that are typically ascribed to midbrain and forebrain neurons. Supported by DK21397 & NS084633.

T-2532-P: Neural Responses to Food and Non-Food Pictures and their Association with Same Day Energy Intake

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Background

These data represent a pilot study examining the difference in neural responses among high-energy, low-energy, and non-food pictures and to what extent these responses predict same-day energy intake.

Methods

Using a cross-sectional design, 25 adults participated. Each participant reported to the laboratory in a fasted state, were fitted with a 128-electrode electroencephalogram (EEG) net, and were passively shown pictures of food (in random order) grouped into three categories: high-energy foods, low-energy foods, and non-food items (control). Event related potentials (ERPs) were recorded using Electrical Geodesics, Inc., (EGI; Eugene, Oregon) amplifier system (20K gain, nominal bandpass=10-100Hz). ERPs of interest were the P300 and late positive potential (LPP). The National Cancer Institute's Automated Self-administered 24-hour Dietary Recall (ASA24) was used to assess same-day energy intake.

Results

The P300 ERP was not different between picture categories (P>0.42). For the LPP, the magnitude of response to high-energy food pictures was 3.41±1.99 mv, low-energy food pictures was 2.88±2.24 mv, and non-food pictures was 2.63±1.86 mv (F=3.34, P=0.04). Specifically, neural response to high-energy foods was different than non-food items (P=0.027) and trended toward a difference in low-energy foods (P=0.122). Linear regression analysis showed that food pictures trended toward, but did not significantly predict, same-day energy intake (P=0.172).

Conclusions

These data suggest that the brain perceives high-energy foods differently than non-food items for the LPP. However, whether or not the magnitude of the neural response to pictures of food predicts same-day energy intake is questionable.

T-2533-P: The effects of long-term physical activity on food attention allocation in college freshmen women

Bruce W. Bailey, PhD; Sharla Compton, M.S.; Michael J. Larson, PhD; James D. LeCheminant, PhD;

Background

The purpose of this study was to examine the effects of long-term (24 weeks) physical activity on attention allocated toward food in college freshmen women.

Methods
Seventy-nine freshmen college women wore a multi-function pedometer for 24 weeks after being randomly assigned to a daily step level: 10,000; 12,500; or 15,000. After at least 16 weeks of intervention, participants were given a cognitive viewing task (pictures of food and flowers) with the neural response measured using electroencephalogram (EEG) and event-related potentials (ERPs). P300s and LPPs are components of the ERP indicating increased attention to stimuli.

Results

There was a significant difference in daily step counts between groups (P < 0.01). No interaction between step group and picture condition (food vs. flowers) was found for any of the three ERP variables (P300 amplitude, P300 latency, LPP amplitude). The 12,500 group showed a significantly elevated response in comparison to the other groups for both food and flowers (F=8.84; P<0.01).

Conclusions

12,500 and 15,000 steps per day did not preferentially alter neural orientation toward food cues compared to flowers. However, there is a non-linear response to hedonic cues, with 12,500 steps per day resulting in higher neural response to food and flower compared to 10,000 and 15,000 steps per day.

T-2534-P: Efficacy of Lorcaserin for Reducing Cravings in Patients With Antipsychotic-Induced Weight Gain

Charles T. Nguyen, MD; Susan Shakib, PharMD, BCPS;

T-2535-P: Effects of Phentermine-Topiramate Extended-Release on Gastric Functions, Satiety, Satiation and Gut Hormones in Obese Patients

Andres Acosta, MD, PhD; Jessica O’Neill, none; Deborah Eckert, RN; Duane Burton, MR, BS; Alan R. Zinsmeister, PhD; Michael Camilleri, MD;

Background

Phentermine-Topiramate ER (PhenTop) is approved for the treatment of obesity. However, the effects of the medication on gastric functions, satiation, satiety and relevant gut hormones are unknown.
Methods

In a single-center, randomized, parallel-group, double-blind, placebo-controlled, 14-day study, we evaluated the effects of PhenTop (7.5/46mg, orally, daily) on gastric emptying (GE), gastric volume (GV), satiation, and satiety, and fasting and postprandial gut hormones in 24 obese adults using validated assays. Participants underwent a baseline satiation test (maximal tolerated volume, MTV) by Ensure ingested at 30mL/min on Day 0 prior to initiation of study medication. Post-treatment, all participants underwent (on separate days) measurements of satiation by MTV, GE of solids and liquids by scintigraphy, GV by SPECT during fasting and after 200mL Ensure, and after 4 hours a satiety test by kcal intake during a buffet meal. In addition, fasting and postprandial HPP, CCK, GLP-1, PYY and ghrelin were measured by radioimmunoassay. Statistical analysis was done using ANCOVA adjusting for baseline satiation test, age and gender as covariates.

Results

Groups were balanced on gender and were similar for age and BMI (34.9+-1.1 kg/m2). PhenTop was associated with reduced food intake at buffet meal (mean Δ 260kcal, p=0.032) and delayed GE of solids (mean Δ GE4h 6%, p=0.03; Δ GE2h 10%, p=0.052; and Δ GE T½ 19min, p=0.057). There were no significant differences in GV, satiation, GE of liquids and GI hormones. Patients on PhenTop had greater mean weight loss of 1.4 kg than placebo (p=0.03). There were no withdrawals or side effects.

Conclusions

PhenTop reduces food intake and delays gastric emptying of solids, suggesting both central and peripheral mechanisms of action. Support: NIH R01-DK67071 to Dr. Camilleri

T-2536-P: Carotid Intima-Medial Thickness Measured 10-Years Following Roux-en-Y Gastric Bypass Surgery

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Background

Reports of long-term macrovascular events following bariatric surgery are limited. A common cardiovascular event, stroke, is associated with carotid intima-medial thickness (CIMT). This study explored CIMT and blood pressure change in Roux-en-Y gastric bypass (RYGB) patients 10 years following surgery.

Methods
As part of a prospective RYGB study, three groups (post-RYGB patients (SURG), n=150; patients seeking RYGB but did not have surgery (No SURG), n=89; and severely obese controls not seeking RYGB (CNTL), n=137) underwent carotid ultrasonography to measure bilateral maximal CIMT (right and left). These measurements were obtained as part of a 10-year follow-up exam that also included measurement of blood pressure. Blood pressure, sex, age and BMI were also obtained during a baseline exam. Multiple linear regression of CIMT with change in systolic blood pressure (deltaSBP; 10 year minus baseline) was adjusted using sex, age, study group and interaction of study group and deltaSBP.

Results

The mean maximal CIMT(mm) right and left values for SURG, No SURG and CNTL were 0.781, 0.796, and 0.853 (right) and 0.814, 0.796, 0.860 (left), respectively. While baseline SBP was not significantly different between groups at baseline, the deltaSBP (mmHG) for SURG, No SURG and CNTL was -6.80, -0.06, and -0.18 at 10-years follow-up, respectively (p=0.06). Sex and age were significant predictors of right (p<0.001) but not left maximal CIMT. DeltaSBP did not predict right or left CIMT adjusted for study group and group interaction.

Conclusions

Reduction in SBP and CVD has been linked to bariatric surgery. This study, however, did not show a significant association between change in SBP and right or left CIMT when adjusted for the three study groups. Greater post-RYGB follow-up time may be necessary to demonstrate differences in CIMT.

(NIDDK)

T-2537-P: Meal Frequency May Change Body Composition and Blood Markers of Health

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Background

The purpose of this study was to determine if consuming a portion-controlled equi-hypocaloric diet as two meals (2MF) or three meals plus three snacks (6MF) per day can be a successful strategy for obese women to improve weight loss, body composition, blood pressure and lipid concentrations.

Methods

Using a crossover approach, eleven (N = 11) obese female subjects (52 +- 7 years, 101.7 +- 22.6 kg, 39.1 +- 7.6 kg/m2) were randomized to either the 2MF or 6MF treatment condition for two weeks, completed a two-week washout, and alternated treatment conditions for the remaining two weeks. In pre/post fashion,
changes in body mass, body composition, blood pressure and lipid components were measured in response to a standardized test meal.

**Results**

Body mass was successfully lost ($P < 0.05$) under both feeding regimens (2MF: $-2.8 \pm 1.5$ vs. 6MF: $-1.9 \pm 1.5$ kg) in comparison to pre-condition measures. Altering meal frequency did not impact blood pressure, total cholesterol, or LDL cholesterol ($p>0.05$). On average fat-free mass (FFM) by $3.3 \pm 2.6\%$ following the 2MF condition and an average increase of $1.2 \pm 1.7\%$ in FFM following the 6 MF condition ($P \leq 0.05$). Fasting HDL-C percent increased during the 2MF was significantly greater than the 6MF ($1.3 \pm 12.2\%$ vs. $+10.3\%$) ($P < 0.05$).

**Conclusions**

Increased MF (6MF) did not appear to promote greater improvements in blood-markers of health. Alternatively, increases in MF did appear to favorably reduce the loss of FFM during weight loss. However, we cannot support an altered MF during weight-loss as superior to a hypocaloric diet alone.

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**T-2538-P: The IDEEA Monitor and Activity Temperament Questionnaire Do Not Accurately Estimate Energy Expenditure or Predict Weight Loss**

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**Background**

Limited economical means are available to estimate activity energy expenditure (AEE) and predict weight loss. We examined 1) the validity of the IDEEA 2) if the ATQ is associated with movement, and 3) if the IDEEA, ATQ, and activity predict weight loss during energy restriction.

**Methods**

Seventy-three (21M, 52F) healthy adults (22-50y; 21.5-28.4 kg/m²) were randomized in a 1:2 ratio to maintain energy intake (N=26) or to reduce energy intake by 25% (N=47) for 2 yrs. At baseline, participants wore an Intelligent Device for Energy Expenditure and Activity (IDEEA) in a metabolic chamber; completed the Activity Temperament Questionnaire (ATQ) to measure activity temperament; and completed a whole room metabolic chamber assessment to measure 24-h EE, % of time active, and spontaneous physical activity (SPA; kcal/d). Resting metabolic rate (RMR) was measured by indirect calorimetry. AEE was calculated using the formula; $AEE=TEE-(RMR+(0.1*TEE))$ where TEE is total energy expenditure.
Results

The IDEEA overestimated AEE and TEE compared to the metabolic chamber (421±34 kcal, 261±31 kcal; respectively). IDEEA AEE error variance was not stable over levels of AEE (R2=0.66). IDEEA TEE was stable over levels of TEE (R2=0.02). Chamber 24-h EE was positively associated with the ATQ (R2=0.10) but the ATQ did not correlate with AEE. In both groups, SPA at baseline predicted weight loss at month 12 and 24 (R2=0.17; R2=0.16).

Conclusions

The IDEEA monitor was not accurate compared to the metabolic chamber. The IDEEA and ATQ did not predict weight loss, though SPA did predict weight loss. Economical means of estimating AEE and predicting weight loss compared to the metabolic chamber are still needed.

T-2539-P: Medical Weight Management and Diabetes Remission

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Background

Diabetes prevalence is increasing and although prevention efforts are widespread, incidence continues to climb. Surgery for obesity has been effective for inducing diabetes remission, possibly as a function of total weight loss. We assessed the impact of medical weight loss on diabetes remission.

Methods

To assess the effect of medical weight management for inducing diabetes remission, we reviewed sequential enrollees in the Wake Forest Baptist Health Weight Management Center who participated in medical weight loss treatments. Electronic medical records from November 2012 to April 2014 were abstracted for all patients enrolled with a diagnosis of type 2 diabetes mellitus (T2DM) and a follow up glycated hemoglobin (HgA1C). We reviewed records to identify the number of patients who achieved HgA1C values of 5.7% or less and descriptive characteristics of the patients and their response to treatment.

Results

There were 92 patients enrolled in the medical weight loss treatment programs with a diagnosis of T2DM. Of the 92 patients with T2DM, 18 (19.4%) achieved HgA1C of 5.7% or less within a mean of 266 [image inserted here] 124 days of initiating treatment. The average follow up HgAC of this group was 5.4 [image inserted here] 0.4%, representing a decrease of 23% from baseline. The mean weight loss achieved was 49.4 40.6 lbs or 16.6 10.2% of initial body weight. Most patients were off all medications for diabetes treatment. Of note, 40 patients (43%) achieved HgA1C values of less than 6.5%.
Conclusions

A significant proportion of patients with diabetes engaged in treatment at a comprehensive medical weight loss center achieved normal HgA1C values. Additional study is needed to establish the efficacy of medical weight loss for diabetes remission and understand predictors of inducing remission.

T-2540-P: Multiple Sclerosis””Relationships between Obesity, Inflammation and Arterial Function

Tracy Baynard, PhD; Robert W. Motl, PhD; Bo Fernhall, PhD;

Background

Chronic inflammation reduces arterial function and is prominent in obesity and multiple sclerosis (MS). The relationship between obesity, inflammation and arterial function in MS is unknown. We aimed to determine the associations between body fat, inflammation and arterial function in MS vs control.

Methods

Persons with (n=33) and without MS (CON) (n=33) were matched for age, sex, and body mass index (BMI) and had serum analyzed for interleukin-6 (IL-6) and C reactive protein (CRP) as markers of inflammation. Body fat was assessed by dual energy x-ray absorptiometry, and arterial measurements included arterial stiffness, augmentation index, central blood pressure (BP), and forearm blood flow (FBF) using strain gauge plethysmography as an assessment of endothelial function.

Results

Both groups were similar in BMI, trunk and body fat, CRP and IL-6. Inflammation was more strongly correlated with fat in CON vs. the MS group. Trunk fat was positively correlated with central (BP) in MS but not CON; however trunk fat was only correlated with augmentation index in CON. Both groups showed similar relationships to arterial stiffness and trunk fat was negatively correlated with peak FBF in only the MS group. Inflammation correlated similarly with peak FBF for both groups; only arterial stiffness correlated with inflammation in CON.

Conclusions

These data suggest that trunk fat, inflammation, arterial function are differentially associated between MS and a control population. It appears body fat does not contribute to inflammation in MS in the same way it might in a control group.
T-2541-P: Heterogeneity in the Lipid-Lipoprotein Response to the Healthy Mediterranean Diet: The Role of the Genetic Background

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Background

A great inter-individual variability in the lipid-lowering effects of the traditional Mediterranean diet (MedDiet) has been previously highlighted. This variability may be attributed to multiple factors, including the family genetic background. The aim of the present study was to examine whether family history of dyslipidemia influences the lipid-lipoprotein response to the MedDiet.

Methods

We recruited 36 individuals with a family history of dyslipidemia (i.e. having at least one first-degree relative with a diagnosis of dyslipidemia) and 28 individuals without a family history of dyslipidemia, aged between 24 and 53 years, who had slightly elevated LDL-C concentrations (3.4-4.9 mmol/l) or total cholesterol to HDL-C ratio ≥ 5.0. Variables related to the lipid-lipoprotein profile were measured before and after a 4-week isocaloric MedDiet during which all foods and drinks were provided to participants.

Results

Subjects without a family history of dyslipidemia experienced greater decreases in total cholesterol than those with a family history of dyslipidemia in response to the MedDiet (respectively -11.3% vs. -5.1%; P for group by time interaction=0.02). Decreases in LDL-C, HDL-C, total cholesterol/HDL-C, LDL-C/HDL-C, apo B and apo A-1 were also noted, with no difference between groups (P for group by time interaction>0.10). The family history of dyslipidemia had a greater impact on the lipid-lipoprotein response to the MedDiet in subjects with lower baseline values of LDL-C and in women.

Conclusions

These results suggest that cholesterol-lowering effects of the MedDiet are more pronounced in those not genetically predisposed to dyslipidemia. These results highlight that genetic predispositions to dyslipidemia may explain at least in part the heterogeneity in cholesterol response to the MedDiet.
T-2542-P_DT: Obesity Prevalence and Psychosocial Variables in a Sickle Cell Disease (SCD) Clinic Sample

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Background

Medical advances have led to improved longevity and health in Sickle Cell Disease (SCD); thus persons with SCD may increasingly experience overweight or obesity. We describe the prevalence and psychosocial correlates of normal (NW), overweight (OW) and obesity (OB) in a SCD clinic population.

Methods

Archival review of data collected as part of an ongoing study at the Duke SCD Center. Data was collected via survey and medical records review from a consecutive sample of clinic patients. The study represents a cross-sectional analysis of 226 adult African American patients (age M=33.6 yrs; BMI M=26.3 kg/m2; F=55%) receiving routine follow-up care and included BMI (measured kg/m2) and psychosocial data (The Longitudinal Exploration of Medical and Psychosocial Factors in Sickle Cell Disease). This self-report inventory assesses demographics; pain; and eight validated, content driven instruments for the assessment of psychiatric, behavioral and social functioning.

Results

Prevalence was 1) NW BMI 18.5-24.9 (53%); 2) OW BMI 25-29.9 (26%); 3) OB BMI >30 (21%). Age was associated with BMI category (NW M=32; OW & OB M=36; p=.032); all other variables of interest were evenly distributed across BMI categories (ANOVA; p's=ns). Means for psychosocial variables: Alford Edwards Social Support Inventory (AESSI M=54.9 comparable to other studies); Cohen's Perceived Stress Scale (CPSS M=14.3; Average); Symptom checklist-90 Global Severity Index (M=57; clinical) Depression (M=56; clinical), Anxiety (M=53; clinical).

Conclusions

Individuals with SCD are experiencing improved health and longevity due to advances in treatment. Understanding the relationship between SCD, weight, and psychosocial variables will be essential if we are to assist these patients with healthy weight goals. Further research is needed.
T-2543-P: Missed Opportunities for Weight Management for Overweight Patients

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Background

No prior research has examined perspectives among non-physician health professionals about the typical patient body weight they initiate obesity care and feel confident providing obesity care.

Methods

We conducted a national internet-based survey (in 2014) of 500 health professionals who worked at least 15 hours a week in an ambulatory setting (100 from each of five professions: nutrition, nursing, behavioral/mental health, exercise, pharmacy). Using T-tests, we evaluated differences in perception of the typical patient body weight (assessed by pictures of five different body sizes that ranged from normal BMI to class III obese) to initiate weight loss discussions, refer or self-refer to your care for weight management, and feel successful helping patients lose weight.

Results

Most health professionals did not report engaging patients in weight loss discussions until they were at least class I obese (97%) and did not report receiving referrals or self-referrals for weight loss until patients were at least class II obese (76%). Health professionals felt least successful helping class III obese patients lose weight (54%).

Conclusions

There are missed opportunities for health professionals to provide appropriate weight-related care for overweight patients, particularly since health professionals feel less successful helping class III obese patients lose weight.

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T-2544-P: Effects of Phentermine and Topiramate Extended-Release (PHEN/TPM ER) on Weight Loss (WL), Risk of Type 2 Diabetes Mellitus (T2DM),
and Concomitant Medication Costs in Older Obese/Overweight Subjects

Timothy Church, MD, PhD; Lucia Bonnemaison, PhD;

Background

Over 25% of people >=65 years old have T2DM. The CONQUER study evaluated PHEN/TPM ER treatment in obese/overweight subjects with weight-related comorbidities; this post hoc analysis assessed WL and progression to T2DM in older subjects.

Methods

The 56-week, double-blind, Phase 3 CONQUER trial randomized subjects (BMI >=27 -<=45 kg/m2 and >=2 weight-related comorbidities) to placebo (PBO), PHEN 7.5mg/TPM ER 46mg (7.5/46), or PHEN 15mg/TPM ER 92mg (15/92). WL and progression to T2DM were assessed in subjects who were >=65 years old at baseline and receiving >=1 concomitant medication (baseline or end of treatment [EOT]) for hypertension (HTN), dyslipidemia (DYSL), or T2DM (n=160; PBO=58; 7.5/46=36; 15/92=66). Cost offsets were calculated by multiplying unit cost (Medi-Span's PriceRx) by the number of doses per day from baseline to EOT. PHEN/TPM ER cost was not included.

Results

At baseline, age range was 65-71 yrs; 56% female mean weight 100kg, BMI 36kg/m2, and HbA1c 6%; 87% had HTN, 46% DYSL, and 21% T2DM. By week 56, LS mean WL was -2.5%, -7.9%, and -8.9% for PBO, 7.5/46, and 15/92, respectively (P<=.0005 vs PBO). T2DM annualized incidence rate was 13.5, 7.5, and 8.8, respectively. Baseline annual concomitant med costs were $1448, $1793, and $1052, respectively; by EOT, change in annual concomitant med costs were $19, -$84, and -$118, respectively. Common adverse events were constipation, dry mouth, and dizziness.

Conclusions

Among older subjects, PHEN/TPM ER-induced WL was associated with reduced progression to T2DM and decreased annual concomitant medication costs.

T-2545-P_DT: Healthy Foods, Healthy Families (HFHF): Combining Fruit and Vegetable Exposure Interventions and Financial Incentives at Rhode Island's
Urban Farmersâ€™ Markets to Improve Nutrition among Recipients of Federal Food Assistance

April Bowling, MA; Kayla L. Ringelheim, BA Human Biology; Mikayla E. Moretti, BS Nutrition and Dietetics; Alvin H. Tran, MPH; Kirsten K. Davison, PhD;

Background

HFHF is a fruit and vegetable (F&V) exposure/incentive program implemented at farmers’ markets in low-income neighborhoods and targeting families receiving federal food assistance. We examined effects of HFHF on participants’ diet and associations between exposures, incentives and dietary change.

Methods

Exposure activities included educational materials, F&V tastings and cooking demonstrations. Incentives included 40% F&V bonus for EBT card users and $20 for use purchasing F&V at every 3rd market visit. Self-report surveys measuring dietary behaviors, nutritional literacy and program utility were administered to all participants upon enrollment (n=425, 46.2% Hispanic, 94.8% Female). Participants were randomly sampled for follow-up at markets during mid-season (n=186) and at season end (n=146). Attendance and incentives received were tracked over 16 weeks at all markets (mean=7.7 visits).

Results

Participants reported significantly increased vegetable consumption (p=.005), borderline increases in fruit consumption (p=.097), and decreased soda consumption (p=.005). Participants reported no changes to food assistance spent on F&V (p=.94) but 70% reported significant increases in family consumption of F&V, indicating that subsidies expanded F&V buying power. Participants reported that exposure activities and incentives similarly affected program attendance and predicted increases in children’s F&V acceptance.

Conclusions

Interventions combining F&V exposure activities and modest financial incentives at farmers’ markets in low-income neighborhoods can improve diet quality of families receiving federal food assistance.

T-2546-P: Methods of Prior Weight Loss Attempts by Adults Seeking Weight Loss Surgery
Background

Few studies have presented data relevant to the frequency of previous weight loss attempts and weight loss methods for individuals seeking bariatric surgery.

Methods

Participants were adults (BMI >40 kg/m2 or >35 kg/m2 with Type 2 Diabetes) who enrolled in Heads Up, an insurance-sponsored observational study examining surgical and non-surgical weight loss techniques. Participants completed a semi-structured interview with a registered dietitian who recorded number and types of previous weight loss attempts including description of methods utilized in those attempts.

Results

Of the 293 participants completing screening in anticipation of bariatric surgery, 197 (67%) were Caucasian and 90 (30.7%) were African American; 250 (85%) were female. Participants had a large number of prior attempts at weight loss; women on average had more attempts (11.9+8.1) than men (8.1+7.1), p=.007. On average, participants attempted 2.3 + 1.01 different weight loss methods, and reported 48.3 + 26.5 pounds as their greatest previous weight loss. Over half (56%) reported using prescription drugs to lose weight; 61% reported using commercial weight loss programs.

Conclusions

Adults seeking bariatric surgery have a large number of prior weight loss attempts using a wide variety of methods. The relatively low prevalence of use of approved medications prior to bariatric surgery may reflect the few available medications and the fact that prescription rates for these medications remain low in primary care practice. Recruitment for this study is ongoing; subsequent analyses will correlate prior weight loss attempts and methods with bariatric surgery efficacy.

T-2547-P: A Novel Approach to Training Healthcare Students in the Delivery of Evidence-Based Obesity Treatment

Background
Many healthcare providers believe that they have not been adequately trained to treat obesity, and thus, often do not address it with their patients. Medical educators recommend healthcare students be better trained to treat obesity, but educational curricula are already overburdened with content.

**Methods**

A group of 35 interdisciplinary healthcare students participated in an extracurricular multicomponent obesity treatment training program that weaved together didactic and experiential elements. As a major component of the training program, students led a free 10-week community-based weight management intervention for low-income community residents. An interdisciplinary team of weight management professionals taught the didactic and supervised the experiential components of the training. Analyses compared weight loss results from the student-led weight loss program with those from an existing evidence-based program of similar length and format that was led by weight management professionals.

**Results**

Participants in the student-led and professional-led programs lost a statistically and clinically significant amount of weight over their respective programs. Although participants in the student-led program attended fewer classes and were heavier at baseline than those in the professional-led program, weight change was not significantly different between the student-led (-4.2% ± 1.5%) and professional-led (-3.3% ± 2.2%) programs, $F(1,44)=1.02$, $p=.32$, $\eta^2=.023$.

**Conclusions**

An extracurricular training program with didactic instruction and experiential learning appears to be a viable strategy for both preparing healthcare students to provide evidence-based obesity treatment and providing a much needed treatment to those who can least afford it.

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**T-2548-P: Developing a Novel Approach to Characterize the Global Attributes of Successful Weight Management Foods for Dieting and Non-Dieting Consumers.**

*Nicola J. Buckland, PhD; Michelle Dalton, PhD; Richard J. Stubbs, PhD; Marion M. Hetherington, DPhil; Graham Finlayson, PhD;*

**Background**

Successful weight management (WM) requires selecting optimal dietary foods. Perceived food properties can influence food intake alongside nutritional attributes. The global dimensions underpinning WM-compatible foods and differences across diet status have not been investigated.
Methods

We have established an on-going platform for the characterisation of foods according to perceived (e.g. sensory, psychological) and actual (e.g. physical, nutrient, cost) dimensions, including associations with successful WM. Perceived dimensions of foods were collected using online surveys. Actual objective dimensions were sourced from manufacturers' information and nutritional databases. To date more than 100 foods have been characterised by 390 dieting and 726 non-dieting individuals. Linear models were applied to examine the combination of dimensions (perceived and actual) that most strongly determine WM foods in dieters and non-dieters.

Results

For actual dimensions, energy density was the strongest predictor of WM foods for both dieters and non-dieters. For perceived dimensions, energy content and satiating capacity were the strongest predictors of successful WM for non-dieters ($p<0.0001$). For dieters, an additional hedonic component was significant in the model with perceived pleasantness positively ($p<.001$), and desire to overeat negatively ($p<.001$) associated with successful weight WM.

Conclusions

This approach can be applied to characterise the global attributes of an unlimited database of foods. Actual determinants of WM-foods did not differ between dieters and non-dieters but perceptual processes did. Food perceptions and their interaction with nutritional effects have implications for WM.

T-2549-P: Does the Obesity Epidemic Call for Health Teams with Specific Training on the Subject?

ILEANA C. CARZOGLIO, MD; ISABEL BOVE PEREZ, PhD

Background

Obesity is currently considered one of the most serious health problems of the 21st century, as it determines the development of several chronic noncommunicable diseases (NCDs) in adults. Obese children tend to remain obese in adulthood, with an increased risk of developing chronic diseases at younger ages. Health professional training in our country does not include a profound study of this increasingly prevalent disease bearing great morbidity and mortality, disability and high medical expenses to health systems.

Methods

In order to analyze the basic skills of newly graduated doctors who are in their specialization process regarding diagnosis and treatment of obesity, we performed a medical and surgical School of Medicine resident survey.
Results

53% of the residents surveyed do not diagnose and 74% do not treat obese patients in their daily practice, with no statistically significant differences by gender (P = 0.633). Moreover, as they progress in their specialization, neither diagnosis nor treatment improves. Those physicians who do diagnose and treat obese patients are mostly medical specialties residents. They expressed interest in having an Obesity Degree aimed at all health professionals with high academic standards.

Conclusions

Given the importance and complexity of obesity, we need to centralize training among professionals from different health related areas, so as to create multidisciplinary teams with a comprehensive, unified, consistent and updated insight into the disease. This will in turn encourage obesity research, providing the ability to design strategies focused on the epidemiological reality of our population while promoting coordinated actions aimed at slowing down the growth of this nationwide epidemic.

T-2550-P: Endoscopic Duodenal-Jejunal Bypass Liner in Patients with Body Mass Index between 30 and 35 kg/m2.

Erick E. Castillo, MD; Fernando Pimentel, MD; Allan Sharp, MD; Alejandra Alarcón, RN; Palmenia P. Pizarro, Bachelor; Ricardo Funke, MD; Luis Ibañez, MD; Alex Escalona, MD;

Background

The DJBL is an endoscopic implant that mimics the duodenal-jejunal bypass component of the Roux-in-Y gastric bypass. Previous reports have shown significant weight loss in implanted morbidly obese subjects, however, results in patients with moderate obesity are unknown.

Methods

Review of prospective registry of all patients with BMI between 30 and 35 kg/m2 undergoing an endoscopic implant of DJBL. Primary endpoints included weight variation from the implant to the end of follow-up and in some cases far from the explant.

Results

The DJBL was endoscopically implanted in 81 patients (Mean age: 42±15 years; 64% female; mean weight: 92.1±14 kg; baseline BMI: 32.3±1 kg/m2). Type 2 diabetes, hypertension and dyslipidemia; 10, 25 and 32 patients, respectively. There were 44 elective (Mean time of use 361±160 days) and 5 early endoscopic removals. In the 24-week completer population was 15% of total body weight loss. Mean weight at explant was 78±11 kg (p<0.001) equivalent to 10.4+-6 kg weight change, 12+-7% of total body weight loss and 49+-36% excess of weight loss.
Conclusions

The DJBL is safe in patients with BMI between 30 and 35 kg/m2 resulting in significant weight loss. These results suggest that this device may be suitable for the treatment of moderate obesity.

T-2551-P: Safety and Efficacy of the Endoscopic Duodenal-Jejunal Bypass Liner (DJBL, EndoBarrier®) in Obese Patients older than 65 years.

Erick E. Castillo, MD; Fernando Pimentel, MD; Allan Sharp, MD; Alejandra Alarcón, RN; Palmenia P. Pizarro, Bachelor; Ricardo Funke, MD; Luis Ibañez, MD; Alex Escalona, MD;

Background

The DJBL is an endoscopic implant that mimics the duodenal-jejunal bypass component of the Roux-en-Y gastric bypass. Previous reports have shown significant weight loss, however, results are unknown in patients older than 65 years.

Methods

Review of prospective registry of all patients older than 65 years that are undergoing an endoscopic implant of DJBL. Endpoints included safety and weight change.

Results

The DJBL was endoscopically implanted in 11 subjects (Mean age: 72±5 years; 55% female; mean weight: 103.4±14 kg; mean BMI: 38.1±5 kg/m2). Implantation time was 22±13 minutes; explantation time was 14±3 minutes. There were 5 elective (Mean time of use 361±146 days) and 1 early explant due to gastrointestinal bleeding. Mean weight at 24-week and at explant time were 84.4±11 and 83.5±12 kg, respectively (p<0.001). Mean weight loss at explant was 21±7 kg. (p<0.005) equivalent to 19.8±5% of total body weight and 47±15% excess of weight loss.

Conclusions

The DJBL is safe and effective in patients older than 65 years and results in significant weight loss. These results suggest that this device may be suitable for the treatment of obesity in older patients.
T-2554-P: Novel Clinical Anthropometric Method in Relation to Adiposity-Related Cardiovascular Risk Factors

Woong Hwan Choi, MD; Jung H. Park, MD;

Background

High levels of visceral adipose tissue (VAT) are associated with cardiovascular risk. Instead of measuring VAT directly, various anthropometries like waist circumference (WC), body mass index (BMI), and total fat mass are used to assess cardiovascular risk and WC is most reliable method as yet.

Methods

We compared diagnostic accuracy of AHA/NHLBI criteria components except WC using ROC curves according to VAT, WC, BMI, and total fat mass. Dual-energy x-ray absorptiometry (DXA)-derived VAT measurement is easier, safer and cheaper than CT. We analyzed Korean National Health and Nutrition Examination Survey 2010 data. We measured DXA-derived VAT with Hologic’s APEX software (Version 5.5). Metabolic syndrome followed the AHA/NHLBI criteria. Receiver Operating Characteristic (ROC) curves were used to assess clinical utility. This study included 4480 subjects, aged equal to or greater than 20 years (1938 men; 2542 women).

Results

VAT ($r = 0.833,$ $p < 0.01$) had higher correlation with WC than BMI ($r = 0.825,$ $p < 0.01$) and total fat mass ($r = 0.597,$ $p < 0.01$). The prevalence of metabolic syndrome was 29.9%. Based on the area under the ROC curve (AUC), accuracy of VAT to diagnose metabolic syndrome (AUC = 0.847; $p < 0.01; 95\% \text{ CI}, 0.83-0.859$) was higher than WC (AUC = 0.832; $p < 0.01; 95\% \text{ CI}, 0.819-0.844$), BMI (AUC = 0.786; $p < 0.01; 95\% \text{ CI}, 0.772-0.801$), and total fat mass (AUC = 0.721, $p < 0.01; 95\% \text{ CI}, 0.705-0.737$).

Conclusions
Except component of reduced HDL cholesterol, diagnostic accuracies of VAT were higher than other anthropometric methods. These results demonstrate that DXA-derived VAT is a more useful clinical marker to evaluate cardiovascular risk.

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**T-2555-P_DT: Community Health Workers to Engage Families in Obesity Prevention**

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**Background**

Community Health Workers (CHWs) offer culturally appropriate health education, counseling and social support to families. We examined the feasibility of using CHWs to support obesity prevention messages as part of a primary care obesity prevention program called *Steps to Growing Up Healthy.*

**Methods**

Bilingual, bicultural community health workers helped to design an intervention for mothers of children 2-4 years of age that focused on 4 specific obesogenic behaviors (reduce/eliminate sugar sweetened beverages, limit milk to 1% and <2 cups, decrease screen time and increase physical activity). 54 mother-child dyads were randomized to receive the intervention by either monthly home visits (n=24) or monthly telephone calls (n=30) from the CHWs. The primary outcome was engagement by the CHW at 12 months. Secondary outcomes were changes in obesogenic behaviors and BMI percentile.

**Results**

Enrolled children had the following demographics: age 32.5 +/- 6.5 mos, 93% Hispanic, 46% female, 67% BMI<85th%tile, BMI%tile 65.3 +/- 11.2. Home visits were completed with 75% of participants (5.8 home visits/engaged participant). Telephone calls were completed with 80% of participants (4.8 calls/engaged participant). Regardless of intervention group, there was a trend toward smaller increases in BMI%tile over 12 months in children who received 3 or more intervention doses as compared to children who received fewer than 3 doses (p=0.10).

**Conclusions**

Community Health Workers were equally successful in engaging families in obesity prevention through either home visits or telephone calls and there was a downward trend in BMI% with increasing doses of the intervention irrespective of how the dose was administered (home visit or telephone call).
Background

A chart review was performed to evaluate the effectiveness of the Medifast 4&2&1 Plan on body weight (wt) and cardiometabolic parameters in overweight and obese adults. The program is rich in high quality protein and balances carbohydrate intake making it ideal for seniors and people with diabetes.

Methods

Charts from adults >=18 years who signed a research consent form, had a BMI >=25 kg/m2 and used the Medifast 4&2&1 Plan between January 2012 and March 2014 were reviewed. The Medifast 4&2&1 Plan consists of 4 portion-controlled meal replacements, 2 self-prepared meals, 1 healthy snack, and provides a total of 1000-1200 kcals daily. Body wt and composition, systolic and diastolic blood pressure (SBP, DBP), and pulse were collected at multiple time points between 1 and 24 weeks (wks). The primary endpoint was weight change at 12 wks. A completers analysis was performed using nonparametric paired Wilcoxon signed rank tests to examine change from baseline.

Results

310 charts (57.1% female, 28.4% >=65 yrs, BMI 37.6+-6.8 kg/m2, 14.2% type 2 diabetes) were assessed. Significant (p<.0001) wt loss occurred at all times (-24.4+-12.3 lbs (n=169) at 12wks and -35.7+-16.0 (n=73) at 24wks). At 12wks, fat loss exceeded lean loss by 4-fold, and 87.0 and 51.5% achieved clinically significant wt loss of 5 and 10%, respectively. SBP and DBP were significantly reduced (p<.0001) by wk 1 and at all other times (12wk SBP -11.6+-15.8 mmHg and DBP -6.8+-12.2). Pulse was significantly reduced at 12wks (-3.4+-10.8 BPM, p=.004).

Conclusions

The Medifast 4&2&1 plan administered through MWCCs is effective for both weight loss and improvements in cardiometabolic risk factors while preserving lean mass.
T-2557-P: The Impact of Roux-en-Y Gastric Bypass on Chronic Kidney Disease in a Diverse Group of Patients

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Background

Studies have shown that bariatric surgery reduces hyperfiltration and proteinuria in the severely obese. However, these studies had small sample sizes of primarily non-Hispanic white patients, and mostly patients with high eGFR rates (hyperfiltration) without Chronic Kidney Disease (CKD).

Methods

Patients were selected if they had a Roux-en-Y Gastric Bypass (RYGB) without revision and had at least one year of baseline and two years of follow-up data for the assessment of kidney function and body weight changes. The eGFR was calculated using the Modification of Diet in Renal Disease (MDRD) equation commonly used in clinical practice. Data were analyzed using paired sample t-tests to determine the change between baseline eGFR and serum creatinine (Cr) before surgery and two years after surgery. In addition, the relationship between weight loss, eGFR and serum creatinine change was examined using an analysis of covariance controlling for age, gender, weight at surgery, and race.

Results

Patients (n = 3,113) were 55% non-Hispanic black or Hispanic, 47.3 ± 11.1 years old, and 83% women; 251 (8%) patients with an eGFR < 60 (Cr = 1.5 ± 0.79). There was a significant 36% increase in eGFR two years after surgery (47 ± 11 to 64 ± 21; p < .001) with a decrease in Cr during this time period (1.5 ± 0.8 vs. 1.3 ± 0.9; p < .001). After adjusting for race, age, gender, and weight at surgery the more weight a patient lost per month, the greater their change in eGFR (-1.22 [-1.68,-0.76]; p < .001) and Cr (0.01[0.00, 0.03]; p = .004).

Conclusions

Roux-en-Y gastric bypass resulted in a significant increase in eGFR and decrease in serum creatinine up to two years after surgery in patients with chronic kidney disease. Improvements were greatest for those with the poorest kidney function before surgery.

T-2558-P: Medication Cost-Offsets Associated with Phentermine/Topiramate Extended-Release (PHEN/TPM ER)
Induced Weight Loss (WL) in Subjects with Edmonton Obesity Staging System (EOSS) Stage 2

Arya M. Sharma, MD, PhD; Donna Ryan, MD; Wesley W. Day, PhD;

Background

EOSS stratification of weight-related morbidity takes into consideration medication use to treat comorbidities. The cost of these medications contributes to the economic burden of obesity.

Methods

The Phase 3, double-blind, 56-week CONQUER study, randomized obese/overweight subjects (BMI >=27-<=45 kg/m2) with >=2 weight-related comorbidities to placebo (PBO), PHEN 7.5/TPM ER 46 (7.5/46), or PHEN 15/TPM ER 92 (15/92). This post-hoc analysis evaluated WL and annual cost-offsets associated with changes in concomitant med use in subjects with baseline EOSS=2 (established weight-related chronic disease), using >=1 concomitant med (baseline or end of treatment [EOT]) for hypertension, dyslipidemia, or type 2 diabetes mellitus. Cost-offsets were calculated by multiplying unit cost (Medi-Span's PriceRx database) by number of doses/day from baseline to EOT. PHEN/TPM ER cost was not included.

Results

Of 2487 subjects, 476, 228, and 472 with EOSS 2 were in the PBO, 7.5/46, and 15/92 groups, respectively. At baseline, mean weight was 103kg and mean annual cost was $1061, $1214, and $1153 for PBO, 7.5/46, and 15/92, respectively. At week 56, mean % WL was -1.7%, -8.5%, and -10.2% (P<.0001 vs PBO; ITT-LOCF). By EOT, annual concomitant med costs increased with PBO and decreased with PHEN/TPM ER: $83, -$66, and -$69 for PBO, 7.5/46, and 15/92, respectively (P<.01 vs PBO). Common adverse events were constipation, paresthesia, and dry mouth.

Conclusions

Among subjects with EOSS stage 2, PHEN/TPM ER-induced WL was associated with decreased annual concomitant medications costs.

T-2559-P: Hope Thinking and Past Trauma Mediate the Relationships of
Body Mass Index with Mental Health Treatment Need and Use

Emily J. Dhurandhar, PhD; Andrea N. Hendricks, PhD; Kevin R. Fontaine, PhD; Peter S. Hendricks, PhD;

Background

Excess weight is associated with a higher risk of mental health conditions. Factors that might influence mental health treatment use among the overweight and obese, including hope thinking, trauma history, and perceived stigma associated with receiving mental health treatment, are not well understood.

Methods

Primary care clinic patients (n = 196; BMI range = 18.5 to 47) were recruited to complete a battery of self-report measures. Hope thinking, trauma history, and perceived stigma associated with receiving mental health treatment were evaluated as mediators of the association between BMI and need for mental health treatment, BMI and unmet need for mental health treatment, and BMI and mental health treatment use in three separate multiple mediator models using a bootstrap approach.

Results

Greater BMI was associated with a greater need for mental health treatment and a greater frequency of mental health treatment use. Hope thinking and past trauma mediated the relationships of BMI with both mental health treatment need and use. BMI was not related to unmet treatment need.

Conclusions

Increased mental health treatment need and use among the overweight and obese may be accounted for by lower hope thinking and greater incidence of trauma in this population.

T-2560-P: Study of Cognitive Load and Restaurant Menu Ordering Practices: Galvanic Skin Response and Face Validity of Menu Format

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Background

Restaurant menus have received scrutiny related to obesity prevention policies. Activities high in cognitive load increase energy intake. We used galvanic skin response (GSR) and self-report questionnaires to establish convergent and face validity of menus designed to vary in cognitive load.

Methods

We evaluated 5 menu designs (presented in a randomized order, N=19 adults, 18-35 yrs). Menus were similar in food choices, but the format of presentation varied (e.g., order of items, level of description, price formatting). A neutral reading task was performed for 1 minute as a baseline (BL) measure, and then participants read and ordered from each menu. An indicator of cognitive load was obtained by galvanic skin response (Mindfield Biosystems). Participants ranked the menus from hardest (H) to easiest (E) for decision-making and answered questions using Likert-type scales (-10 to +10) about mental demand and annoyance using the H and E rated menus. Self-reported state hunger was recorded.

Results

An overall effect of menu design was found on ranking (p=.005). Mean GSR (microsiemens, µS) for E and H menus were significantly different from baseline (E M=0.64 µS, SD=1.46; H M=0.87 µS, SD=1.39; p=.007 & .003, respectively) and there was a higher mean change in GSR for H compared to E menus (M=0.15, SD=1.03; p=.036). Mean GSR difference between H and E was not related to hunger. Questionnaire ratings of mental demand and annoyance were higher for the H menu (p<.001 and p=.004, respectively). No differences in ordering outcomes were found.

Conclusions

Face and construct validity of menus was established for menus for future study of restaurant menu cognitive load and ordering practices.

T-2561-P_DT: Urban Farm-Based Intervention Increases Fruit and Vegetable Consumption While Decreasing Food Insecurity in a Low-Income, Primarily Hispanic Population at Elevated Risk for Diabetes: Pilot Data from New Haven Farms
Background

Both reduced access to fresh fruits and vegetables and increased food insecurity are linked to increased rates of obesity and diabetes. This urban farm-based intervention is designed to reduce health disparities by providing access to fresh fruits and vegetables while decreasing food insecurity.

Methods

Participants were referred from a local health clinic by their clinician. Participants were eligible if they had an income within 200% of the federal poverty level and two or more risk factors for diabetes. The farm-based intervention was 16-weeks long and included weekly nutrition education, cooking demonstrations and group meals led by a local chef, gardening education, and a weekly share of produce to take home. Process data on participant perceptions of the program were collected weekly. At baseline and endpoint, dietary intake was measured using the NHANES DSQ, food security status was measured using the USDA HFSSM, and height, weight, and blood pressure were measured.

Results

On average, participants (n=40) attended 11 out of 16 education sessions. The participants were primarily female (90%) and Hispanic (77.5%) with an average age of 42.1 years. Daily intake of fruits and vegetables increased by an average of 0.86 servings (p=0.002) by the end of the intervention. Food insecurity was reduced in adult participants and the children who reside with them. Forthcoming data will be examined to determine the effect of the intervention on weight status and blood pressure.

Conclusions

Ongoing studies will assess the impact of this intervention on diabetes risk. Further research is necessary to better understand the mechanisms, duration of impact, cost-effectiveness, and how such programs could be scaled up to have broader population effects on nutrition related diabetes risk.

T-2562-P: Weight Loss with Sustained-Release Naltrexone/Bupropion (NB) as an Adjunct to Intensive Behavior Modification: A Subgroup Analysis in African American and White Subjects

Claire Dybala, PharmD; Hung Lam, PhD; Brandon Walsh, PhD; Charles Baum, MD;
**Background**

African Americans (AA) are disproportionately impacted by obesity and related comorbidities, and generally do not respond as well to obesity pharmacotherapy as whites (W). This analysis evaluated 56 weeks of treatment with NB vs placebo (PBO) in AA and W subjects who completed the COR-BMOD study.

**Methods**

This completer subanalysis was performed on data from a phase 3, double-blind, PBO-controlled 56-week study of NB with intensive behavior modification (BMOD) conducted in overweight/obese subjects. In the COR-BMOD study, NB significantly reduced body weight vs PBO, and more NB-treated completers achieved 56-week weight loss of >=5% (80.4% NB vs. 60.4% PBO; P < 0.001) and >=10% (55.2% NB vs. 30.2% PBO; P < 0.001) versus PBO. This completer subgroup analysis evaluated treatment with NB among 313 W and 70 AA subjects. Treatment differences of percent changes from baseline in body weight were performed using an ANCOVA model.

**Results**

Mean baseline characteristics were similar between W and AA in terms of body weight (AA: 100.3 kg; W: 101.4 kg), BMI (AA: 36.7 kg/m²; W: 36.4 kg/m²), except for age (AA: 44.5 yrs; W: 48.7 yrs). At week 56, the PBO plus BMOD response was more robust in W subjects than AA subjects (W = -9.2%; AA = -4.9%). Weight loss with NB plus BMOD was greater in W subjects (W = -13.2%; AA = -9.1%) but similar after PBO correction (W: -4.0%; AA: -4.3%). The frequency and pattern of AEs and SAEs were similar between cohorts.

**Conclusions**

AA and W subjects exhibited similar PBO-subtracted weight loss after 56 weeks of NB. This analysis suggests the efficacy of NB is unrelated to race/ethnicity.

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**T-2563-P: Gender, Inhibitory Control and Food Cue Sensitivity Predict Intake of Highly Palatable Foods**

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**Background**

Low inhibitory control (IC) and high food cue sensitivity (FCS) are implicated in overconsumption of palatable foods. Neuroimaging results suggest that IC may have a larger effect on response to such foods in men than in women. We examined the roles of gender, IC, and FCS in predicting food intake.
Methods

Overweight or obese females (n = 116) and males (n = 21) completed a self-report measure of food cue sensitivity (Power of Food Scale (PFS), a neuropsychological test of IC (DKEFS Color-Word Interference Task), and a sham taste test of highly palatable snack foods, during assessment prior to entry into a behavioral weight loss treatment.

Results

Controlling for age and IQ, results indicated that IC and gender interacted to predict taste test intake (p < .01, $\eta_p^2 = .06$). Specifically, IC capacity negatively predicted taste test intake in males, but not in females. A PFS x gender interaction effect was not detected. However, of note, PFS scores weakly predicted intake in female participants ($R^2 = .18, p = .05$).

Conclusions

Results provide preliminary evidence for a differential effect of inhibitory control on intake of palatable foods across gender, and are consistent with previous findings of differential brain responses to food associated with IC in males and females.

T-2564-P: Strategies to Resist Food Temptation in Young Children: A Review of Laboratory-Based Experiments

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Background

Poorer self-control is a risk factor for pediatric obesity. Prior laboratory experiments compared children's self-control for food using a delay of gratification (DoG) paradigm. A review of these classic experiments may provide novel insights for pediatric obesity prevention or treatment.

Methods

A literature review identified experiments testing strategies to promote self-control using the DoG paradigm. In this paradigm, children choose between an immediate, smaller reward vs. waiting longer for a larger reward. Searches were conducted focusing on participants 3-7 years old in: PubMed, PsychINFO, Web of Science, and Google Scholar using specified keywords. Fifteen studies were identified. As a secondary aim, studies examining the relationship between DoG and child obesity status were identified, which yielded 6 additional studies.
Results

For aim 1, 10 of the 15 (67%) studies found that 'internal' (6 studies) and 'external' strategies (4 studies) produced longer wait times. Internal strategies included: thinking thoughts unrelated to the reward (e.g. happy thoughts), thinking about waiting, and focusing on the non-consummatory properties of the reward. External strategies included external distractions (e.g. playing with toys). Regarding aim 2, 4 of the 6 studies (67%) showed that obese compared to non-obese children were more likely to choose the immediate reward.

Conclusions

Interventions targeting self-control hold promise for early obesity prevention or treatment. Methodologically, the DoG paradigm developed in the 1970s is a relevant and innovative approach for studying and modifying child self-control processes in our modern obesogenic environment.

T-2565-P: Changes in Appetite and Food Palatability in Roux-en-Y Gastric Bypass (RYGB), Vertical Sleeve Gastrectomy (VSG) and Control (C) Participants: A Prospective 6-Month Study

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Background

Changes in appetite after bariatric surgery likely play a role in weight loss, but comparison of these appetitive changes with appropriate control groups have not been reported.

Methods

Six-mo observational study comparing changes in appetite and responses to food cues in women undergoing RYGB, VSG, or no treatment (BMI-matched controls (C)). Participants completed the Eating Inventory (cognitive restraint, disinhibition, and hunger) at baseline and 6 mo. They used visual analog scales (VAS) to rate their liking (1=not at all, 11=very much) of high-palatability (HP) and low-palatability (LP) foods presented visually during an fMRI task. 58 women (RYGB=22, VSG=17, C=19) with a mean (±SD) BMI of 44.0±4.2 kg/m2 and age of 36.7±8.9 yr (59% black, 36% white) participated. Wt changes at mo 6 in RYGB, VSG, and C were -27.7±7.1, 24.8±4.3, & +1.3±2.8 kg, ps<0.001 for C vs RYG & VSG.
Results

Cognitive restraint increased more in RYGB (+2.8±5.0) and VSG (+3.8±5.8) than C (-0.6±1.9; ps < 0.03). Disinhibition decreased more in RYGB (-4.8±4.0) and VSG (-3.5±4.0) than C (+0.5±3.5; both ps<0.01), as did hunger, with RYGB -4.1±4.1, VSG -4.1±3.6, and C +1.1±3.3; both ps<0.001. Changes in VAS ratings of LP foods did not differ. Liking of HP foods tended to decline more in RYGB (-1.4±2.3) and VSG (-1.0±1.4) than C (-0.1±1.2; p=0.07). Wt loss was related to higher restraint and lower disinhibition, hunger, and liking of HP foods (ps<0.01).

Conclusions

RYGB and VSG, compared with no treatment, resulted in increased cognitive restraint and decreased disinhibition, hunger, and liking of highly palatable foods. These changes were significantly associated with the resulting robust weight losses.

T-2566-P: Timing of Gestational Weight Gain and Infant Adiposity in the Maternal Obesity Management (MOM) Trial

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Background

Excessive gestational weight gain (eGWG) is a modifiable risk factor for, and independent predictor of, fetal overgrowth. Early eGWG has been shown to increase the odds of unfavorable neonatal body composition. Thus, the timing of eGWG may affect infant adiposity and subsequent child obesity risk.

Methods

We aimed to assess the timing of GWG on adherence to the 2009 Institute of Medicine (IOM) guidelines and its relationship with anthropometric markers of infant body composition. A subset of women enrolled in the MOM trial, a randomized controlled trial of prenatal lifestyle intervention, were categorized as: 1) appropriate GWG (ie, within IOM) in the first and second halves of pregnancy (overall appropriate, OA); 2) appropriate GWG in the first half of pregnancy and eGWG in the second half of pregnancy (late excessive, LE); 3) eGWG in the first half of pregnancy and appropriate GWG in the second half of pregnancy (early excessive, EE); and 4) eGWG throughout pregnancy (overall excessive, OE).

Results
Conclusions

The majority of women had eGWG by term and gained the most weight in late pregnancy. Neonatal body composition did not differ with timing of GWG. Future studies should examine if appropriate rate of GWG relates to infant body composition. Attention should be given to GWG management in late pregnancy.

T-2567-P: First Trimester Weight Gain: Are We Within the IOM Guidelines?

Anne Gilmore, PhD; Nancy F. Butte, F, PhD; Leanne M. Redman, PhD;

Background

The 2009 Institute of Medicine Gestational Weight Guidelines assumes a weight gain of 0.5-2 kg (1.1 - 4.4 lb) during the first trimester of pregnancy. The aim of this study is to objectively quantify first trimester weight gain to assess early adherence to the guidelines and understand the likelihood of women entering the 2nd trimester with excess gestational weight gain.

Methods

First trimester weight gain in 104 pregnant women was determined by calculating weight gain per day between pre-pregnancy weight and measured weight in the first trimester, and multiplying gain/day by 91 days (13 weeks). Analysis of a subset using rate of gain during the first trimester was also done and gave similar results. Relationship between first trimester weight gain and covariates including BMI class, age, and parity were examined.

Results

Average first trimester weight gain was 1.51 +- 3.1 kg (range: -8.45 - 15.6 kg) and was not significantly affected by BMI class, maternal age, or parity. Twenty-six women (25%) gained within the IOM guidelines, 40 (38%) gained below, and 38 (37%) gained above the IOM guidelines. These proportions did not vary significantly by BMI class, age, or parity.

Conclusions
Gaining outside of the IOM guidelines during the first trimester of pregnancy may negatively impact the health of the mother and fetal growth and development. Since most women establish prenatal care late in the first trimester, preconception counseling of gestational weight gain is imperative.

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**T-2568-P: Calorie Restriction Results in Cardiometabolic Improvements in Non-Obese Individuals**

*Anne Gilmore, PhD; Leanne M. Redman, PhD; Steven R. Smith, MD, FTOS; Eric Ravussin, PhD;*

**Background**

Calorie restriction (CR) has anticipated benefits for healthspan including decreased risk of cardiovascular disease.

**Methods**

An ancillary study to CALERIE 2, a 2-year study of 25%CR in 61 non-obese (BMI: 22-28 kg/m2) men (n=18) and women (n=43), assessed the cardiometabolic effects of CR. Individuals in the CR group (n=37) achieved 17+-1% (Mean+-SE) and 14+-1% CR after 1 and 2-y of intervention, which resulted in significant weight loss (-9+-0.5 at 1-y and -8+-0.5 kg at 2-y; p<.0001).

**Results**

In comparison to control, 25%CR resulted in a decrease in visceral (-0.4+-0.04kg; p<.0001) and subcutaneous abdominal fat depots (-1.7+-0.1kg; p<.0001) as well as intrahepatic (-0.004+-0.1%; p=0.003) and intramyocellular lipid (-0.06+-0.02%; p=0.003). Furthermore, 25%CR decreased blood pressures (SBP: -3.8+-1.4mmHg; p=0.007 and DBP: -3.9+-0.9mmHg; p<0.001), total cholesterol (-12.0+-2.6mg/dL; p<0.0001), LDL-cholesterol (-10.3+-2.2mg/dL; p<0.0001), HOMA-IR score (-0.1+-0.1; p=0.02) and increased in HDL-cholesterol (3.1+-1mg/dL; p=0.002).

**Conclusions**

In conclusion, CR in normal weight and healthy individuals is still beneficial in decreasing biomarkers of cardiovascular and metabolic disease such as visceral fat, ectopic lipid, insulin resistance and blood pressure.

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**T-2569-P: Patients who are Eligible for Bariatric Surgery Achieve Clinically**
Significant Weight Loss, Weight Loss Maintenance and Biometric Changes Through Lifestyle Intervention Using Meal Replacements

Linda D. Gotthelf, PhD; Linda Grant, BS; Carol Addy, MD, MMSc;

Background

Many health professionals consider bariatric surgery for patients with body mass index (BMI) >35 kg/m² and comorbid conditions or BMI >40 kg/m² as the only option. However, medically-supervised clinic-based programs with intensive behavioral counseling can be a non-surgical choice for such patients.

Methods

This retrospective study evaluated patients with obesity enrolled in HMR clinics. HMR, a comprehensive treatment program, includes weekly coaching by health educators, increased physical activity (>2,000 kcal/week) and use of meal replacements (MR). Eligible patients had an initial BMI ≥35 kg/m² with ≥1 comorbidity [fasting blood glucose (FBG) >100, systolic blood pressure (SBP) ≥140 and/or diastolic blood pressure (DBP) ≥90, HDL <40 for men, <50 for women, or triglycerides (TRIG) ≥150 or were on medications for any of these conditions] or BMI ≥40 kg/m², continuous participation in weight loss (WL) and weight maintenance (WM), and a health risk appraisal at baseline and during WM.

Results

441 patients (mean age 56.6 yrs) had a mean initial body weight (IBW) and BMI of 125.5 kg and 43.8 kg/m², respectively. Mean reduction in body weight vs IBW was -20.9%. 84.6% of patients maintained a weight loss of >10% of IBW with mean duration follow-up of 103 wks. Mean decreases for TC/HDL (-9.5%), TRIG (-21.6%), FBG (-7.6%), SBP and DBP (-7.1 mmHg and -4.6 mmHg). 45.3% of patients who were initially on medications for lipids, hypertension or diabetes (n=311) discontinued at least one of these medications. Changes in dosages were not assessed.

Conclusions

Participation in intensive lifestyle programs such as HMR, with weekly coaching, use of MR and increased PA can achieve clinically significant WL, enduring WM, favorable biometric changes and reduced medication use and provide an alternative to surgery in eligible patients.

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T-2570-P: Laparoscopic Sleeve Gastrectomy Patients' Perceptions of
Their Health and Well-Being and Satisfaction with Weight Loss Progress Following Surgery

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Background

Limited research has focused on patients' perceptions of their physical, emotional, and psychological health and well-being after laparoscopic sleeve gastrectomy (LSG) surgery and satisfaction with weight loss progress one year following surgery. To address this gap, we used qualitative methods to explore patients' perceptions and satisfaction in a sample of post LSG surgery patients in Newfoundland and Labrador, Canada.

Methods

Twelve participants (11 female and one male) who underwent LSG were interviewed between September 2012 and March 2014. Interviews were digitally recorded, transcribed verbatim, and analyzed for common themes.

Results

Key themes identified included: (i) perceived relationship with food; (ii) perception of weight loss amount; (iii) perceived quality of life (QoL); (iv) perceived benefits for the healthcare system; (v) support systems and interpersonal relationships; (vi) living with uncertainties regarding weight regain, return of comorbidities, and medical coverage of possible excess skin removal. Participants' recommendations to improve clinical management included: (i) provision of a psychologist to help patients facing mental challenges (e.g., continued food addictions and emotional eating); (ii) expansion of the bariatric program (e.g., pre-surgical psychological assessment to determine readiness for surgery and preparedness for potential challenges following surgery, establishment of satellite units in other health regions for follow-up care); (iii) more nutritional counselling following surgery; among others.

Conclusions

All participants indicated they had no regrets about making the decision to undergo LSG and were generally happy with the amount of weight lost. Although improvements in QoL were reported, participants identified mental challenges that may confront those who undergo LSG.

T-2571-P: Reduction in Advanced Glycation Endproducts: Pilot Results
from The Healthy Charleston Challenge
Lifestyle Wellness Intervention

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Background

Diet-derived Advanced Glycation Endproducts (AGES) induce inflammation, are more prevalent in 'Southern Diets', and are linked with obesity and multiple disease states. Our pilot study investigated the ability of an exercise/diet intervention to reduce AGES among participants in South Carolina.

Methods

Twenty participants (10 male, 10 female) were recruited for the biomarker study during the Healthy Charleston Challenge (HCC) orientation; samples were collected pre and post HCC participation. The 12-week HCC program is designed to increase physical activity, and provide skills, professional guidance, and accountability for developing healthy habits. Inclusion in the fee-based HCC program requires participants expression of the need to lose > 15 lbs of weight and be healthy enough for rigorous physical activity. Once enrolled, participants are assigned to teams based on group workout time schedules. Participants also complete food logs, and education sessions with a registered dietician.

Results

Participant's ages ranged from 26 to 71 (Mean 48.75±10.3) with an average BMI of 32.2±3.9. As well as AGES, fasting glucose, A1C, and total body mass via dual energy x-ray absorptiometry were examined. 100% percent of participants completed the study with an average weight loss of 13.0±7.9 lbs. Paired Samples T-Test revealed participants made significant improvements across all biomarkers. Prior to engagement in the HCC the average measured AGES was 72.4ug/ml which improved ~50% to 36.3ug/ml.

Conclusions

Previous studies show accumulation of AGES are significant to the progression of many diseases including diabetes, heart and cardiovascular disorders, neurodegenerative disorders and organ failure. Our preliminary results demonstrate the ability of an exercise/diet intervention to reduce AGES ~50%.

T-2572-P: Effectiveness of Weight Watchers: An Updated Systematic Review

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Background

Limited evidence exists about the efficacy of commercial weight loss programs. Our objective is to compare the weight loss outcomes and clinical benefits of Weight Watchers (WW) to control or behavioral counseling among adults with overweight or obesity.

Methods

We searched MEDLINE from inception to March 2014 for randomized controlled trials of WW versus control or counseling that were published in English. Two reviewers extracted information on study design, population characteristics, and outcomes (mean percent weight loss, systolic blood pressure (SBP), diastolic blood pressure (DBP) and fasting glucose). We synthesized data qualitatively, and were unable to perform meta-analyses due to heterogeneity. From the 3,103 articles identified in our search, we included 8 trials.

Results

As compared to control, WW achieves mean percent weight losses that are 2-6% greater at 3 months and 3-4% greater at 12 months. WW lowers SBP by 0.8-1.5 mmHg and DBP by 0.9-2.8 mmHg greater than control at 12 months. WW lowers fasting glucose up to 15.7 mg/dL more than control at 12 months. There were no differences in mean percent weight loss between WW and behavioral counseling. No trials comparing WW to counseling reported blood pressure and only one trial reported fasting glucose.

Conclusions

WW achieves greater weight loss and improved blood pressure outcomes as compared to control, and achieves similar weight loss to counseling. Clinicians could consider referring patients to WW when guideline-recommended moderate to high intensity lifestyle counseling is unavailable.

T-2573-P: Quantifying Energy Intake Changes during Obesity Pharmacotherapy

Arjun Sanghvi, BS; Britta Goebel, PhD; Kevin D. Hall, PhD;

Background

Obesity pharmacotherapy can lead to clinically meaningful long-term weight loss. In humans, most obesity drugs primarily work by decreasing energy intake. However, the time course of energy intake change during obesity pharmacotherapy remains to be elucidated.

Methods
We used a validated mathematical model of human metabolism to provide the first quantification of metabolizable energy intake changes during long-term obesity pharmacotherapy using repeated body weight data from randomized, placebo-controlled trials that evaluated 14 different drugs or drug combinations.

**Results**

Changes in metabolizable energy intake during obesity pharmacotherapy were well-described by an exponential pattern comprising three simple parameters, with large early decreases of intake followed by a transition to a smaller persistent drug effect. Interestingly, at the time of maximum weight loss, drug effects on metabolizable energy intake had already waned to a small fraction of their initial values.

**Conclusions**

Metabolizable energy intake changes during obesity pharmacotherapy followed an exponential time course, and different drugs can be evaluated and compared using a common mathematical framework.

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**T-2574-P: Does a Resistance Training Intervention Increase Non-Resistance Training Physical Activity in Prediabetic Adults?**

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**Background**

Successful initiation of one health behavior may result in engagement in others. Our purpose was to determine if an intervention targeting only initiation and maintenance of resistance training (RT) increased non-RT physical activity (PA) in previously sedentary overweight/obese prediabetic adults.

**Methods**

The Resist Diabetes trial included a 3-mo initiation phase in which participants performed a whole-body RT workout 2x/wk in a lab gym with an ACSM-certified personal trainer, followed by a 12-mo maintenance phase in which participants were randomized to one of two RT maintenance condition (standard care vs. social cognitive theory-based intervention). Minutes per week of total, moderate- (>3 METs), and vigorous-intensity (>6 METs) PA were assessed at baseline and months 3, 9 and 15 using the Aerobics Institute Longitudinal Study Questionnaire, administered online. Linear growth curve analyses, controlling for sex and intervention condition, assessed changes in non-RT PA over study period.
Results

Data on n=159 (44 male; age: 60+-5y; BMI: 33+-4 kg/m2) Resist Diabetes participants revealed mean total PA min/wk were 227+-180, 245+-152, 278+-226, and 274+-225 and mean moderate-intensity PA min/wk were 131+-133, 148+-140, 170+-175, 178+-178 at baseline, and months 3, 9, 15, respectively. The slope (rate of change) in total PA min/wk ($\hat{r}^2=23.6$, p=0.001) and in moderate PA min/wk ($\hat{r}^2=16.0$, p=0.005) increased over the 15-mo. study period. No changes were noted in vigorous PA min/wk (p=0.947).

Conclusions

By month 9 participants were meeting current PA guidelines for moderate-intensity PA of at least 150-min/wk. Successful initiation of RT may increase other forms of PA in previously sedentary, overweight/obese adults with prediabetes. These findings should be confirmed in other at-risk populations.

T-2575-P: MRI Finds Dramatic Loss of Pericardial Fat after Gastric Bypass Surgery

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Background

Roux-en-Y gastric bypass surgery (RYGB) is receiving increasing recognition for its rapid restoration of normal blood glucose levels and its profound weight loss. Most patients have improvement of comorbidities, but mechanisms for these benefits seem to be independent of the total of weight loss.

Methods

Recently, we demonstrated by noninvasive magnetic resonance imaging (MRI) that excess fat accumulation around the heart (pericardial) and in the liver is associated with diminished organ functions in obese subjects. However, total pericardial fat was not correlated with BMI or BSA. In this pilot study we performed cardiac MRI scans at 3T on RYGB subjects within 2 months of surgery and 10 months after surgery. Patients enrolled in the bariatric surgery program (BMI ≥ 35 kg/m2) at Boston Medical Center were recruited for this study. Our cardiac scans provide quantitative data for measuring total pericardial fat, several left ventricular cardiac functions and left ventricular wall mass.

Results

In a pilot study of 5 RYGB bariatric patients, all lost 20-50% of their total body weight and 4 of 5 lost 25-50% of pericardial fat as quantified by MRI scans taken 10 months after surgery. Pericardial fat loss in this small cohort did not correlate to total body mass changes and increased in 1 subject, further showing that individual responses to RYGB are variable. We are currently analyzing our data for cardiac functions and structure to assess whether changes occur in this short time frame.
Conclusions

MRI showed that loss of body mass achieved by RYGB can result in significant loss of pericardial fat in the majority of subjects. However, some individuals (non-responders) may not lose local fat while experiencing dramatic total weight loss.

T-2576-P: Determination of Number Needed to Treat (NNT) with Lorcaserin (LOR) to Achieve A1C Reductions of ≥0.5% in Overweight and Obese Patients (PTS) with Type 2 Diabetes (T2D): A Retrospective Analysis of the BLOOM-DM Study

Yehuda Handelsman, MD, FACP, FACE, FNLA; Randi Fain, MD; Alan Glicklich, MD, MBA; Yuhan Li, MS; William Shanahan, MD; William Soliman, PhD;

Background

Oral antidiabetic drugs (OADs) are generally approved to reduce A1C by >0.4%. A 2nd OAD added to metformin typically reduces A1C by 0.5-1%. A sub-analysis of obese/overweight pts with T2D determined the NNT to achieve A1C reductions of >=0.5% with LOR.

Methods

BLOOM-DM was a 52-week (wk), randomized, double-blind, PBO-controlled trial in overweight and obese pts with T2D uncontrolled by metformin, sulfonylurea, or either agent in combination with other OADs. Pts received LOR 10 mg BID (n=256) or PBO (n=253), and all received a standard diet and exercise program. Mean weight loss at wk 52 (MITT) was 4.5 and 1.5%, respectively. OADs could be decreased as needed and added/increased after wk 12. At baseline, 92% of pts were taking metformin, 50% a sulfonylurea, and 42% both. This post hoc analysis evaluated the NNT with LOR to achieve A1C reduction of >=0.5% at wk 52 in the overall population.

Results

Mean A1C at baseline was 8.1%, and mean reduction in A1C at wk 52 with LOR vs PBO was -0.9% vs -0.4% (modified-ITT). 74% of LOR pts and 45% of PBO pts achieved >=0.5% absolute reduction in A1C at
wk 52; 53% and 30% had A1C reductions >=1.0%, respectively. The NNT to achieve >=0.5% absolute reduction in A1C with LOR was 3.5, and 4.4 to achieve 1.0%.

Conclusions

In the BLOOM-DM study, physicians needed to treat 3.5 overweight/obese pts with T2D with LOR to achieve A1C reductions of 1.0%, supporting potential concomitant glycemic benefits of LOR when managing weight in T2D pts. Further study is necessary to determine if this is a weight-independent effect.

T-2577-P: Assessing the Confounding Effects of Non-Sweetener Corn Intake on the Validity of a Biomarker of Added Sugar Intake (Î´13C Value in Fingerstick Blood)

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Background

An objective measure of added sugar (AS) intake is necessary. Î´13C value of fingerstick blood is a novel validated biomarker of AS intake (including high fructose corn syrup). However, non-sweetened corn products also carry a Î´13C value similar to AS sources, which may impact blood Î´13C value.

Methods

The objectives are to determine the contribution of non-sweetened corn (corn oil, corn starch, whole corn) to the diet relative to AS intake, and to assess the magnitude of effect of AS and non-sweetened corn intake on Î´13C value. Adults (n=226; 172 female) ≥18 years underwent assessments of dietary intake using 24-hour intake records and provided a fingerstick blood sample, which was analyzed for Î´13C value using natural abundance stable isotope mass spectrometry. Corn and AS intake in grams (g) were extracted using nutrition analysis software (Nutrition Data Systems for Research). Statistical analyses included descriptives, paired samples t-tests, and multiple linear regressions (MLR).

Results

Among participants (aged 42±15 yrs), AS mean daily consumption = 88±58 g; mean total non-sweetened corn intake = 13±13 g; mean Î´13C value = -19.16+0.9‰. Paired t-tests showed significant differences in AS versus non-sweetened corn intake (mean difference = 75±57 g, P<0.001). The MLR model predicting Î´13C value was significant (R² = 0.10; F = 11.8; P<0.001), yet only AS was a significant predictor of Î´13C (Î² = 0.31; P<0.001), non-sweetened corn was not significant (Î² = 0.004; P = 0.9).
Conclusions

These results show that non-sweetened corn consumption does not significantly contribute to δ13C value of human blood. Also, as the effect of AS intake on health has become highly controversial, this provides timely evidence for the utility of δ13C value as a valid, minimally invasive AS biomarker.

T-2578-P: Designing an Agent-Based Model to Advance Obesity Prevention Intervention Research: The ChildObesity180 Case Study

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Background

Systems science is an innovative way to study complex problems; however, there is a knowledge gap about its utility and application. This case study unpacks the perceived black box of agent-based modeling (ABM), providing a detailed look at model attributes, assumptions, and data inputs.

Methods

ABM is a computational methodology that simulates behaviors of heterogeneous 'actors' across multiple scales and through time. We developed a mechanistic model of the context into which two interventions are implemented, the functioning of each intervention, and exploration of positive (or negative) synergy between interventions. The ABM follows a simulated population of individual children as they move across school, home, and community. Children are exposed to a series of interventions designed by ChildObesity180. The model outcome is the expected impact of the interventions on energy balance.

Results

Using data from public sources the model contains several attributes: 1) town type, demography; 2) agent properties (e.g. BMI), behaviors (e.g. daily energy expenditure) and physiology; 3) time segment (e.g. 08:00 all agents move from home to school); and 4) environment (e.g. 3 communities). Observational data from ChildObesity180 was used to estimate dose, reach, and retention for each intervention. Attributes (e.g. compensatory response to an intervention) were estimated from empirical literature.

Conclusions
ABM is a useful tool for childhood obesity prevention to estimate intervention impact across contexts, examine the influence of input assumptions and the synergistic effect of implementing simultaneous strategies, leading to a better understanding of gaps and opportunities for greater impact.

T-2579-P: Scaling of Adult Regional Body Mass and Body Composition as a Whole to Height: Relevance to Body Shape and Body Mass Index

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Background

Adult body mass (M) empirically scales as height (Ht) squared (M~Ht^2), but does regional body mass and body composition as a whole also scale as Ht^2? This question is relevant to a wide range of biological topics, including interpretation of body mass index (BMI).

Methods

Dual-energy x-ray absorptiometry (DXA) was used to quantify regional body mass (head, arms, trunk, legs) and whole-body composition (fat, lean soft tissue [LST], bone mineral content [BMC]) in non-Hispanic (NH) white, NH black, Mexican American, and Korean adults participating in the National Health and Nutrition Examination Survey (NHANES) and Korean NHANES. Regression models were developed to establish Ht scaling powers for each measured component with adjustments for age and adiposity.

Results

Exploratory analyses conducted on subjects with complete DXA scans (n=22,113) revealed a consistent scaling pattern across men and women of the four race/ethnic groups: regional mass powers, head (~1) < arms and trunk (~2) < legs (~2.5); and body composition, LST (~2) < BMC (~2.5). This pervasive pattern was confirmed in US and Korean population sample analyses with appropriate weighting and DXA imputation. Since M scaled as Ht^2, tall and short subjects differed in body shape (e.g., head mass/M~Ht^-1) and composition (e.g., BMC/M~Ht^-0.5).

Conclusions

Adult human body shape and relative composition are a function of body size as defined by stature, a finding that has important implications in multiple areas of obesity and biological research.
T-2580-P: Characterization of Hypoglycemia in Patients with Type 2 Diabetes (T2D) with Lorcaserin Therapy during the First 12 Weeks of the BLOOM DM Phase 3 Study

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Background

Hypoglycemia (hypo) risk may increase in T2D patients (pts) taking certain oral antihyperglycemic drugs (OADs) during weight loss (WL). Hypoglycemic events were examined in pts on lorcaserin (LOR), a chronic weight management medication, or placebo (PBO) in the BLOOM DM Study.

Methods

This modified-ITT analysis explores the role of LOR, OAD type, WL, and baseline and change in glycemia as well as in hypo events in obese/overweight pts with T2D. Pts with BMI 27–45 kg/m² and A1C 7-10% on metformin, sulfonylurea (SFU) or both were randomized to 52 wks of LOR 10 mg bid (n=256) vs. placebo (PBO; n=253); all received lifestyle counseling. Hypo events (blood glucose <65 mg/dL) were examined during the first 12 wks, when OAD doses could only be changed for patient safety. Results were stratified by responder status at wk 12 (i.e., >=5% body weight (BW) loss [high-responder], 0-5% BW loss [low-responder] vs <=0% BW loss [nonresponder]), OAD type, baseline A1C/FPG, and A1C change.

Results

During wks 1-12, hypo occurred in 18.4% of LOR and 15.9% of PBO pts (P=0.47), with rates higher in high-responder (LOR 19.0%, PBO 20.0%) and low-responder (LOR 19.3%, PBO 17.5%) vs nonresponders (LOR 13.6%, PBO 9.6%). More (88.5%) hypo events occurred in SFU-treated pts (28.2% LOR pts, 24.5% PBO pts) with higher rates in responders (LOR 33.3%, PBO 41.7%). Hypo rates were higher with baseline A1C <7.9% (18.4%) vs >=7.9% (15.9%) lower baseline FPG (<155 mg/dl, 20.1%; >=155 mg/dl, 14.5%); and with larger A1C reductions (>0.7%, 23.7%; <=0.7%, 12.6%).

Conclusions

Consistent with prior reports, WL in T2D pts, regardless of method, was associated with higher rates of hypo, especially with SFUs, lower baseline A1C/FPG, and greater on-treatment A1C reduction. Clinicians should be aware of this possible effect and the potential need to adjust OAD therapy.
T-2581-P_DT: Racial/Ethnic Comparisons of Weight Loss Treatment Utilization among Treatment-Seeking Patients with Obesity and Binge Eating Disorder

Valentina Ivezaj, PhD; Rachel Barnes, PhD; Marney White, PhD, MS; Carlos M. Grilo, PhD;

Background

Racial/ethnic minority groups are less likely than Whites to seek eating disorder (ED) treatment, and most persons are more likely to seek treatment for obesity than for an ED. Little is known about racial/ethnic treatment utilization for weight loss by persons with obesity and binge ED (BED).

Methods

413 obese patients (Black: n=101, 24.5%, Latino: n=39, 9.4%, White: n=273, n=66.1%) seeking treatment for BED and weight loss (Age: $M=46.4, SD=10.8$; BMI: $M=39.0, SD=5.9$) completed a semi-structured interview regarding prior treatment sought for weight loss (e.g., self-help diets, supervised diets, medications, and psychological), and frequency of each treatment utilized.

Results

The most frequently utilized treatment reported was self-help diets (attempts ranged 0 to 500); the least frequently utilized treatment was psychological (attempts ranged 0 to 4). Blacks were significantly less likely to attempt self-help diets and to seek psychological treatment for weight loss than were Whites. Latinos and Blacks were significantly less likely to attempt supervised weight loss programs than were Whites. Further analyses of frequencies of each type of treatment utilized revealed considerable variability by race/ethnicity.

Conclusions

Patients with obesity and BED utilized several weight loss treatments, often at high frequencies. Ethnic/racial differences in treatment utilization emerged. Findings highlight the need for greater understanding of weight loss treatment barriers and accessibility among different minority groups.
T-2582-P: The Utility and Validity of the Beck Depression Inventory in Weight Loss Surgery Patients

Valentina Ivezaj, PhD; Rachel Barnes, PhD; Carlos M. Grilo, PhD;

Background

The Beck Depression Inventory-II (BDI) is commonly used in the screening and evaluation process with weight loss surgery (WLS) candidates despite relatively limited psychometric evidence in this patient group. We examined the utility and validity of the BDI in women seeking WLS.

Methods

124 women (White: 67.2%) WLS candidates (age: \(M=41.8, SD=11.0\); BMI: \(M=49.9, SD=8.6\)) were administered the Structured Clinical Interview for DSM-IV (SCID-I/P) and completed a self-report battery that included BDI-II, and several other measures of psychological functioning.

Results

On the SCID-I/P, 13% met criteria for current affective disorder. ROC curve analysis revealed BDI had good AUC (.788) for predicting SCID-I/P diagnosis; BDI score of 15 optimized sensitivity and specificity. Using BDI cut-off of 15, 42% were categorized as High-BDI, 58% as Low-BDI. Patients diagnosed with SCID-I/P affective disorders had higher ED psychopathology, self-esteem, and shame than those without affective disorders. High-BDI had significantly higher levels of all associated measures than the Low-BDI group; with greater effect sizes.

Conclusions

The BDI demonstrated utility for identifying affective disorders in women WLS candidates with a cut-point score of 15 performing well. Subtyping women by BDI scores of \(\geq 15\) may identify a significantly more disturbed subgroup than reliance on SCID-I/P for affective disorder diagnoses.

T-2583-P: Predictors of Early Attrition in Patients Attending an Obesity-Management Program

Dishay Jiandani, BASc; Sean Wharton, md; Jennifer L. Kuk, PhD;
Background

High attrition rates are commonly seen in clinical weight management programs. Our objective was to identify predictors of early dropouts in an obesity-management program.

Methods

7,940 patients attending The Wharton Medical Weight Management Clinic were analyzed and predictors of early attrition (<6 months) were evaluated using Cox-proportional hazards ratio.

Results

In both males and females, patients that were middle and older aged [HR range=0.57-0.64], were non-smokers [HR=0.66-0.72], or had T2D [HR=0.74-0.76, P<0.05] were less likely to dropout. Males were more likely to dropout if they were Asian [HR (95%CI)=1.47 (1.11-1.95)]. Females that had lower education [HR=1.12 (1.04-1.20)] or cancer [HR=1.47 (1.08 to 2.01)] were more likely to dropout, but were less likely if they had hypertension [HR=0.84 (0.73-0.97)] or fatty liver [HR=0.72 (0.58-0.91)].

Conclusions

Age and smoking status are predictors of early attrition. Sex dependent variations in ethnicity, education and health outcomes also influence attrition rates. Identifying those at risk can refine our programs to better suit individuals, thereby increasing program effectiveness and reducing attrition.

T-2584-P: Dramatic Improvement in Adipokines Following Weight Loss Surgery among Adolescents with Severe Obesity

Aaron S. Kelly, PhD; Kyle D. Rudser, PhD; Kara L. Marlatt, M.S.; Todd Jenkins, PhD, MPH; Thomas H. Inge, MD, PhD;

Background

Adipokine dysregulation is thought to be a pathophysiological mechanism linking obesity to the development of insulin resistance and atherosclerosis. Weight loss surgery in adults improves the adipokine profile but little is known about post-surgical changes among adolescents.

Methods
In this prospective, longitudinal study we evaluated change from baseline of oxidized LDL cholesterol (oxLDL), interleukin-6 (IL-6), tumor necrosis factor alpha (TNF-α), monocyte chemo-attractant protein-1 (MCP-1), adiponectin, leptin, and resistin at 3- and 12-months following elective laparoscopic roux en Y gastric bypass (RYGB) surgery in 13 adolescents (mean age ± SD 16.5±1.6 years; 10 females) with severe obesity.

Results

Mean BMI was reduced by 21.4±3.6% and 37.4±7.8% at 3- and 12-months, respectively. IL-6 (baseline: 1.7±0.9 pg/mL vs. 3-mo: 0.7±1.1 pg/mL, p=0.05 and vs. 12-mo: 0.4±0.9 pg/mL, p<0.05) and leptin (baseline: 92.9±31.3 ng/mL vs. 3-mo: 59.2±52.4 ng/mL, p<0.01 and vs. 12-mo: 37.3±33.4 ng/mL, p<0.001) significantly decreased, and adiponectin (baseline: 6.1±2.9 µg/mL vs. 3-mo: 12.7±7.7 µg/mL, p<0.01 and vs. 12-mo: 15.4±8.0 µg/mL, p<0.001) significantly increased. Trends toward improvements in oxLDL, MCP-1, and resistin were observed.

Conclusions

Among adolescents with severe obesity, RYGB surgery led to dramatic improvements in IL-6 (-75%), leptin (-60%), and adiponectin (+200%), which appear favorable compared to pediatric obesity studies of lifestyle modification therapy or pharmacotherapy.

T-2585-P: Clinical Outcomes in Patients with Diabetes Mellitus Using a Medically Supervised Commercial Weight Reduction Program Compared to Standard Care in Endocrine Specialty Clinic

Ryan C. Kennedy, MD; Aysha Inankur, MD; Ambreen Qureshi, MD; Kristen McQuerry, MS Statistics; L. Raymond Reynolds, MD;

Background

The HMR weight loss (WL) program offers low-calorie meal replacements (MR), behavioral modification education, and medical supervision of complex patients (pts). Metabolic and anthropometric changes achieved and maintained by diabetic HMR pts were evaluated vs usual care in an endocrine clinic.

Methods
This retrospective comparison study enrolled 29 diabetic pts with BMI >25 undergoing the active WL phase of HMR. Pts underwent an average of 6 months in WL and were followed through the weight maintenance (WM) phase. Multiple endpoints were assessed at baseline (bsl) including BMI and hemoglobin A1c (A1c). Endpoints were reassessed at 6 and 12 months in WM. The usual care group (UCG) was obtained through chart review of 26 diabetic pts with BMI >25 in an endocrine specialty clinic who completed education by a certified diabetes educator (CDE). Data were analyzed using ANCOVA and protected LSD, adjusting for age, gender, and baseline weight.

Results

Preliminary data showed a change in BMI at 6 months of -6.8+-0 (bsl 44+-8.4) and -0.7+-1.1 (bsl 35+-6.2) for HMR pts and UCG, respectively (p<0.05). HMR pts had 12%+-3% WL vs 6%+-6% in UCG (p=0.30). 6 month A1c was similar in HMR pts (7.5%+-2;bsl 8.3+-1.9) and UCG (7.5%+-2.3;bsl 9.8+-1.8). HMR pts had a reduction of total medication usage of 28%, with at least one medication discontinued in 80% of pts, while the UCG had only 23% of pts with discontinuation of at least one medication(p<0.05).

Conclusions

Preliminary data shows that when compared to CDE-led diabetic education emphasizing lifestyle change, pts in an intensive lifestyle program like HMR utilizing weekly coaching, MRs and exercise, had a significant decrease in BMI and achieved a similar A1c with greater reduction in medication use.

T-2586-P: The Impact of High and Low FODMAP Diets on Blood Glucose Concentrations and Subjective Appetite Ratings in Healthy Young Adults

Evan Kerr; Kathleen Melanson, PhD, R.D;

Background

Colonic fermentation of dietary FODMAPs has been found to elicit prebiotic effects impacting blood glucose response and appetite. This study examined how changes in FODMAP consumption effect blood glucose concentrations and subjective appetite ratings in both fasting and postprandial conditions.

Methods

This study utilized a single blind, randomized, crossover design. Healthy participants (n=16) were instructed to follow a diet low in fermentable oligo-, di-, monosaccharides and polyols (FODMAPs) and a high FODMAP diet for three days each. The diet periods were separated by an 11-day 'washout period.' FODMAP intake was analyzed by 24-hour recalls using NDSR. Blood glucose was analyzed using Cholestech. Subjective appetite was analyzed through use of visual analogue scales. Measures were taken
before and after a breakfast containing 50g FODMAPs. Data were analyzed via ANOVA and Spearman correlations.

**Results**

In the 8 subjects who successfully increased FODMAP consumption, postprandial blood glucose was significantly lower at 30 min under High-FODMAP conditions, with a significant treatment by time difference ($F(1,7) = 7.216, p=0.007$). FODMAP intake was inversely associated with subjective hunger 30 min post meal ($rs=-0.433$). Similar results were observed with prospective consumption at 30 and 60 min post meal ($rs=-0.448$ and $-0.406, p<0.05$).

**Conclusions**

This study suggests that increases in dietary FODMAPs can have beneficial effects regarding blood glucose and subjective appetite ratings. However, further research, with larger samples, is needed to confirm this relationship and explore means to enhance compliance.

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**T-2587-P: Randomized, Double-Blind, Placebo Controlled 4 Week Proof of Concept Trial of Beloranib, A Novel Treatment for Obesity and Food-Related Behavior in Prader-Willi Syndrome (PWS)**

*Jennifer Miller, MD; Daniel Driscoll, MD, PhD; Thomas E. Hughes, PhD; Dennis D. Kim, MD;*

**Background**

Beloranib is a MetAP2 inhibitor reducing hunger and restoring balance to the production/utilization of fat; prior studies have shown ~11% BW loss and ~50% reduction in hunger over 12 wks. PWS patients fail to regulate metabolism and hunger, resulting in preoccupation with food and drive to eat.

**Methods**

This was a randomized, double-blind, placebo-controlled study. 17 adults with PWS from PWS-dedicated group homes were randomized to receive twice weekly SC doses of 1.2 mg (n=5), 1.8 mg (6) of beloranib, or placebo (6) for 4 weeks. All patients were offered 50% increase in daily calorie allowance throughout the trial.
Results

All 17 patients (11 females, age 33.5yr, BMI 31.4kg/m2, BW 72.0kg) completed the trial. After 4 wks, patients on 1.2 and 1.8mg lost an average (+/-SEM) of -0.9+-1.1 and -4.5+-2.0% total body fat (DXA) vs +3.6+-2.4% for PBO (p=0.039). Known markers of beloranib response (adiponectin, LDL, and HDL) also were improved. Food-related problem behaviors, as measured by Hyperphagia Questionnaire, improved by 1.8% (1.2mg), 52.4% (1.8mg), vs. worsening by 40.5% with PBO (p=0.025). Beloranib was well-tolerated and safe with no severe/serious adverse events.

Conclusions

This study demonstrated proof-of-concept safety and effectiveness of beloranib on body composition, food related problem behaviors, and cardiovascular risk markers in PWS, despite the 50% increase in calorie intake. Larger/longer studies with beloranib are indicated in this population.

T-2588-P: Joint Pain Before and Following Bariatric Surgery: 3 Year Follow-Up

Wendy C. King, PhD; Marcelo Hinojosa, MD; William Gourash, MSN CRNP; Bruce Wolfe, MD; Jia-Yuh Chen, MS; David Flum, MD, MPH, FACS; Anita Courcoulas, MD, MPH; Susan Z. Yanovski, MD, FTOS; Katherine Elder, PhD; James Mitchell, MD; Gregory Dakin, MD, FACS

Background

Bariatric surgery has been shown to result in reduction of debilitating joint pain. However, the long-term response has not been well-described in patients undergoing Roux-en-Y gastric bypass (RYGB) or laparoscopic adjustable gastric band (LAGB).

Methods

2221 adults undergoing bariatric surgery (median BMI 46 kg/m2 (range 33.0-94.3), median age 47 years (range 18-78), 78% female, 87% white, 70% RYGB, 25% LAGB) completed standardized questionnaires regarding back, hip, knee, ankle and bodily pain, pre- and annually post-surgery. Medication use for, and the severity and impact of, joint pain were assessed, as was whether specific types of pain were experienced during a timed 400 meter walk at usual pace. Data from some items assessing hip, knee and ankle pain were combined to indicate 'leg' pain. Change in pain over time was examined with linear and generalized linear mixed models. Pre- to 3 years post-surgery results are presented.

Results

There was a significant decrease pre- to 3 years post-surgery in the prevalence of back pain (>=very bothersome 21% to 12%) and leg pain (>=very bothersome 19% to 11%), back or leg pain during the 400m
walk (47% to 26%), and whether back or leg pain interfered with work (>=quite a bit 20% to 10%) or normal activities (>=quite a bit 39% to 23%) (ps<.0001). There was improvement in the SF-36 pain score (mean of 40 vs. 45) (ps<.0001), but not in narcotic pain medication use (16% vs. 19%; p=.20) or dissatisfaction with pain level (85% vs. 83%; p=.94).

**Conclusions**

Clinically meaningful improvements in many aspects of joint pain were reported through 3 years. Despite that, 3 years post-surgery the majority of participants continued to be dissatisfied with their joint pain and approximately one in five reported narcotic pain medication use.

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**T-2589-P: Walking Capacity Before and 3 Years Following Bariatric Surgery**

Wendy C. King, PhD; Jia-Yuh Chen, MS; Bruce Wolfe, MD; Marcelo Hinojosa, MD; Anita Courcoulas, MD, MPH; David Flum, MD, MPH, FACS; William Gourash, MSN CRNP; Susan Z. Yanovski, MD, FTOS; Katherine Elder, PhD; James Mitchell, MD; Gregory Dakin, MD, FACS

**Background**

Walking limitations are common among bariatric surgery candidates. Previous studies have shown dramatic short-term improvements following bariatric surgery but durability and variability of the response is unknown.

**Methods**

2221 adults undergoing bariatric surgery (median BMI 46 kg/m² (range 33.0-94.3), median age 47 years (range 18-78), 78% female, 87% white) completed questionnaires and a timed 400 meter walk at usual pace pre- and annually post-surgery. A mobility deficit was defined as inability to complete the timed walk in 7 minutes, representative of a cardiorespiratory fitness level of <12 mL oxygen/kg/min. Change in walking capacity over time was examined with linear and generalized linear mixed models. Pre- to 3 years post-surgery results are presented.

**Results**

There was a significant decrease pre- to 3 years post-surgery in the prevalence of a mobility deficit (48% vs. 33%), walking aid use (15% vs. 12%) and perception that health limits ability to walk 1 block (38% vs 14%), several blocks (63% vs. 24%) and > 1 mile (80% vs 34%) (ps<.0001). There were significant improvements in mean resting heart rate (78 vs. 70 bpm), the SF-36 physical function score (37 vs. 48), the IWQOL-lite physical function score (42 vs. 84) and the timed walk among completers (383 vs. 343 sec) (ps<.0001).

**Conclusions**
3 years post-surgery there were significant pre- to post-surgery improvements in perceived and objectively measured walking capacity. Still, one-third of participants had an objectively-defined mobility deficit and perceived limitations walking more than 1 mile.

T-2590-P: Postprandial Lipemia Impairs Microvascular Vasomotion in Obese Women but Did Not Affect Incretins and Intestinal Peptides Levels.

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Background

Postprandial lipemia (PPL) is related to metabolic and vascular damages. Microvascular vasomotion (MV) is important for microvascular blood flow distribution. The aim of this study was to assess MV, incretins and intestinal peptides in obese and healthy women before and during PPL.

Methods

Of the 37 participants, 19 were obese [BMI 32.3±1.5 kg/m² (mean±SD), 30.8±4.7 years] and 18 were healthy volunteers [BMI 21.8±1.8 kg/m², 27.9±5.4 years]. MV was assessed by laser Doppler flowmetry (LDF) throughout all procedures. Blood sampling was collected for GLP-1, GIP, ghrelin, leptin, C-peptide, PYY and pancreatic polypeptide (PP) analysis at baseline and at 30, 60, 120 and 180-min after high fat meal ingestion.

Results

Compared to healthy volunteers, obese GLP-1, GIP, ghrelin, PP and PYY levels did not present significant differences at baseline, respectively (2.6[1.7-4.3] vs. 3.2[1.9-4.3]pM/l; p=0.41); (9.5[6.7-14] vs. 16.0[9.5-20.5]pg/ml; p=0.06); (75.0[51.7-100.8] vs. 52.0[33.5-84.0]pg/ml; p=0.07); (6.5[1.4-13.2] vs. 6.0[1.3-8.0]pg/ml; p=0.75); (32.5[16.7-41.7] vs. 33.0[16.7-41.7]pg/ml; p=0.62) and after meal. At 180-min endothelial component of vasomotion was significantly lower in obese than in healthy women (p=0.02).

Conclusions

Our results suggest that fat overload worsens MV without significant changes on tested peptides in obese women.
T-2591-P: Impact of a Volunteer Peer-led Intervention for Weight Control in Primary Care

Jennifer Kraschnewski, MD; Lindsay Cover, BS; Erica Francis, MS; Christopher Sciamanna, MD MPH;

Background

Effective weight control approaches must be widely disseminable in order to impact the obesity epidemic. A promising model for overcoming cost barriers to dissemination of obesity interventions is by engaging volunteer laypersons. We tested a volunteer-led weight control program in primary care.

Methods

We conducted a study of overweight female patients (n=80), randomized to a volunteer peer-led intervention adapted from the Diabetes Prevention Program vs. an information-only control. Volunteer peer leaders (n=6) were selected from patients having successfully lost and maintained >= 10% maximum weight and underwent training to deliver the intervention. Study participants in the intervention group met weekly for 12 weeks. Primary outcome was weight lost at 12 weeks. Secondary outcomes included dietary intake, physical activity.

Results

Participants had a mean age of 60.5 years, a BMI of 32.6, and most were married (69%). In preliminary analyses, intervention participants lost more weight than control participants (5.0 lbs vs. 2.3 lbs, p=0.08). Attendance was high at group sessions, with 70% of participants attending 9 of 12 sessions. Intervention participants who attended 9 or more sessions lost significantly more weight than control participants (5.7 lbs vs. 2.3 lbs, p=0.03). Secondary outcome analyses are underway.

Conclusions

A volunteer peer-led intervention may be an effective approach to helping primary care patients with weight control. Further research is necessary to test this innovative approach in a large, more diverse population.

T-2592-P: Edmonton Obesity Staging System Prevalence and Association with
Weight Loss in a Community Obesity Clinic

Jennifer L. Kuk; Karissa L. Canning, MSc; Ruth E. Brown, MSc; Sean Wharton, md; Arya M. Sharma, MD, PhD;

Background

The objectives of this study are to determine the distribution of EOSS stages in patients attending a referral based weight management clinic (Wharton Medical Clinic - WMC) and if there are differences in patient age, sex, BMI or achieved weight loss by EOSS staging.

Methods

4,944 obese patients who attended the WMC were categorized using EOSS staging using metabolic risk factors, medication use and doctor diagnosis of obesity-related comorbidities from electronic patient files.

Results

The prevalence of EOSS stage 0, 1, 2, and 3 was 2.6%, 21.8%, 73.2% and 2.5% respectively. Patients in lower EOSS stages had a lower body weight and age than patients in the upper EOSS stages. Individuals with treatment times greater than 3 months were more likely to be in higher EOSS stages, older, had a higher initial BMI and lost more weight than individuals who discontinued treatment before 3 months (P<0.05). Of the patients who attended the clinic for more than 3 months, EOSS stage was positively related with the achieved weight loss.

Conclusions

The patients who attended this community weight management clinic were more likely to be classified in the higher stages of EOSS, and had greater weight loss outcomes.

T-2593-P: Long-Term Weight Loss Outcomes after Endoscopic Revision of Gastric Bypass

Nitin Kumar, MD; Christopher C. Thompson, MD;

Background
Weight regain after Roux-en-Y gastric bypass (RYGB) is correlated with dilated gastrojejunal anastomosis (GJA). There is level I evidence for the safety and effectiveness of transoral outlet reduction (TORe) for treatment of weight regain after RYGB. We aimed to determine weight outcomes after TORe.

Methods

All consecutive TORe procedures performed using a full-thickness endoscopic suturing device with at least three months of available follow-up were included. Data was collected prospectively between 2010 and 2013. All statistics are reported as mean ± SEM. Means were compared using Student's t-test and proportions were compared using Fisher's Exact test. All statistics are reported as mean ± SEM.

Results

126 patients (51.1 ±0.9 yr, 21M/105F) underwent TORe at an average 8.1 ±0.9 years after RYGB. Average regain of 45.3 ±2.3% of lost weight from nadir resulted in BMI of 40.2 ±0.8 at time of TORe. There were no significant procedural complications. At 3 months post TORe, average weight loss was 9.6 ±0.7 kg (25.9 ±2.4% EWL). At 6 months post TORe, average weight loss was 11.0 ±0.9 kg (26.0 ±3.1% EWL). At 1 year, average weight loss was 9.8 ±1.5 kg (19.6 ±2.9% EWL). At 3 years, average weight loss was 6.7 ±2.4 kg.

Conclusions

A large number of patients regain weight after RYGB, potentially reintroducing comorbidities and decreasing quality of life. TORe offers these patients a safe and effective method for weight loss with durable results. Additionally, this technique offers patients an alternative to surgical revision.

T-2594-P: Shifts from Obese to Non-obese BMI Categories in Patients Treated with Lorcaserin: A Retrospective Analysis of Three Phase 3 Studies in Overweight and Obese Patients

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Background

Obesity is a chronic, progressive disease associated with increasing mortality and morbidity risk with increasing BMI. Effect of lorcaserin (lor) on BMI shifts to <30 kg/m2, in accordance with HEDIS measures, in obese patients (pts) with or without type 2 diabetes mellitus (T2DM) was evaluated.
Methods

This is a post-hoc analysis from 3 phase 3 trials (BLOSSOM: NCT00603902, BLOOM: NCT00395135, BLOOM-DM: NCT00603291) in overweight and obese pts (N=7794) evaluating the efficacy and safety of lor 10 mg bid vs placebo (pbo) for weight loss over 52 weeks; all pts received diet and exercise counseling. Overall results from MITT/LOCF populations have been previously reported. This analysis focuses on pts obese at baseline (bl; n without T2DM/n with T2DM): 30-34.9 kg/m2, class I obesity (n=2440/162); 35-39.9 kg/m2, class II obesity (n=2152/173); >=40 kg/m2, class III obesity (n=1278/111).

Results

In pts without T2DM, more pts with class I obesity (39% vs 21%) and class II obesity (4.5% vs 1.2%) at bl had BMI <30 at wk52 with lor vs pbo (both \(P<0.001\)). Four pts (0.6%) in each group with class III obesity at bl reached BMI <30 at wk52 (\(P=NS\), lor vs pbo). In pts with T2DM, more pts with class I obesity at bl treated with lor vs pbo had BMI <30 at wk52 (30% vs 12%, \(P=0.004\)). Two (2.4%) pts with class II obesity and one (1.6%) pt with class III obesity at bl treated with lor had BMI <30 at wk52 (vs 0 pts for pbo in class II or III, \(P=NS\)).

Conclusions

This post-hoc analysis demonstrates that lor is effective compared with placebo in helping more pts with obesity (with and without T2DM) shift into the overweight category, particularly those with class I obesity at bl, thus potentially decreasing weight-related health risks.

T-2595-P: Integrating Physical Activity into the Workflow of Ambulatory Nursing Staff Increases Moderate Physical Activity and Decreases Sedentary Time.

Lorraine M. Lanningham-Foster, PhD; Sharon Tucker, PhD, RN; Michele Farrington, BSN, RN, CPHON; Yelena Perkhounkova, PhD; Kathleen Clark, PhD, RN, A.RNP.;

Background

Occupational energy expenditure plays an important role in the obesity epidemic. Most worksite physical activity (PA) programs focus on informational or behavioral approaches and few have incorporated environmental supports to promote PA. In this study, we examined the effects of a 6-month worksite PA intervention based on adding enhanced non-exercise activity thermogenesis (NEAT+) strategies into the work environment.
Methods

Female nursing staff (registered nurses and nursing assistants) of 2 ambulatory clinics at a large academic medical center participated. The work environment was modified in both clinics to integrate NEAT+ strategies into the daily workflow through a variety of options: treadmill workstations, walking meetings, stair climbing, exergaming, and 3-minute NEAT+ video clips. The intervention also included reinforcing text messages. Using a cross-over design, one clinic received text messages for months 1-3 (n= 20) and the other clinic received text messages for months 4-6 (n= 12). PA was assessed at baseline, months 3 and 6 using the Sensewear Mini Armband. Texting was tracked using the HealthCrowd© Platform.

Results

There was a significant 3% increase in time spent in moderate PA along with a significant 3% reduction in the amount of time spent in sedentary PA at intervention's end for participants receiving early texting (p < .01). During an 8-hour shift, this would be 14 minutes of more moderate PA/less sedentary PA. Participants received 100% of all text messages, and each participant responded an average of 18 times during 3-months when prompted to reply.

Conclusions

A NEAT+ approach (including text messaging) integrated into the workflow of ambulatory nursing staff can improve moderate PA levels and decrease sedentariness.

T-2596-P: Single-Anastomosis Duodenal-Jejunal Bypass with Sleeve Gastrectomy(SADJB-SG): Diabetes Remission in First 100 Patients

Wei-Jei Lee; Yu-Hung Lin, MD; Abdullah Almulaifi, MD; Jun-Juin Tsou, RN; Yi-Chih Lee, PhD; Jung-Chien Chen, MD; Kong-Han Ser, MD; Shu-Chu Chen, RN;

Background

Laparoscopic duodenal-jejunal bypass with sleeve gastrectomy (SADJB-SG) is a new metabolic surgery specifically designed for the treatment of type 2 diabetes mellitus (T2DM). This study reports the metabolic results following this novel technique.

Methods

A total of 100 consecutive patients (40 males and 60 females, mean age 43.3(10.7) years, mean BMI 34.7(5.9), mean HbA1c 8.7% with a mean duration of T2DM for 5.2(4.6) years) underwent SADJB-SG
were recruited. The criteria of inclusion were not well controlled obese T2DM patients. SADJB-SG is a simplified duodenal switch with a single anastomosis of jejuna loop at 150-200 cm distal to Treitz ligament.

**Results**

The mean operation time was 188.1 [image inserted here] 32.4 minutes and the mean hospital stay was 4.4 [image inserted here] 2.5 days. Four (4%) major complications were encountered, included two bleeding and one stricture which was resolved by laparoscopic revision surgery. The other one patient had postoperative respiratory failure and rhabdomyolysis required ICU with good recover. No mortality developed. The mean BMI decreased to 25.5 with mean weight loss of 27.9% at one year, Prolong complete and partial remission of T2DM was achieved in 63.2% and 13.6% of the patients.

**Conclusions**

SADJB-SG is a simplified and short duodenal switch procedure specifically designed as a metabolic surgery. This study demonstrates that SADJB-SG is safe and offers good T2DM remission for not well controlled obese T2DM patients.

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**T-2597-P: Laparoscopic Sleeve Gastrectomy with Gastric Plication May Avoid Gastric Leakage**

Wei-Jei Lee; Abdullah Almulaifi, MD; Jun-Juin Tsou, RN; Yi-Chih Lee, PhD; Jung-Chien Chen, MD; Kong-Han Ser, MD; Shu-Chu Chen, RN;

**Background**

Laparoscopic sleeve gastrectomy (LSG) is becoming the first choice of bariatric surgery. However, there has a space for improvement in complications associated with LSG, including leakage and GERD. Combining LSG with gastric plication (LSG-P) may decrease the complication compared to LSG alone.

**Methods**

One hundred ninety-one morbid obese patients (mean age of 33.5(9.9) years and mean BMI of 40.4(6.5) Kg/m2) underwent our novel procedure, (LSG-P), and were followed for 6 months. Operative complication, weight loss and GERD symptoms were followed compared with a matched group of 191 patients with LSG.

**Results**

LSG-P had a longer operative time than LSG (129.4 vs. 113.3 minutes, p<0.01) but shorter hospital stay (2.4 vs. 3.3 days, p<0.01). There was no leakage case in LSG-P but 2 (1.1%) cases in LSG had leakage.
with one death. LSG-P group had 3 (1.5%) major complications all due to bleeding. There was no difference in preoperative clinical parameters between the two groups. The mean EWL% at 6 months was similar (57.9% in LSG-P and 57.2% in LSG, p=0.76). The use of PPI for GERD in LSG-P are slightly less (4.7% vs. 6.3%) at 6 months.

Conclusions

LSG-P appears to be an acceptable alternative to LSG with the advantage to avoid leakage following LSG.

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T-2598-P: Surgical VS Medical Therapy for Diabetic Patients with BMI < 35 Kg/M2: 5-Year Outcomes

Wei-Jei Lee; Chih-Cheng Hsu, MD, DrPH; Jun-Jun Tsou, RN; Jung-Chien Chen, MD; Kong-Han Ser, MD; Shu-Chu Chen, RN;

Background

Metabolic surgery has been developed recently for the treatment of type 2 diabetes mellitus (T2DM). Although the short-term effect is impressive, the durability of these effects is uncertain.

Methods

This was a retrospective cohort study of obese T2DM patients with BMI < 35 Kg/m2 underwent metabolic surgery. 52 patients (mean BMI 31.0 ± 2.3 Kg/m2, T2DM duration 4.5± 4.7 years and HbA1c 9.0± 2.1%) received metabolic surgery with a follow-up period of 5 years were compared with those received standard medical treatment from a prospective cohort study in Taiwan (DMIDS). The DMIDS cohort had 299 patients (mean BMI 29.1 ± 2.4 Kg/m2 , T2DM duration 2.7± 3.2 years, HbA1c was 8.1± 1.8%). Prolong complete remission was defined as HbA1c < 6% without medication for 5 years and partial remission was HbA1c < 6.5%.

Results

At 5-years, there was one (2.0%) mortality in the surgical group and another patient developed end stage renal disease. The remaining 50 patients in the surgery group had a mean weight loss of 21.2% and the HbA1c decreased to 6.3± 1.1%. Prolong T2DM complete remission was achieved in 19(38%) of the patients and partial remission in another 13(26%) patients. The medical group remained a similar HbA1c level of 8.0 ± 1.6% at 5-year. There was 9(3.0%) mortality in the medical group without difference to the mortality rate in surgical group.

Conclusions
In mild obese T2DM patients, metabolic surgery is more effective in glycemic control than medical treatment over 5 years but did not reduce the mortality rate. A survival benefit requires more than 5-year to be proven.

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**T-2599-P: Internalized Weight Bias in Bariatric Surgery Patients: Psychosocial Correlates and Weight-Loss Outcomes**

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**Background**

This study examined the relationship between pre-surgical internalized weight bias and post-surgical outcomes in adult weight-loss surgery patients.

**Methods**

Weight-loss surgery patients (N=170, age=45.7±12.0 y, pre-op Body Mass Index [BMI]=47.8±8.8 kg/m2) were recruited from one urban and one rural medical center. Participants completed the Weight Bias Internalization Scale (WBIS) and Beck Depression Inventory-II (BDI-II) before surgery. Pre-surgery and post-surgery (12 months) weights were extracted from the electronic medical record and used to calculate percent excess body weight loss (%EBWL).

**Results**

The average WBIS score by item pre-operatively was 4.54±1.1, which was comparable to WBIS scores previously published in adolescent surgical populations. Higher pre-operative WBIS scores were related to higher pre-operative BDI-II scores after controlling for pre-operative BMI, age and sex, p<0.001. Higher pre-operative WBIS scores were associated with lower %EBWL 12-months post-operatively after controlling for age, pre-operative BMI, BDI-II scores, and sex, p=0.039. No differences were found by geographic location or race.

**Conclusions**

Adult bariatric surgery patients report notable internalized weight bias, which was associated with more depressive symptoms pre-operatively and lower %EBWL 12 months post-operatively. Helping patients to cope with internalized weight bias may increase post-operative weight-loss and well-being.
T-2600-P: Changes in Daily Physical Activity after Bariatric Surgery

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Background

We examined whether daily non-exercise activity and body postures (sitting, standing, lying) change in patients undergoing bariatric surgery post-operatively compared to pre-operatively.

Methods

The study protocol involved performing thrice-repeated 14-day measurements of non-exercise activity and body postures, preoperatively and at 6 and 24 months after bariatric surgery. Patients underwent body composition analysis by DXA. Non-exercise activity and body postures were measured using a validated Physical Activity Monitoring System (PAMS). LABS patients (n=30) undergoing gastric bypass bariatric surgery were recruited. Inclusion/exclusion criteria matched those of LABS and in addition, eligible subjects were excluded who could not walk at 2.4 mph for 15 minutes, or weigh greater than 227 kg at the screening visit. No intervention to improve physical activity was provided.

Results

In 30 subjects (45 + 10yr, 48 + 6 kg/m2, 27F) weight decreased at 6 months post-op from 131 + 23 kg to 102 + 18 kg (p<0.001); fat mass loss, 22+ 9 kg. Daily physical activity increased from 3759 + 653 to 4167 + 722 Activity Units/day (P=0.01). Body postures did not change (stand/walk time 364 + 162 cf 345 + 128 min/day; sit 531 + 185 cf 558 + 122 min/day; lie 545 + 105 cf 537 + 83 min/day). For the 19 subjects with 24 months follow-up, there were no significant changes in body movement or posture between 6 and 24 months.

Conclusions

Decreasing sit time and increasing daily physical activity may be an opportunity to improve outcomes in bariatric surgery.

T-2601-P: The Role of Avoidance-Based Coping in the Psychosocial Functioning of Weight Loss Treatment Seeking Adults

Jason Lillis, PhD; Jessica Unick, PhD; Heather Niemeier, PhD; Kathleen Kendra, PhD; Graham Thomas, PhD; Tricia Leahey, PhD; Leah Dorfman, MS, MPH; Rena Wing, PhD;
Experiential avoidance (EA) is a coping style characterized by the tendency to try to alter unwanted thoughts, feelings, or bodily sensations when doing so causes harm. This study examines the role of EA in quality of life using a sample of treatment seeking overweight and obese adults.

Methods

Participants were 162 overweight or obese adults recruited for a weight loss intervention study who completed a baseline assessment prior to entering treatment that included standardized height and weight measurement and the completion of a battery of self-report questionnaires, including the Acceptance and Action Questionnaire (AAQ; a standardized measure of Experiential Avoidance) and several short-forms from the NIH PROMIS (Patient Reported Outcomes Measurement Information System) initiative (DeWalt et al, 2007)- Global Quality of Life, Depression, and Satisfaction with Relationships. The sample was 85% female with an average age of 50 (+/-10).

Results

Results showed that higher AAQ scores (higher EA) was strongly associated with lower overall health-related quality of life (r=-.551), relationship satisfaction (-.504) and less perceived ability to take values-consistent action (-.442) after controlling for BMI and depression.

Conclusions

This study provides preliminary evidence that experiential avoidance may be a key factor in the psychosocial functioning of overweight and obese adults. Targeting EA could have a benefit by improving secondary outcomes to help ease the lives of people who remain overweight or obese after treatment.

T-2602-P: Effect of the Ideal Protein Weight Loss Method on Weight Loss and Metabolic Parameters

Tim N. Logemann, MD; David Murdock, MD; Kelly O'Heron, RD; Michael Braun, Bachelor of Science; Arlyne Frane, BSN; Rita A. Murdock, MA;

Background

The Ideal Protein Weight Loss Method (IPWLM) is a 4 phase program with 1-on-1 coaching and balanced lifestyle education to promote and maintain weight loss. The diet is a low carbohydrate, low fat, ketogenic diet. The effect of the IPWLM on weight, lipids, glucose, BP is described.

Methods
58 obese patients enrolled in the IPWLM where total protein intake is kept to a normal level (45-65 grams/day) while total carbohydrate and fat calories are low to promote ketogenesis, fat burning, and weight loss. In phase 1, low calorie prepackaged protein based supplied food products (over 50 different to provide variety and improve compliance) is combined with low carb vegetables and lean protein purchased food. Weekly health coach visits provide encouragement, answered questions, monitored compliance, took measurements and provided nutritional guidance till target weight is reached. Baseline and post treatment serum lipids, glucose, height, weight and blood pressure were obtained.

**Results**

82% of patient were protocol compliant. Early drop out occurred in 5%. Phase 1 was well tolerated but occasional mild nausea and headache occurred. There was often a large weight loss (10-15 lbs) the first week. Thereafter men lost a mean of 4 lbs/week, women lost 2 lbs/week. The BMI fell (34.4 to 30.8) and BP fell (123/76 to 112/72). Total and LDL cholesterol decreased 10%, triglycerides decreased 48%, while HDL cholesterol was unchanged. Average fasting glucose fell 4% in the entire group but 8% in prediabetics. Diabetic medications use decreased.

**Conclusions**

Phase 1 of the IPWLM is well tolerated and has a high compliance rate. Phase 1 results in rapid weight loss, improved blood pressure, insulin sensitivity and lipid profiles. Larger and longer term studies are needed.

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**T-2603-P: Night Eating and Obesity Treatment: Program Attrition and Outcomes**

*Janet Lydecker, MS; Joshua Brown, PhD; Sandra Coulon, MA; Patrick M. O'Neil, PhD;*

**Background**

Some obese individuals report night eating, but the bidirectional influence of night eating and obesity treatment remains understudied.

**Methods**

This study assessed night eating in patients receiving behavioral obesity treatment (N = 249). Surveys measured behavioral and psychological factors pre-treatment and at program end; clinic staff measured weights weekly.

**Results**
Night eating was inversely associated with post-treatment use of weight-loss behaviors ($p=.01$), but not weight loss ($p=.63$). Attrition moderated the relation of nocturnal ingestion with weight loss ($p=.02$) such that with lower attendance, nocturnal ingestion influenced weight loss less than higher attendance. Gender moderated the relation of evening hyperphagia with weight-loss behaviors ($p=.03$) such that evening hyperphagia had more influence on weight-loss behaviors for women than men. Night eating improved in this obesity program ($p<.01$).

**Conclusions**

Findings suggest that subthreshold night eating behaviors do not directly affect weight loss, and may actually improve with obesity treatment. Future research should assess the durability of this improvement and the relation of more clinically significant night eating patterns to obesity treatment.

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**T-2604-P: Preliminary Validity and Reliability of $\delta^{13}C$ in Fingerstick Blood as a Biomarker of Sugar-Sweetened Beverage Intake in Adolescents**

*Carly MacDougall; Cateyln Hill, undergraduate student; Shaun Riehl, MS, RD; Hope Jahren, PhD; Josh Bostic, BS; Valisa Hedrick, PhD, RD; J. Tina Savla, PhD; Madlyn Frisard, PhD; Hollie A. Raynor, PhD; RD, LDN; Brenda M. Davy, PhD RD FTOS;*

**Background**

Sugar-sweetened beverage (SSB) consumption may contribute to weight gain and obesity development. Fingerstick blood $\delta^{13}C$ is a valid and reliable biomarker of added sugar and SSB intake in adults, but to date the biomarker has not been evaluated in children or adolescent populations.

**Methods**

The objective of our pilot investigation was to evaluate the validity and reliability of fingerstick blood $\delta^{13}C$ as a biomarker of SSB intake in adolescents. Individuals aged 12-17 years (n=26) completed five laboratory sessions, which included providing demographic information, and assessment of height and weight. At two visits, participants completed the beverage intake questionnaire (BEVQ) and provided fingerstick blood samples, which were analyzed for $\delta^{13}C$ value using natural abundance stable isotope mass spectrometry.

**Results**

Participants (62% M) were 14±1 yrs of age; mean BMI of 21±3 kg/m2. Mean fingerstick $\delta^{13}C$ value at times 1 and 2 were -19.73±0.46 and -19.72±0.46, and reported usual daily SSB intake at times 1 and 2 were 136±86 and 177±31 kcal, and 11±7 and 14±19 fl oz. $\delta^{13}C$ values were strongly correlated...
and not different at the two time points (mean difference = -0.007, P=0.64), which demonstrated reliability. $\delta^{13}$C values were significantly correlated (all P<0.05) with reported SSB energy ($r=0.46$ and 0.47) and fl oz ($r=0.47$ and 0.50).

Conclusions

These preliminary findings suggest that the minimally invasive fingerstick blood $\delta^{13}$C holds promise as a valid and reliable biomarker of SSB intake in adolescents.

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**T-2605-P: Aspiration Therapy in Super Obese Patients â€“ Pilot Trial**

*Evzen Machytka; Marek Buzga, MD, PhD; Martina Bojkova, MD; Tomas Kupka, MD;*

**Background**

While bariatric surgery is the best option for weight loss in the super-obese population, patients with BMI>50 kg/m2 have a substantially higher rate of perioperative mortality than those with BMI<50 kg/m2. We evaluated a new device for the treatment of obesity, the AspireAssist@ Aspiration Therapy Aspiration Therapy (Aspire Bariatrics, King of Prussia, PA) in super-obese patients BMI>55 kg/m2. Recent studies of AspireAssist in patients with initial BMIs of 35-55 kg/m2 demonstrate not only high efficacy, but also an excellent safety profile. The AspireAssist consists of an endoscopically-placed gastrostomy tube (A-TubeTM) and siphon assembly, with which patients aspirate gastric contents 20 min after meal consumption, removing about 30% of ingested calories. Aspiration Therapy is given in conjunction lifestyle modification. The implantation procedure does not require general anesthesia, is done on an outpatient basis, and is fully reversible.

**Methods**

From September 2012 to May 2014, 8 subjects (6 men, 2 women), average age 44.9 years (32-63 years) were enrolled in this single arm study. The mean initial weight of the subjects were 186.4 kg (143 to 233); the mean BMI 63.4 kg/m2 (59.5 -71.9). Aspiration Therapy was started after the fistula healed (10-21 days post-post A-Tube placement). Lifestyle intervention was provided as a 10-session diet and behavioral modification program. Patients were monitored regularly for electrolytes and metabolites.

**Results**

Mean weight loss after 3 months was 17.2 kg (7 patients), after 6 months, 28.6 kg (6 patients), after 9 months - 32.2 kg (4 patients), after 1 year of 42 kg (2 patients). All patients have responded to this therapy, with no patient losing less than 10 kg in the first 3 months. No serious adverse events occurred. Three minor adverse events were reported: all minor infections at the wound site, resolved within 3-5 days by local ATB. Procedural success was 100%. To date, all patients are continuing with Aspiration Therapy (AT), and report a high level of satisfaction with AT.
Conclusions

The results from this study demonstrate that the AspireAssist is technically feasible, safe with a low complication rate, and effective in the super-obese, either as a long-term therapy or a bridge therapy to bariatric surgery.

T-2606-P: An Examination of Neuropsychological Deficits in Overweight Women with Binge Eating Disorder

Stephanie Manasse, BA; Evan Forman, PhD; Adrienne S. Juarascio, PhD; Meghan L. Butryn, PhD; Anthony C. Ruocco, PhD;

Background

Preliminary evidence suggests that neurocognitive processes underlying binge eating (BE) pathology may be distinct from that of general overeating and obesity. However, few studies have directly compared executive function in overweight individuals with and without BE.

Methods

The current study administered a semi-structured interview assessing for binge eating and a neuropsychological battery to overweight (BMI 26-50 kg/m2) women with (n=31) and without (n=43) significant BE pathology (i.e., at least one binge episode per week for the past three months) prior to entry to either a behavioral weight loss or binge eating intervention.

Results

After controlling for age and IQ, results indicate that individuals with BE pathology performed worse on a task of planning ($p < .01$, $\hat{F}p^2 = .10$), displayed steeper delayed discounting (i.e., immediate, smaller vs later, larger rewards; $p = .02$, $\hat{F}p^2 = .09$), and had poorer self-regulatory control ($p = .02$, $\hat{F}p^2 = .08$) compared to the overweight control group. The two groups did not demonstrate differences on tasks of cognitive flexibility ($\hat{F}p^2 < .01$), risk-taking ($\hat{F}p^2 = .02$), or working memory ($\hat{F}p^2 < .01$).

Conclusions

Results suggest individuals with BE may present with a distinct neurocognitive profile, specifically, planning difficulties, preference for short-term over long-term reward, and inhibition problems. Future research should examine methods for enhancing these processes to improve treatment response.
T-2607-P: Food Reward Sensitivity, Implicit Liking and Delayed Discounting as Predictors of Binge Eating Pathology in Overweight Women

Stephanie Manasse, BA; Evan Forman, PhD; Adrienne S. Juarascio, PhD; Meghan L. Butryn, PhD; Anthony C. Ruocco, PhD;

Background

Recent theories of self-regulation posit that approach tendency (e.g., food cue sensitivity, implicit liking of palatable food) interacts with executive function to predict dysregulated behavior. We sought to examine whether such processes predict binge eating (BE).

Methods

The current study administered a semi-structured interview assessing for the presence of BE, an implicit attitudes task (IAT) of highly palatable foods, a self-report measure of food reward sensitivity (Power of Food Scale), and a delayed discounting (DD) task to overweight women (BMI 26-50 kg/m², n=74) prior to entry of either a behavioral weight loss or BE intervention. We conducted analyses both to predict the presence of BE in the entire sample (dichotomously, utilizing logistic regression) and frequency of binge episodes (continuously, utilizing multiple regression) within the sub-sample (n=31) of participants who endorsed BE.

Results

Food reward sensitivity, but not implicit attitudes, predicted the presence of BE (Wald c² = 12.19, p < .01). Within the BE group, implicit attitudes significantly moderated the relation between DD and frequency of BE, such that steeper discounting positively predicted frequency of BE. As predicted, the relationship only existed for those with higher implicit attitudes towards palatable food (p = .04, I²p² = .32). However, there was no evidence of an interaction between food reward sensitivity and DD (p = .91, I²p² < .01).

Conclusions

Results suggest IA, food reward sensitivity, and DD may differentially influence BE behavior. Future research should examine whether food reward sensitivity temporally precedes the development of BE, and consider approach tendencies and prioritization of short-term reward in treatment development.
T-2608-P: Can Phentermine Impact Ability to Delay Reward in the Obese?

Laurel Mayer, MD; Bernd Figner, PhD; Bjorn Carlsson, MD; B. Timothy Walsh, MD; Rudolph L. Leibel, MD PhD;

Background

Obese individuals discount delayed monetary rewards more steeply than normal weight individuals. We examined whether short-term phentermine (PHEN) administration can shift discounting steepness.

Methods

In a blinded, cross-over design, patients received 1 week of 37.5mg PHEN once daily PO and 2 weeks of placebo. Testing occurred at the end of the first and third weeks. Participants were asked to make a series of decisions about money available sooner, or larger amounts of money, available later. Monetary amounts ranged from $15-$85, and delay from 2-4 weeks. Participants were informed that one of their choices would be selected at random, and they would receive that reward. Generalized mixed-effects modeling was used to examine effect of drug on absolute and percent election of larger, later choices. Following the double-blind phase, patients were offered 6 months of open treatment with PHEN.

Results

Participants were 13 obese individuals, 41± 15 yrs; BMI 36.25+3.23kg/m2. Consistent with expected effects, participants were more patient the larger the relative difference in monetary amount (p<0.001). The longer the delay, the more likely they were to choose the sooner reward (p<0.01). Participants receiving PHEN chose the larger, later option more often compared to placebo (59 vs 49, p=0.04). There was an association between the percentage of larger, later options chosen when receiving PHEN and later weight loss during open treatment (r= -0.30).

Conclusions

After only 1 week of phentermine administration, alterations are evident in capacity to delay reward; these responses may be predictive of successful weight loss.

T-2609-P: Predicting Changes in Negative Emotional Eating Following Bariatric Weight-Loss Surgery

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Background

Obesity has been associated with higher rates of social anxiety, and social anxiety has been linked to increased emotional eating. We hypothesized that reductions in BMI and social anxiety following bariatric surgery would predict decreases in negative emotional eating.

Methods

Participants were 206 bariatric weight loss surgery patients who completed self-report questionnaires. Liebowitz Social Anxiety Scale (LSAS) scores measured social anxiety. Scores from the negative emotion subscale in the Emotional Appetite Questionnaire (EMAQ) reflected eating due to negative emotions. BMI was calculated from self-report data. All data were collected shortly preceding surgery and at 1-year post surgery.

Results

Multiple regression was performed to examine whether changes in BMI and social anxiety predicted changes in negative emotional eating. BMI, social anxiety scores and negative emotional eating decreased significantly 1-year post surgery. Changes in BMI did not significantly predict changes in negative emotional eating. Decreases in social anxiety, however, did predict decreases in negative emotional eating following bariatric surgery, even when controlling for changes in BMI, \( p = .001 \).

Conclusions

These research findings suggest that there may be behavioral benefits to bariatric surgery when psychosocial improvements occur, independent of weight loss. It would be worthwhile to test whether targeting social anxiety helps reduce negative emotional eating in obese participants.

T-2610-P: Sleep Quality, Duration and Chronotype in the National Weight Control Registry

Kathryn R. Middleton, PhD; Graham Thomas, PhD; Andrew Seiden, BA; Jennifer Trautvetter, BA; Rena Wing, PhD;

Background

Obesity has been associated with shorter duration and poorer quality sleep. However, it is not known whether individuals successful with long-term weight loss and maintenance differ in sleep quality, duration, and chronotype (i.e., being a 'morning' or 'evening' person) from those who are obese.

Methods
Sleep habits of National Weight Control Registry members (NWCR) who have maintained a >=13.6 kg weight loss for >=1 year were compared to enrollees in a behavioral weight loss intervention (INT). 757 NWCR (73% female, 92% white, age=52+-13, BMI=27+-5) who completed the Morningness-Eveningness Questionnaire (MEQ, a measure of 'morning' vs. 'evening' chronotype) and the Pittsburgh Sleep Quality Index (PSQI) were compared to 75 INT (77% female, 88% white, age=56+-10, BMI=36+-5) who completed the PSQI and 52 INT (81% female, 85% white, age=58+-9, BMI=37+-4) who completed the MEQ.

**Results**

Controlling for age, MEQ scores were higher in NWCR than in INT, $p=.005$, indicating greater propensity toward 'morning type.' More NWCR than INT were morning types (60% vs. 50%), and fewer were evening types (5% vs. 8%), $p=.031$. Fewer NWCR reported <7 hours of sleep (29% vs. 45% INT, $p=.004$). NWCR also reported shorter latency to sleep onset (minutes=18+-16 vs. 23+-25 INT, $p=.003$) and were more likely to report good sleep quality (65% vs. 52% INT, $p=.024$).

**Conclusions**

Results suggest that successful weight loss maintainers are more likely to have morning chronotype and have longer duration and better sleep quality than treatment seeking obese. Future analyses will examine if these factors change as a result of weight loss or are predictors of weight loss outcomes.

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**T-2611-P: Convergent Validity of Physical Activity Monitors in Adults with Unilateral Traumatic Transtibial Amputation**

*Cassie Mitchell, MS; Susan B. Sisson, PhD, RDN, CHES, FASCM; Carol P. Dionne, PhD, PT, DPT, OCS, Cert MDT; Derek A. Crawford, M.S., M.Ed; Josh New, M.S.*

**Background**

Adults with unilateral traumatic transtibial amputation (UTTA) report a decline in overall volume for physical activity (PA) post-trauma, and are at elevated risk for chronic disease development and weight gain. PA may improve health outcomes, but no validated measures exist in adults with UTTA. 

**Methods**

Ambulatory adults (n=7) ages 21-64 with UTTA wore each of the following PA monitors (PAMs) during four 6-minuteute counter-balanced PA phases: the ActiGraph GT3X (AG), the ActivPAL (AP), the SenseWear Armband (SWA), and the Intelligent Device for Energy Expenditure and Activity (IDEEA). The four phases comprised: sitting, standing, self-selected light walking, and self-selected moderate walking with a 2-minute rest between phases. Stopwatch recorded time/phase served as the criterion.
measure for minutes in PA. Exclusion criteria were: cardiovascular disease, hypertension, obesity, stroke or neuromuscular disorders. A repeated-measures ANOVA was used for statistical analysis.

**Results**

There were no differences across PAMs and the criterion for sitting or standing phases. For light intensity, all monitors differed from the criterion (F(4)=3106.864, p<0.001) and undercounted total minutes. For moderate intensity, all PAMs, except the AP, differed from the criterion (F(4)= 3106.864, p<0.001) and undercounted total minutes.

**Conclusions**

All PAMs correctly captured minutes sitting and standing. PAMs did not correctly capture minutes in light intensity. The AP was the only valid monitor for moderate intensity. Future research should include other commercially available PAMs and incorporate other amputation populations.

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**T-2612-P: mHealth Software as a Service for Behavioral and Clinical Research**

*Jon Moon, PhD; Jared Sieling, MS; James McClain, PhD;*

**Background**

Researchers and practitioners are increasingly using mobile health (mHealth) systems to assess physiologic and behavioral measures and for remote interactions. Developing the software, data management and analysis systems are beyond the resources and duration of most grants and projects.

**Methods**

mHealth software and data infrastructure for research should benefit from flexible and distributed cloud-based services provided as 'mHealth software as a Service' (mHaaS) and move away from one-time, 'de novo' mobile development (without a base of code or team experience in the research area) by institutional IT departments or independent developers. We reviewed the cost, effort and duration of mHealth research projects and compared these to resources that would be required for equivalent projects undertaken in an mHaaS environment. Tasks of planning, development, testing, updates, compliance, server cost and technical support were evaluated for each project.

**Results**

We analyzed 7 mHealth projects as de novo development vs the same project benefitting from mHaaS. The average cost to provide mHealth software and support was $58,066 ($33,548 to $147,000) and require 7.7 months (5 to 13) to complete testing and be ready for use. The equivalent cost in an mHaaS environment would be approximately $31,960 ($12,000 to $73,864) and take 3.7 months (1 to 9) to complete. Projects were 45% cheaper and 52% faster in an mHaaS environment.
Conclusions

Software development is a barrier in clinical and behavioral mHealth research. Some research projects fail for lack of resources or expertise. mHaaS may be cheaper and faster than de novo development. Plus, mHaaS has inherent scalability, allowing successful projects to be disseminated efficiently.

T-2613-P: Are Health Risks Increased by Excessive B Vitamin Supplementation Following Bariatric Surgery?

Carolyn E. Moore, PhD, RD; Vadim Sherman, MD;

Background

Few prospective studies have compared changes of nutrient intake while assessing effectiveness of thiamin, vitamin B12, and folate supplementation to prevent B vitamin deficiencies immediately following Roux-n-Y bypass (RYGB) and sleeve gastrectomy (SG).

Methods

The response to 3 months supplementation on maintaining blood B vitamin concentrations following bariatric surgery was determined. Women undergoing RYGB (n=11) and SG (n=11) consumed bariatric vitamin supplements (12 mg thiamin, 350 ug vitamin B12, 800 ug folic acid) daily for 3 months. Height, weight, body mass index, and blood vitamin concentrations were measured preoperatively and at 3 months. Wilcoxon signed rank analyses compared body weight parameters, laboratory indices, and nutrient intake at baseline and 3 months.

Results

Supplementation for 3 months maintained blood thiamin, increased serum folate from 13.1 +- 5.4 to 16.3 +- 6.0 nmol/L (P=0.049), and increased serum vitamin B12 concentrations from 498 +- 150 to 736 +- 340 pg/mL (P = 0.005). Dietary intake of thiamin and folate decreased in the combined surgical groups, while dietary intake of B12 was maintained. Bariatric B vitamin supplements provided multiple intakes of the Recommended Dietary Allowances (1090% thiamin; 14,583% vitamin B12; 200% folate).

Conclusions

Although energy intake decreased 64%, B vitamin supplementation for 3 months resulted in a 48% increase of serum vitamin B12, a modest folate increase, and no reduction of blood thiamin. The rapid rise of serum B12 attributed to the high content of supplements and protein shakes may be of concern.
T-2614-P: Effects of Phentermine and Topiramate Extended-Release (PHEN/TPM ER) on Weight Loss (WL) in Older Obese/Overweight Subjects Over 2 Years

Donna Ryan, MD; Sunil Karnawat, PhD; Sarah Odeh, BS;

Background

Obesity rates are increasing in the US, including among older adults. The CONQUER study evaluated obese/overweight subjects (BMI >=27-<=45 kg/m²) with >=2 weight-related comorbidities for 56 weeks; SEQUEL allowed subjects to continue treatment for an additional 52 weeks.

Methods

Subjects in this Phase 3, double-blind trial were randomized to placebo (PBO), PHEN 7.5 mg/TPM ER 46 mg (7.5/46), or PHEN 15 mg/TPM ER 92 mg (15/92). This post hoc analysis of the SEQUEL study evaluated WL in a subpopulation of subjects who were >=65 years (n=64; PBO, n=21; 7.5/46, n=15; 15/92, n=28). This analysis evaluated least-squares mean WL from baseline (CONQUER Week 0) to end of treatment (SEQUEL Week 108) among subjects who were >=65 years at baseline (CONQUER Week 0).

Results

At baseline, age range was 65.2-70.8 years, 58% were female, mean weight 101kg, and BMI 36 kg/m²; 67% had hypertension, 39% had dyslipidemia, 50% had prediabetes, and 20% had T2DM. After 108 weeks, least-squares mean WL was -4.3%, -8.0%, and -11.4% for PBO, 7.5/46, and 15/92, respectively (P=.0012 vs PBO for 15/92; ITT-LOCF). The annualized incidence rate of T2DM was 3.5, 0, and 2.3 for PBO, 7.5/46, and 15/92, respectively, for subjects without T2DM at baseline. Common adverse events were constipation, dry mouth, and dysgeusia.

Conclusions

Among subjects who were >=65 years at treatment initiation, PHEN/TPM ER and lifestyle modifications were associated with significant WL vs placebo after 108 weeks, suggesting long-term safety and efficacy in this population.
T-2615-P: Online Weight Loss Programs: What Type of Engagement Matters Most?

Sherry L. Pagoto, PhD; Cameron Sepah, PhD; Kristin L. Schneider, PhD; Molly E. Waring, PhD; Bradley M. Appelhans, PhD; Matthew C. Whited, PhD;

Background

Online weight loss programs have shown promise for efficacy. Studies show that participant engagement predicts better weight loss outcomes, but it is not clear what types of engagement predict weight loss. The purpose of our study was to determine which types of engagement predict weight loss.

Methods

Prevent is an online weight loss program based on the Diabetes Prevention Program. Participants could engage by completing 16 Core lessons, reporting weight and/or steps, private messages to coaches, participation in discussions, and by 'liking' comments. We aimed to examine the association between each form of engagement and weight loss. We also examined which forms of engagement predicted weight loss after controlling for completion of Core lessons. The sample (n=220; 62% women; 50% Caucasian) had pre-diabetes. Mean weight loss after 16 weeks was 5%.

Results

Most types of engagement predicted greater weight loss: core sessions completed (r=.40, p<.001), weigh-ins (r=.38, p<.001), private messages to coach (r=.35, p<.001), discussion participation (r=.43, p<.001), and likes (r=.37, p<.001). Reporting steps was not associated with weight loss (r=14; p=.06). The only form of engagement that was significant when number of completed Core sessions was in the model was participation in discussions (b=.25; p=.001).

Conclusions

While most forms of engagement predicted weight loss, only participation in discussions predicted weight loss beyond completing Core sessions. Research should explore whether inducing greater engagement in discussions could improve outcomes in online and social network-based weight loss programs.

T-2616-P: Estimated Full-Scale IQ Does Not Predict Weight Loss after Bariatric Surgery
Background

Baseline neuropsychological functioning can predict weight-loss after bariatric surgery. However, no studies to date have examined IQ as a predictor. This is an important investigative target in the context of longitudinal studies showing that lower IQ predicts subsequent weight-gain in adulthood.

Methods

Cognitive testing was completed as part of a comprehensive pre-surgical psychosocial evaluation. Intelligence was estimated using full-scale IQ derived from the Wechsler Abbreviated Scale for Intelligence, 2nd Edition (WASI-2). Body mass index (BMI), percent weight-loss, and percent excess weight-loss were calculated for subsets of patients at 1 month (n = 73), 3 month (n = 68), 6 month (n = 59), 12 month (n = 54), 18 month (n = 40), and 24 month (n = 24) post-surgical follow-ups. IQ was used as a predictor in a series of hierarchical regression analyses at each time point, controlling for type of surgery (gastric bypass and sleeve gastrectomy), baseline BMI, and sex (BMI and % weight loss).

Results

Patient subsets did not differ in terms of estimated full-scale IQ or any of the demographic variables collected during the evaluations, including age, education, race, or sex. Regression analyses indicate that pre-surgical estimated full-scale IQ was not a significant predictor of post-surgical BMI, percent weight loss, or percent excess weight loss at any time point after accounting for variance attributable to surgery type, pre-surgical BMI, and sex.

Conclusions

Lower IQ is not associated with poorer immediate or sustained weight-loss after bariatric surgery; however, this finding requires replication in larger samples. Further work is also needed to determine if other variables mediate or moderate the relationship between IQ and weight-loss after surgery.

T-2617-P: A Feasible and NEAT! Way to Reduce Sedentary Time among Adults with Diabetes

Christine Pellegrini, PhD; Sara A. Hoffman, BA; Elyse R. Daly, BA; Manuel Murillo, B.S; Gleb Iakovlev, MS;

Background
Background: Recent experimental findings suggest that breaking up prolonged bouts of sedentary behavior reduces postprandial glucose and insulin responses. We examined the use of a smartphone application developed to interrupt sedentary time in adults with diabetes over a one month period.

Methods

Methods: Nine adults with type 2 diabetes were recruited to participate and use the NEAT! technology (smartphone application and Bluetooth-enabled waist-worn intervention accelerometer) over a one month period. Following 20 consecutive minutes of sedentary time, participants received a prompt to stand up for >= 2 minutes. Evaluations on the acceptability of the technology were completed at one month. Sedentary behavior and physical activity were also objectively measured at baseline and one month using Actigraph accelerometers.

Results

Results. Eight participants (88.9%) completed the intervention and agreed that NEAT! was motivational and made them more conscious of sitting time. Most (87.5%) participants expressed a desire to use NEAT! in the future. NEAT! was used 21.9 (8.0) days for 7.6 (2.5) hours/day and were prompted to stand up 5.8 (3.5) times/day. Sedentary time was reduced from 67.5 (7.5)% to 61.9 (9.5)% ($p=0.13$) between baseline and 1 month, and light activity increased from 29.7 (6.0)% to 35.8 (10.0)% ($p=0.54$).

Conclusions

Conclusion: The results suggest that NEAT! is an acceptable technology to intervene on sedentary time among adults with type 2 diabetes. We acknowledge the financial support of the Chicago Center for Diabetes Translation Research (NIDDK P30 DK092949).

T-2618-P: Improved Probability of Diabetes Remission 3 Years after Roux-n-Y Gastric Bypass (GBP) Compared to Laparoscopic Gastric Banding (LAGB) Controlling for Percentage Weight Change: Results from the Longitudinal Assessment of Bariatric Surgery (LABS)

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Background

Randomized controlled clinical trials have demonstrated improved diabetes remission after bariatric surgery compared to medical management, but few studies have addressed the relative efficacy of different bariatric surgical procedures on diabetes improvement during long-term follow-up.

Methods

LABS 2 is an observational cohort study that enrolled and followed 2458 obese subjects undergoing bariatric surgery. 1868 of these participants had complete data to assess diabetes status at both baseline and at least one follow-up visit. 627 subjects (34%) were classified with diabetes (HA1c > 6.5%, use of diabetes medications), of whom 466 underwent GBP and 140 had LAGB. These participants with diabetes were studied prior to surgery and annually thereafter to assess co-morbid disease status. Generalized linear mixed modeling was used to test the association of bariatric surgery type and diabetes remission (HA1c < 6.5%, no use of diabetes medication) adjusting for percent weight change.

Results

At 3 years, 68.2% of GBP vs 30.4% of LAGB subjects were in diabetes remission. Baseline univariate risk factors associated with remission included age (odds ratio, 95% CI of 0.84, 0.76-0.93), % body fat (2.1, 1.5-3.0), C-peptide (1.4, 1.2-1.6), HA1c (0.59, 0.50-0.70), insulin use (0.27, 0.16-0.45), HTN med use (0.53, 0.31-0.91), and undergoing GBP vs. LAGB (4.9, 2.7-9.0). Controlling for weight loss, the probability of remission remained significantly greater after GBP than LAGB over the follow-up period (OR=2.9, 95% CI 1.9-4.5, p < 0.001).

Conclusions

Older participants with longer standing diabetes, those taking insulin, and worsened islet cell secretory markers are less likely to achieve diabetes remission with bariatric surgery. Independent of weight loss, GBP was superior to LAGB in inducing diabetes remission at 3 years.

T-2619-P: The Effects of Lorcaserin, a Selective 5-HT2C Agonist, on Weight Loss in Obese and Overweight Postmenopausal Women with and without Type 2 Diabetes Mellitus

Leanne M. Redman, PhD; Randi Fain, MD; Alan Glicklich, MD, MBA; Yuhan Li, MS; William Shanahan, MD; William Soliman, PhD;
Background

Cardiovascular risk associated with obesity is higher in postmenopausal women due to loss of cardioprotective effects from estrogen. Weight loss and glycemic parameters were evaluated by menopausal status in women with or without type 2 diabetes mellitus (T2DM) treated with lorcaserin (lor).

Methods

This post hoc analysis includes 2 randomized trials of lor 10 mg bid vs placebo (pbo) in which menopausal status at baseline was recorded: BLOSSOM (NCT00603902), overweight or obese patients without T2DM (premenopausal [pre-MP], n=2425; postmenopausal [post-MP], n=116); BLOOM-DM (NCT00603291), overweight or obese patients with T2DM (pre-MP, n=177; post-MP, n=98). Patients received diet and exercise counseling. Analyses by menopausal status were performed at week 52.

Results

Greater % weight loss was achieved in pre- and post-MP lor-treated patients with and without T2DM vs pbo (pre-MP with T2DM [5.1% vs 1.6%, P<0.001] and without [6.0% vs 2.7%, P<0.001]; post-MP with T2DM [4.5% vs 2.3%, P=0.020] and without [7.9% vs 2.5%, P<0.001]). Pre-MP and post-MP patients with T2DM had greater reduction in A1C with lor vs pbo (pre-MP: -0.89 vs -0.57; post-MP: -0.74 vs -0.24; both P<0.05).

Conclusions

Post-MP women treated with lor achieved greater weight loss than with diet and exercise alone; lor is therefore effective in this population, who have greater difficulty losing weight and who are at increased risk for weight-related comorbid conditions.

T-2620-P: Gastrointestinal Symptoms up Until 5 Years after Gastric Bypass and Duodenal Switch: A Randomized Controlled Trial

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Background

We compare changes in gastrointestinal symptoms and psychosocial aspects up until 5 years after gastric bypass and duodenal switch.
Methods

In a randomized controlled trial of sixty patients (BMI 50 to 60 kg/m²), 31 had gastric bypass and 29 had duodenal switch. Patients completed the Gastrointestinal Symptoms Rating Scale and a bowel function questionnaire at baseline and at 1, 2 and 5 years after surgery. Fifty-four (90%) patients completed the questionnaires at 5 years. Linear mixed models were used for continuous variables to investigate time—treatment interactions (diarrhea, gastro-esophageal reflux, daytime defecations). Ordered categorical outcomes at 5 years were compared with the exact Wilcoxon-Mann-Whitney test (loose stools, social limitations, reduction in daily well-being).

Results

Duodenal switch patients had more diarrhea \( (P=.0036) \) and gastro-esophageal reflux \( (P=.0016) \) compared to gastric bypass patients. The number of daytime defecations changed from 2.1 to 3.0 after duodenal switch and from 2.0 to 1.8 after gastric bypass \( (P=.016) \). At 5 years, more duodenal switch patients had loose stools (48.1% vs 11.1%, \( P=.014 \)) and reported significantly more social limitations and reduction in daily well-being due to bowel symptoms. Three duodenal switch patients were reoperated to elong the common channel because of diarrhea.

Conclusions

Over the first 5 years after surgery, duodenal switch patients had more gastrointestinal side effects and daily life limitations due to altered bowel symptoms compared to gastric bypass patients.

T-2621-P: Vitamin Concentrations and Calcium Metabolism 5 Years after Gastric Bypass and Duodenal Switch: A Randomized Controlled Trial

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Background

No long-term controlled studies have compared nutritional outcome after gastric bypass and duodenal switch. We compared vitamins and calcium metabolism before and up until 5 years after these procedures.

Methods
Sixty patients (BMI 50 - 60 kg/m\(^2\)) were randomly allocated to gastric bypass (n=31) or duodenal switch (n=29) and followed for 5 years. Fifty-five patients (92\%) completed the 5-year follow-up. Standard supplementations of vitamins and minerals were recommended, and supplementation was adjusted during follow-up according to a pre-defined monitoring and treatment protocol. Linear mixed models were used to compare changes between treatment groups. Abbreviations: PTH, parathyreoid hormone.

**Results**

The 25-hydroxyvitamin D levels decreased from 51.0 to 27.7 nmol/L after duodenal switch and from 49.5 to 45.7 nmol/L after gastric bypass (\(P < .001\)). Ionized calcium decreased after both procedures, with greater reductions after duodenal switch (\(P = .019\)). PTH increased more after duodenal switch than after gastric bypass (\(P = .002\)). Vitamin A levels decreased from 1.6 to 1.1 µmol/L after duodenal switch and were stable after gastric bypass (\(P < .001\)). Vitamin B6, B12, C, E and folic acid remained stable or increased, with no between-group differences.

**Conclusions**

Duodenal switch causes greater reductions in the levels of vitamins A and D and greater disturbances in calcium metabolism than gastric bypass up until 5 years after surgery. Long-term monitoring and adjustments of vitamins and minerals is indicated after both procedures.

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**T-2622-P_DT: The Immunophenotype Changes in Morbid Obese Subjects in Response to Weight Loss by Gastric Sleeve Surgery and Energy Restriction**

*Nasser M. Rizk, MD; Moataz Bashah, Dr, MD,PhD,FEBS,MASMBS;

**Background**

Obesity is a metabolic disease associated with immune cell abnormalities. The aim of this study is to monitor the changes in peripheral blood immune cell markers (CD4+ T cell, CD4+ T-helper subpopulations), and inflammatory cytokines IL-6, MCP-1 and IL-10 in blood before and after surgical treatment.

**Methods**

Fasting venous blood samples were collected from 8 morbid obese subjects with BMI > 40 kgm\(^2\) at admission to gastric sleeve operation for weight loss and after 3 months of energy restriction in the Metabolic/Surgical department at Hammed Medical Hospital (HMC)-Qatar. For immunophenotyping of T-cell populations of CD4+ cells, the circulating CD45+ was counted using (BD LSRFortessa TM Cell Analyzer). CD4+ T-cell subpopulations were defined as naïve (CD45RA+andCD27+), central memory T
cells (CD45RO+andCD27+), and effector/peripheral memory (CD45RO+and CD27-) and natural T-regulatory cell (CD4+CD25+ Fox3+). Cytokines were measured by Elisa.

Results

The mean age of the study subjects and SD were 31.67 (9.80) years. Follow up of the subjects revealed that BMI was reduced by 8%, and CD4+ T- cells subpopulations indicated significant reduction in the naïve cell number by 18%, central memory by 24% and natural T- regulatory cells by 27%, but not effector memory cells (3%) among the obese subjects. A significant reduction of circulating IL-6 and MCP-1 was observed after the intervention by 33% and 13% (p=0.021 and p=0.019) respectively, while IL-10 increases by 12% (p=0.049).

Conclusions

Weight loss intervention to morbid obese subjects by gastric sleeve with energy restriction was accompanied by a significant change in immunophenotyping polarization from M1 to M2 with a shift from pro-inflammatory to anti-inflammatory pattern.

T-2623-P: Association of Lifestyle Physical Activity Components and Sedentary Behavior with Weight Loss

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Background

Physical activity is an important intervention target for weight loss. Little is known about lifestyle components of physical activity and their association with weight change. This study examined the association of work, household, recreational, travel, and sedentary behavior with weight loss.

Methods

Participants were enrolled in a 12 month behavioral weight loss intervention, with assessments at baseline, 6 and 12 months. Data were available for N=205 at 6 months (age=45.5±7.1 years, BMI=32.2±3.8 kg/m2) and N=121 at 12 months (age=46.2±6.3 years, BMI=32.0±3.6 kg/m2). The intervention included a combination of weekly group sessions and telephone calls, a prescribed energy restricted diet and/or prescribed moderate-to-vigorous physical activity (MVPA). Weight was assessed on a digital scale. Physical activity was assessed with the Global Physical Activity Questionnaire and included measures of work MVPA, household MVPA, recreational MVPA, travel MVPA, total MVPA, and sedentary time.

Results
Weight was decreased by 9.0+-6.3 kg and 9.9+-7.9 kg at 6 and 12 months, respectively (p<0.001). At 6 months, weight change was significantly associated with change in recreational MVPA (r=-.19, p=0.006), travel MVPA (r=-.29, p<0.001), and total MVPA (r=-.21, p=0.003). Weight change at 12 months was significantly associated with change in travel MVPA (r=-.21, p=0.023). Change in sedentary behavior was not significantly associated with change in weight at either 6 or 12 months.

**Conclusions**

Components of MVPA, in particular travel MVPA, is associated with change in weight at 6 and 12 months. However, sedentary behavior is not associated with weight change. Interventions should consider targeting active commuting as a strategy to increase physical activity and improve weight loss.

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**T-2624-P: Weight Loss and and Reduction of Waist Size in 237 Hypogonadal Men with Obesity Grades I-III under Long-Term Treatment with Testosterone Undecanoate (TU): Observational Data from a Registry Study**

*Farid Saad, PhD; Ahmad Haider, MD, PhD; Gheorghe Doros, PhD; Abdulmaged Traish, PhD;*

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**T-2625-P: Obese Hypogonadal Men with Cardiovascular Diseases (CVD) Benefit from Long-Term Treatment with Testosterone Undecanoate (TU): Observational Data from a Registry Study**

*Farid Saad, PhD; Ahmad Haider, MD, PhD; Gheorghe Doros, PhD; Abdulmaged Traish, PhD;*
T-2626-P: Improvement of Metabolic Syndrome (MetS) Parameters in 237 Obese Hypogonadal Men upon Long-Term Treatment with Testosterone Undecanoate (TU) Injections: Observational Data from a Registry Study

Farid Saad, PhD; Ahmad Haider, MD, PhD; Gheorghe Doros, PhD; Abdalmaged Traish, PhD;

T-2627-P: The Effects of Partial use of Formula Diet on Nutritional Deficiency after Bariatric Surgery in Japanese Severe Obese Patients - 12-month Follow-Up Study

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Background

It is important to prevent nutritional deficiencies after bariatric surgery, as well as to prevent weight regain. We investigated the effect of formula diet, which is composed of low energy, high protein, enough vitamins and minerals, on postoperative nutrition in Japanese severe obese patients.

Methods

Thirty Japanese severe obese patients undergoing bariatric surgery were enrolled (male; 6, female; 7, gastric bypass; 2, sleeve bypass; 2, sleeve gastrectomy; 9, mean body weight; 119.5 kg, mean BMI; 43.6 kg/m2, mean HbA1c; 6.3%). Subjects were randomly divided into formula diet group (FD group; 7) and
conventional diet group (CD group; 6 cases) and observed for 12 months after bariatric surgery. In FD group, a pack of formula diet was replaced with one of three daily low-caloric meals. MicroDiet (Sunny Health Co. Ltd., Japan) or ObeCure (US Cure Inc., Japan) were used as the formula diet. A food diary was recorded by each patient, and dietary nutrition was calculated by the dieticians.

Results

Mean daily energy intake changed from 3182 to 1287 kcal/day after the surgery. After 12 month of surgery, daily protein intake was 64.3 g/day in FD group and 45.9 g/day in CD group. And daily intakes of iron, zinc, vitamin A, D and B12 in FD group were also higher than that in CD group. These daily intakes of protein, iron, zinc, vitamin A and D in CD group were lower than the respective Japanese recommended dietary allowances. Furthermore, serum iron level in FD group was higher than that in CD group after 12 month of surgery.

Conclusions

These results suggested that protein and several vitamins/minerals tended to be deficient, and partial use of formula diet to replace one meal a day was useful to prevent the nutritional deficiencies after bariatric surgery in Japanese severe obese patients.

T-2628-P: The Weight Related Abuse Questionnaire: Reliability, Validity and Clinical Utility

Jessica Salwen; Genna F. Hymowitz, PhD:

Background

Weight-related teasing/stigmatization (WRT) may be distinct from teasing and general abuse, and may differentially impact adult outcomes. As WRT increases in severity, depression and disordered eating also increase. Currently, there are no validated measures designed to assess these occurrences.

Methods

We developed the Weight Related Abuse Questionnaire (WRAQ; verbal and physical abuse subscales) and validated it in young adult and clinically obese populations. Concurrent validity was assessed via measures of WRT and general childhood abuse, and convergent validity was assessed with measures of depression and disordered eating. In study 1, an undergraduate population (N=292) was used as a pilot sample. In study 2, another undergraduate population (N=291) was used as a validation sample; a subsample of this population (n=65) was used to determine 6 month test-retest reliability. Study 3 evaluated the preliminary validity of the WRAQ in a sample of pre-bariatric surgery patients (N=45).

Results
Study 1 data indicated that the WRAQ subscales had strong psychometric properties (based on factor analysis and reliability/scale consistency analysis) and strong concurrent and convergent validity. Study 2 showed similar results, further supporting the validity of the questionnaire, and test-retest reliability was good. In study 3, responses on the WRAQ showed good psychometric properties, and correlated well with measures of childhood abuse, depression, and disordered eating.

Conclusions

Overall, the WRAQ has excellent psychometric properties, and is strongly associated with measures of current psychopathology. Additionally, it fills a gap in the assessment literature and may be a beneficial tool for evaluating which individuals are at increased risk for psychopathology.

T-2629-P: Long Limb Roux-en-Y Gastric Bypass as a Revision Strategy

Margaret Inman, MD; Leslie M. Schuh, PhD; Brenda Logan, RN, BSN; Brenda Cacucci, MD; David Diaz, MD; Christopher Evanson, MD; Douglas Kaderabek, MD;

Background

Proximal Roux-en-Y gastric bypass (RYGB), the most frequently performed bariatric surgery, is effective for many patients. However, optimal treatment is unclear for those who do not achieve ideal weight loss or who regain weight. Therefore, the present study examined revision to long limb RYGB.

Methods

This retrospective chart review examined 29 long limb RYGB surgeries performed at the St. Vincent Carmel Bariatric Center of Excellence from December 14, 2005 to May 16, 2013. Patients without clinic visits at 1 year or longer after surgery (n=9) were telephoned to inquire about health and weight outcomes.

Results

Patients were 86% female and 93% Caucasian, 48 years old, with presurgery weights and BMIs of 299.6 lbs and 48.8 kg/m2. Lengths of stay were significantly longer than primary RYGB (7 versus 2 days) and surgical complications (27.6%) and readmissions (34.5%) were more common. However, patients lost significant weight (57.0% EWL at last observation, mean of 2.8 years post-surgery) and maintained weight loss up to 8 years. Surgical complications had no significant effect on weight loss. Patients reported current health as fine to good.

Conclusions

Long limb RYGB can be a successful revision surgery for patients with inadequate weight loss or weight regain if careful patient selection and close followup are performed.
T-2630-P: Biliopancreatic Diversion with Duodenal Switch Outcomes up to Three Years after Surgery

Margaret Inman, MD; Leslie M. Schuh, PhD; Brenda Logan, RN, BSN; Brenda Cacucci, MD; David Diaz, MD; Christopher Evanson, MD; Douglas Kaderabek, MD;

Background

Bariatric surgery is the only treatment producing regular, sustained weight loss in obese patients. Biliopancreatic diversion with duodenal switch (BPDS) produces the greatest weight loss with good resolution of comorbid conditions. We examine a large sample of BPDS patients at a single center.

Methods

This retrospective chart review examined 269 laparoscopic and open BPDS surgeries performed at the St. Vincent Carmel Bariatric Center of Excellence from May 24, 2005 to October 22, 2013. Surgical complications, reoperations, and weight loss were examined.

Results

Patients were 74% female and 89% Caucasian, 43.2 years old with presurgery weights and BMIs of 329.1 lbs and 52.6 kg/m2. Surgery time was 120 minutes and length of stay 4.7 days. Forty-two patients (15.6%) had complications: 19 readmissions, 4 returns to operating room, and 4 mortalities (1.5%) from 2 days to 6 years after surgery. Patients lost 74.3% of excess weight 1 year after surgery (weight and BMI of 197.3 lbs and 32.3), 78.9% at 2 years (weight and BMI of 189.2 lbs and 31.0), and 77.9% at 3 years (weight and BMI of 192.8 lbs and 31.3).

Conclusions

BPDS can produce robust weight loss and maintenance of weight loss in morbidly obese patients with careful patient selection and close follow up for short and long term complications.

T-2631-P: Laparoscopic Sleeve Gastrectomy Outcomes up to Two Years after Surgery
**Background**

Sleeve gastrectomy (SG) was originally performed as part of biliopancreatic diversion with duodenal switch (BPDS). In high risk patients, SG can be the first step of staged procedures. It is becoming recognized as a stand-alone procedure. We examined a large sample of SG patients at a single center.

**Methods**

This retrospective chart review examined 432 laparoscopic sleeve gastrectomy surgeries performed at the St. Vincent Carmel Bariatric Center of Excellence from May 2, 2006 to February 28, 2014. Surgical complications, reoperations, and weight loss were examined.

**Results**

Patients were 75.5% female and 85.0% Caucasian, 44.4 years old with presurgery weights and BMIs of 294.2 lbs and 47.0 kg/m2. Length of stay was 1.9 days, 7.1% were readmitted for nausea, leak, infection, pain, or dehydration, and 1.4% had endoscopies within 30 days. Patients lost 68.2% excess weight 1 year after surgery (weight and BMI of 205.9 lbs and 32.8 kg/m2) and maintained 65.0% excess weight loss at 2 years (weight and BMI of 215.3 lbs and 33.6 kg/m2). Two patients had revision surgery. Both received BPDS at 2 and 3 years after SG.

**Conclusions**

Laparoscopic SG was safe and effective, achieving weight loss similar to roux-en-Y gastric bypass. Longer term comparative effectiveness studies remain necessary.

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**T-2632-P: Improving Nutrition Knowledge, Attitudes and Behaviors with a MyPlate Intervention in a Military Dining Facility**

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**Background**
The USDA’s MyPlate is a visual model of the recommended distribution of 5 food groups. It was hypothesized that a MyPlate intervention in a military dining facility (DFAC) would improve MyPlate awareness, nutrition knowledge, and self-reported nutrition attitudes and behaviors of US Army Soldiers.

**Methods**

The MyPlate intervention consisted of four components: (1) plates whose surface depicted the MyPlate model, sized appropriately for portion guidance, replaced plain plates, (2) MyPlate trays replaced plain trays, (3) foods were labeled with their appropriate MyPlate quadrant or circle, and (4) posters introduced the new plates, trays, and food labeling system. Military participants (15 men, 3 women, age = 30 ± 13) ate lunch in the DFAC for six weeks: a two-week baseline, a two-week MyPlate intervention, and a two-week post-intervention period. MyPlate awareness, knowledge, attitudes, and behaviors were measured with surveys at Week 1 and Week 6.

**Results**

From pre- to post-intervention, MyPlate awareness increased from 7 to 17 participants, correct labeling of the dairy circle increased from 6 to 15 participants, and correctly naming all 5 food groups on a MyPlate diagram increased from 5 to 15 participants (p’s < 0.01). From pre- to post-intervention, participants were significantly more likely to agree that it is possible to eat all 5 food groups at every meal, that eating from the 5 food groups is important, and that they are trying to eat from the 5 food groups every day (p’s < 0.05).

**Conclusions**

A brief MyPlate intervention in a military DFAC was an effective tool for improving nutrition knowledge and self-reported attitudes and behaviors in US Army Soldiers.

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**T-2633-P: Vitamin D Status after Biliopancreatic Diversion: A Brief Retrospective Report**

*Abigail J. Cole, BS; Carrie P. Earthman, PhD, RD; Matthew W. Grabau, Bachelor of Science - Exercise Physiology; Daniel B. Leslie, MD; Bridget M. Slusarek, RN BSN; Shalamar D. Sibley, MD;*

**Background**

Vitamin D (VitD) deficiency is commonly reported post bariatric surgery though not well studied following biliopancreatic diversion (BPD).

**Methods**

We conducted a retrospective chart review of individuals who underwent BPD at the Bariatric Surgery Center during 2013 and who had at least one serum 25-hydroxyvitamin D (25OHD) measurement; we
compared pre- and ~1 year post-BPD (T1) 25OHD in the individuals who had at least 2 available measurements around that timeframe (n=14, 11 women and 3 men).

**Results**

Mean age was 38.6 +/- 12.5 years; 4 had diabetes. Six of 14 had a subsequent 25OHD at ~1.5 years post-BPD (T2). At T1 mean weight loss was -78.5 +/- 30 lbs. Mean pre-BPD 25OHD was 26.4 +/- 11.7 ng/ml; 6 were between 20 and 29 ng/ml, 4 <20 ng/ml. Eleven of 14 were prescribed VitD (~3000 IU/d) post-operatively. Mean T1 25OHD was 31.2 +/- 12.9 ng/ml; 8 were between 20 and 29 ng/ml, 2 <20 ng/ml. From T1 to T2 (n=6), 25OHD trended lower, from 30.1 +/- 12.8 ng/ml to 26.3 +/- 13.4 ng/ml, P=0.068. Only 1/6 was prescribed 50,000 IU/d VitD between T1 and T2.

**Conclusions**

Clearly there is a need for data driven clinical protocols to standardize treatment for VitD deficiency before and after BPD, and to enhance compliance with treatment.

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**T-2634-P: Motivation, Self-Efficacy and Weight Loss within a Multi-Arm Weight Loss RCT**

*Alyssa Singer; Charles Swencionis, PhD; Judith Wylie-Rosett, Ed.D., RD;*

**Background**

Research on the relationship between motivation, and dieting and exercise self-efficacy, and weight loss has produced inconsistent findings. Thus, this study aims to explore and clarify the relationship between these constructs.

**Methods**

This study evaluated 472 participants who were part of a larger RCT. Participants were recruited from the Community Health Plan affiliated with LIJ Medical Center and randomized into three groups of progressive increasing intensity: workbook only, computer intervention and computer intervention plus staff. Weight and height were collected at baseline and 12 months. Initial body mass index (BMI) had an average of 35. Participants also completed the Dieting Readiness Questionnaire, the Eating Habits Confidence Survey and the Exercise Confidence Survey at baseline. We hypothesized that motivation and self-efficacy would be related to change in BMI regardless of group assignment.

**Results**

Factor analyses confirmed that each survey examined a unitary construct, yet Pearson's product moment correlations found no significant relationship between change in BMI and motivation and self-efficacy
surveys. Mean difference for change in BMI was significant for the highest intensity intervention group ($M = -1.24$, $SD = 2.62$) when compared to the lowest ($M = .36$, $SD = 2.08$), ($F(2, 466) = 4.41$, $p = .01$).

**Conclusions**

Findings suggest initial motivation is less related to weight loss than is clinical support. It is unclear how motivation and self-efficacy fluctuated throughout the study. Weight loss programs may be enhanced by utilizing and incorporating supportive elements.

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**T-2635-P_DT: Racial Variation in Clinical Outcomes Following Adjustable Gastric Band (AGB): Analysis of 67,514 Surgical Review Corporation BOLD Database Patients**

*Justin Kucinski, DO; Gus Slotman;*

**Background**

Overall AGB results for weight loss and resolution of obesity co-morbidities are known. However, differences in treatment responses to AGB by race have not been investigated. This study identified variations by race in weight and BMI and in the distribution of obesity co-morbidities following AGB.

**Methods**

Data from 67,514 AGB patients in the Surgical Review Corporation's BOLD database was analyzed retrospectively in four groups: African-American (AA, $n=7,601$), Caucasian (C, $n=50,283$), Hispanic (H, $n=4,188$), Asian (A, $n=140$), and Other (Pacific Islands, Native American, or $>1$ race recorded; O, $n=5,302$). Weight, BMI, and prevalence of obesity co-morbidities in each group were tabulated at 2, 6, 12, 18, 24 and 36 months post-operatively. Outcomes analysis used General Linear Models that included baseline and post-operative data, and were modified for binomial distribution of dichotomous variables. Pair-wise comparisons of results for AA,C,H,A,O versus each other were made at each interval.

**Results**

Weight and BMI were AA > C,H,O to 36 mos. ($p<0.0001$). To 24 months hypertension was highest AA>C and lowest H>O ($p<0.001$). Increased diabetes A,AA,C,H, and sleep apnea, asthma, and back pain in AA,C,H at 2,6 months ($p<0.001$) resolved at 12 months. Dyslipidemia was highest C,A to 12 months ($p<0.05$). Abdomen panniculitis, GERD, liver disease, stress incontinence, gout, musculoskeletal pain, leg edema, depression, psych impairment, cholelithiasis were highest in C up to 18 months ($p<0.05$).
Conclusions

AGB outcomes vary by race. AA weight loss was less than C, H, A, O. Hypertension persisted long-term in AA, C. Metabolic co-morbidities resolved least in A. Overall resolution of co-morbidities is lowest for C and best for H, O. Racial variations should be considered in identifying patients for AGB.

T-2636-P: Can We Identify Patients at Risk for Poor Attendance to Routine Follow-Up Visits Following Weight Loss Surgery?

Stephanie Sogg, PhD; Jeffrey B. Conti, BA; Noreen Reilly-Harrington, PhD; Mark J. Gorman, PhD:

Background

20-40% of weight loss surgery (WLS) patients experience suboptimal weight loss outcomes. Research indicates that nonattendance at post-WLS follow-up visits is related to poorer weight loss outcome. Therefore, early identification of patients at risk for poor attendance to follow-up visits is vital.

Methods

We prospectively examined potential predictors of 1-year follow-up visit attendance for 283 consecutive WLS patients. Potential preoperative predictors included Axis I diagnoses/symptoms, eating disturbances, current/past substance use/abuse and 'food addiction' (Yale Food Addiction Scale/YFAS). In light of evidence that poor early post-surgical WL predicts both poorer follow-up attendance and poorer long-term WL, we examined 6-month WL as a potential predictor of 1-year visit attendance. Weight loss was measured as percentage of baseline body weight lost. We compared the mean 6-month WL in those patients who attended their 1-year visit and those who did not (Welch's two-sample t-test).

Results

Of 283 consecutive patients, 42 have 6-month WL data, and have had the opportunity to attend their 1-year visit. Of these, 24 attended their 1-year visit (57% +/- 8%). Patients attending the 1-year visit lost significantly more weight than those who did not (28.0% +/- 1.0% vs. 24.1% +/- 1.4%, P=0.04). In addition, a trend was observed for patients with higher YFAS scores to be less likely to attend the 1-year visit (6.4 +/- 0.5 for those who attended, vs. 8.0 +/- 0.7 for those who did not; P=0.07). Note: our sample will be >200 by Obesity Week

Conclusions
These findings suggest 2 identifiable early risk factors for suboptimal outcomes. Patients with 'addictive' eating or poor early WL may be at risk for nonattendance at follow-up visits, & thus also at risk for poorer long-term WL and may benefit from interventions designed to enhance visit adherence.

**T-2637-P: Bipolar Disorder and Weight Loss Surgery: Weight Outcomes and Attendance at Post-Operative Visits**

*Background*

Obesity affects 68% of patients with Bipolar Disorder (BD) and is linked to worsened mood episodes and suicidality. While BD patients may be denied access to weight loss surgery (WLS), only one study directly examined the impact of BD on post-surgical weight loss and found no difference in outcome.

*Methods*

We prospectively investigated whether a diagnosis of BD (Bipolar I, Bipolar II, or Bipolar NOS) affected weight loss (WL) outcomes following WLS. We compared mean 6-month WL in patients with and without BD (Welch's two-sample t-test). WL was measured as percentage of baseline body weight lost. Given the importance of attendance at post-operative visits as a factor influencing long-term weight outcomes, we also examined whether having BD affected attendance at 3, 6, or 12 month routine post-operative visits. The association between BD and attendance was assessed by chi-square tests on 2x2 tables of counts of attendance (Y/N) vs bipolar (Y/N) for each post-operative visit.

*Results*

Of 283 consecutive patients enrolled in our surgical program, 21 met our criteria for BD. Patients with BD did not differ from other patients in rates of attendance at 3, 6, or 12 month post-operative visits. WL data was collected for 120 patients at 6 months, with 8/120 patients (6.7%) having BD. WL at 6 months did not differ for the BD (25.1% +/- 7.3%) and non-BD (23.7% +/-6.0%) groups (p=0.61).

*Conclusions*

Patients with and without BD may have comparable 6 month WL and adherence to post-operative visits in the year following WLS. While BD patients may encounter delay/denial of WLS due to perceived low adherence or mood instability, more empirical data is needed to inform practice within this population.
T-2638-P: Adverse Impact of Obesity and Low Muscle Quality on Lower-Extremity Physical Function in Older Women

Chad R. Straight; Anne O. Brady, PhD; Ellen M. Evans, PhD;

Background

Obesity and low muscle quality (MQ) are both associated with poorer physical function in older adults; however, the combined effects are incompletely characterized. We investigated whether obesity and low MQ resulted in poorer lower-extremity physical function (LEPF) than obesity or low MQ alone.

Methods

Older women (n=97, 73.9 +/- 5.5 y, BMI = 26.6 +/- 4.7 kg/m2) underwent assessments for body composition via dual-energy X-ray absorptiometry and unilateral leg extensor power using the Nottingham power rig. Based on median splits of percent body fat (%Fat) and MQ (watts/kg of lower-body lean mass), participants were categorized into four groups: low %Fat and low MQ, low %Fat and high MQ, high %Fat and low MQ, and high %Fat and high MQ. A composite measure of LEPF was calculated by summing the Z-scores of three individual tests (6-minute walk, 8-foot up-and-go, 30-s chair stand). All statistical analyses were controlled for age and comorbidities.

Results

As expected, both %Fat (r = -0.46, p < 0.01) and MQ (r = 0.54, p < 0.01) were associated with composite LEPF. Women with high %Fat and low MQ had significantly poorer composite LEPF than all other groups (all p < 0.05). Relative to the low %Fat and high MQ group, women with high %Fat and low MQ performed 22%, 29% and 32% poorer on the 6-minute walk, 8-foot up-and-go and 30-s chair stand, respectively (all p < 0.05). Conversely, the high %Fat with high MQ group performed 19-31% better compared to the high %Fat with low MQ group (all p < 0.05).

Conclusions

In community-dwelling older women, obesity and low MQ results in poorer LEPF than either obesity or low MQ alone. These findings also suggest that adequate MQ, even in the presence of obesity, is paramount for maintaining physical function in older women.

T-2639-P: Nutrient Status 7 years after Bilio-Pancreatic Diversion with Duodenal Switch
Background

Background: Since the biliopancreatic diversion with the duodenal switch (Switch) produces gross malabsorption, evaluation of long term nutrient changes is appropriate.

Methods

Methods:: Measurements of micronutrients, trace elements, PTH, iron studies, protein, lipid profiles and Hb A1c were completed at baseline prior to surgery after participants had signed an approved consent and repeated at 1 and 7 years after surgery. Patients were advised supplements adjusted by blood studies and compliance checks. Independent t tests and ANOVAS compared changes.. A p value of 0.05 was considered as significant.

Results

269 patients had surgery. 191 (70% women), age 43yrs, BMI 52.9kg/m2 qualified for analysis. 193 were available at yr 1; 98 at 7 yrs. Gender distribution was NS. BMI was 33.3 at 1 yr & 30.1 at 7 yrs. Baseline Vit D was low & PTH high. Patients took some supplements. Yr 7 fat soluble vitamins remained low. Iron studies showed iron deficiency. Zn was low for 26%. Lipid profiles showed improvement except for HDL. Diabetes resolved. Total protein was significantly decreased. Significant year group differences were present for 74% of the variables.

Conclusions

Health improved to yr 7. Lipid profiles & HBA1c normalized. Between year 1 & 7 most nutrients stabilized, however low vitamins A (28%), D (56%) & B1 (17%) persisted. Protein deficiency and low Zinc developed. HCT was low for 40% of patients, HGB for 46%. This provides focus for clinical monitoring.

T-2640-P: Prospective, Pharmacoepidemiologic Database Analysis of Qsymia® (Phentermine and Topiramate Extended-Release [PHEN/TPM ER]) Usage from a Representative US Sample of Patients

Craig A. Peterson, MS; Xanna Steelman, BA; Antoinette Stroh, BS; Santosh T. Varghese, MD;
**Background**

Qsymia (PHEN/TPM ER) capsules CIV was approved by the US FDA in July 2012 for chronic weight management in combination with lifestyle modifications in adults with a body mass index (BMI) of >=30 or >=27 kg/m2 with >=1 weight-related comorbidity.

**Methods**

This Phase 4 post-marketing study examined demographics, weight-related comorbidities, and concomitant medication use among patients prescribed Qsymia to assess appropriate medical use. This analysis collected age and gender data from patients (pts) with >=1 recorded Qsymia prescription from 17 September 2012 to 28 February 2013, from the Qsymia Certified Pharmacy Network database (n=30,426). Separately, age, gender, weight-related comorbidities, and concomitant medication use were acquired from the Humedica Electronic Health Record (HEHR) database (n=727).

**Results**

In both databases, mean age was 49 years and 78% were female. In the HEHR database, 43% were Caucasian, 6% African American, 0.6% Asian, and 50% unknown/other; mean BMI=37kg/m2 (78% had BMI >=30 and 49% BMI >=35) with <2% having BMI <=25. In the HEHR database, 50% had dyslipidemia, 42% hypertension (HTN), and 19% type 2 diabetes mellitus (T2DM). Among those with a BMI >=35, 54% had dyslipidemia, 51% HTN, and 27% T2DM. In addition, 45% were taking antihypertensives, 26% antidiabetics, and 22% antidepressants (including SSRIs and SNRIs).

**Conclusions**

These data demonstrate consistencies in pt demographics, weight-related comorbidities, and concomitant med use among pts prescribed Qsymia, CONQUER clinical trial pts, and labeled indication, confirming medically appropriate individuals are using Qsymia as intended for chronic weight management.

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**T-2641-P: Participation in Worksite Health Promotion Programs and Weight Loss in Obese Workers: Results from the Live for Life study**

*Marissa Stroo; Rebecca JN. Brouwer, MS; Truls Ostbye, MD, PhD;*

**Background**

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Workplace weight management programs can result in at least short-term, modest weight loss. However, little is known about how employee weight loss is impacted by level of engagement in these programs, and the impact of concurrent participation in other health promotion programs.

Methods

The study evaluated two worksite weight management (WM) programs (WM: educational program versus WM+: behavioral program), in a population (n=550) of obese (BMI >=30) employees, using a randomized-controlled design. We explored the association of intervention engagement as well as concurrent participation in 1) other free weight-related programs within the worksite (e.g., stairway walking programs), 2) paid offerings within the worksite (e.g., diet and fitness center membership), and 3) paid external offerings (e.g., Weight Watchers) on weight change overall and by study arm. Participation in the weight management programs was categorized into 4 levels (No participation to full participation). Participation in paid worksite programs and in external programs, were categorized into 3 levels (None, 1 program, or 2+). Free programs within the worksite were categorized into 3 levels (None, 1-3 programs, 4+). Multivariable linear regression analyses were used to assess the association of participation on percentage of weight change.

Results

Participants with the highest levels of participation in either study arm lost more weight than those with lowest (-0.12 vs. -2.75 lbs.). High participation in the free worksite programs was significantly related to weight reduction (b=-1.33, SE=0.46, p=0.004). In testing for arm differences, greater participation in paid external programs was associated with a significant increase in weight loss in the WM arm (b=1.65, SE=0.78, p=0.04), while participation in free programs was associated with increased weight loss in the WM+ arm (b=-2.45, SE=0.67, p=<0.001).

Conclusions

Acknowledging that these associations may be partly explained by unmeasured confounders, the results suggest that while worksite weight management programs show some positive effects, employers should also encourage employees to take full advantage of a variety of other worksite programs for even greater results.

T-2642-P: Food Cravings and Food Consumption Following Roux en Y Gastric Bypass Versus Cholecystectomy Controls

Ranjan Sudan, MD; Elizabeth R. Lyden, MS; Jon Thompson, MD;

Background
Food cravings and consumption of craved foods after a Roux-en-gastric bypass (RYGB) are poorly understood. We studied these in RYGB and controls. This information may explain why some patients fail to change eating behaviors after RYGB and to provide better information for nutritional counselling.

**Methods**

RYGB patients (n=50) and controls undergoing cholecystectomy alone (CC) (n=38), completed a validated food craving inventory (FCI) before operation, and at 2 and 6 weeks postoperatively. In addition, RYGB completed FCI at 12, 24, 36 and 52 post-operatively. A linear mixed effect model with a first-order autoregressive structure for correlations was used to evaluate changes in food consumption and food cravings between visits. Correlations between food cravings and BMI or weight changes, before and after RYGB were assessed with Spearman correlation coefficients. P < 0.05 was considered statistically significant.

**Results**

Food consumption was lowest at 2 weeks after RYGB, and after that increased progressively over time in the first year, but remained below that of pre-surgery (overall p <.0001). However, fast food and high fat cravings were significantly lower only at 2 weeks, and sweets at 2 weeks and 6 weeks compared to pre-surgery (p<0.05). For RYGB, total food consumption correlated moderately with higher preoperative BMI (r=0.3, p=0.03) as did high fats and sweets cravings. Compared to CC, food consumption was significantly lower after RYGB but not cravings.

**Conclusions**

Food consumption was low in the first year after RYGB and gradually increased with time but, food cravings were not different beyond 6 weeks compared to either before RYGB or after CC. These findings suggest that RYGB may limit food consumption but, not affect the drive to consume certain food type.

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**T-2643-P: Do The Obese Eat Faster than the Lean? Insights from a Novel Portable Sensing Device**

*Diana Thomas, PhD; Mirna Halawani, Undergraduate; Steven B. Heymsfield, MD; Adam Hoover, PhD; Jenna L. Scisco, PhD; Eric Muth, PhD; Corby K. Martin, PhD;*

**Background**

Eating bite rate studies have long established that obese subjects eat faster than the lean. Past studies were limited because investigators needed to directly measure bite rates using laboratory devices.

**Methods**
Two subject cohorts wore a wrist worn sensor that detects movement from the hand to the mouth. The first group (117 females and 99 males) ate one meal in a cafeteria at Clemson University. The second cohort (39 females and 38 males) wore the sensor in their usual free-living environment for a continuous period of 3 days where meals and bite rates were automatically detected through internal sensor algorithms. Regression models and quartile analysis were performed to examine the relationship between bite rates, BMI, and eating duration in both cohorts. Regression was again applied to determine relationships between total energy intake and eating duration in the cafeteria cohort.

**Results**

BMI did not predict eating bite rate in either cohort. Bite rates were fairly constant between cohorts with highest bite rates observed in normal weight subjects. The quartile analysis revealed that eating duration was positively associated to BMI. Eating duration \( p<0.0001 \), age \( p=0.011 \) and gender \( p=0.005 \) were predictors of total energy intake in the cafeteria data. There were differences in quartile analysis between cohorts.

**Conclusions**

Obesity is not related to eating bite rates. Meal duration is a predictor of total consumed energy intake and is associated with higher BMI. The differences between cafeteria and free-living subjects suggest caution is needed when extrapolating laboratory results to free-living humans.

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**T-2644-P: Roux-en-Y Gastric Bypass Patients Have Increased Sedation Requirements for Routine Endoscopy**

*Christopher Thompson, MD, MHES, FACG, FASGE; Nitin Kumar, MD; Christopher C. Thompson*

**Background**

Many patients experience marked changes in their metabolism after Roux-en-Y gastric bypass (RYGB) that may impact sedation requirement during endoscopy. This study aims to determine if there is a difference in sedation dose during esophagoduodenoscopy (EGD) performed on patients before and after RYGB.

**Methods**

*Database:* The database consisted of all RYGB patients who underwent EGD under conscious sedation at a tertiary center over a 4 year period. **Methods: Part 1:** A retrospective matched cohort study. Two hundred RYGB patients were randomly selected, and matched 1:1 to 200 patients without RYGB by age, gender, and body mass index (BMI). Sedative doses during EGD were compared using Student's \( T \)-test. Additionally, multivariable linear regression was used to determine predictor(s) of sedation dose in the RYGB group. **Part 2:** A subgroup analysis on RYGB patients from the database who underwent EGD both before and after gastric bypass. Sedative dosages were compared using a paired \( T \)-test.
Results

200 RYGB patients (45±11 y, 12M/188F, BMI 34.0±7.1 kg/m2) were matched to 200 controls (45±11 y, 12M/188F, BMI 34.1±7.2 kg/m2). Mean fentanyl and midazolam doses in RYGB and control were 132.4±40.4 mcg vs 108.6±31.6 mcg (p < 0.001), and 5.4±1.5 mg vs 4.3±1.2 mg (p < 0.001). History of RYGB was the strongest predictor of high sedation doses (p < 0.01). 33/519 had EGD before and after RYGB. Mean fentanyl and midazolam doses before and after RYGB were 95.0 ± 39.0 mcg vs 130.5 ± 41.3 mcg (p < 0.05), and 4.0 ± 1.0 mg vs 5.5 ± 1.7 mg (p < 0.05).

Conclusions

RYGB patients required higher doses of sedation during EGD compared to non-RYGB with similar age, gender and BMI. History of RYGB was the strongest predictor of a higher sedative dose during EGD in this population. Pharmacokinetics in the RYGB population warrant further investigation.

T-2645-P: Reducing Bariatric Surgery Length of Stay Through Multidisciplinary Teach-Back

Melissa Tilford; Celia Thompson, BSN RN; Ben Joe, Pharm. D.; Debbie Webb, RD; Moreva Lopez, RN; Donna Nicholas, RN; Michelle Duckworth, RN;

Background

Studies have established hospital length of stay (LOS) strongly correlates with increased risk of in-house and postoperative complications. The purpose of this study was to identify if early education can improve the bariatric surgery patient LOS and participation in post-operative care.

Methods

A multidisciplinary committee comprised of nursing, nutrition and pharmacy developed a Teach-Back Tool for the bariatric patients in a New Level 2 Surgery Center. This was designed around a daily checklist, which included the following topics: smoking cessation, dietary progression, deep vein thrombosis prophylaxis, respiratory care, physical activity, pain management, nausea and vomiting management, vitamin and mineral regimes, long-term follow-up schedule and parameters for notifying the attending surgeon upon discharge. Teach-back began two weeks prior to surgery during preoperative classes and continued through discharge.

Results

A comparison was performed based on data ten months prior to and four months post implementation. Patient understanding was confirmed when patient explained information in their own words/perform a
Conclusions

Collaboration with patients in their treatment plan empowers patients to take an active role in their healthcare thereby enhancing a shorter LOS and potentially decrease complications.

T-2646-P: Changes in Diet Restraint and Sweet Craving Predict Weight Regain in the POUNDS LOST Trial

Jenny Tong, MD; Dennis Hanseman, PhD; Nancy M Laranjo, BA; Vincent Carey, PhD; George Bray, MD; Donald A. Williamson, PhD; Lu Qi, MD, PhD; Benjamin J. Harsh; Stephen D. Anton, PhD; Frank M. Sacks, MD;

Background

Dietary interventions for weight loss are typically associated with low long-term success rates due to high rates of weight regain. We aimed to identify behavioral and psychological factors that predict weight regain in the Preventing Overweight Using Novel Dietary Strategies (POUNDS LOST) trial.

Methods

A total of 811 overweight and obese participants (age 51 ± 9 y [mean ± SD], 64% female, BMI 33 ± 4 kg/m2) were randomly assigned to one of four diets with targeted percent energy from fat, protein and carbohydrates as 20-15-65, 20-25-55, 40-15-45, and 40-25-35 for 2 y. Logistic regression analysis was performed to identify predictors of weight regain (comparing highest vs. lowest quartiles of weight regain) after most participants achieved weight loss (-5.6 ± 7.0 kg) at 1 y. Chi-square test was performed to compare weight regain among diet assignments.

Results

Between 12 and 24 months, 82% of the participants regained some of their lost weight (2.2±4.1 kg). There was no difference in weight regain among the diet assignments (p=0.28). Greater craving for sweets, lower satisfaction with the diet, lower hunger, and greater cognitive restraint of eating at 1 y were positively associated with weight regain. Additionally, increases in disinhibited eating, hunger, craving for sweets, and decrease in cognitive restraint of eating over the second year of intervention were associated with more weight regain.

Conclusions
Our findings suggest that changes in dietary restraint (weaker) and craving/overeating (more) were the most likely factors that resulted in weight regain. Future interventions that target these at risk behaviors may lead to a more sustainable weight loss.

**T-2647-P: Quantitative Magnetic Resonance Estimates of Total Body Water at 4 Year Post-Bariatric Surgery**

*Tatiana Toro-Ramos, PhD; Wenwen Yu, M.S.; Susan Lin, PhD; Alfons Pomp, MD; Gladys Strain, PhD; Anita Courcoulas, MD, MPH; Bret Goodpaster, PhD; James DeLany, PhD; Dympna Gallagher, EdD;*

**Background**

This study evaluated the validity of quantitative magnetic resonance (QMR, ~0.0068 Tesla), EchoMRIAH system (Echo Medical, Houston, TX) in estimating total body water (TBWQMR) in post-bariatric surgery adults using the 3-hour deuterium oxide dilution (TBW2O) technique as a basis for comparison.

**Methods**

21 fasted overweight and obese adults (7 M, 14 F) from the Longitudinal Assessment of Bariatric Surgery study had assessments performed on same morning at 43.4±10.0 months post-surgery. The relaxation time of the hydrogen ions in water, when placed in the QMR magnetic field, was used to estimate the total amount of body water. Agreement between TBWQMR and TBW2O was evaluated using a Bland-Altman plot. T-test tested between method differences. Using linear regression adjusting for body weight and height TBW2O predicted 87% of the variance in TBWQMR.

**Results**

Mean values were: weight 97.9±19.4 kg (pre-surgery weight: 134.1±24.7 kg), BMI 34.4±6.3 kg/cm², TBW2O 41.0±8.8 L; TBWQMR 40.2±8.2 L. Agreement between methods was high and there was no proportional bias, although limits of agreement were wide (TBW: -5.13 - 6.78 L). There were no statistically significant differences between methods (mean difference -0.82 ± 3.0 L, p = 0.23). Methods were highly correlated for TBW (R = 0.94). A linear relationship was found between methods: TBWQMR (L) = 9.89+0.87* TBW2O, r²=0.88, SEE=2.96 L.

**Conclusions**

QMR for the non-invasive assessment of TBW post-bariatric surgery may be useful at the group level.
T-2648-P: Parents Who Disagree that Their Child is Overweight: What Do They Want When Visiting the Pediatrician (MD)?

Christy B. Turer, MD; Glenn Flores, MD;

Background

Weight-management-strategy preferences in parents disagreeing (PD) that their child is overweight (OW) are unknown.

Methods

Mixed-methods analysis of a 20-question survey of parents of 2-18 year-old OW children in primary-care clinics assessing parental disagreement that child's OW (strongly disagree/disagree=PD v. strongly agree/agree/neutral=PA), most important thing MD can do to help child lose weight, helpfulness of 13 clinical practices (ranked 1-13, 1=most helpful), and preferred follow-up interval (f-up). Grounded theory was used to identify qualitative themes. Bivariate and multivariable analyses examined associations of PD with clinical-practice helpfulness and preferred f-up. Multivariable models included child weight status, race/ethnicity (African-American [AA], Latino [L], and white [W]), and income.

Results

15% of 219 parents disagree their child's OW, more commonly those of OW (68% v. obese 29% and severe obese 3%) and AA (56% v. L 38% and W 0%) children, and lower income. Major themes for how MD can help that occurred only with PD were change how weight's assessed and use race-specific scales. All parents ranked check for weight-related problems as most helpful (mean, 3) and preferred 10-week f-up. After adjustment, PD ranked parental role-modeling (ÄŶ=-1.4, P=.02) and reduce screen time (ÄŶ=-2.0, P=.01) higher than PA, with no differences in f-up.

Conclusions

Whereas both PD and PA want MD to check for weight-related problems and f-up regularly, PD want weight assessments changed and rank as most helpful weight-management strategies that include parental role-modeling and reducing screen time.

T-2649-P: Comparison of Weight Loss with Prescription Anorectic Medications
or Herbal Appetite Suppressant Supplementation in a Physician-Supervised Weight Loss Program

Sara VanWyk, MPH, CPH; Sara L. VanWyk, MPH, CPH; Edward Zbella, MD, CPI, FACOG, FACS; Sejal Shah Alvarez, MD, FAAP;

Background

Debate exists regarding the effectiveness of herbal appetite suppressants for weight loss. This investigation assesses the relationship between the use of phentermine, phendimetrazine, or an herbal dietary supplement (HDS) and weight loss in a physician-supervised weight loss program.

Methods

Investigators performed a retrospective chart review of patients that were prescribed either phentermine, phendimetrazine, or an HDS that contains *Hoodia gordonii* (a natural appetite suppressant) over a two-year period in a physician-supervised weight loss program. Prognostic factors, such as baseline age and BMI, starting month, and gender, were examined for weight loss by multivariate analysis with Cox proportional hazard modeling. Weight loss was assessed as achievement of a 3 point reduction starting BMI.

Results

A total of 2,927 patients were retrospectively reviewed (phentermine=811, phendimetrazine=1,725, HDS=391). Baseline age and BMI, treatment group, and gender each contributed significantly to the Cox regression model on weight loss. Phentermine was associated with a 1.456-fold greater rate of weight loss compared with HDS (CI 1.279; 1.657). Phendimetrazine was associated with a 1.201-fold greater rate of weight loss compared with HDS (CI 1.068; 1.352).

Conclusions

Our findings are consistent with other studies that have linked patients' weight loss outcomes to use of anorectic medications. Results indicate that patients who are prescribed phentermine and phendimetrazine lose weight at a greater rate than patients who receive an HDS.

T-2650-P: Identification and Proof of Mechanism for Botanical Inhibition of Intestinal DGAT1
Rodney A. Velliquette, PhD; Jeff Scholten, PhD; Kerry Grann, DrPH; Kristin Morris, PhD; Kevin Gellenbeck, PhD; Charles (Chun) Hu, PhD; R Keith Randolph, PhD;

Background

Diacylglyceride Acyltransferase 1 (DGAT1) is the enzyme that adds the final fatty acid on to a diacylglyceride during triglyceride (TG) synthesis. DGAT1 plays a key role in the assimilation and transport of dietary TG. Exaggerated postprandial circulating TG is an indicator for metabolic disorders.

Methods

In an effort to develop a natural product that inhibits DGAT1, we screened an internal botanical library with a primary cell-free DGAT enzyme assay; activity of the botanical extracts with IC50 <= 50Åµg/mL was confirmed in a secondary cellular DGAT1 assay. Resulting lead botanical extracts were examined in a parallel, double-blind, placebo-controlled proof of mechanism clinical study. Eighty-nine healthy, overweight subjects were randomized to receive 2 grams daily of individual extract or placebo for 7 days. The serum TG levels in response to a high fat meal (HFM) challenge (83.5% fat, 12% carbohydrate, 4.5% protein), were measured before and after 7 days of supplementation.

Results

Four lead botanical candidates were identified from in vitro screening: whole grape extract (WGE), red raspberry leaf extract (RLE), apricot/nectarine extract (ANE) and apple peel extract (APE) (IC50 = 1.9, 9.8, 3.5 and 1.4Åµg/mL, respectively). Compared to placebo, only WGE significantly reduced the TG excursion to the HFM. There were no significant dose or diet related gastrointestinal side effects reported.

Conclusions

These data support the attenuating effect of WGE on postprandial TG excursion and the proof of mechanism for intestinal DGAT1 inhibition. This is the first human clinical evidence of a botanical extract inhibiting intestinal DGAT1.

T-2651-P: Predictors of Initiation of a Behavioral Weight Loss Intervention

Corrine Voils, PhD; Janet Grubber, MSPH; Maren K. Olsen, PhD; Megan McVay, PhD; Jennifer Gierisch, PhD, MPH; Matthew Maciejewski, PhD; William Yancy, Jr, MD;

Background

Patients often show an initial interest in a behavioral weight loss intervention yet do not initiate the intervention. We compared eligible patients who did and did not initiate a trial-based behavioral weight loss program on demographic and psychosocial variables.
Methods

Data are from an ongoing trial in which obese outpatients at the Durham Veterans Affairs (VA) Medical Center complete a 16-week, group-based weight loss intervention; if >=4kg weight loss is achieved, then patients are randomized to a maintenance intervention or usual care. Potential participants attended an in-person screening appointment during which consent was obtained, eligibility was assessed, and psychosocial measures were administered. Bivariate associations between these measures and intervention initiation (i.e., provided a baseline weight corresponding to the first session) were tested with Chi-square and Wilcoxon rank-sum tests.

Results

Of the 572 eligible outpatients, 504 initiated the intervention, and 68 did not. Compared to initiators, non-initiators perceived less encouraging social support for diet (p=.02), reported absence of a support person (p=.003), had more favorable expectations about physical fitness (p=.02), and were more likely to be female (p=.002) or Black (p=.01). There were no differences by previous weight loss attempt; self-efficacy, intrinsic or extrinsic motivation, or behavioral intentions for diet or physical activity (PA); or social support for PA.

Conclusions

Efforts to retain people who have shown initial interest in behavioral weight loss trials may incorporate strategies targeting females (in male-dominated environments such as VA), minorities, and people lacking social support to enhance motivation for initiation of behavioral weight loss programs.

T-2652-P: Validation of Stable Isotopes of Biomarkers of Meat, Fish, and Soda Intake

Susanne B. Votruba, PhD; Diane O'Brien, PhD; Jonathan Krakoff, MD;

Background

Ratios of naturally occurring stable isotopes have potential as accurate, inexpensive dietary biomarkers. The aim of our study is to use stable isotope ratios of carbon (13C/12C) and nitrogen (15N/14N) to distinguish intakes of fish, meat, and soda.

Methods

Sixteen men (42+-9 yrs, BMI 26.4+-.3.8 kg/m2) were inpatients at the NIDDK in Phoenix, AZ, for 14 weeks. Dietary effects on plasma and RBC 13C and 15N were tested using a factorial design, with three intake variables (meat/fish/ soda) present at two levels (present/absent), against a common, background diet (50%cho, 30%fat, 20%pro). Blood was drawn biweekly and hair was sampled post diet intervention.
Measurements were conducted via continuous flow IRMS. Plasma and RBC data were analyzed with factorial ANCOVA, including week as a covariate and diet X week interactions. Only significant main effects are presented here. Hair data were analyzed with factorial ANOVA.

**Results**

The carbon isotope ratio of plasma was elevated when diets included soda ($\bar{\Delta}Y = 0.22 \pm 0.05, P < 0.0001$) and meat ($\bar{\Delta}Y = 0.19 \pm 0.05, P = 0.0001$). The nitrogen isotope ratio of plasma was elevated when diets included fish ($\bar{\Delta}Y = 0.28 \pm 0.03, P < 0.0001$) and meat ($\bar{\Delta}Y = 0.22 \pm 0.03, P < 0.0001$). Results were similar for RBC. In hair, the carbon isotope ratio was elevated when diets included soda ($\bar{\Delta}Y = 0.77 \pm 0.3, P = 0.02$), and the nitrogen isotope ratio was elevated when diets included fish ($\bar{\Delta}Y = 0.4 \pm 0.2, P = 0.02$) and meat ($\bar{\Delta}Y = 0.5 \pm 0.2, P = 0.005$).

**Conclusions**

These results indicate that measurement of the natural enrichment of 13C/12C and 15N/14N in plasma, RBC, and hair may serve as biomarkers for meat, fish and soda intake, and establish a role for tissue stable isotopes in distinguishing longer term dietary patterns.

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**T-2653-P: Plasma Fatty Acid Profile and Prevalence of Essential Fatty Acid Deficiency Following Gastric Bypass Surgery**

*Kelly Wagner; Breanne Wright, MS; John Burgess, PhD; Nana Gletsu-miller, PhD;*

**Background**

Roux-en-Y gastric bypass (RYGB) promotes intestinal fat malabsorption but whether this leads to essential fatty acid deficiency (EFAD) is unknown. We conducted a retrospective, cross-sectional characterization of plasma fatty acid profiles of individuals who varied in length of time following RYGB.

**Methods**

Plasma phospholipids were extracted from RYGB patients ($N=23$) after a 10 hour fast and analyzed by capillary gas chromatography. Fatty acids were identified using standard references (Sigma-Aldrich, St. Louis, MO); concentrations were expressed as a percentage of total. The formation of Mead acid (20:3n-9) exceeding 0.21% of total fatty acids is established by Siguel et al, (Clin Chem,1987) as a functional marker of EFAD. Data is presented as mean +- standard error and range. Pearson correlations were used, $P < 0.05$.

**Results**
Subjects were female (96%), Caucasian (90%), age 49+-1.5 (33-85) years, body mass index (BMI) 31.0+-2.8 (21-53) kg/m2, and 5.3 +1.2 (1-27) years post-surgery. Plasma fatty acid concentrations were palmitate, 28.3%, stearate, 18.7%, linoleic acid, 18.7%, oleic acid, 13.31%, arachidonic acid, 10.27%, Mead acid, 0.10%, eicosapentaenoic acid, 0.38%, and docosahexaenoic acid, 1.77%. EFAD was detected in 17.4% of individuals. Only arachidonic acid concentrations varied with length of time following surgery, R = -0.45, P = 0.03.

Conclusions

EFAD is prevalent following RYGB, but the severity is not clear since clinical manifestations (ectopic fat accumulation, alopecia, brittle nails, infertility, and nerve dysfunction) were not assessed. Future studies should characterize EFAD following RYGB with a goal towards prevention and treatment.

T-2654-P: Psychometric Properties of the Control of Eating Questionnaire for the Experience of Food Cravings: Validation in Overweight and Obese Adults in An Integrated Analysis of Phase 3, Randomized, Double-Blind, Placebo-Controlled Trials of Sustained-

Michelle Dalton, PhD; Graham Finlayson, PhD; Brandon Walsh, PhD; John Blundell, PhD;

Background

Food cravings are associated with overeating and obesity, and may have implications for successful weight loss. This analysis evaluated the psychometric properties and validity of the Control of Eating Questionnaire (CoEQ), a 21-item assessment of food cravings and mood over the previous 7 days.

Methods

This integrated analysis of four Phase 3 trials examined 3362 overweight or obese subjects who were randomly assigned to receive sustained-release (SR) naltrexone 32mg/day plus SR bupropion 360mg/day (NB; n=2043) or Placebo (PBO; n=1319) for 56 weeks. Participants completed the CoEQ at baseline and at Weeks 8, 16, 28, and 56. Principal components analyses (PCA) were conducted to examine the underlying structure of the CoEQ in the NB and PBO groups. The number of components retained was determined using parallel analysis. Subscales were constructed from the items that loaded on components and were tested for internal consistency by Cronbach's alpha.
Results

In the NB group, the PCA revealed 6 components that explained 70.1% of the variance. Parallel analysis determined 4 components should be retained, which explained 67.3% of the total variance: Craving Control; Craving for Sweet; Craving for Savory; and Positive Mood. This component structure was confirmed in the PBO group and replicated at each time point. Internal consistency for the components was very high (Iα=0.77 to 0.90). Changes in the craving components across the trial period were associated with 56-week weight loss (p<0.001).

Conclusions

The CoEQ comprises four sub-scales: Craving Control, Craving for Sweet, Craving for Savory, and Positive Mood, and is a psychometrically valid tool for research on the experience of food cravings. In this analysis, all CoEQ craving sub-scales were predictive of weight loss at 56 weeks.

T-2655-P: Food Craving and Weight Loss: An Integrated Analysis of the Effects of Sustained-Release Naltrexone/Bupropion (NB) on the Cravings and Mood Sub-Scales of the Control of Eating Questionnaire (CoEQ)

Michelle Dalton, PhD; Brandon Walsh, PhD; Amy E. Halseth, PhD; Graham Finlayson, PhD; John Blundell, PhD;

Background

NB is postulated to act in the hypothalamus and CNS reward pathways to elicit weight loss. In four Phase 3 trials, the CoEQ was used to assess food cravings and mood over the previous 7 days. The effect of NB on CoEQ components, and their relationship with weight loss, were evaluated.

Methods

An integrated analysis of CoEQ data from four 56-week Phase 3 trials of NB in overweight or obese subjects was performed. CoEQ was administered at baseline and Weeks 8, 16, 28, and 56. Analysis was performed on subjects who completed 56 weeks of NB (n=1238) or Placebo (PBO; n=720), and had weight and CoEQ measurements at baseline and Week 56. A principal components analysis of the CoEQ revealed 4 components explaining 67.3% of total variance: Craving Control (CR); Craving for Sweet (SW); Craving for Savory (SV); and Positive Mood (MD). Treatment differences were evaluated using ANOVAs and associations between CoEQ components and weight loss were examined using Pearson's correlations.
Results

NB significantly improved CR ($p<0.001$), SW ($p<0.02$), SV ($p<0.001$), and MD ($p<0.001$) compared with PBO. Early improvements in CR (Week 8, 16, and 28) and SW (Week 8) with NB vs PBO were independent of weight loss. The largest treatment effect was observed with CR, and CR improvement at each time point was associated with Week 56 weight loss ($p<0.001$). In the subset of subjects with body composition measurements, early CR improvement (Week 8) was associated with greater reduction in fat mass ($r=-0.39; p<0.001$) and BMI ($r=-0.40; p<0.001$) at Week 56.

Conclusions

Compared with PBO, NB resulted in improved CR and SW independent of weight loss, suggesting a direct effect of NB on cravings. Further, NB was associated with sustained improvement in all CoEQ sub-scales, and improvements in CR were associated with reductions in fat mass and BMI at Week 56.

T-2656-P: Effect of Lorcaserin on Weight Loss in Patients with Severe Obesity

Zhixiao Wang, PhD; Xuan Li, MS; Annette Powers, PharmD, MBA; Ken Fujioka, MD;

Background

Patients (pts) with severe obesity (SO) (BMI $\geq 40$ or BMI $\geq 35$ with $\geq 1$ obesity-related comorbidity) may be qualified for bariatric surgery (sur). However, some pts and payers are concerned about potential complications and high costs of sur. Effect of lorcaserin (lor) in pts with SO was assessed.

Methods

This is a post-hoc analysis of pts with SO at baseline (bl) from 3 phase 3 trials (BLOSSOM: NCT00603902, BLOOM: NCT00395135, BLOOM-DM: NCT00603291) evaluating the efficacy and safety of lor 10 mg bid vs placebo (pbo) for weight loss over 52 weeks; all pts received diet and exercise counseling. Average weight loss and percentage of patients who reduced their weight to below the SO threshold (BMI<35) were compared between patients treated with lorcaserin and those received placebo in the MITT/LOCF population with SO. Weight loss in pts with SO who lost 5% or more at week 12 (W12 responders), was also examined.

Results

Average weight loss is 5.9% in pts treated with lor (average BMI at bl: 39.1), vs 2.6% in the pbo (average BMI at bl: 39.2) ($P<0.001$). More pts with SO at bl had BMI reduced to below 35 at wk52 with lor vs pbo (30.8% vs 16.1%, $P<0.001$). More pts with SO were W12 responders with lor (47.3%) compared to those with pbo (21.9%). In the W12 responders with SO, average weight loss is 10.5% in pts treated with lor, vs 9.4% in the pbo. 53.9% of W12 responder pts with lor had BMI reduced to below 35 at wk52 compared to 43.0% with pbo.
Conclusions

The effect of lor in pts with SO suggests that it may be considered for pre-sur weight loss treatment or as a potential alternative to sur in this population. However, long-term clinical and economic data are needed to further evaluate the role of lor in pts with SO.

T-2657-P: The Profile of LPL Mass Before and After Bariatric Surgery in Japanese Patients with Morbid Obesity

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Background

Because LPL is produced mainly by adipocytes in insulin-dependent manner, LPL mass is a biomarker reflecting insulin sensitivity of adipocytes. LPL mass lowers with increase in the degree of obesity, however the profile of LPL mass in morbid obese patients were unclear.

Methods

In 26 Japanese patients with morbid obesity (BMI >35) who received bariatric surgery at TOHO University Sakura Medical Center (male/female=12/14, sleeve gastrectomy n=18, gastric bypass n=8, diabetes n=6, dyslipidemia n=13), we evaluated values of LPL mass and various parameters (body composition and glucose-lipid metabolic factors) at baseline and changes after bariatric surgery. In addition, we also evaluated the relationships between LPL mass and various parameters.

Results

At baseline, the value of LPL mass was low(45.9±29 g/dl), correlated negatively with triglyceride(r= -0.304) and positively with HDL-cholesterol(r=0.670). During the 12 months after bariatric surgery, mean BW(-33kg), visceral and subcutaneous fat area(-130cm²,-221cm²), HbA1C(-0.9%) and TG(-26mg/dl) were significantly decreased, HDL-cholesterol(+12mg/dl) was significantly increased. LPL mass showed slight decrease during the first month after surgery, and increased dramatically at 3M, continued slight increase to 12M (1M:38,3,3M:62,12 M:70).

Conclusions

In Japanese patients with morbid obesity, the value of LPL mass is low and correlates with TG and HDL-C. LPL mass increases after bariatric surgery in parallel with weight loss and improving glucose-lipid metabolism. LPL mass may reflect adipose tissue function in patients with morbid obesity.
T-2658-P: Effects of Simple Distraction Tasks on Self-Induced Food Cravings in Men and Women with Grade 3 Obesity  

Richard Weil; Simon Klebanov, PhD; Betty Kovacs, MS, RD; Andrew McClelland, PhD (Psychology);  

Background  
Cognitive tasks such as computer screen card sorting can successfully reduce food cravings but can be impractical for use in public. We tested four 30-second tasks, two of which can be performed discretely in public, to determine if they reduce self-induced food cravings in obese men and women.  

Methods  
We tested the effect of finger tapping the forehead and ear, toe tapping the floor, and staring at a blank white wall on self-induced food cravings. At baseline for each of their four favorite foods subjects (n=55) induced cravings and then immediately rated the craving intensity and image vividness. Then, each task was randomly assigned to a food and for each task subjects performed four 30-sec trials while thinking about the same (corresponding) food, followed immediately by rating the image vividness and craving intensity. Single factor repeated measures ANOVA was performed for cravings and images to test for significant changes between baseline and all trials.  

Results  
The effect of each task (control, forehead, ear, toe) on craving and image was analyzed by a single factor (trial: baseline, experimental trials 1-4) repeated measures ANOVA. Craving analysis revealed main effects for tasks: forehead (F [4,216]=22.2, p<0.001), toe (F [4,216]=8.3, p<0.0001), ear (F [4,216]=7.9, p<0.0001), control (F [4,216]=9.1, p<0.0001). Image vividness analysis revealed main effects for tasks: forehead (F [4,216]=20.2, p<0.0001), toe (F [4,216]=10.3, p<0.0001), ear (F [4,216]=12.9, p<0.0001), control (F [4,216]=10.98, p<0.0001.  

Conclusions  
Four simple 30-second distraction tasks, two of which can be performed discretely in public (wall and toe), significantly reduced the intensity and image vividness of self-induced food cravings in men and women with grade 3 obesity. The effect of forehead tapping was greater than the remaining tasks.  

T-2659-P: Effects of Bariatric Embolization on Weight Gain, Selected
Appetite-Driving Hormones of Obesity and Gastric Histology

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Background

Bariatric arterial embolization (BAE) is a new potential treatment for obesity where the gastric fundus is embolized with small particles, leading to weight loss. However, its affect on various appetite-driving gut hormones of obesity both systemically and locally is not completely understood.

Methods

The selection of fundal arteries for BAE was based on a celiac DSA c-arm CT (Siemens Artis Zee). Fundal arteries were targeted using an anti-reflux microcatheter (SureFire mT) and a steerable guidewire. X-ray-visible 50μ BaSO4-alginate-impregnated embolic beads were delivered in 6 pigs (BAE) and 4 pigs received sham saline injections. All animals received proton pump inhibitors starting 3 days prior to the procedure. Upper endoscopy was performed at 1 week post-BAE. Weekly weights and serum gut derived hormones (Ghrelin, GLP-1, PYY) were obtained. Animals were sacrificed at 4 weeks, and anti-ghrelin or anti-gastrin staining in the Fundus and/or antrum was evaluated microscopically.

Results

Weight declined in BAE pigs at 1 week (-0.9+/-2.3lbs vs. sham: 2.9+/-1.9lbs) and weight gain was impaired at 4 weeks (8.3+/-3 vs.13.6+/-2 lbs, P<0.01). BAE pigs had decreased serum ghrelin (P<0.001) and increased GLP-1 (P<0.001); PYY was unaffected. Ghrelin production was reduced in the fundus and antrum of the BAE pigs relative to shams (20.2+/-9 vs. 36.8+/-11, P<0.03 and 24.1+/-9 vs. 46.3+/-18, P<0.01, respectively). Duodenal ghrelin production was unchanged (9.9+/-5 vs.12.4+/-3). Gastrin production was lower in the antrum in BAE pigs (98.5+/-23 vs.127+/-35, P<0.02).

Conclusions

Like bariatric surgery, BAE significantly affects appetite-regulating gut hormones of obesity with muted serum ghrelin levels and gastric production and increased GLP-1 levels signaling satiation. Changes in ghrelin and gastrin in the antrum suggest that BAE may have a global effect on the stomach.

T-2660-P: Shifting Towards Evidence-Based Primary Care Management of Adults Who are Obesity: Evaluation of
Background

Despite its prevalence, obesity remains underdiagnosed and undertreated by primary care clinicians. To address these gaps in care, a performance improvement continuing medical education (PI-CME) program was implemented in 2012 for primary care clinicians managing adult patients who are obese.

Methods

The program was based on validated obesity performance measures and guidelines. The program included 3 stages: A) a case-based survey to assess practice patterns in obesity management and chart audit for 25 of adult patients who were obese; B) participants identified practice areas to improve and chose relevant interventions; and C) the case-based survey and chart audits for comparison to stage A results. The 32 participants who completed all stages were primarily MDs (91%) and internists (94%), who have been practicing for 15 years and see 30 patients who are obese per week, on average.

Results

Participants were significantly more likely to calculate BMI and also measure waist circumference. For weight loss counseling, participants were significantly more likely to address lifestyle changes, nutrition, physical activity, and medication therapy, and were more familiar with surgical options and FDA-approved medications. Participants were also significantly more likely to: assess patient motivation to lose weight and were much more confident in their skills to address this issue; and recognize medications contributing to weight gain.

Conclusions

The assessment of initiative identified several shifts toward evidence-based primary care management of adult patients who are obese. Although the program successfully addressed current gaps in obesity care, much work is left to do, and hopefully efforts like it will continue.
Pharmacotherapy in a Real-World Setting in the United States

Shumin Zhang, MD, ScD; Sudhakar Manne, MS; Jennifer Lin, PhD; Jiao Yang, PhD;

Background

Obesity raises the risk of many diseases. We analyzed a large electronic medical record (EMR) database to determine the characteristics of real-world overweight/obese patients potentially eligible for adjunctive obesity pharmacotherapy per the 2013 AHA/ACC/TOS guideline.

Methods

Patients from the GE Centricity EMR database were selected if they had body mass index (BMI) \( \geq 30 \) kg/m\(^2\) or \( \geq 27 \) kg/m\(^2\) with \( \geq 1 \) weight-related comorbidity (hypertension, dyslipidemia, or type 2 diabetes [T2DM]) from 1 October 2002 to 30 September 2011 (first date recorded as the index date); were aged \( \geq 18 \) years at index; and had \( \geq 12 \) months of continuous enrollment before and after the index date. The resulting sample (N=1,835,541) was 58.3% female, 57.6% Caucasian, 32.4% commercially insured, and 27.5% on Medicare with a mean age of 51.8+-16.5 years and a median BMI of 31.3 kg/m\(^2\). Patient characteristics were analyzed using descriptive statistics and stratified by obesity pharmacotherapy use.

Results

Frequent comorbidities were hypertension (55.4%), dyslipidemia (36.1%), T2DM (13.4%), and osteoarthritis (9.1%). Few patients received obesity pharmacotherapy (0.7%) within 12 months after the index date and those who did were more obese (median BMI, 33.6 kg/m\(^2\)), younger (42.5+-12.9 years), female (84.3%), Caucasian (62.1%), and commercially insured (39.1%). Relative to the overall sample, they had fewer prevalent comorbidities but more depression and use of antidepressants (30.8 vs 14.2%) and nonsteroidal antiinflammatory drugs (21.7 vs 12.1%).

Conclusions

In patients potentially eligible for obesity pharmacotherapy, comorbidities were common and few received obesity pharmacotherapy. Patients who did tended to be heavier, younger women and commercially insured, and to have fewer prevalent comorbidities but more depression.

T-2663-P: Dietary Protein Modifies the Effects of a 25-hydroxyvitamin D Concentration-associated Genetic Variant
in DHCR7 on Changes in Insulin Sensitivity: the POUNDS LOST Trial

Yan Zheng; Tao Huang, PhD; Frank B. Hu, MD, PhD; Jennifer C. Rood, PhD; George Bray, MD; Frank M. Sacks, MD; Lu Qi, MD, PhD;

Background

Vitamin D has been related to various metabolic functions such as regulation of insulin sensitivity and risk of type 2 diabetes, beyond its role in calcium metabolism. In a recent study, the vitamin D-associated, 7-dehydrocholesterol reductase gene (DHCR7) variants were related to diabetes risk.

Methods

We investigated whether the DHCR7 genotype affected changes of insulin resistance and insulin secretion, and its interaction with diet interventions varying in macronutrients in a 2-year randomized weight-loss diet intervention trial. We genotyped a GWAS-identified variant rs12785878 in 732 overweight or obese adults (aged 30-70 years, 39% males) from the Preventing Overweight Using Novel Dietary Strategies (POUNDS LOST) trial.

Results

We identified significant interactions between rs12785878 and dietary protein on changes in HOMA-IR and insulin. At the 6-month and 2-year visits of intervention respectively, each T allele was associated with 0.07-unit and 0.02-unit less reduction in both log(insulin) and log(HOMA-IR) among the participants assigned to high-protein diets, but related with a 0.09-unit greater reduction in both log(insulin) and log(HOMA-IR) among those assigned to average-protein diets (P for interactions at 6-month visit <= 0.002, and at 2-year visit <= 0.03).

Conclusions

Our study suggests that carriers of T alleles of rs12785878 might benefit less in improving insulin sensitivity by consuming high-protein weight-loss diets than average-protein diets. Our findings suggest potential roles of dietary factors in the relation of vitamin D and diabetes.

T-2664-P_DT: Menominee Journey to Wellness: A Long-Term Obesity Prevention Partnership for American Indian Children and Their Families
Background

American Indian children have the highest rates of obesity and are at high risk of related future chronic diseases. University and community partners have an ongoing 14-year partnership to implement obesity prevention interventions on the Menominee Reservation, ranked lowest in health in Wisconsin.

Methods

This partnership has produced completed and continuing epidemiologic surveys, 2 NIH-funded randomized-controlled early childhood healthy lifestyle interventions (one ongoing), and numerous community interventions conducted via a community engagement committee. Most recently, the partnership developed the *Menominee Broken Hoop Model* to facilitate community understanding of how historic and current trauma, adverse childhood events, and unhealthy coping mechanisms (e.g., food, activity, sleep, and sedentary behaviors and/or substance abuse) contribute to poor overall health. This *Menominee Model* is driving additional community-based collective impact interventions.

Results

Progress includes multiple changes in the food and built environments, such as establishment of community gardens, children's programs, policy changes, and increased community engagement. In addition, a systematized and sustainable system for tracking child data was built to assess the longitudinal impact of interventions on child health outcomes (e.g., BMI, fitness). Menominee also received national recognition for their obesity prevention work by being selected for the inaugural launch of the *Let's Move in Indian County* by Michelle Obama.

Conclusions

This long-term community-academic partnership has resulted in multiple positive effects for the community. Ongoing obesity research and prevention collaborations are community-driven with academic input and are based on scientific evidence and traditional and current community wisdom.

T-2665-P: Showers, Culture, and Conflict Resolution: Perceptions of Wellness Opportunities on the Job

*Stephanie Linakis, MS; Roberta Goldman, PhD; Paul Werth, MA; Christina Roberto, PhD; Jason P. Block, MD;*

Background
Large employers are increasingly implementing workplace wellness programs, but research on employee opinions of them is limited. At a large academic medical center in Boston, we conducted 12 focus groups to gauge employee perceptions of existing and potential future wellness programs.

**Methods**

Data were analyzed by immersion into the focus group transcripts to identify themes, creation of a code book, line-by-line coding of transcripts, and analysis of code reports. Mean age of participants (N=109) was 41 years, 89% were female, and 54% White. Employees felt that wellness programs were an asset for health, but more importantly, would signal the organization's concern for their wellbeing. Employees appreciated existing exercise classes and labeling in the cafeteria even if they did not utilize. To facilitate a cultural shift in support of wellness, participants wanted organization of offerings under a branded wellness program; more promotion by managers; and schedule flexibility.

**Results**

Wellness needs extended beyond exercise/nutrition. Participants also wanted support for improving employee relationships, such as through conflict resolution programs. There was a desire for more dedicated employee space for breaks and improvements of public space to accommodate social interaction. For 'traditional' wellness programs, greater variety and more on-site amenities, such as showers, a gym, and a healthier cafeteria, were highest priority. Participants had generally positive views on incentives and competitions to motivate wellness.

**Conclusions**

Hospital employees called for more exercise and healthy food options. They also wanted management to address serious constraints on time, space, communication and interpersonal relationships, important aspects of work environments that are not typically the focus of wellness efforts.

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**T-2666-P: I Think Good Will Come of It: Employer Perceptions of Workplace Wellness Programs**

*Renata L. L. Smith, MPH; Dennis Ross-Degnan, ScD; Paul Werth, MA; Jason P. Block, MD;*

**Background**

Employers are increasingly implementing workplace wellness programs, including financial incentives for participating in wellness activities or changing health behaviors. Little is known about employer decision-making regarding these programs and how they perceive them.

**Methods**
We conducted semi-structured, 1-hour interviews with benefits managers at 11 large employer clients of Harvard Pilgrim Health Care, a non-profit HMO. We queried their perceptions of workplace wellness programs and wellness financial incentives, asking about reasons for offering or not offering programs and facilitators/barriers to success. We stratified companies by use of incentives: none, limited, or extensive use, and by business sector: health care, higher education, and finance/business. Data were analyzed beginning with immersion into the interview transcripts to identify dominant themes, creation of a code book, line-by-line coding of transcripts, and analysis of code reports.

**Results**

Commonly cited underlying factors for programs included healthcare inflation, employee happiness, and promoting health: 'Intuitively I feel this is the right thing to do.' Having an advocate high up in the company was a facilitator of programs; barriers were cost, time, young/healthy employees, and an entrepreneurial company philosophy. Many employers measured program success by participation/satisfaction; few measured health or economic outcomes. Few employers offered financial incentives to change behavior, with some expressing skepticism.

**Conclusions**

Employers have strong aspirations and goals of programs but often are unable to measure outcomes: "It's difficult to measure the effectiveness of it. You have to just kind of blindly accept 'if I do this I am somehow influencing people to live healthier and thereby reducing my healthcare costs.'"

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**T-2667-P: Investigating Correlations between Georgia SHAPEâ€™s School Intervention Programs and Statewide School Health Data in Georgia**

*Kelly Cornett, MS; Emily Anne A. Vall, PhD; Jean O'Connor, JD, MPH, DrPH;*

**Background**

The SHAPE initiative brings governmental, philanthropic, academic, and business communities together to lower incidence of youth obesity in Georgia. SHAPE's physical activity (PA) initiatives, like Power Up for 30 (PU30), encourage elementary schools to enhance learning environments through PA policy.

**Methods**

Student fitness data are collected annually using the FitnessGram protocol, and students are classified according to their performance in a Healthy Fitness Zone (HFZ) for five health-related fitness tests. Contextual school district characteristics including attendance, performance, and discipline data are collected by the Georgia Department of Education through local education agencies. The PU30 survey
addresses various components of CDC’s Comprehensive School Physical Activity Program including demographic information, physical education practices, recess practices, before/after school PA, classroom PA integration, staff wellness, and family/community involvement.

Results

Three years of FitnessGram data are available as of November 2014 with 99% of elementary schools participating, and data have been collected from 78% of Georgia’s elementary schools using the PU30 survey. Mapping comparisons of school district characteristics reveal correlations worth further exploration.

Conclusions

Mapping Georgia’s school data demonstrates some areas of the state may face complex and multi-factorial challenges to preventing youth obesity and promoting wellness. The data support a need for expanding school interventions that improve school health through comprehensive technical assistance.

T-2669-P: Thriving Obesity? Prevalence of Ideal Thrive Vitals at the Initial Visit to a Weight Management Program

William T. Donahoo, MD, FTOS;

Background

Ideal lifestyle behaviors of diet, activity, smoking, and obesity management have been shown to decrease mortality and disease. We sought to determine the prevalence of ideal lifestyle behaviors except obesity (i.e. Thriving Obesity) and variance with BMI in patients seeking treatment for obesity.

Methods

A convenience sample of patients at the first visit to the Metabolic-Surgical Weight Management Department at Kaiser Permanente Colorado were asked to fill out an anonymous survey. In order to limit the answers to clinically relevant, specific, measurable, achievable, and realistic behavior changes, we used the following definitions of ideal lifestyle behaviors: diet of 5 servings of fruits and vegetables, <1 sugar sweetened beverages per day, activity of 150 min per week exercise, <2 hr per day (non-work/school) screen time, and no tobacco use. Height and weight were self-reported, although the patients had access to the height and weight measured at the visit.

Results

A total of 635 questionnaires were collected. Overall age was 45 ± 13 yrs (mean ± SD, range 17-74), BMI 39.5 ± 7.3 kg/m² (27.1-78.6). There were 4.6% with all 5 behaviors, and 12.1%, 22.7%, 40.4%, 17.5% and
2.7% met 4, 3, 2, 1, and 0 criteria respectively. Comparing those with 4 or 5 behaviors (n=60) to 0 or 1 behaviors (n=70), there were no significant differences in age (43.1 ± 13.8 vs 42.6 ± 12.1, p=0.82) but those with more lifestyle behaviors had a lower BMI (38.3 ± 6.7 vs 41.3 ± 9.1, p=0.04).

Conclusions

Thriving Obesity (patients seeking obesity treatment who are following ideal lifestyle behaviors) was uncommon; less than 1 in 20 were following all 5 ‘Thrive Vital Signs’. However, even in this obese population, those with 4 or 5 positive behaviors were less obese than those with 0 or 1 behavior.

T-2670-P: Tweeting Differently: A Case Study Comparing @MyPlate and @FoodNetwork

Allison Doub; Meg Small, PhD; Leann L. Birch, PhD;

Background

Current rates of obesity suggest many Americans do not follow the USDA MyPlate guidelines. Social media could increase the uptake of evidence-based guidelines, however government organizations tend to use social media to distribute information, not engage with the community (Waters & Williams, 2011).

Methods

This case study compared two nutrition-related Twitter accounts established in 2009 on account use, reach, content, and nutrition information: government-run @MyPlate and industry-run @FoodNetwork. Data were drawn from the @MyPlate and @FoodNetwork Twitter pages. Publicly available tools were used to analyze the content of tweets, followers, and identify the top 10 retweets of each account (the most widely distributed content). Top retweets were examined using qualitative content analysis. An a priori coding scheme was developed to capture structure (e.g., photos, links). Text and images of food were coded for food groups. Open coding captured emergent themes related to nutrition behaviors.

Results

@FoodNetwork followed more accounts and tweeted more often. Followers of both accounts were highly engaged as evidenced by retweets and replies, but @MyPlate rarely replied to followers. @MyPlate had fewer total followers (N=60,787) than @FoodNetwork (N =

Conclusions

@MyPlate and @FoodNetwork differed in all analyzed aspects and appeal to different audiences. Consistent with findings from other studies of government and non-profit groups @MyPlate used Twitter as a one-way channel, which may limit long-term follower en
T-2671-P: Influence of Design and Architecture on Elementary School Staff and Student Healthy Eating Outcomes

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Background

The school environment provides multiple opportunities to support development of healthy eating behaviors. This study took advantage of a natural experiment to investigate the role of the physical environment in shaping school, staff, and student healthy eating outcomes.

Methods

An elementary school underwent a complete building renovation following theory- and evidence-based strategies to promote healthy eating. The study employed mixed methods to prospectively evaluate changes to school policies and programs, staff attitudes and dietary behaviors, and student healthy eating-related psychosocial outcomes and dietary behaviors. Measures were collected pre- and 12-months post-occupancy in the renovated school. Qualitative data was collected using in-depth interviews, focus groups, and mapping exercises, which were coded for themes based in the paradigm of phenomenology. Quantitative data was collected using validated surveys and analyzed using paired sample t-tests.

Results

The school implemented new policies and programs, including staff wellness activities, and there was a significant decrease in the percent of teachers with a high-fat diet (from 73.68% to 57.14%, p = 0.034). Many physical barriers to healthy eating programming were removed, but staff indicated varying degrees of self-efficacy to actively use healthy eating design features. Student outcomes were minimal; however, qualitative evidence indicated an improvement in nutrition knowledge was likely related to the renovated school's signage.

Conclusions

The architectural renovation showed promise to assist school implementation of healthy eating efforts. Greater positive changes among students may require longer follow-up to detect. Future research should explore integration of architectural and community capacity-building strategies.
T-2672-P: The Prevalence of Metabolic Syndrome and Insulin Resistance and the Effect of Exercise Intervention among Korean Children at Risk for Overweight and Obesity in Jeju Island

Yoonsuk Jekal, PhD; Chul Hyeong Park, MEd; Chang-Joon Lee, PhD; Tae-Hong Kim, BA; Seong-Min Jeong, BA;

Background

The purpose of the current study was to examine 1) the obesity rate by a variety of obesity assessments 2) the prevalence of metabolic syndrome (MetS) and insulin resistance (IR), and 3) the effect of exercise intervention on risk factors of MetS and IR among children at risk for obesity in Korea.

Methods

In cross sectional study, 349 children at risk for obesity (4th-6th grade; 63% boys; mean age, 10.98 yrs.) were recruited out of 30 elementary schools in Jeju, Korea. BMI, WC and %body fat were measured. Serum analysis were conducted to assess insulin, high density lipoprotein cholesterol, triglycerides and glucose, and blood pressure was assessed. MetS was defined with criteria for children, and homeostasis model assessment insulin resistance score was computed. In the intervention study, 23 children at risk for obesity were recruited, and intervention consisted of aerobic and circuit training and education class for 4-week. The level of physical fitness and obesity, MetS and IR were measured.

Results

In boys, 62.3%, 60.9% and 98.2% were obese, and in girls, 69.0%, 69.0% and 74.4% were obese by BMI, WC and %body fat respectively. 61% had IR, and 18.0% had MetS. After 4-weeks intervention participation, there was little change in obesity level. However, there were significant increases in the level of physical fitness including cardiopulmonary endurance(p=.011), muscular strength(p<.001) & endurance(p<.001) and flexibility(p=.001), and there were significant decreases in Glu(p=.002), TG(p=.003), and HOMA-IR(p<.001).

Conclusions

The current study concluded that the child obesity in Korea is medically severe, since obesity induces MetS and IR. By short-term intervention participation, the level of physical fitness, MetS and IR were improved among children at risk for obesity without significant body weight reduction.
T-2673-P: Creating an Obesity Prevention Network to Collectively Impact Obesity in Wisconsin

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Background

In Wisconsin, the 2012 adult obesity rate was 30% with projections to increase (F as in Fat Report, 2014). To combat obesity, the Institute of Medicine reports the need for a systems-based approach. Collective impact has emerged as a viable means for aligning systems.

Methods

The Wisconsin Obesity Prevention Network (WOPN), a collaborative group of statewide partners from community organizations to government agencies, was established to implement a common, systems-based agenda for obesity prevention. WOPN began with literature reviews on network building, social network analysis, and collective impact. Key informant interviews (n=80) and a web-based survey (n=836) were conducted to determine capacity and expect to be repeated to evaluate progress. Collaborative meetings were held with existing coalitions to discuss collective impact and align partners.

Results

WOPN has increased awareness of obesity prevention; the web-based survey generated a 30% response rate and indicated broad, cross-sector support for creating better connections for shared vision and measurement. Development of a leadership team and employing a director was essential to structuring a backbone organization. An agenda setting process in multiple community settings (i.e. childcare) have begun and funds have been leveraged to provide additional support for WOPN infrastructure.

Conclusions

Developing partnerships and addressing obesity prevention issues collaboratively has enabled connectivity across sectors and leveraged funding. Collective work around identified priorities will be evaluated for its ability to increase overall effectiveness of obesity prevention interventions.

T-2674-P: The Influence of Raised-Bed Garden Participation on Fruit and Vegetable Consumption
Background

The Food Access in Michigan (FAiM) Project is studying the relationship between food insecurity and food environments in Michigan. The purpose of this study was to determine the characteristics of garden participants and if a raised bed garden increased fruit and vegetable intake.

Methods

The participants were residents of Baxter Community, an inner-city area in Grand Rapids, MI. Demographics, food security, and purchasing behaviors were collected in garden (n=12) and non-garden participants (n=40). In May, nutrient intake was measured with three 24-hour recalls from 9 garden and 16 non-garden participants. In August, three 24-hour recalls were repeated in the 9 garden participants.

Results

The frequency of marginal food security was greater in garden participants (25%) than non-garden participants (10%). Among SNAP participants, garden participants (25%) reported a greater use of the Double-up Food Bucks than non-garden participants (9%). In May, the median fruit, and vegetable intake of garden and non-garden participants were similar, 0.8 (IQR 0.4, 2.5) vs. 1.7 (IQR 1.3, 2.6) and 1.9 (IQR 1.3, 4.4) vs. 2.1 (IQR 1.6, 2.8), respectively. In August, vegetable intake in garden participants had increased to 2.4 (IQR 1.5, 9.0).

Conclusions

A motivation for involvement in urban gardening programs may be marginal food security. Access to an urban raised bed garden may increase vegetable, but not fruit intake.

T-2675-P: HP2 - Health Promotion Practicum for Medical Students: Leadership Development for Lifestyle Medicine Competencies

Sarah J. McCaskey, MS, RD; Kari A. Hortos, DO, FACOI, FAODME;}

Background

Physicians who practice positive health behaviors are more likely to counsel patients on lifestyle interventions. The aim of this study is to improve medical students' confidence and self-efficacy in addressing their own personal health habits, motivational and behavioral skills.
Methods

Program Specifics - 8-week participation in Weight Watchers At Work series with individualized nutrition plan - Augmented with literature review and resource guide for medical students - Weekly topics designed for laypeople but grounded in reputable behavior change techniques - Attend one community-based meeting for observation and participation - Behavior Change Plan Activity - Select health behavior to change, set goal, monitor and record behavior for 6 weeks, and complete post-assignment survey - Complete pre- and post-series assessments to determine changes in self-efficacy in health behaviors - Attitudes toward Medical Nutrition Therapy, Nutrition and Physical Activity Self-Efficacies

Results

After the practicum, subjects reported improved nutrition knowledge and diet planning skills, increased confidence in ability to engage in physical activity despite availability and scheduling conflicts, and increased confidence in ability to plan healthy food choices 'even when stressed, tired, and busy'. Subjects also indicated stronger agreement toward importance of nutrition counseling for effective patient dietary behavior change. 100% of subjects perceived the Behavior Change Plan as a valuable tool to use again for other behaviors.

Conclusions

An 8-week extracurricular practicum that provides nutrition and exercise guidelines and includes community-based health behavior support improved students' self-efficacy in personal health behaviors, perception of efficacy of health behavior change counseling, and met lifestyle medicine competencies.

T-2676-P: Kids Will Drink Green Smoothies! Children’s Willingness to Try, Liking and Intake of Smoothies Containing Fruits and Dark Leafy Greens in a Preschool Setting

Brandi Y. Rollins, PhD; Wendy Stein, BS; Kathleen Keller, PhD;

Background

Dark leafy greens (DLGs; e.g. spinach, kale) are a low-energy source of essential nutrients that might help to promote a healthy body weight in children. However, children's intakes of DLGs fall below the USDA guidelines, thus novel methods for increasing children's intake are needed.

Methods
Study aims were to determine children's willingness to try, liking, and intake of smoothies containing fruits and DLGs, and to test for individual differences in children's smoothie intake (ages 5-8; n=32). In the preschool setting, children's willingness to try and liking of five novel smoothies containing varying amounts of fruits (e.g. strawberries, peaches) and DLGs (e.g. spinach, kale) were measured; all smoothies were green in color. Children's ad libitum intake of their most preferred smoothie was assessed at an afternoon snack. Parents reported on child temperament, food responsiveness, food neophobia, child intake of fruits and DLGs, and availability of fruits and DLGs in the home.

Results

Children rated the smoothies as well-liked (mean +- SD; 2.3 +- 0.4 out of 3.0), and 97% of children were willing to try the smoothies. During snack time, children consumed 8.0 +- 7.6 ounces or 82.7 +- 78.7 kcals of the smoothies. Children who consumed more ounces of the smoothies tended to have higher levels of approach (r=.44, p<.01) and food responsiveness (r=.33, p=.05), and parents' who regularly served smoothies at home (r=.35, p=.05). Similar correlations were found for children's kcal intake of the smoothies. No other associations were found.

Conclusions

Children were willing to taste and consume smoothies containing fruits and DLGs in a preschool setting, on average meeting 50% of USDA recommendations for weekly intake of DLGs in one eating occasion. Adding DLGs to fruit smoothies may be an effective strategy for increasing children's intake of DLGs.

T-2678-P: Weight Loss Success in the Trucking Industry

Peter D. Vash, MD; Cynthia Graff, LLB; Kathy Ayres, BS Data Communications;

Background

Professional truck drivers have high rates of obesity and are an underserved, high risk population. Because they also have limited time and access to treatment and preventative support systems new innovative and more accessible treatment methods are needed.

Methods

Lindora Clinic established an ongoing partnership with a national trucking association to deliver weight loss through a structured e-mobile coaching program delivering lifestyle behavioral modification; a reduced carbohydrate calorie restricted diet; and 10 personalized coach calls for support and accountability.

Results

In the first year, of 134 drivers, average BMI 40.2, 73% lost 5% or more of their initial weight, 36% lost 10% or more of their starting weight with an average weight loss of 8.3% and a BMI reduction of 3.2 units.
In year two, of 523 trucking support staff and drivers, average BMI 37.9, 80% lost 5% or more of their initial weight, 44% lost 10% or more of their starting weight with an average weight loss of 9.6% and a BMI reduction of 3.6 units. E-mobile technology can help develop weight loss habits for a transient underserved population.

Conclusions

The Lindora e-mobile lifestyle weight management program has shown significant weight loss results for this difficult to reach, underserved, high risk population.

T-2679-P: A Randomized Trial Examining the Impact of Communicating Genetic and Lifestyle Risks for Obesity

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Background

Genetic testing for obesity is available directly to consumers, yet little is understood about its impact on weight management motives and behaviors. We conducted a randomized trial to examine the short-term impact of providing personalized risk feedback for obesity, using a 2x2 factorial design.

Methods

Study participants (N=696) from the Coriell Personalized Medicine Collaborative (CPMC) were randomized to receive the following: 1) no risk feedback, 2) genetic risk (FTO gene), 3) lifestyle risk (hours sitting while watching TV), or 4) combined genetic/lifestyle risks. Participants completed surveys at baseline and 3 month follow-up. Linear regression models examined the impact of risk feedback on intentions to lose weight and change in self-reported weight. Mean age was 50 years, 68% were female, 93% were Caucasian, and 60% had a BMI ≥ 25.

Results

There was a significant interaction effect for genetic and lifestyle feedback on intent to lose weight (p<.05). Those who received genetic risk feedback had higher intentions at follow-up, compared to those who received no risk feedback (p<.005). Lifestyle or combined genetic/lifestyle risk feedback did not result in greater intentions. Notably, receiving 'high' genetic risk had a significant impact on intent only if presented alone or in combination with 'high' (but not 'low') lifestyle risk (ps≤.05). Weight change did not differ across groups.

Conclusions
The impact of communicating genetic risk for obesity varies as a function of the context in which risk is presented. Conveying risks from multiple sources will likely be more effective when risk results are consistent across risk assessment models.

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**T-2680-P: Rapid Adoption of a School-Based Obesity Prevention Initiative That Targets Policy, Systemic and Environmental Changes to Improve Nutrition and Increase Exercise**

*Janice Key, MD; Coleen Martin, MS, RD; Lucie M. Kramer, MS, RD; Carolyn Lindstrom, BS;*

**Background**

Effective obesity prevention must go beyond traditional health care and address today's 'obesogenic' environment through PSE changes targeting nutrition and exercise. Although many organizations recommend that physicians expand their role and participate in these efforts few physicians have done so.

**Methods**

The Docs-Adopt School Health Initiative was developed based upon several community-generated pilot programs. This model (1) recruits local physicians to join school wellness committees and trains the physicians and school staff in obesity prevention efforts, and (2) incentivizes schools to strategically address their specific needs and improve nutrition and increase exercise among their students and staff through selection of evidence-based PSE changes in a wellness checklist.

**Results**

Over 4 years this model has rapidly implemented in 147 schools in 3 districts (average participation: 46% Year 1; 71% Year 2; 86% Year 3; 82% Year 4). Physician involvement differed between districts with a county medical society (77% of schools) compared to without (9%). Examples of PSE changes include: remove deep fat fryer (53%), hold fruit/vegetable tastings (19%), promote water drinking (75%), have non-food reward policy (32%), plant/sustain a garden (89%), increase daily physical activity (71%), hold only healthy fundraisers (24%).

**Conclusions**

This simple model of a school-based intervention is readily accepted by schools, leads to many PSE changes and promotes physician involvement in obesity prevention. Support by medical organizations appears to increase physician involvement.
T-2681-P: Performance of C.L.A.S.S. for Classroom Level Assessment of Nutrition Education in Pennsylvania Preschools Eligible for SNAP Education

Barbara Lohse, PhD

Background

Challenges and barriers evaluating preschooler response to nutrition education support classroom level approaches. Classroom Assessment Scoring System (C.L.A.S.S.) is a validated, observation-based protocol assessing 3 classroom quality domains: Emotional support (ES), instructional support (IS), classroom organization (CO). Domains are further defined by dimensions (e.g., productivity, teacher sensitivity, positive climate, concept development). C.L.A.S.S. performance as a preschool nutrition education intervention evaluation tool was examined.

Methods

C.L.A.S.S. was used in a controlled study of Families Understanding Nutrition (F.U.N.), a 9-month intervention in 8 Philadelphia preschools serving low-income families. A professional videographer produced baseline and follow-up classroom videos of meal/snack and story time in 4 F.U.N and 4 control classes. Two certified C.L.A.S.S. coders, blinded to purpose, treatment and stage, independently reviewed videos. C.L.A.S.S. domain scores were compared to the Protocol for Mapping Policies and Practices (PMPP) scored by a child behavior expert; PMPP focuses on child feeding behaviors.

Results

All teachers were experienced and rated teaching as highly enjoyable. At baseline 7 of 10 C.L.A.S.S. dimensions were more positive for F.U.N. (all P<.02); CO, ES, and IS were greater in F.U.N. Congruent with usual practice, C.L.A.S.S. scores deteriorated over the school year, but less in F.U.N. classrooms. C.L.A.S.S. ES, IS, CO means and PMPP feeding practices were significantly associated with BMI z-scores. Classrooms with better quality teacher-child interaction had fewer obesogenic practices. PMPP feeding practice scores were correlated with ES, IS, CO (all P<.01) suggesting classrooms more supportive of child development and learning as identified by C.L.A.S.S. followed more obesity prevention practices.

Conclusions

C.L.A.S.S. measures of teacher-child interactions were congruent with class BMI z-scores and child feeding practices, supporting use for obesity intervention impact assessment. Funded by the PA Dept of Public Welfare, PA Nutrition Education TRACKS, as part of USDA SNAP.
T-2682-P: Successful Obesity Prevention among Soldiers Requires Improved Promotion of Healthy Eating

Elena Spieker, PhD; Douglas Maurer, DO, MpH; Jennifer Bakalar, MS; Dawn Bates, MA; Eric Stice, PhD; Tracy Sbrocco, PhD;

Background

Despite fitness requirements for promotion and retention, overweight in the military has risen to 60% among men in the last decade. Current military weight loss programs achieve limited success. Prevention may be the most important approach to reducing the high prevalence of excess weight gain.

Methods

Project Fit4Duty is an obesity prevention program that utilizes solution focused, dissonance-based counseling to address sedentary behavior and unhealthy eating habits through participant-driven change. Fit4Duty was adapted for the military from Project Health, a civilian weight gain prevention program that reduced obesity onset by 50%. Four cohorts (N=42) of male Army Soldiers at Fort Lewis (Age 27.7 ± 6.2; body mass index (BMI) 31.1 ± 3.8kg/m2) completed 6 weekly 1-hour group sessions and pre/post assessments. Participants completed height and weight measurements, self-report instruments at baseline and post-program, and provided qualitative feedback on the Fit4Duty program.

Results

Participants averaged 80% attendance (M=4.1, SD=1.5 sessions). Participants reported difficulty finding healthy foods on base as a primary barrier to behavior change. Other barriers included deficits in basic nutrition and cross-training education, and lack of command support to attend sessions. Qualitative input from participants was used for program evaluation and revision to program components.

Conclusions

Given the time restrictions Soldiers face and occupational implications of being unfit, prevention programs will require policy changes to succeed. Population health, readiness, and national defense depend on improved access, education, and availability of nutritious food options for Army Soldiers.

T-2683-P: Successful Weight Loss among Overweight and Obese Adolescents

E. Whitney Evans, PhD, RD; Diana Rancourt, PhD; Elissa Jelalian, PhD;
Background

Nearly 35% of adolescents are overweight or obese. Comprehensive lifestyle interventions demonstrate efficacy for some adolescents but have limited reach and impact. One strategy for improving existing interventions is to learn from successful adolescent weight losers.

Methods

To characterize successful adolescent weight losers, we used data from 922 overweight and obese adolescents, ages 12-16 years at baseline, enrolled in the National Longitudinal Study of Adolescent Health (AddHealth). Using self-reported weight data, adolescents were categorized as a weight gainer if they gained >10 pounds (n=412), weight maintainer if they maintained their weight +5 points (n=390), or weight loser if they lost >10 pounds (n=120) between waves I (1994-1995) and II (1996). Self-reported and measured anthropometrics are highly correlated in this cohort (r=0.92). All analyses were conducted using survey procedures in SAS 9.3 to adjust for Add Health's complex sampling design.

Results

Weight losers were more likely to be female (46.3 vs. 32.5%), older (14.7 vs. 14.2 years), and have a higher BMI (29.2 vs. 27.0 kg/m²) at wave I as compared to gainers (p<0.05). There were no differences by race/ethnicity or maternal education. On average, male weight losers lost 22 lbs and females lost 19 lbs. Male and female weight gainers gained 23 and 21 lbs, respectively. Among weight losers, females were more likely to diet, but exercise was reported equally across genders (~60%).

Conclusions

Thirteen percent of overweight and obese adolescents enrolled in AddHealth successfully lost weight over one year of follow-up. These data support that adolescents of all racial and ethnic backgrounds can achieve successful weight loss.

T-2684-P: Do Overweight Children Always Stay Overweight As Adults?

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Background

Overweight children are at an increased risk of overweight in early and mid-adulthood, but quantification of the risk beyond mid-life is missing. We examined the probability of overweight in adulthood at ages 18-29 and 60-69 years given weight status at age 13 years.
Methods

In the Copenhagen School Health Records Register 13,536 boys and 25,674 girls, born 1930-1969, had data on measured heights and weights at 13 years and information on adult body size from linkages to other Danish cohorts and registers. Child overweight (including obesity) at 13 years was defined by the International Obesity Task Force criteria (BMI >21.9 kg/m² in boys and >22.5 kg/m² in girls). Adult overweight (including obesity) was defined by the World Health Organization criteria of BMI >25 kg/m². At 13 years 4.5% of boys and 7.9% of girls, at 18-29 years 12.4% of men and 24.1% of women, and at 60-69 years 68.1% of men and 58.4% of women were overweight.

Results

Among overweight boys, 71.3% [95% confidence interval (95% CI): 62.1-79.4] were also overweight in their 20s and 87.9% (95% CI: 71.8-96.6) in their 60s, and among overweight girls these numbers were 68.8% (95% CI: 65.1-72.5) and 85.5% (95% CI: 74.2-93.1). However, only 34.0% (95% CI: 28.1-40.4) of overweight men in their 20s and 2.6% (95% CI: 1.8-3.7) of overweight men in their 60s had also been overweight as children and among overweight women these numbers were 42.5% (95% CI: 39.5-45.7) and 4.7% (95% CI: 3.5-6.1).

Conclusions

Overweight children have a high risk of also being overweight in adulthood. However, the majority of overweight adults were not overweight as children.

T-2685-P: Echocardiography as a Marker of Cardiovascular Risk in Obese Children and Adolescents

Simone H. Caixe, Ma; Carlos A. Almeida, MD, MSc, PhD; Augusto C. Benedeti, MD; Jorge Garcia, MD; Luiz A. Del Ciampo, MD;

Background

Childhood obesity is a global epidemic and its prevalence has increased since the early 1970's. The study aimed to compare the echocardiographic parameters of left ventricular geometry between obese and non-obese children.

Methods

Cross-sectional study with 71 individuals, aged 7 to 11 years, from metropolitan region of Ribeirão Preto, Brazil. Personal data (sex and date of birth) were obtained for each subject, as well as anthropometric measurements (weight and height), arterial pressure and echocardiographic measures (left ventricular (LV) mass, relative LV wall thickness, LV mass/body surface, LV mass/ height Â² and LV mass/height). The
individuals were classified according to their nutritional status in 'obese' and 'non-obese' and the variables were studied comparing the two groups.

**Results**

There was no difference in gender (p=0.81) and age (p=0.72), between obese and non-obese groups. Systolic (106.51±12.71 vs 94.10±5.25, p<0.01) and diastolic (64.08±9.29 vs 58.44±5.56, p<0.01) pressure values were higher in obese group. The ecocardiographic study showed higher values for LV mass (79.49±21.21 vs 56.74±11.77, p<0.01) and LV mass/height index^2 (38.32±9.84 vs 32.56±7.16, p<0.01) for the obese group.

**Conclusions**

Obese children has higher LV mass probably due to higher systolic and diastolic arterial pressure, contributing to demonstrate the importance of transthoracic echocardiography as a marker of cardiovascular risk in obese children and adolescents.

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**T-2686-P: Relationship between Inflammatory Markers and Lung Function in Morbidly Obese Women**

*Fabiana S. Peixoto-Souza, Mrs; Elaine Cristina de Campos; Marcela C. Barbalho-Moulim; Elaine Cristina N. Campos, master; Rafael M. Laurino Neto, Bariatric Surgeon; Flavia Greiff, Master Student; Rodolfo P. P Vieira, PhD; Marcela Barbalho-Moulim, P*

**Background**

The interleukin 6 (IL-6) and 8 (IL-8) are considered markers of systemic inflammation, but its association with impaired lung function in morbid obesity is not clear yet. Therefore, the aim of this study was to correlate respiratory function with systemic inflammatory mediators in obese women.

**Methods**

Cross-sectional study included 18 morbidly obese women, aged between 32 and 54 years and BMI 45.79 Â± 4.83 kg/m2, which was evaluated lung function by spirometry, through the maneuvers: slow vital capacity (SVC), forced vital capacity (FVC) and maximal voluntary ventilation (MVV); and also respiratory muscle strength by measuring the maximal static respiratory pressures - the maximal inspiratory pressure (MIP) and maximal expiratory pressure (MEP). The plasmatic quantification of inflammatory markers (IL6, IL8) was assessed by ELISA. For statistical analysis was applied the Student's t-test and Pearson correlation, with p<0.05.

**Results**
The IL-6 was negatively correlated with: MIP (r = -0.56, p = 0.002), MEP (r = -0.53, p = 0.03), SVC (r = -0.48, p = 0.01) and FVC (r = -0.42, p = 0.02). The IL-8 was negatively correlated with: MIP (r = -0.49, p = 0.007) and MEP (r = -0.48, p = 0.01), but not with lung volumes. A reduction in MIP was also observed (100 ± 24.53 cmH2O) when compared with the predicted values (129.86 ± 18.31 cmH2O), but this did not happen with MEP. No changes were found in lung function.

Conclusions

The systemic inflammatory markers were negatively related to lung volumes and respiratory muscle strength. Thus inflammatory markers may be related to the development of respiratory complications in this population of women with morbid obesity.

T-2687-P: Relationship between Workload of Walk Test with Progressive Load and Body Composition in Morbidly Obese Women

Fabiana S. Peixoto-Souza, Mrs; Elaine Cristina de Campos; Marcela C. Barbalho-Moulim; Elaine Cristina N. Campos, master; Luciana MM. Sampaio, PhD; Marcela Barbalho-Moulim, PhD;

Background

Obesity decreases the functional capacity and the body mass is an important contributor to increase the workload while walking, being this may be influenced by body composition. So, the aim was to correlate the workload of walking with body composition in obese women.

Methods

Cross-sectional study of 18 morbidly obese women with BMI 46.82 ± 4.88 kg/m2 and aged between 28 and 60 years, with no change in lung function. Functional capacity was measured by the incremental shuttle walk test (ISWT) and body composition was assessed by bioelectrical impedance analysis (BIODYNAMICS 450®). For statistical analysis we applied the Student's t-test and Pearson correlation, with p< 0.05.

Results

The workload of walking during the ISWT correlated positively with lean body mass (r= 0.54, p=0.01) and negatively with fat mass (r = -0.54, p=0.01). A significant reduction was observed in the distance (365.5 Â± 88.27 m) when compared to the predicted values (457.53 Â± 61.32 m).

Conclusions
The estimated workload from ISWT was associated with body composition, specifically lean and fat body mass.

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T-2688-P: Metabolic Syndrome Components™ Tendency to Cluster in Pre-Pubertal Children Disappeared with Adjustment for Growth Parameters: The Nutrition and Health Survey in Taiwan

Hsin-jen Chen, PhD; Wen-Harn Pan, PhD;

Background

Metabolic syndrome components (MSC) in children are correlated with age and growth status, which could confound the observed clustering of metabolic deteriorations. The International Federation of Diabetes recommended that metabolic syndrome cannot be diagnosed in young children < 10 years old. We investigated whether MSC clustering existed in pre-pubertal children after excluding growth's confounding.

Methods

Using the population representative survey sample of elementary school students in Taiwan, we fitted regression models to estimate the residuals of the 5 classic MSC, controlling for sex and indicators of growth (age, height, body mass index (BMI)). Top decile residuals of waist circumference, fasting glucose, triglycerides, and systolic blood pressure, and the bottom decile residuals of HDL were used to define the MSC clustering (having >= 3 MSC with extreme residuals). Only pre-pubertal children were included for analysis (n=1483, 6-12 years old).

Results

Probability of having >= 3 MSC's extreme age-adjusted residuals (4.3%; 95% CI=3.1%-5.5%) was much higher than probability by chance (0.9%). After further adjustment for height and BMI, the probability of having >= 3 extreme residuals attenuated to 1.4% (CI=0.7%-2.0%). Official criteria (e.g. IDF's) for metabolic syndrome had poor sensitivity (6.2%, CI=1.1%-27.9%) but good specificity (98.8%, CI=98.0%-99.3%) to distinguish the growth-adjusted clustering of metabolic deteriorations.

Conclusions

MSC's tendency to cluster in pre-pubertal children disappeared after growth status was adjusted in the analysis. For pre-pubertal children, MSC clustering may just reflect excess growth in height and BMI. Diagnosis of metabolic syndrome at this young age might not provide additional clinical/preventive value to measuring BMI and growth.
T-2689-P: Association between Weight Status and All-Cause Mortality: A Prospective Study in a Large Chinese Cohort

Hsiu-Hsi Chen, MD; Ching-Yuan Fann, PhD; Kun-Cheh Yang, MD, MSc; Long-Teng Lee, MD, MPH, PhD, EMBA; Hsiu-Hsi Chen; Kuo-Chin Huang, MD, PhD;

Background

This study aimed to examine the relationship between weight status and all-cause deaths based on a large Chinese cohort.

Methods

We used data derived from an integrated model of community-based multiple screening in northern Taiwan between 1999 and 2010. We examined the association between weight status and all-cause of deaths prospectively among 43,230 men and 65,386 women. The categories of weight status were divided into underweight (BMI<18.5 kg/m²), normal weight (18.5 kg/m²?BMI<24.0 kg/m²), overweight (24.0 kg/m²?BMI<27.0 kg/m²), and obesity (27.0 kg/m²?BMI). We used Cox proportional hazards regression model to assess the impact of weight status for the risk of death during a maximum follow-up of 11 years.

Results

A total of 7,025 participants died during the follow-up period. The mean age of death was 78.6±12.1year-old. After adjustment for age, gender, education level, exercise, smoking and history of diabetes and hypertension, the HRs compared to normal weight group were 1.85 (95% CI: 1.62 -2.12 ) in underweight group, 0.82 (95% CI: 0.77 - 0.88 ) in overweight group and 0.87 (95% CI: 0.81 -0.93) in obesity group.

Conclusions

The poorest survival was observed in underweight group while overweight and obesity group were all related to better outcomes. It is worthwhile to reconsider the optimal age-gender-dependent cutoff values for weight status in Chinese population.

T-2690-P: Obesity Influences the Level of Prostate-Specific Antigen in Chinese Men
Background

Serum prostate-specific antigen (PSA) level varied by the race and can be influenced by many factors. Obesity has been linked with the PSA level in different populations, but the results are inconsistent. The aim of this study was to examine the relationship between BMI and PSA in Chinese men.

Methods

Cross-sectional analysis in men aged 19 to 82 years (N = 12,964) who without prostate cancer and had health examination between 2008 and 2013 in a clinical center in Xi'an, China. Obesity (25 >= BMI > 30 kg/m2) and overweight (BMI >= 30 kg/m2) were classified according to the WHO criterion. Mean (SD) PSA level was calculated by categories (normal weight, overweight, and obesity) and age group (<=45, 46-59, >=60 years). The association between BMI and PSA was examined using multivariate regression models and stratified by age.

Results

The crude prevalence of was 38.42% for overweight and 3.47% for obesity in the study population. Mean PSA level increased with age at each BMI category. BMI was negatively associated with PSA level at each age group, independent of fasting plasma glucose (FPG) and prostate volume. Per unit increase in BMI was associated with a decrease of PSA by 0.03, 0.11, and 0.15 ng/mL in men aged <= 45, between 45 to 59, and >= 60 years, respectively.

Conclusions

Our results indicate that a higher BMI is associated with a lower level of PSA in healthy Chinese men across all age group, independent of prostate volume and FPG. With the current obesity epidemic, individual's BMI should be considered when PSA test is used to screen or diagnose prostate cancer.

T-2691-P: Effect of weight gain velocity early in life on glycemic profile at school age.

Cintia Ms. Costa; Paula Ms. Campagnolo, PhD; Marcia Ms. Vitolo, DSc;

Background

Weight gain during infancy has been associated with insulin sensitivity in adulthood. However, if it occurs still in childhood remains controversial. We investigate the association between weight gain during different periods in the first 7 years of life and glycemic profiles in schoolchildren.
Methods

Prospective cohort study in which 500 mother-child pairs were recruited at a hospital maternity ward that serves low-income patients. Child anthropometric data were obtained at 12-16 months, 3-4 years and 7-8 years of age. Weight gain was analyzed based on BMI z-score variation in each of the three periods (subtracting each period's final BMI z-score from its initial BMI z-score). Glycemic profiles were assessed at age 7-8 and glycaemia and insulin levels and HOMA-IR values were measured. The schoolchildren were categorized according to their size at gestational age: small/appropriate for gestational age (AGA; <90th percentile by sex) or large for gestational age (LGA; >90th percentile by sex).

Results

After adjusting for confounding variables, BMI z-score gain from 3-4 to 7-8 years was associated positively with glycaemia (p<0.001) and HOMA-IR (p=0.010) at 7-8 years and there was a strong tendency to positive association with insulin (p=0.06). Regarding size at birth, the association remained significant only for the LGA children (glycaemia p=0.034; HOMA-IR p=0.007; insulin p=0.011).

Conclusions

Our findings suggest that BMI z-score increase is a predictor for the development of glycemic profile impairment during childhood, especially in the LGA. This offers important clues for interventions to control insulin resistance as early as at 3-4 years of age.

T-2692-P: The Influence of Parental Body Mass Index on Weight Status Trajectories from Childhood to Mid-Adulthood in the 1970 British Cohort Study

Silvia S. Costa, PhD, MRes; William Johnson, PhD; Russell M. Viner, MD PhD;

Background

Longitudinal studies on the influence of parental obesity on offspring's weight trajectories to mid-adulthood are lacking. This study aimed to describe the weight status trajectories from childhood to mid-adulthood, and examine the influence of parental BMI on offspring's weight status trajectories.

Methods

BMI was available at ages 10/26/30/34/42 years for 4174 members (57% ?) of the 1970 British Cohort Study. Individuals were categorised as overweight/obese (OW/OB) or non-OW/OB at each age, according to Cole et al's (2000) BMI cut-points for 10 years and the 25 kg/m2 cut-point from 26 years onwards. All
possible trajectories of weight status from 10 (childhood) to 42 years (mid-adulthood) were computed; trajectories with \( \geq 5\% \) of the sample were kept individually and those with \(< 5\% \) were collapsed into one. Multinomial logistic regression was used to assess association of parental BMI with weight status trajectories (by sex), adjusted for potential confounders/mediators (e.g. early puberty).

**Results**

30\% of individuals were never OW/OB, 6\% and 44\% were OW/OB from childhood and 26-34 years respectively. In fully adjusted models, higher parental BMI increased the risk of OW/OB onset at 10 (OR: 1.2-1.3 \(?; \ 1.2 \)?) and 26-34 years (OR: 1.2 \(?\) ), versus never being OW/OB (all \( p<0.001 \)). Associations were stronger for maternal than paternal BMI in females but similar in males. Early signs (versus no signs) of puberty also increased risk of OW/OB onset at 10 (OR: 3.7 \(?; \ 9.2 \)?) and 26-34 years (OR: 1.8 \(?; \ 4.7 \)?), versus never being OW/OB (all \( p<0.04 \)).

**Conclusions**

Results highlight the importance of primary prevention, as most individuals remained OW/OB after onset. Early maturing OW/OB children and those with OW/OB parents are potential priority targets for interventions, due to their higher risk for persistent OW/OB through to mid-adulthood.

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**T-2694-P: Longitudinal Associations between Asthma and General and Abdominal Weight Status among Norwegian Adolescents and Young Adults: The HUNT Study**

*Kathryn B. Egan, PhD; Adrienne S. Ettinger, ScD, MPH; Andrew T. DeWan, PhD, MPH; Theodore R. Holford, PhD; Turid Lingaas L. Holmen, MD, PhD; Michael B. Bracken, PhD, MPH;*

**Background**

In adolescents and young adults, the temporal directionality to the asthma and weight status association remains unclear. Asthma may be a consequence of obesity; however, asthma may also increase adiposity.

**Methods**

Combining data from three, sequentially-enrolled population-based surveys of Norwegians age 12-30 years from 1995-2008, the associations between: 1) baseline weight status and subsequent asthma and 2) baseline asthma and subsequent weight status after 4- and 11-years of follow-up (N=1,543 and N=1,596).
respectively) were examined. Weight status was defined as general (body mass index, BMI) or abdominal (WC) underweight, normal weight, overweight, or obesity.

**Results**

Adolescents with baseline general overweight or abdominal obesity had increased risk of asthma. Likewise, baseline asthmatics had increased risk of general overweight or abdominal obesity. After sex stratification, males only were at increased risk. Males with general (OR 1.90; 95%CI 1.32,2.73) or abdominal (OR 1.66; 95%CI 1.13,2.44) overweight had increased risk of asthma. Males with baseline asthma had increased risk of general (OR 2.14; 95%CI 1.54,2.98) or abdominal (OR 1.77; 95% CI 1.27,2.47) overweight.

**Conclusions**

Among a cohort of Norwegian adolescents and young-adults, a bi-directional association between asthma and weight status was observed in males. Each condition at baseline increased the risk of the other condition over time. No association was observed in females.

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**T-2695-P: Body Weight Variability as an Independent Predictor of Weight Gain in College Females**

*Emily H. Feig; Samantha R. Winter, BA, BM; Eric Stice, PhD; Michael R. Lowe, PhD;

**Background**

Fluctuation in body weight is common, particularly in those who chronically diet to control their weight. A history of weight loss dieting has been found to predict weight gain, but it is unknown whether it is dieting behaviors or weight fluctuations that are associated with future weight increase.

**Methods**

Objective measures of weight variability over time would clarify whether weight fluctuation itself is associated with future weight gain. This study examined variability in measured weights, indexed as the sum of the absolute values of within-subject deviations from mean weight calculated across 3 time points over 6 months, as a predictor of weight gain over the next 18 months. The sample consisted of 199 female non-obese college freshmen struggling to control their weight. The selection criteria in fact produced a sample that on average did not gain weight over time, but about one-third gained ($M = 5.34$ kg, $SD = 4.26$) and another third lost ($M = 4.66$ kg, $SD = 2.69$) weight over two years.

**Results**

Larger absolute fluctuations in weight over the first three assessments predicted greater weight gain over the next 18 months. This relationship remained when controlling for baseline BMI, as well as self-reported
The model explained a significant proportion of the variance in 18-month weight change, $R^2 = 0.08$, $F(1,166) = 9.64$, $p = 0.002$.

**Conclusions**

Measured weight variability appears to capture a feature distinct from self-reported dieting. It may reflect an ultimately unsuccessful struggle to avoid or reverse weight gain produced by our obesogenic environment.

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T-2696-P: The Impact of Obesity on the Risk of Falling for Older Adults

*Angela G. Fowler-brown, MD; Sarah Chiodi, MSPH; Christina C. Wee, MD, PhD;*

**Background**

One component of functioning that has not been well studied in relationship to obesity is the risk of falling. The aim of our study was to examine whether obesity is prospectively associated with increased risk of falls and with fall-related hospitalization in older adults.

**Methods**

15,576 subjects, aged $\geq 60$ years from a nationally-representative, prospective survey of U.S. adults. Weight (self-reported) analyzed in categories - non-obese (BMI $< 30$ kg/m$^2$), mild/moderate obesity (BMI $30-34.9$ kg/m$^2$), severe obesity (BMI $\geq 35$ kg/m$^2$). The main outcome of interest was whether any fall occurred during the year after weight status was ascertained. The fall outcome and whether a fall-related hospitalization occurred was assessed via in-person survey at 6 months intervals. Fully adjusted multivariable logistic regression models included age, sex, race, marital status, education and insurance status. Test statistics were corrected for clustering induced by study design.

**Results**

There were 1,098 falls and 207 fall-related hospitalizations. Severe obesity (adj. OR 1.57, 95% CI 1.03, 2.39), but not mild/moderate obesity (adj. OR 1.02, 95% CI 0.87, 1.20), was prospectively associated with higher odds of falling, compared to the non-obese. Severe obesity was associated with higher estimate of odds of fall-related hospitalization (adj. OR 1.55, 95% 0.70, 3.44), but was not statistically significant. Mild/moderate obesity was not associated with fall-related hospitalization.

**Conclusions**

While the conventional image of a senior at risk of falling is underweight, our findings suggest that severe obesity is a risk factor for falling in older populations. These data may inform the process of identifying seniors at high risk of falling.
T-2697-P: Long Term Change in Diet Quality and Prevention of Weight Gain in Men and Women

Teresa Fung, ScD, RD; An Pan, PhD; Tao Hou, MPH; Stephanie Chiuve, ScD; Deirdre Tobias, ScD; Dariush Mozaffarian, MD, DrPH, FACC; Frank Hu, MD;

Background

Little evidence exists on changes in diet quality and weight change. Therefore, we examined the association between change in diet quality as measured by diet quality scores and concurrent weight change over 20 years.

Methods

We used repeated dietary data from 1986-2007 in 50,603 women in the Nurses' Health Study(NHS), 20,308 men in the Health Professionals Follow-up Study(HPFS), and 47,968 younger women in the Nurses' Health Study II(NHS2) and computed for each individual the Alternate Mediterranean Diet Score(aMed), the Alternate Health Eating Index-2010(AHEI-2010), and the Dietary Approaches to Stop Hypertension score(DASH). All scores emphasize fruits and vegetables, but they differ substantially in score range and components such as dairy, sodium, and sweetened beverages. We used regression models to assess four year changes in diet scores and concurrent weight change, adjusted for lifestyle factors.

Results

Baseline mean age was 49 y for NHS, 48 for HPFS, and 38 for NHS2. Significantly less weight gain was observed with each 1 standard deviation (sd) increase of AHEI-2010 (-0.88 lb for NHS, -0.76 lb for HPFS, -1.49 lb for NHS2). Higher DASH score and aMed also showed significantly less weight gain, but not as much as the AHEI-2010. Higher AHEI-2010 had the least weight gain among the 3 scores. Compared with the aMed, weight change was significantly less for AHEI-2010, from 0.70 lb less in HPFS to 1.48 lb in NHS2 for each 1 sd in diet quality score.

Conclusions

Better diet quality, as measured by a higher AHEI-2010 score, is associated with less weight gain, and results were stronger in younger women.

T-2698-P: Central Adiposity After Breast Cancer Diagnosis and Mortality in the
Health Eating Activity and Lifestyle Study

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Background

Among breast cancer survivors, we examined whether waist circumference (WC) and waist-hip ratio (WHR) after diagnosis are associated with risk of any death or breast cancer death.

Methods

Our analysis included 621 women diagnosed with local or regional breast cancer in the Health, Eating, Activity and Lifestyle (HEAL) Study cohort. At a clinic visit 30 (+/- 4) months postdiagnosis, trained staff measured participants' waist and hip circumferences and obtained fasting serum samples for assays of insulin, glucose, C-peptide, insulin growth factor-1 and binding protein-3, C-reactive protein (CRP), and adiponectin. Using multivariate Cox proportional hazards models, we estimated hazard ratios (HR) and 95% confidence intervals (CI) for death.

Results

Over 9.5 years, 107 deaths occurred. After multivariate adjustment, higher WC was positively associated with all-cause mortality (HRq4:q1: 2.99, 95% CI: 1.14, 7.86), but its positive association with breast cancer mortality was not statistically significant. Higher WHR was positively associated with all-cause mortality (HRq4:q1: 2.10, 95% CI: 1.08, 4.05) and breast cancer mortality (HRq4:q1: 4.02, 95% CI: 1.31, 12.31). Adjustment for HOMA and CRP attenuated the risk estimates for WC (14-29%) and WHR (1-11%) and rendered models non-significant.

Conclusions

In this diverse breast cancer survivor cohort, postdiagnosis WC and WHR were associated with all-cause mortality. Attenuation of associations by HOMA and CRP supports a role of insulin resistance and inflammation in the effects of central adiposity on mortality for breast cancer patients.

T-2699-P: Childhood Body Size and Later Risk of Ischemic Stroke Among Women

Line K. Haugaard, MD; Michael Gamborg, PhD; Thorkild IA IA. SÃ¸rensen, -, MD, Dr Med Sci; Jennifer L. Baker, PhD;
Background

Adult body size is associated with ischemic stroke, but the association between body size in childhood and ischemic stroke in adulthood is unclear. As gender affects stroke outcome we investigated if childhood body mass index (BMI) and height are associated with the risk of ischemic stroke in women.

Methods

A cohort of 152,740 Danish schoolgirls (7 through 13 years of age), born from 1930-1989, had weight and height measured in school from which BMI (kg/m2) was calculated. Ischemic stroke events (ICD 8: 433-434, ICD-10: I63) were ascertained by linkage to national registers. The hazard ratios (HR's with 95% confidence intervals, CIs) of BMI and height, transformed to z-scores, for ischemic stroke in adulthood from age 25 years were estimated by Cox proportional hazards models.

Results

In 4,016,740 person years of follow up, 3,253 of the women received a diagnosis of ischemic stroke or died of ischemic stroke as adults. BMI z-scores were positively and linearly associated with the risk of ischemic stroke. The association increased with age at measurement, and by 13 years it reached a HR=1.06 (CI: 1.02; 1.11). Height z-scores were inversely and linearly associated with the risk of ischemic stroke at all ages, showing a stable pattern from 7 (HR=0.88, CI: 0.85; 0.91) to 13 years (HR=0.90, CI: 0.87; 0.93).

Conclusions

Childhood BMI and height are associated with the risk of ischemic stroke in adult life among women, suggesting that some of the risk factors for this disease are established during these early years of life.

T-2700-P: Impact of Obesity on Health Care Costs in Adults Over 65 Years of Age

Kevin Hawkins

T-2701-P: DXA-VAT and Cardiovascular Risk Factors in Korea National Health and Nutrition Examination Survey
Background

Visceral adipose tissue is related with cardiovascular risk factors. Recently, a dual-energy X-ray absorptiometry (DXA) measurement of visceral adipose tissue (DXA-VAT) was developed. We performed the analysis of the associations between the cardiovascular risk factors and DXA-VAT.

Methods

The data from Korea National Health and Nutrition Examination Survey (2009) 4,431 subjects (aged over 20 years old and without type 2 diabetes) were analyzed. Metabolic syndrome used the International Diabetes Federation definition, and insulin resistance was measured by the homeostasis model assessment of insulin resistance.

Results

DXA- VAT was increase with age. DXA-VAT; 5.7cm2 (men) 8.0cm2 (women) increased per 10 year in DXA-VAT(p<0.001). HOMA-IR also had positive correlated with DXA-VAT(men: r=0.255, p<0.001; women: r=0.237, p<0.001). According to the incensement of positive metabolic syndrome factors, DXA-VAT was increased (p<0.001) in both genders. Two factors positive were correlated with 123+73 cm2 in men and 113+68 cm2 (DXA-VAT). Theses DXA- VAT was matched the waist circumference (WC) 84.3 cm in men and 78.5

Conclusions

DXA- VAT was well correlated with cardiovascular risk factor and insulin resistance. Due to convenience of measurement and accuracy, DXA-VAT cans replacement waist circumference in the risk estimation but further research are needs.

T-2702-P: The Relationship between Chronic Hepatitis B and Metabolic Syndrome among Non-Diabetic Adults: A Structural Equation Modeling Approach

Kuo-Chin Huang, MD, PhD; Chiao-Yu Huang, MD;

Background
Unlike documented interactions of hepatitis C with cardio-metabolic risks, the relationships between chronic hepatitis B and metabolic syndrome are controversial. In this study, we aimed to explore the relationship between chronic hepatitis B (CHB) and metabolic syndrome (MetS) among non-diabetic adults.

**Methods**

This was a community-based, cross-sectional study of 17,030 non-diabetic adults (7437 males and 9593 females; mean age, 36.04±3.85 years) in a county of Northern Taiwan from 2008 to 2009. We measured and tested the associations of hepatitis B surface antigen (HBsAg) status with MetS and individual components. A structural equation model (SEM) was constructed to elucidate the pathways between CHB and individual MetS components.

**Results**

A total of 2,982 (17.5%) participants were found to be HBsAg seropositive. Up to 15.5% of HBsAg seropositive and 16.9% of HBsAg seronegative subjects had MetS. Those with HBsAg seropositive had lower odds ratio (OR) for MetS compared with seronegative subjects irrespective of age, gender and lifestyles (OR: 0.76, 95% CI: 0.68-0.85). HBsAg seropositivity was only associated with lower OR for hypertriglyceridemia (OR: 0.59, 95% CI: 0.52-0.66) and low serum levels of high density lipoprotein cholesterol (OR: 0.86, 95% CI: 0.79-0.93) after adjusting for confounders. Moreover, SEM revealed HBsAg seropositivity was negatively associated with dyslipidemia directly ($\hat{\beta}=-0.12$, $P<0.001$) while the links between HBsAg status and obesity, hypertension and insulin resistance were insignificant.

**Conclusions**

The inverse relationship between CHB and metabolic syndrome may be attributable to the net beneficial effects on lipid profiles rather than obesity and insulin resistance.

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**T-2703-P: Overweight or obesity from infancy to early adulthood and subsequent ischemic heart disease in the 1946 British birth cohort study**

*William Johnson, PhD; Diana Kuh, PhD; Valerie Tikhonoff, MD, PhD; Rebecca Hardy, PhD;*

**Background**

The ages at which overweight or obesity in childhood are a risk factor for ischemic heart disease (IHD) is not clear. Further, early life overweight or obesity, according to body mass index (BMI), may actually be protective in overweight or obese adults due to long-term gains in fat-free mass.
Methods

The sample comprised 1749 males and 1696 females with at least one measure of BMI at ages 2, 4, 6, 7, 11, 15, 20, and 26 years; overweight or obesity was defined according to the International Obesity Task Force cut-offs. At ages 36, 43, 53, and 60-64 years, fatal and non-fatal IHD events were obtained from self-reported diagnoses and hospital admissions, and were coded using the International Classification of Diseases. Cox proportional hazard models were used to investigate the relationships of overweight or obesity with IHD, adjusting for sex, socio-economic position, smoking, and physical activity; effect modification by overweight or obesity at age 26 years was tested.

Results

There were 203 events with a rate of 1.84 per 1,000 person-years of follow-up. Overweight or obesity at age 2 years was associated with decreased rates (hazard ratio 0.70, 95% CI 0.50-0.98), whereas overweight or obesity from age 4 years onward was associated with increased rates and was strongest at age 7 years (1.99, 0.62-1.66). This estimate was robust to adjustment for confounders and adulthood overweight or obesity, but there was no evidence that the association was weaker in overweight or obese adults compared to normal weight adults.

Conclusions

Programs aiming to prevent IHD might be best focused on the identification of overweight or obesity at age 7 years, where BMI may be less confounded by adiposity rebound or puberty. More work is needed to reveal which childhood BMI traits might offer protection to overweight or obese adults.


Yang-Hyun Kim, Dr.; Ki-Young Lee, MD; Jun-Goo Kang, MD.PhD; Chang-Beom Lee, MD;

Background

Albuminuria is well-known risk factor for developing renal disease and cardiovascular disease. Recently several studies have reported that metabolically obese but normal weight (MONW) and metabolically obese and obese (MOO) subjects are predisposed to type 2 diabetes mellitus and premature coronary heart disease. This study was performed to investigate the relationship between the prevalence of albuminuria and MONW and MOO in South Korean.
Methods

We analyzed 10,962 subjects (4,994 men and 5,968 women) from the 2011-2012 Korea National Health and Nutrition Examination Survey (KNHANES). We divided subjects into four groups according to the body mass index (BMI) and metabolic syndrome (MetS); metabolically healthy and normal weight (MHNW) group were normal weight (18.5 ≤ BMI < 23 kg/m²) subjects without MetS, MONW group were normal weight subjects with MetS, metabolically healthy but obese (MHO) group were obese (BMI ≥ 25 kg/m²) subjects without MetS, and MOO group were obese subjects with MetS. Albuminuria was defined urine albumin to creatinine ratio (ACR) ≥ 30mg/g. Multivariate logistic regression analysis was performed to evaluate the prevalence of albuminuria between MONW and MHO groups.

Results

The prevalence of albuminuria was increased in women than men in all four groups and metabolically obese groups in men and women. Among 4 groups, after adjusting for all covariates, MONW and MOO showed increased prevalence of albuminuria in both men and women. MONW group showed the highest odds for having albuminuria in men (odds ratio and 95% confidential intervals; 2.76 and 1.77-4.46) and MOO group had the highest odds for having albuminuria in women (odds ratio and 95% confidential intervals; 2.51 and 1.65-3.79).

Conclusions

Albuminuria was associated with the presence of metabolically obese status in South Korea. Therefore, physicians should be aware of the presence of albuminuria, when screening for MetS in the subjects with normal or obesity.

T-2705-P: Workplace Slip, Trips and Falls and Obesity

Gabe Koepp

T-2706-P: Obesity Is Associated with Poorer Sustained Attention in Middle Aged Adults - Results from the Irish Longitudinal Study on Aging (TILDA)

Siobhan Leahy; Rose Anne Kenny, MD R.C.P.I., R.C.P., R.C.P.E., M.R.I.A.;
Background

Midlife obesity is associated with later life dementia. The relationship between body mass index and specific domains of cognitive function is unclear. We investigate the relationship between obesity and sustained attention, a fundamental executive function, in middle aged adults.

Methods

3269 community dwelling adults aged 50-64 from The Irish Longitudinal Study on Aging, a nationally representative population study, were studied. Participants completed a comprehensive health assessment including a computer based Sustained Attention to Response Task (SART, a continuous performance reaction time task), and had their height and weight objectively measured. Obesity was defined as Body Mass Index (BMI) >=30kg/m2. Binary logistic regression was performed to assess the relationship between obesity, SART mean reaction time (RT), variability in RT and number of errors committed.

Results

Mean age of the sample was 56.7 years. 45% were men and 33.5% were obese. After adjustment for covariates across domains of demographics, cardiovascular health, physical function, medication usage and other cognitive measures, obesity was associated with greater variability in SART RT (Odds Ratio (OR) = 1.12, p<0.01) and a greater number of errors (OR= 1.16, p<0.01) but not mean reaction time (OR=1.00, p=0.9).

Conclusions

Obesity is associated with greater variability and increased errors on the SART in middle aged adults, indicating poorer sustained attention. Obesity may represent a modifiable risk factor for early cognitive decline.

T-2707-P: Visceral to Subcutaneous Fat Ratio Was the Meaningful Metabolic Indicator among Body Composition Tools in Obese Subjects

Kyu Rae Lee, MD,PhD.; Hyun Hyi Choi, MD;

Background

It is evident that much attention to obesity has been paid to prevent cardio-metabolic risk morbidity and mortality in advance. So far, body mass index had been considered as the standard diagnostic indicator to define obesity for epidemiologic study. As previous researches shown, various interventions would be
considered the obese degrees based on BMI. In while the purpose of medical or surgical interventions is to promote life expectancy and lessen obesity related mortalities. However BMI has some limitations to show the correct fatness according to other studies. Another diagnostic methods such as body impedance analysis (BIA), fat mass (DXA) and adipose tissues (CT) would be concerned to measure their body fat in detail. Therefore we investigated to explore the relationship between metabolic risk variables and body composition of obese subjects.

**Methods**

57 obese peoples (43 female, 42.34 years aged 29.57 kg/m2) who visited bariatric clinic of Wallace Memorial Baptist Hospital underwent their height, weight, BIA (X-scan, Korea), DXA, abdominal CT for fat measurement. A whole body DXA scan (GE Health Care, Lunar Corp., Madison, WI, USA) was performed for each subject to measure total and regional lean mass (kg), total body fat (kg), and total body fat percentage (%) using fan-beam technology. Additionally the fat mass of arm, trunk, and leg were measured for regional body fat composition assessment. In addition insulin, free fatty acid, cholesterol, triglyceride and high density cholesterol were obtained after overnight fasting at the same day. SPSS package for windows (version 17) was performed for statistical analysis. Probability under 0.05 was considered as statistical significant at both sided. Pearson's correlation coefficient and student's-t-test were used for analysis. All participants were divided into two groups according to visceral to subcutaneous fat ratio, metabolic risk variables and body composition markers were compared between two groups.

**Results**

There was a significant relation between visceral to subcutaneous fat ratio (V/S ratio) *and total cholesterol after controlled age and sex. Although visceral adipose tissue** in high V/S ratio groups (n=21) was very significantly higher than those in low groups (n=36, p=.002), V/S ratio** was more closely related with metabolic risk variables (p=.000). Low HDL cholesterol, high triglyceridemia, and glycosemia* were higher in high V/S ratio groups than low groups. (**: p<0.01, *: p<0.05)**

**Conclusions**

Visceral subcutaneous ratio was the significant determinant among body composition methods in order to assess the metabolic risk factors in obese Korean subjects. Further well controlled cohort trial would be needed in the future.  

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**T-2708-P: Waist Circumference Change Predicts Future Arterial Stiffness in Chinese: Taichung Community Health Study (TCHS) Cohort**

Wen-yuan Lin, MD; Chiu-Shong Liu, MD; Chia-Ing Li, PhD; Tsai-Chung Li, PhD; Kuo-Chin Huang, MD, PhD; Cheng-Chieh Lin, MD, PhD;
Background

Central obesity and arterial stiffness have been reported to increase the risk of cardiovascular disease and all-cause mortality. In this study, we investigated the association between waist circumference change and future arterial stiffness in the middle-aged Taiwanese.

Methods

A total of 2326 subjects, aged 40 years and above, were recruited from Taichung city in Taiwan in 2004. Among these, 1636 subjects were followed up with a mean 2.8 years. 869 baseline normal arterial stiffness subjects were kept for final analyses, 146 of whom exhibited incident arterial stiffness. Arterial stiffness was defined as baPWV >= 1540 cm/sec and baPWV >= 1480 cm/sec in male and female, respectively. WC change was categorized as WC increase and decrease. The relationships between WC change and baPWV change were analyzed using multiple logistic and linear regression analyses.

Results

The mean follow-up duration is 2.8 years. After adjustment for potential confounders, using multiple linear regression analyses, ΔWC was positively associated with Δ baPWV. In multivariable models, participants with WC increase had a 40% increase in risk of incident albuminuria (adjusted incidence rate ratio (95% CI): 1.40(0.89-2.30)) compared with participants with WC decrease.

Conclusions

Waist circumference change predicts future arterial stiffness in the middle-aged Taiwanese. Further study is necessary to clarify the linking mechanism between waist circumference and arterial stiffness.

T-2709-P: Was Excess Adiposity or Metabolic Dysfunction Associated with Human Papillomavirus Infection among Adult Women from the NHANES 2003-2010?

Su-Hsun Liu, MD, PhD; Hsin-Jen Chen, PhD; Tsung-Han Hsieh, MS;

Background

Previously, we have shown that obesity (BMI >= 30 Kg/m2) did not predict human papillomavirus (HPV) incidence in a cohort of perimenopausal women. Yet, it is unclear whether central obesity (waist
circumference > 88 cm) or metabolic dysfunction is associated with HPV infection in adult women in general.

**Methods**

Using data from adult women aged 20-59 in the NHANES between 2003 and 2010 (N=4570), we compared any-type and high-risk (HR) type HPV prevalence among women with and without central obesity. In a fasting subgroup (N=2085), we also compared HPV prevalence by metabolic health status, which was defined by the presence of metabolic syndrome or not according to the ATP III criteria. HPV DNA detection was based on the Linear Array genotyping results. Adjusted prevalence ratios (aPR) were estimated in multivariable Poisson regression models including age, socioeconomic factors, history of smoking, and numbers of lifetime and recent sexual partners.

**Results**

Overall, prevalence of any- and HR-HPV was 42.8% and 23.4%, respectively. Central obesity was associated with any-HPV (aPR=0.92, P=0.036) but not with HR-HPV after adjustment. In contrast, while not observed in the overall population, obese women had a reduced HR-HPV prevalence (aPR=0.76, P=0.019) in the fasting subgroup. Also among fasting women, metabolic dysfunction appeared to be correlated with a decrease in HR-HPV prevalence (aPR=0.62, P=0.009) in the obese but not in the nonobese group (aPR=1.19, P=0.326; P for interaction=0.013).

**Conclusions**

In this US-representative female population, central obesity but not obesity was associated with a low any-type HPV prevalence. In a fasting subgroup, we found that obese women had a reduced HR-HPV and a significant interaction between obesity and metabolic derangement on women's risk for HR-HPV.

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**T-2710-P: Associations between Excess Adiposity and Seroprevalence of Herpes Simplex Virus Types 1 and 2 among Adults Aged 20-49: Results from the NHANES 1999-2012**

*Su-Hsun Liu, MD, PhD*;

**Background**

Evidence on relationships between excess adiposity and herpes simplex virus (HSV) infection is limited and inconsistent. Considering the changing epidemiology of HSV1 and HSV2, we sought to determine the association between excess adiposity and HSV seroprevalence by sex and by calendar time.
Methods

Adults aged 20-49 years who participated in the NHANES in 1999-2012 and who reported ever having had any sex were included. Survey-based Poisson regression method was applied to delineate the association between the seropositivity of HSV1 and HSV2 with obesity (BMI≥30 kg/m2) and with central obesity (waist circumference>88cm for women,>102cm for men), respectively. Multivariable models also included the survey cycle, age, race/ethnicity, educational level, marital status, relative poverty level based on the annual household income, history of smoking and of genital herpes, and number of lifetime sexual partners. Secular changes were assessed across four-year cycles for stable estimates.

Results

Of the 11015 included participants, 58.8% were positive for HSV1 and 18.5% for HSV2. Overall, obesity (adjusted RR:1.04;95%CI:1.00,1.08) and central obesity (adjusted RR:1.05;95%CI:1.01,1.09) were associated with an increased risk for HSV1 prevalence, respectively. Yet, the strength between central obesity and HSV1 prevalence differed by survey years (Ps for interaction<0.05). In contrast, an increase in HSV2 prevalence was only observed in centrally-obese women (adjusted RR:1.14;95%CI:1.02,1.27) amid a decreasing secular trend in HSV2 prevalence.

Conclusions

Using data from the continuous NHANES in 1999-2012, we showed that individuals with excess adiposity were indeed at varying levels of risk for HSV1 or HSV2 infections, depending on the survey years, the virus type, host sex, and anthropometric measures used for evaluation.

T-2711-P_DT: Predicting Cardiovascular Disease Risk in Young Mexican Adults Using Two Sets of Waist Circumference (WC) Cutoff Points

Courtney Marques; Ingrid M. Zago, Bs; Flavia C.D. Andrade, PhD.; Celia Aradillas-Garcia, PhD.; Margarita Teran-Garcia, MD, PhD, FTOS;

Background

Measuring WC is a non-invasive technique to assess abdominal obesity, a component of metabolic syndrome. Using the same WC cutoff values for different ethnic groups is inadequate for predicting risk for metabolic diseases, including cardiovascular disease (CVD).

Methods
Our objective was to compare the risk for CVD indicated by two sets of WC cutoff values for Mexicans. The current WC cutoff values applied to Latin Americans were established by the International Diabetes Federation (IDF-WC) using data from a south Asian population. The IDF-WC cutoff values and the new proposed set (NEW-WC), are as follows: IDF-WC above 80 cm and 90 cm, and NEW-WC above 84 cm and 98 cm in women and men, respectively. Biochemical data (lipid and metabolic panels) and anthropometric data (height, weight and WC) were collected from 698 applicants (18-25 years old) to the Autonomous University of San Luis Potosi in Mexico during the 2009 school-cycle.

**Results**

WC was positively correlated with BMI, systolic and diastolic blood pressure (p<0.0001) and serum triglycerides (p<0.0003) and negatively with HDL-cholesterol (p<0.0001). Individuals classified as having abdominal obesity by the IDF-WC cutoff values showed significantly lower BMI (p<0.001) than those classified using NEW-WC cutoff values. In females, the systolic and diastolic blood pressures were also significantly lower for the IDF-WC cutoff values than for the NEW-WC cutoffs (p<0.01 and p<0.04, respectively).

**Conclusions**

Our data demonstrate that the IDF-WC cutoff values may not be appropriate for the Mexican population in that they tend to overestimate risk for CVD. Additionally, the relationship between WC and blood pressure, as a risk factor for CVD, is different between males and females.

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**T-2712-P: Childhood Body Size and the Risk of Malignant Melanoma in Adulthood**

*Kathrine D. Meyle; Michael Gamborg, PhD; Thorkild IA IA. Sørensen, -, MD, Dr Med Sci; Jennifer L. Baker, PhD;*

**Background**

Investigations have shown an association between increased adult anthropometric measurements and the risk of developing malignant melanoma (MM). Here, we investigate if height and body mass index (BMI: kg/m2) in childhood were associated with the future risk of melanomagenesis.

**Methods**

The Copenhagen School Health Records Register contains records of 372,636 Danish children who attended school in the Copenhagen Municipality and were born from 1930-1989. Heights and weights were measured annually from 7 to 13 years of age. Height and BMI values were transformed to z-scores. Cases were identified by linkage to the Danish Cancer Registry and defined as ICD-7 (190) and ICD-10 (C43). Cox proportional hazards regressions were conducted. Analyses were stratified by birth cohort and sex (as significant differences in the associations were not found between males and females).
Results

2,177 cases (982 males and 1195 females) of MM were identified. At ages 7 and 13 years, the hazard ratios (HR) per 1 z-score increase in height were 1.20 [95% confidence interval (CI), 1.15-1.25] and 1.19 [95% CI, 1.14-1.25] for the risk of MM in adulthood, respectively. The HR per 1 z-score increase in BMI were 1.04 [95% CI, 0.99-1.09] for age 7 and 1.00 [95% CI, 0.96-1.06] for age 13. For both height and BMI, similar results were obtained for the ages between 7-13 years.

Conclusions

These results indicate that future risk of MM already originates in childhood and is driven largely by height and not BMI.


Jay P. Bae, PhD; Maureen J. Lage, PhD; Daojun Mo; David R. Nelson, MS; Byron J. Hoogwerf, MD;

Background

To better understand the burden of obesity in diabetes mellitus (DM) patients in the real world of clinical care, we estimated obesity prevalence among diabetes patients and described patient characteristics across Body Mass Index (BMI) categories.

Methods

Data from US physician electronic health records (Humedica) over 2008-2011 were obtained. Patients (Pts) with diagnosis of type 1 (T1) or type 2 (T2) DM were classified according to average BMI measurements (kg/m^2) as: Underweight (UW) (<18.5), Normal (Nl) (18.5-25), Overweight (OW) (25-30), Obese I(OI) (30-35), Obese II (OII) (35-40), or Obese III (OIII) (>40). Analyses were performed separately by T1 and T2. Differences were examined across BMI categories using ANOVA (continuous variables) and chi-square tests (categorical variables). Differences among T1 and T2 pts used chi-square tests.

Results

There were 287,275 diabetes pts (T1: 14,782; T2: 272,493) in the analyses. T1: female: 50%; median age: 56 years; Caucasian: 65%. T2 pts: female: 51%; median age: 64; Caucasian: 67%. T2 pts had higher percentages in obesity categories compared to T1 (T1: UW 1%, Ni 21%, OW 31%, OI 23%, OII 13%, OIII 11%; T2: 0.3%, 11%, 27%, 28%, 18%, 16%; P<0.001). Prevalence of hypertension and metabolic syndrome increased with increasing BMI for both T1 and T2 (Ps<0.001). Framingham risk scores were higher in obese pts for both T1 and T2 (Ps<0.001). UW pts had the highest percentage of smokers for both
T1 and T2 (Ps<0.001). T2 in the obese categories were more likely to have poor glycemic control (HbA1c>=7) (P<0.001) and using insulin (P<0.001) compared to non-obese T2 pts.

Conclusions

Obesity is associated with increased cardiovascular risk factors among T1 and T2 pts and poorer glycemic control among T2 pts.

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**T-2714-P: Obesity Parameters are Stronger Predictor of Insulin Resistance in South Asian Men than Women**

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Background

Insulin resistance (IR) plays a role in the pathogenesis of cardiovascular disease (CVD), which tends to appear among South Asians at younger ages. Anthropometric measures may serve to predict IR in this population group, yet, epidemiologic data drawn from large South Asian samples are lacking.

Methods

We assessed the associations between anthropometrics and IR by in a cross-sectional study in 6309 South-Indian adults who were not diagnosed with diabetes (mean age XXX year; XXX% female. Anthropometric predictors were BMI, waist circumference (WC) and body fat percentage (BF%); covariates were age, sociodemographic status, physical activity level, stress, as well as blood glucose and insulin levels. IR, the outcome, was defined using the homeostasis model assessment of IR (HOMA-IR) >75th percentile in the studied population.

Results

IR prevalence was 16.4% males; 22.2% females. Correlations of HOMA-IR and BMI (r=.51), WC (r=.48) and BF% (r=.41) were higher in males than females (r=.36, .36, and .31, respectively, all p<.05). Age was uncorrelated with HOMA-IR. Adjusted analyses showed that BMI (β=.49), WC (β=.47) and BF% (β=.43) predicted HOMA-IR in males, with lower βs in females: BMI β=.33, WC β=.38 and BF% β=.29. Adjusted odds ratios for IR with high BMI, WC and BF% were 8.2, 10.4, 11.5 in males, and 4.4, 4.4 and 2.6, respectively, in females (all p<.001).

Conclusions
In conclusion, obesity parameters were stronger predictors of IR in males compared to females in this South Indian population, suggesting that risk factors may differ. Further research will elucidate other components, such as inflammation, which may be contributing to IR in South Asian women.

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**T-2715-P: Associations between 12-Year Changes in Body Mass Index and Sexual Functioning in Midlife Women**

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**Background**

Prior research on body weight and female sexual functioning is inconclusive. This study examined whether body mass index (BMI) is associated with concurrent sexual functioning and if changes in BMI are associated with changes in sexual functioning over 12 years in midlife women.

**Methods**

Midlife women (N = 2,600) who were sexually active at any time point during the Study of Women’s Health Across the Nation (SWAN) reported annually on sexual functioning and underwent BMI measurements for 12 years. Generalized linear mixed effects models examined associations between baseline levels and longitudinal changes in BMI and the following sexual functioning variables: desire, arousal, intercourse frequency, and ability to climax. Models adjusted for demographic variables, depressive symptoms, hormone use, alcohol intake, and menopausal, smoking, and health statuses.

**Results**

Mean BMI increased from 27.7 to 29.4 kg/m² and all sexual functioning variables declined significantly (ps < .001) over 12 years. Higher baseline BMI was associated with lower intercourse frequency (p = .006). BMI change over time was not associated with change in any aspect of sexual functioning; however, during years of greater-than-expected BMI increases relative to women’s overall BMI change trajectory, reduced sexual desire (p = .03) and less frequent intercourse (p < .001) were reported.

**Conclusions**

BMI and sexual functioning track closely on a yearly basis, independent of changes in both variables with aging. Future studies should explore factors that may underly these associations. Support: NIH/DHHS NR004061, AG012505, AG012535, AG012531, AG012539, AG012546, AG012553, AG012554, AG012495
T-2716-P: Low Muscular Strength Thresholds for the Detection of Cardiometabolic Abnormalities in Adolescents.

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Background

There is a robust association between grip strength and cardiometabolic health among adolescents. What remains to be determined are sex-specific cutpoints for 'low strength' in the detection of risk. The purpose of this study was to determine thresholds of low strength in adolescent boys and girls.

Methods

Data are from a large cohort (n=1421) of adolescents aged 10-12 years. A continuous, cardiometabolic risk score (MetScore) was constructed from the following components: percent body fat, fasting glucose, blood pressure, plasma triglycerides levels, and HDL-cholesterol. An abnormal cardiometabolic phenotype was characterized as >=90th percentile of the MetScore. Logistic regression and receiver operating characteristic (ROC) analyses were performed to examine the relative odds of the abnormal cardiometabolic phenotype, per every 10% deduction in relative strength (represented by [(grip strength/body mass)], as well as to identify a sex-specific, low- relative strength threshold, respectively.

Results

Lower relative strength was robustly associated with increased odds of the abnormal cardiometabolic phenotype, such that for every 0.10 decrement of relative strength, there was a 3.7 and 2.4 increased odds (p<0.001) for boys and girls respectively. Potential low-relative strength thresholds ranged from 0.10-0.80 of body mass. In boys, the optimal threshold to detect the abnormal cardiometabolic phenotype was 0.40 (AUC=0.73; 95% CL 0.67-0.77). For girls, the optimal threshold was 0.35 (AUC=0.70; 95% CL 0.65-0.75).

Conclusions

There is a sex-specific threshold of low relative strength, such that <=0.40 and <=0.35 grip strength-to-body mass ratio had the highest AUC, sensitivity, and specificity profiles for boys and girls respectively, in the detection of cardiometabolic abnormalities.
T-2717-P: Associations Between Fasting Serum Cortisol Level and Anthropometric Measurements in Schoolchildren

Lovaine Rodrigues, MS; Paula Ms. Campagnolo, PhD; Fernanda Rauber, MS; Caroline Sangalli, MsS; Marcia Vitolo, PhD;

Background

Different directions of association have been reported between morning cortisol levels and increased central obesity in adults. The aim of this paper was to examine the associations between fasting serum cortisol level and anthropometric measurements in children.

Methods

A cross-sectional data analysis of children recruited to a randomized controlled trial in the city of São Leopoldo, Brazil. The data included Body Mass Index (BMI), waist circumference, and waist/height ratio, as well as tricipital/subscapular skinfold thickness and fasting serum cortisol levels at age 7-8. We used multiple linear regression adjusted for sex to verify the relationship between each measurement and the cortisol level at age 7-8.

Results

Participants included 289 (165 males) children. The mean cortisol level was 9.81+0.24 ug/dL. Association was found between cortisol and all anthropometric measurements at age 7-8: BMI (Â¥: -0.45; CI95%: -0.80 to -0.10), waist circumference (Â¥: -0.09; CI95%: -0.17 to -0.02), waist/height ratio (Â¥: -13.89; CI95%: -24.14 a -3.65), tricipital skinfold thickness (Â¥: -0.14; CI95%: -0.25 to -0.03) e subscapular skinfold thickness (Â¥: -0.14; CI95%: -0.24 to -0.04).

Conclusions

The morning cortisol level was negatively correlated with increased adiposity in children, can be attributed to increased clearance of cortisol already observed in adults. More studies are necessary to determine specific anthropometric turning-point that differentiates these cortisol releases.

T-2719-P: Adiponectin and LDL Oxidation in Latino Youth
Background

Adiponectin possesses antioxidant properties. Oxidation of low-density lipoprotein (LDL) is a key step in atherogenesis, but the relationship between oxidized LDL (oxLDL) and adiponectin is unknown. We investigated the independent associations between adiponectin and oxidized LDL in Latino youth.

Methods

One hundred and forty Latino youth (16.1±2.8 y; F=83; M=57; Lean=67, Overweight=34, Obese=39) participating in the Arizona Insulin Resistance Registry were used for this analysis. Fasting serum levels of total adiponectin were determined via double antibody radioimmunoassay (Linco Research, Inc.), oxLDL was determined via sandwich ELISA (Mercodia, Inc.), LDL-c was determined via an automated analyzer (Cobas c 111; Roche Diagnostics), and LDL particle size was determined using polyacrylamide gel electrophoresis using the Lipoprint system (Quantimetrix Co., Redondo Beach, CA). Analysis was conducted using Pearson correlation and multiple linear regression analysis (SPSS V.22; IBM).

Results

In bivariate analysis, adiponectin was significantly and inversely related with oxLDL (r=-0.31; p<0.001). When adiponectin was entered into a multivariate regression analysis along with age and gender, adiponectin was a significant independent predictor of oxLDL (β²=-1.78; p=0.01; R²= 0.12). After further adjustment for LDL-c and LDL particle size (both highly associated with oxLDL), adiponectin remained a significant independent predictor of oxLDL (β²=-1.27; p=0.049; R²= 0.67).

Conclusions

These data suggest that adiponectin is a strong predictor of oxLDL, independent of LDL-c and LDL particle size. Further research is needed to determine if changes in adiponectin impact cardiovascular disease risk via an oxLDL mediated mechanism.

T-2721-P_DT: Glycemic Control with Oral Medications in Adults with Type 2 Diabetes: NHANES 1999-2010

Meredith Shapiro; Daniel Hsia, MD; Frank L. Greenway, MD; William Johnson, PhD;

Background
About 50% of U.S. adults with type 2 diabetes mellitus (T2DM) do not meet the ADA recommendation of HbA1c ≤ 7.0%, underscoring the need for more clinical trials studying new diabetes medications. Socioeconomic and racial differences in medication use and glycemic control are of interest.

Methods

Data from NHANES 1999-2010 were examined to identify adults ages 20 and older treated for T2DM. Treatment regimens were determined from self-report medication lists. Glycemic control was assessed as HbA1c ≤ 7.0% or > 7.0%.

Results

Frequencies of taking oral medication alone were: B: 63.4%, M: 73.5%, W: 62.4%. Frequencies of HbA1c ≤ 7.0% while taking oral medications alone were: B: 59.3%, M: 49.1%, W: 64.6%, p<0.008. More people on oral medication+insulin or insulin alone had HbA1c > 7.0%. More Mexican Americans (38.0%) than Blacks (52.2%) and Whites (43.7%), p<0.002 and those who were not high school graduates (53.8%), p<0.0001 had HbA1c > 7.0%. Glycemic control did not vary significantly by sex, age, obesity status (BMI), and family income.

Conclusions

Glycemic control differs by race and educational attainment. Control is less prevalent in adults on more aggressive treatments, probably due to progressive loss of insulin secretion with time, thus making recruitment for clinical trials studying new oral diabetes agents even more difficult.

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T-2722-P: MRI-Measured Bone Marrow Adipose Tissue is Related to Cortical Bone Size in Children

Kuang Zong, BS; Yan Gao, MD; Jun Chen, BS; Steven B. Heymsfield, MD; Dympna Gallagher, EdD; F. Xavier Pi-Sunyer, MD; Wei Shen, MD;

Background

Several studies have shown an inverse correlation between cancellous bone marrow adipose tissue (BMAT) and bone mineral density, while such relationships in cortical bone are less studied. We aimed to investigate if an inverse relationship between BMAT and cortical bone is present in children.

Methods

A total of 185 healthy children (76 females and 109 males, 5-19 years old) were included in this study. Right mid-femur bone marrow adipose tissue area (BMA), right mid-femur cortical bone area (CBA), subcutaneous adipose tissue (SAT), visceral adipose tissue (VAT), and skeletal muscle were accessed with...
a 1.5 T whole-body magnetic resonance imaging (MRI) scanner. Dual-energy X-ray absorptiometry was used to measure total body fat (TBF).

**Results**

~A positive association was observed between BMA and CBA in the right femur ($r = 0.313$, $p < 0.001$). In standardized regression analysis with CBA as dependent variable and BMA as independent variable showed an inverse correlation after adjusting for weight ($F^2=-0.263$, $p<0.001$), for total body fat ($F^2=-0.201$, $p<0.001$), and for SAT, VAT, and skeletal muscle ($F^2=-0.272$, $p<0.001$).

**Conclusions**

~Our results suggest an inverse correlation between BMA and CBA is present in children and this link in cortical bone is consistent with the previous finding in cancellous bone. These results support the role of preferential differentiation of mesenchymal stem cells from osteoblasts to adipocytes.

**T-2723-P: Relationship between MRI-Measured Bone Area and Bone Marrow Adipose Tissue in Cortical Bones**

_Nicholas Buniak, BS; Zhaoyu Chen, MD; Jun Chen, BS; Steven B. Heymsfield, MD; Dympna Gallagher, EdD; Xavier Pi-Sunyer, MD, MPH; Wei Shen, MD;

**Background**

~Recent studies demonstrated an inverse relationship between bone mineral density (BMD) and cancellous bone marrow adipose tissue (BMAT). However, little is known if this relationship is also present in cortical bones.

**Methods**

~Right mid-femur bone marrow adipose tissue area (BMA) and right mid-femur cortical bone area (CBA) were evaluated in 615 healthy men and women (age 18-89 yr) by whole-body T1-weighted magnetic resonance imaging (MRI). Total body fat (TBF) was measured using whole-body dual-energy x-ray absorptiometry. The correlations between CBA and variables including BMA were investigated using the Pearson correlation and standardized regression analysis.

**Results**

~Right mid-femur CBA was significantly correlated with skeletal muscle and weight ($r = 0.700, 0.402$, respectively, $P <0.001$), but not to right mid-femur BMA ($P = 0.280$). However, the strong inverse association between CBA and BMA was observed after adjusting for age, gender, ethnicity, menopause status, weight, TBF, subcutaneous adipose tissue (SAT), visceral adipose tissue (VAT) and skeletal muscle.
Conclusions

An inverse relationship exists between BMA and CBA in the right femur independent of other predictor variables which suggests that the link between BMAT and BMD holds true in cortical bones as well. This finding may be explained by preferential differentiation of mesenchymal stem cells.

T-2724-P: Staggering Rates of High C-Reactive Protein in Severely Obese Children and Adolescents Using Nationally Representative Data

Asheley Skinner, PhD; Joseph Skelton, MD, MS; Michael J. Steiner, MD MPH; Eliana M. Perrin, MD MPH

Background

C-reactive protein (CRP), an inflammatory marker associated with cardiovascular (CV) risk, is associated with overweight and obesity throughout childhood. No previous studies have examined CRP in multiple classes of severe obesity.

Methods

We used the National Health and Nutrition Examination Survey (1999-2010). Non-overlapping categories of obesity using age- and sex-specific BMI percentiles for children 2-19 years were: non-obese (<95th percentile), class 1 obesity (≥95th percentile), class 2 obesity (>120% of the 95th percentile or absolute BMI>35, whichever was lower), and class 3 obesity (>140% of the 95th percentile or BMI >40). We used two cutoffs for CRP, based on previous research in adults and children: >1.0 mg/L and >4.0 mg/L. The weighted prevalence (N=17,845) of obesity was 16.8%: 11.5% in class 1, 3.9% in class 2, and 1.4% in class 3.

Results

Prevalence of CRP >1.0 mg/L increased by age and severity of obesity. Elevated CRP by age and non-obese, class 1, class 2, and class 3 was: ages 2-5 years (20.3%, 26.2%, 55.1%, 85.5%); ages 6-11 years (18.9%, 52.9%, 75.1%, 85.5%); and ages 12-19 years (23.5%, 59.2%, 78.5%, 90.9%) (all p<0.001). Patterns were similar for the prevalence of CRP > 4.0 mg/L: ages 2-5 years (7.8%, 6.9%, 17.9%, 23.9%; p=0.05); ages 6-11 years (5.1%, 13.4%, 35.8%, 44.2%; p<0.001); and ages 12-19 years (6.2%, 19.5%, 32.6%, 53.5%; p<0.001). Patterns were similar by sex.
Conclusions

Multiple classes of severe childhood obesity have a strong dose-response relationship with increased CRP. More than half of severely obese older children had high CRP, even using conservative thresholds, trumping other CV associations and perhaps serving as an earlier harbinger of CV compromise.

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T-2725-P: Cardiometabolic Risks in Children and Adolescents with Severe Obesity Using Nationally-Representative Data

Asheley Skinner, PhD; Eliana M. Perrin, MD MPH; Joseph Skelton, MD, MS;

Background

Prevalence of severe forms of obesity has increased in the last 14 years. Although overweight children have relatively low prevalence of cardiometabolic (CM) risk factors, no studies have examined risk in multiple classes of severe obesity.

Methods

We used the National Health and Nutrition Examination Survey (1999-2012). Non-overlapping categories of obesity using age- and sex-specific BMI percentiles for children 2-19 years were: non-obese (<95th percentile), class 1 obesity (>=95th percentile), class 2 (>120% of the 95th percentile or BMI>35), and class 3 (>140% of the 95th percentile or BMI >40). We used standard definitions for abnormal values of cholesterol (>200 mg/dL), HDL (<35 mg/dL), LDL (>130 mg/dL), triglycerides (>150 mg/dL), blood pressure (>95% by age, height, and sex), HgbA1c (>5.7%), and fasting glucose (>100 mg/dL). Weighted prevalence (N=26,684) of obesity was 16.4%: 11.3% class 1, 3.6% class 2, and 1.5% class 3.

Results

CM risk factor prevalence increased with obesity severity (non-obese, class 1, class 2, and class 3; all \( p<0.001 \)): cholesterol (8.1%, 14.3%, 16.2%, 18.6%); HDL (3.8%, 11.8%, 19.6%, 21.6%); systolic BP (2.5%, 5.1%, 11.8%, 14.4%); diastolic BP (0.9%, 1.7%, 0.8%, 8.4%); LDL (6.7%, 12.5%, 11.1%, 9.5%); triglycerides (7.6%, 22.0%, 20.6%, 27.0%); HgbA1c (1.1%, 1.5%, 4.3%, 7.3%); and fasting glucose (11.3%, 16.3%, 29.1%, 26.4%). Association with obesity was strongest in adolescents, with similar patterns at all ages.

Conclusions
Severe childhood obesity is associated with worse CM risk factors. Prevalence of risk factors in class 2 and class 3 obesity provide important information beyond standard obesity classifications, identifying children who are at greatest risk of negative health effects associated with obesity.

T-2726-P_DT: Predictors of Inter-Individual Variation in Blood Pressure Differ from Predictors of Elevated Blood Pressure in Adolescent Girls

Ashley L. Devonshire, MD/MPH; Erin R. Hager, PhD; Maureen M. Black, PhD; Marie Diener-West, PhD; Nicholas Tilton, BS; Soren Snitker, MD;

Background

Overall obesity and central obesity are frequently reported correlates of hypertension in adolescents but conflicting evidence exists regarding the statistical predictors of blood pressure (BP) and elevated BP (defined as SBP or DBP >= 90th NHLBI percentile) in adolescent girls.

Methods

Subjects were a school-based sample of 730 urban, mostly (>90%) African American, non-referred 6th and 7th grade girls (age range 10.0 - 14.7 years). Independent statistical determinants of SBP/DBP as continuous variables were identified by a stepwise model selection method based on the Schwarz Bayesian Information Criterion, which enables selection of a parsimonious model among many highly correlated variables. Candidate variables were: age, weight, stature, heart rate, pubertal development, BMI, BMI-for-age, waist, waist-to-height ratio (WHtR), fat mass, fat-free mass, and fat percentage. Determinants of elevated BP were also examined.

Results

By stepwise selection, the best-fitting models for DBP and SBP included fat-free mass (not fat mass), heart rate and, in the case of SBP, stature. The best-fitting model for elevated BP included WHtR only with no independent effect of age, race, puberty stage, or additional measures of body size. Consistent with the premise of information theory-based effect selection it was not possible to force age, puberty score, or race into either model at \( p < 0.05 \). The prevalence estimate for elevated BP was 4.7% at a WHtR of 0.5 and 13.7% at a WHtR of 0.7.

Conclusions

In this non-referred sample, inter-individual variation in DBP and SBP was best predicted by markers indicative of metabolic needs, suggesting appropriate physiological adaptation, while elevated BP was best predicted by WHtR, an indicator of visceral fat accretion and pathophysiology.
T-2727-P: Health-Related Quality of Life in Patients with Type 2 Diabetes Mellitus

Hyo Jeong Song, RN;

Background

We aimed primarily to investigate the level of health-related quality of life (HRQOL) in patients with type 2 diabetes mellitus.

Methods

This study was a cross-sectional study. Between October 2010 and April 2012, 208 patients with type 2 diabetes mellitus (T2DM) who attended the Diabetes Outpatient Clinic of the National University Hospital, Jeju, South Korea, were recruited. The inclusion criteria were diagnosis of T2DM, and receiving pharmacological treatment for diabetes. Data were collected via face-to-face interviews. A structured questionnaire was used to guide interviews: HRQOL as assessed by use of the EQ-5D Index. Each patient's medical records were reviewed to collect information relating to diabetic factors, including duration of T2DM and metabolic control as measured by HbA1c levels.

Results

The mean EQ-5D Index score of the total respondents was 0.84±0.20 (range, -0.18 to 0.99). According to the results for severity of each the five dimensions on the EQ-5D Index, about 48.6% of the respondents reported moderate or severe pain/discomfort. The EQ-5D Index was signifi-cantly different by duration of diabetes (r=2.73, P=0.007), The EQ-5D Index was not signifi-cantly different by HbA1c levels.

Conclusions

The EQ-5D Index was signifi-cantly decreased by longer duration of diabetes.

T-2728-P: Association Between Weight Loss After Roux-en-Y Gastric Bypass (RYGB) and Incident Organ Cancer

G. Craig Wood, MS; Marie Hunsinger, BSHS; Peter Benotti, MD; Christopher D. Still, DO; Anthony Petrick, MD;
Background

Recent studies have confirmed the protective effects of bariatric surgery on cancer risk. Although the underlying mechanisms are unknown, weight loss is suspected to play a role. This study aims to determine if incident cancer is associated with the extent of weight loss after RYGB.

Methods

Patients at a large integrated health care system with a bariatric surgery center were retrospectively reviewed to identify patients with no history of cancer at the time of RYGB. Diagnoses in the electronic health record, a tumor registry, and subsequent chart review were used to identify post-operative incident malignant organ cancer. The overall incidence of organ cancer was estimated using Kaplan-Meier analysis. The percent excess weight loss (%EWL) in the 48 months after surgery but prior to cancer was compared between those that developed organ cancer versus those that did using repeated measures linear regression.

Results

The 2983 patients had a mean age of 45.6 years (SD=11.1), 81% were female, and a mean baseline BMI of 47.2 kg/m2 (SD=7.9). Median follow-up after surgery was 3.8 years (range=1-12). Incident organ cancer was verified in 54 of the 2983 patients (1.8%). Kaplan-Meier estimates for cancer at 3, 5, and 10 years post-surgery were 1.2%, 2.5%, and 4.1%. After adjusting for age, body mass index, diabetes, hypertension, and dyslipidemia, patients that developed organ cancer had less weight loss (-3.5 %EWL, 95% CI=[-6.8, -0.7], p=0.034).

Conclusions

Greater weight loss after bariatric surgery is associated with lower organ cancer risk. Weight loss success may be related to cancer incidence after surgery. If these findings are confirmed, cancer protection may provide a motivating factor for sustained lifestyle change after bariatric surgery.
An inverse association between obesity and altitude has been reported in the United States population, independent of confounders. Whether this inverse association occurs in other populations with different ethnicities remains unknown.

**Methods**

We retrospectively determined the association between altitude and obesity in the population of Peru, a country with different topographic, socio-economic, cultural, and ethnic features than US. We utilized data publicly available online from the Food and Nutrition National Center, CENAN, for 2009-2010. The on-site survey conducted by CENAN used a nationally representative sample selected by the National Home Survey. Body weight and height were measured using standard methods. Final dataset included 53,830 adult subjects (>=20 years old). Odds ratios for obesity were obtained from multilevel mixed-effects logistic regression analysis, adjusting for risk factors and potential confounders.

**Results**

The odds ratios for obesity were as follows: 1.00 between 0−499 m (reference category), 1.02 (95% confidence interval 0.85 to 1.22) between 500−1,499 m, 0.63 (0.53 to 0.75) between 1,500−2,999, and 0.38 (0.32 to 0.46) at >=3,000 m, controlling for age, sex, self-reported physical activity, out-migration rate, urbanization, and latitude. Importantly, the relative risk estimated from the adjusted odds ratios were as follows: 1.02 (0.88 to 1.17) between 500−1,499 m, 0.68 (0.58 to 0.79) between 1,500−2,999, and 0.42 (0.36 to 0.50) at >=3,000 m.

**Conclusions**

Among Peruvian adults, living at high altitude (>=1,500 m) was associated with lower relative risk for obesity, while adjusting for confounders. These results confirm previous findings that geographical elevation is an important factor linked to obesity.

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**T-2730-P: Body Mass Index in School-Aged Children and Risk of Adult Type 2 Diabetes**

*Esther EZ. Zimmermann, PhD; Michael Gamborg, PhD; Thorkild IA IA. SÃ¸rensen, -, MD, Dr Med Sci; Jennifer L. Baker, PhD;*

**Background**

Adult weight gain and eventual obesity induce a 10-fold increased risk of type 2 diabetes. In view of the high prevalence of childhood obesity the impact of childhood body size on adult type 2 diabetes needs elucidating. We examined childhood body mass index (BMI) and future risk of type 2 diabetes.

**Methods**
A cohort of 260,629 children from the Copenhagen School Health Records Register, born 1930-1989, with height and weight measurements from 7 to 13 years of age was investigated. BMI z-scores were calculated from an internal age- and sex-specific reference. BMI z-scores was divided into five categories corresponding to the <10th, 10-25th, 25-75th, 75-90th and >90th percentiles, using BMI z-scores between the 25-75th percentiles as reference. Via linkage to the National Danish Diabetes Registry 19,878 cases of diabetes diagnosed at 30 years of age or later were identified between 1995 and 2010. Cox regression analyses were performed.

**Results**

In boys at 7 years of age, associations between BMI z-scores below the 25th percentile and adult type 2 diabetes were not detected. Compared with the reference group, boys with BMI z-scores from the 75th-90th and >90th percentile had HRs of 1.06 (CI 1.01-1.13) and 1.45 (CI 1.35-1.56), respectively, of adult type 2 diabetes. The associations became stronger with advancing age at school measurement, and at age 13 years the HRs were 1.36 (95% CI: 1.29-0.44) and 2.15 (95% CI: 2.02-2.28), respectively. Associations were similar in girls.

**Conclusions**

High BMI in childhood is associated with increased risk of adult type 2 diabetes. The associations increased with the age of the child in both sexes. Heavy children comprise a high-risk group for developing type 2 diabetes as adults, although they have a much lower level of risk than heavy adults.

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**T-2731-P: Childhood Body Mass Index and Growth in Relation to Risk of Clinically Recognized Non-Alcoholic Fatty Liver Disease in Adulthood**

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**Background**

Weight gain and eventual obesity in adults is a risk factor for non-alcoholic fatty liver disease (NAFLD). We hypothesize that excess weight in school-aged children increases the risk of adult NAFLD.

**Methods**

A cohort was formed from the Copenhagen School Health Records Register consisting of 244,464 boys and girls, born 1930-89, who had heights and weights measured by physicians or nurses at ages 7-13 years. BMI z-scores were calculated from an internal age- and sex-specific reference. By combining clinical and
liver biopsy data from two National Danish Registers 2,370 NAFLD cases were identified from 1990 through 2010. Hazard ratios (HR) with 95% confidence intervals (CI) were calculated by Cox regression.

**Results**

We found no associations between excess childhood BMI z-score at any age and adult NAFLD. Change in BMI z-score between 7-13 years of age was positively associated with NAFLD in both sexes. When adjusted for BMI at 7 years, the HR of NAFLD was 1.15 (CI 1.05-1.26) per 1-unit increase in BMI z-score between 7-13 years in boys. Similar associations were seen in girls, and when adjusting for BMI z-score at 13 years. Our findings were consistent across year of birth and after accounting for the previous occurrence of alcohol-related disorders.

**Conclusions**

Rapid BMI growth in school-aged children has harmful effects on adult liver health. Intriguingly, the associations were independent of the general level of the BMI per se, and suggest that the dynamics of fat accumulation rather than the amount of stored fat is important in the pathogenesis of NAFLD.

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**T-2732-P_DT: BMI and Pain Predict Activities of Daily Living (ADLs) in an Obese Sickle Cell Disease (SCD) Clinic Population.**

*Lori Boyd, BS; Kelli Kaufman, BS; Mary Wood, MA; Camela S. Barker, MA; Rosellen Reif, MS; Christopher L. Edwards, PhD; Martin Binks, PhD, FTOS;*

**Background**

Our prior work suggests an association of pain & obesity with activities of daily living (ADLs). Pain and impaired ADLs are factors in SCD and obesity is increasingly an issue as longevity & health improve. We hypothesized that higher BMI and increased pain would be associated with lower ADLs.

**Methods**

Archival review of data that was collected as part of an ongoing study at the Duke Comprehensive SCD Center was performed. Data is collected via survey and medical records review from a consecutive sample of clinic patients. The current study represents a cross-sectional analysis of 226 consecutive adult African American clinic patients (age M=33.6 yrs; BMI M=26.3 kg/m2; F=55%) receiving routine follow-up care. ANOVA and regression analyses were performed on subsets of the population data based on available data and weight status. Study variables included BMI (measured kg/m2), Short Form McGill Pain Inventory (SFMPQ), and The ADL Scale.
Results

Weight-related prevalence (BMI; kg/m²; N=226): Normal (NW) 18.5-24.9 (53%); OW 25-29.9 (26%); OB >30 (21%). One way ANOVA indicated OB patients had higher present pain index (PPI) scores than did NW (OB, M=3.9; p=.033; NW, M=3.35). Pearson correlation (OB only) indicated an association of Sensory Pain (SP), Affective Pain (AP) & Present Pain (PPI) with Physical ADLs (p's = .043; .002; .002) and Tot ADLs (p's = .046; .036; .0001). BMI correlated with Tot ADLs (p = .046). Regression analysis indicated that PPI and BMI predicted Tot ADLs (p = .001).

Conclusions

With increased recognition of the prevalence of overweight and obesity in the SCD population and the convergence of pain and BMI involvement in ADL-related impairment, it will be prudent to better understand these relationships in SCD patients both for prevention and treatment relating to obesity.


Se Young Jung; Ju Young Kim, MD, PhD;

Background

There have been discrepancies regarding which index of sarcopenic obesity can best predict metabolic syndrome. The best predictable index for metabolic syndrome in the Korean population was found to be the appendicular skeletal muscle mass divided by the total body weight (SO0)

Methods

The fourth and fifth Korean national health and nutrition examination surveys were conducted from 2008 to 2011. Overall, 7968 men and 10618 women aged 20 or older were recruited. We assumed five new models that may predict metabolic syndrome. One was the total fat mass divided by the total fat free mass (SO1) and other four models are abdominal obesity divided by the appendicular skeletal muscle mass (SO2), the thigh muscle mass (SO3), the arm muscle mass (SO4) and the total muscle mass (SO5). Abdominal obesity was measured according to the trunk fat mass. We calculated the c-statistics of each model and compared these results with those of a previous model (SO0).

Results
After adjusting for the covariates of age, sex, smoking, alcohol consumption, exercise and socioeconomic status, the best prediction model was found to be total abdominal obesity divided by thigh muscle mass (c-statistics 0.7194). The SO5 model had a c-statistics value of 0.7109; in addition, these values were respectively 0.7116, 0.6818 and 0.6450 for the SO2, SO4, and SO5 models. Compared to the previous index (SO0), all five new models showed superior predictability with statistical significance (p-value <0.001 in all models).

Conclusions

We introduced five models which can be used to predict metabolic syndrome. With the index of sarcopenic obesity as measured by the trunk fat mass and thigh muscle mass, we can best correlate sarcopenic obesity with metabolic syndrome. We also found that this is a better index than a previous model.

T-2734-P: Revisiting the Obesity Paradox - Impact of Obesity on Outcomes for Patients with Community-Acquired Pneumonia

Stephanie Sirard; Louis Valiquette, MD; Cynthia Grenier, Pharmacologist, M.Sc Clinical Science; Marie-France Langlois, MD;

Background

The impact of obesity on outcomes of community-acquired pneumonia (CAP) remains controversial. Some studies suggested high BMI is protective against mortality. This study aimed to evaluate the impact of obesity on 30-day all-cause mortality.

Methods

This retrospective study included all adults (n=1750) admitted for CAP, in an academic centre in Canada between 2003 and 2008, with a BMI value (within 3 months of admission; data was available in 86% of our cohort). Patients were classified according to BMI: underweight (<20.0), normal/overweight (20.0-29.9), obese (30.0-39.9), and morbidly obese (>= 40). Multivariate logistic regression analysis was used to determine risk factors contributing to 30-day all-cause mortality in hospitalized patients with CAP.

Results

Morbidly obese (MO) patients were younger than normal/overweight patients (median 61 vs 74 yrs, p<.01), had less cancer (1.7% vs 25%,p<.01) or immunosuppression (10% vs 23%, p=.03). Their CAP were less severe (PSI class IV/V) compared to normal/overweight patients (36% vs 57%, p<.01). Mortality was lower in MO patients (5%) than in underweight (13%) or normal/overweight patients (6%) (p<.01). Low BMI, age >80, acute renal failure, low SaO2 were the strongest independent risk factors of mortality.
Conclusions

Our results do not support the association between high BMI and mortality but reinforces the association with underweight. The apparent protective effect of MO could be explained by a lower threshold for hospital admission due to factors not measured in our study (e.g. socioeconomic status).

T-2735-P: Nonresident Parental Influence on Adolescent Weight and Weight-Related Behaviors: Similar or Different from Resident Parental Influence?

Jerica M. Berge, PhD;

Background

Many parents have shared custody of their children, but do not live with them the majority of the time. The objective of this study is to examine whether and how resident and nonresident parents’ weight and weight-related behaviors are correlated with adolescents’ weight and weight-related behaviors.

Methods

Data from two linked population-based studies, Eating and Activity in Teens (EAT) 2010 and Families and Eating and Activity in Teens (F-EAT), were used for cross-sectional analyses. Resident parents (n=200; 80% females; mean age = 41.8), nonresident parents (n = 200; 70% male; mean age = 43.1), and adolescents (n = 200; 60% girls; mean age = 14.2 years) were socio-economically and racially/ethnically diverse. Multiple regression models were fit to investigate the association between resident and nonresident parents’ weight and weight-related behaviors (e.g., dietary intake, dieting, physical activity, sedentary behaviors) and adolescents’ weight and weight-related behaviors.

Results

Both resident and nonresident parents' BMI were significantly associated with adolescents' BMI percentile. Additionally, resident parents’ sugar-sweetened beverage consumption, fruit and vegetable intake and dieting behaviors were significantly associated with adolescents' sugar-sweetened beverage intake (p<0.05), fruit and vegetable intake (p=0.04) and dieting (p< 0.05), respectively. Furthermore, the association between nonresident parent physical activity and adolescent physical activity was significant (p=0.03).

Conclusions
Findings suggest that resident and nonresident parents may have slightly different influences on their adolescent children's weight-related behaviors. Results may inform researchers regarding which family member(s) may be important to include, or focus on, in obesity prevention interventions.

T-2736-P: A Prospective Evaluation of Associations between Maternal Reports and Observations of Controlling Feeding Practices during Preschool Years: Relationships with Parenting, Child Eating and Weight

Heidi J. Bergmeier; Helen Skouteris, PhD;

Background

Maternal controlling feeding practices can impact children's eating and weight. However, maternal reports of controlling feeding practices have been poorly related to independently rated observations of mealtimes. Maternal reports and observations of controlling feeding practices and their predictor

Methods

Mothers of 72 children aged between 2 and 5 years (M = 3.09, SD = 0.75) participated in two observations of typical home-based mealtimes, set approximately 12 months apart (T1 and T2). Objective mother and child BMI measures were collected during home visits. Child temperament, child eating behaviours, maternal parenting styles and maternal feeding practices questionnaires were also collected at T1 and T2. Cross-sectional and prospective associations between maternal reports and independently rated observations of controlling feeding practices and their relationships with child and maternal factors were analysed.

Results

Results showed an inverse relationship between reported and observed restriction of food at T1. Reported restriction was associated with concern for child weight and negatively with maternal warmth. Observed restriction and pressure to eat were associated with child eating time, whilst reported pressure was negatively associated with child eating behaviour. Longitudinally, child eating behaviour and concern for child weight predicted reported restriction after one year. No associations were found between reported and observed practices.

Conclusions
Observations of maternal practices may provide better representations of practices performed as opposed to mothers’ ideals. Future research should evaluate the influence of bidirectional mother-child interactions on observed feeding practices using a sample of greater socio-economic and BMI diversity.

T-2737-P_DT: Association Between Parenting and Overweight/Obesity Among Asian-American Children

Priya Bhat-Patel; Kyung Rhee, MD, MSc, MA;

Background

Authoritative parenting is associated with decreased risk of childhood obesity in white populations. This relationship is unclear in other racial groups. The goal of this study was to examine the association between parenting (i.e. warmth and discipline) and obesity among Asian-American children.

Methods

Secondary data set analysis was conducted using the Early Childhood Longitudinal Study-Kindergarten (ECLS-K) which oversampled Asian-American children. Parental discipline was assessed by 11 items (0 for 'no', 1 for 'yes') with higher scores indicating harsh discipline and lower scores indicating authoritative discipline. Parental warmth was assessed using 4 items (Likert scale of 1 to 4) with higher scores indicating warmer parenting. Primary outcome was body weight status adjusted for age and gender. We used crude and adjusted logistic regression models to assess the relationship between parent discipline/warmth and child overweight/obese (OW/OB) status when children were in kindergarten.

Results

In the sample (n=650), 23.5% of children were OW/OB, 57.8% of mothers were immigrants, 96.9% of parents were married, 93.5% of parents had a high school diploma or higher, and 46.0% of households had an income over $50,000. In the adjusted model, children whose parents used harsh discipline were more likely (OR=1.04; 95%CI: 1.01-1.06) to be OW/OB compared to children with parents using more authoritative discipline. Children whose parents used warmer parenting (OR=0.96; 95%CI: 0.92-1.00) were less likely to be OW/OB.

Conclusions

Similar to studies conducted in white populations, we found that harsh discipline was associated with increased risk of OW/OB and warmer parenting was associated with lower risk. This information can aid in the design of comprehensive interventions for OW/OB Asian-American children.
T-2738-P: What Makes a Food a Snack? 
Snack Definitions among Low-Income Caregivers of Preschool-Age Children

Christine E. Blake, PhD, RD; Nicholas Younginer, MA; Kirsten K. Davison, PhD; Alexandria Orloski, BS; Rachel Blaine, MPH, RD; Claudia Gehre, MPH; Jennifer O. Fisher, PhD;

Background

Snacks are typically self-defined in epidemiological surveys, but little is known about how parents conceptualize children's snacks. This research used schema theory to explore caregivers' definitions of preschool children's snacks.

Methods

Sixty low-income non-Hispanic White, African-American, and Hispanic primary caregivers of children aged 3-5 participated in qualitative in-depth interviews lasting approximately 60 minutes. Interviews were transcribed verbatim and coded using Nvivo 10. A grounded theory approach including the constant comparative method was used to explore caregiver's child snack definitions. Emergent themes indicated that caregivers defined child snacks along six dimensions including time, location, satiety, size, food characteristics, and nutrition. Further exploration of each dimension provided insight into caregivers child snack definitions.

Results

Time included proximity to meal (e.g. not close), time of day (e.g. early), preparation time, or time needed to eat (e.g. quick). Location referred to inside (e.g. den not dining room) or outside (e.g. car) the home. Satiety distinguished between foods that are filling, not filling or function as 'holdovers'. Size included size of a food (e.g. small) or portion size (e.g. handful). Food characteristics included cold, kid food, versatile, transportable, or treat. Nutrition was used to define snacks as healthy, not healthy, or junkfood.

Conclusions

Caregivers' definitions of preschool children's snacks reflect consideration of social, temporal, spatial, physical, and nutritional contexts of food consumption. Use of a child snack definition consistent with caregiver's perspectives can enhance research on child snacking behavior.

T-2739-P_DT: Linking Parental Feeding Styles with Sleep Behaviors in Preschool
Children from Families At-Risk for Obesity

Richard Boles, PhD; Maria Ulloa, BA; Sheryl O. Hughes, PhD; Susan Johnson, PhD;

Background

Preschool aged children from low-socioeconomic, minority backgrounds are at increased risk for obesity. Parental feeding styles may be linked with other at-risk child behaviors, including sleep habits, which may clarify parent-child interactions targeted for obesity interventions.

Methods

Participants were mothers who identified being Hispanic (English and Spanish speaking) or African American with a preschool aged child who attended Head Start, a federally funded program for low-income families. Parents were recruited during child pick-up and screened by phone for eligibility. Consenting and data collection were completed at participants’ home. Participants completed demographics, the Child Sleep Habits Questionnaire and a sleep diary, Caregiver's Feeding Styles Questionnaire, Family CHAOS, and the BASC-2 screener for behavioral and emotional problems. Height and weight were measured for parents and children using portable equipment.

Results

Participants (n=75 parent/child dyads) reported low-income (92% less than $30K/year) and education (61% high school diploma or less). Percentage of overweight and obesity was high for parents (71%) and children (30%). Children reportedly slept, on average, about one hour less each night ($M=9.9\text{hrs}\pm.9$) when parents reported Authoritarian feeding styles compared to parents who reported Authoritative feeding styles ($M=10.8\text{hrs}\pm1.1$), $p=.05$. Child functioning (BASC-2) and family CHAOS also significantly predicted greater sleep problems.

Conclusions

Interventions that target parenting skills related to optimal feeding styles may improve other parent child interactions linked with childhood obesity. Future intervention studies aimed at improving parental feeding and child sleep habits may also need to address family and child functioning.

T-2740-P: Socio-Economic, Familial and Lifestyle Factors Associated with Obesity in Malaysian Schoolchildren
Background

Identifying the sociodemographic influences that lead to obesity is important for planning and implementing effective prevention initiatives. Thus, the aim of this study was to identify above mentioned factors that are associated with obesity among Malay children.

Methods

A total of 1,095 school children aged 6-12 years were recruited in metropolitan Kuala Lumpur. Information about each child's socio-economic, familial and lifestyle factors was obtained through questionnaires. Body weight and height were measured, and BMI was categorized using WHO 2007 growth reference. Physical activity was objectively measured by pedometer for seven days, while sleep duration was self-reported through questionnaire.

Results

Analysis shown that the risk of being overweight/obese increased among male children (odds ratio (OR) 1.92; 95% confidence interval (95%CI) 1.51,2.45), children with birth weight exceeding 4 kg (OR 3.89; 95%CI 1.61,9.40), those from high monthly household income [>USD2735 per month] (OR 1.74; 95%CI 1.15,2.63) and those did not meet pedometer count recommendation (OR 2.11; 95%CI 1.39,3.20). On the other hand, sleeping for nine to ten hours at night were associated with decreased obesity risk (OR 0.42; 95%CI 0.191,0.922).

Conclusions

Thus, sex, birth weight, household income, and low physical activity were risk factors for obesity. However, adequate sleep, may have protective effect from obesity. This information may help to form the basis of intervention programmes and to manage the obesity problem in Malay children.

T-2741-P: A Qualitative Analysis of Maternal Feeding Beliefs and Behaviors on Food Blogs

Allison Doub; Meg Small, PhD; Leann L. Birch, PhD;

Background

Social norms influence maternal feeding practices, which affect children's obesity risk. Young mothers use the Internet for parenting information and ~75% read weblogs. Research on weblogs is needed to determine the extent to which blog themes support or differ from obesity prevention guidance.
Methods

This study explored themes related to maternal feeding beliefs and behaviors on parent-authored food blogs, which focus on family-friendly foods and child feeding. A purposive sample of 20 food blogs authored by parents of at least one 2-5 year old child was obtained by screening Babble.com's 'Top 100 mom food blogs of 2013' and doing one snowball iteration from eligible blogs. A random sample of up to 12 posts (3 per season) that focused on child feeding was drawn from entries between 12/2012 to 11/2013. Posts were coded for themes using an a priori coding scheme of parent feeding practices developed from existing measures. Open coding was used to capture emergent themes relevant to feeding.

Results

Preliminary results showed that bloggers' beliefs centered on a few themes: The importance of health (28%); Food as fun or entertainment (23%); Parental responsibility for child feeding (19%); and food as a way to emotionally connect with children (15%). Behaviors discussed were most commonly related to themes about child involvement with food preparation (26%); Exposing children to a variety and balance of foods (16%); and Responsive feeding based on children's cues (9%).

Conclusions

Some themes supported exiting guidance on child obesity prevention, such as child involvement and responsiveness. Themes related to feeding for reasons other than child hunger, however, may promote child obesity. Future research should explore whether bloggers influence readers' feeding practices.

T-2742-P_DT: Dietary Intake and Home Food Availability among Low-Income Preschool Children: Associations with Food Security and SNAP Participation

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Background

The SNAP program aims to alleviate hunger and improve diet quality. Few data are available on the association between SNAP participation, food security and dietary quality among low-income at-risk children who participate in the program.

Methods
The present research examined dietary quality and home food availability among 534 low-income children ages 2-4 yrs. NET-Works baseline data included directly measured child BMI, three 24-hr dietary recalls and a home food inventory (observed). Bivariate and multivariate associations were examined between these variables and household food security (USDA 6-item module) and SNAP participation.

Results

In bivariate analyses, food insecurity and SNAP participation were significantly associated with lower fruit/vegetable intake (p<.09 and .001, respectively) and higher sweetened beverage intake (food insecurity p < .03; SNAP p < .02). SNAP households had fewer fruits (p<.03) and more sweetened beverages (p < .05). In multivariate analyses, food insecurity and SNAP were not associated with sweetened beverage or fruit/vegetable intake; but non-Hispanic ethnicity, low education and more household children were significantly associated.

Conclusions

Among low-income preschool children, food insecurity and SNAP participation are not associated with worse diets or foods in the home. Higher sweetened beverage intake is associated with non-Hispanic ethnicity, more children in the home and less parent education.

T-2743-P: The Measurement of Parenting Constructs in the National Cancer Institute's Family Life, Activity, Sun, Health and Eating (FLASHE) Study

Erin Hennessy, MPH; April Oh, PhD, MPH; Linda Nebeling, PhD, RD, FADA; Heather Patrick, PhD;

Background

An increasing volume of research has focused on parents as primary socializing agents for children's obesogenic behaviors. Methodological issues have been raised suggesting the need for a fundamental reconsideration of the foundational knowledge of parenting in regard to childhood obesity.

Methods

The process of developing parenting constructs in NCI's FLASHE Study, a web-based survey, is reviewed. NCI hosted scientific conferences on parenting and cancer preventive health behaviors including the utilization of a dyadic approach. An environmental audit of public-use datasets and a detailed literature review was conducted. These activities highlighted key research gaps and priorities and a pool of potential survey items. A panel of scientific experts reviewed all items. Cognitive testing and usability testing was used to test and refine survey items. NCI's FLASHE study utilizes a dyadic approach to collect data on multiple domains including parenting practices and style.
Results

Parenting practices include control, modeling, support/structure, emotional regulation, and legitimacy of parental authority while parenting style is measured as autonomy, demandingness and responsiveness. Parent-adolescent (12-17years) dyads (n=2500) will complete surveys that evaluate parenting constructs across 4 behavioral domains: fruit and vegetable intake, junk food/sugar sweetened beverage intake, physical activity, and screen time. Preliminary analyses will include parent-adolescent agreement on key constructs and dyadic analyses.

Conclusions

The FLASHE study overcomes several methodological challenges currently inherent in obesity/parenting research. FLASHE allows for dyadic analyses and evaluation of multiple parenting constructs. Challenges included the need for valid, reliable, and short assessment of parenting constructs.

T-2744-P_DT: Black-White Disparities in Obesity Trends by Industry of Employment, 2004 to 2011

Chandra L. Jackson, PhD, MS; David Hurtado, ScD; Ichiro Kawachi, MD, PhD; Frank B. Hu, MD, PhD;

Background

Obesity is associated with increased morbidity and mortality along with occupational concerns such as injuries and work-related loss in productivity. Few studies have evaluated national trends of obesity in Blacks and Whites by employment industry.

Methods

Using a nationally representative sample of 136,923 US adults in the National Health Interview Survey from 2004 to 2011 who self-reported their weights and heights, we estimated race- and sex-specific obesity prevalence for each industry of employment using direct age-standardization methods with the 2000 US Census as the standard population.

Results

Participants' mean age was 47 years, 50% were women, and 13% were Black. White women in Professional (21% to 26%), Finance (22% to 27%), and Healthcare (27% to 31%) industries experienced a significant increase in obesity over the study period as did Black women in Finance (35% to 48%). While White men had a significant increase in obesity prevalence in Manufacturing (34% to 41%), Black men experienced an increase in Professional (22% to 41%), Manufacturing (34% to 41%), Healthcare (28% to 40%) and Accommodation/Food Services (20% to 35%).
Conclusions

Obesity prevalence and trends varied substantially within and between race-sex groups across employment industries. Further research on racial and sociocultural influences on obesity and interventions prioritizing workers employed in certain industries with high or increasing obesity are needed.

T-2745-P: Mid-Childhood Fruit and Vegetable Consumption: Do Timing of Introduction, Early Liking and Early Consumption Matter?

Kai Ling Kong, PhD; Matthew Gillman, MD, SM; Sheryl Rifas-Shiman, MPH; Xioazhong Wen, PhD;

Background

Among American children consumption of fruit and vegetables (F&V) is well below recommended amounts. Limited data exist on early childhood exposure to F&V-including timing of introduction, how much children liked them, and amount of intake-with F&V consumption later in childhood.

Methods

For 1,031 children in the pre-birth cohort Project Viva, at 6m and 1y mothers reported timing of introduction of F&V; at 1, 2, and 3y child's liking of F&V (on a 4-point scale); at 2y, 3y and mid-childhood (7 to 10y) daily intake of F&V. Using Spearman correlation we analyzed tracking correlations of liking and consumption for various time intervals from 1y to mid-childhood. To examine associations of timing of introduction with mid-childhood consumption, we used linear regression models, adjusted for socio-demographics, maternal parity, smoking and own 6m postpartum F&V consumption, and child's age, sex, and breastfeeding duration.

Results

Mean (SD) F&V consumption in mid-childhood were 1.5 (1.1) and 1.3 (0.8) serving/day, respectively. Tracking correlations for liking ranged from 0.34 to 0.66, and correlations for intake from 0.38 to 0.67. For each 1-point increment in 3y liking of F&V, mid-childhood consumption was higher by 0.40 (95% CI 0.30, 0.49) and 0.32 (95% CI 0.26, 0.38) serving/day, respectively. Timing of introduction of F&V was not associated with mid-childhood consumption.

Conclusions

Child's liking and consumption of F&V tracked from infancy through mid-childhood. Liking of F&V at earlier ages, but not timing of introduction was associated with mid-childhood consumption.
T-2746-P: Food Fights: Struggles among Parents of Preschoolers during Meals and Snacks

Tracey Ledoux, PhD, RD;

Background

Parent practices influence eating behavior development among children. Most feeding research focuses on the dinner meal and examines isolated constructs. The purpose of this study was to explore multiple dimensions of interactions between parents and preschool age children during eating episodes.

Methods

Parents of children ages 2-5 years old were recruited from the community to participate in one in depth semi-structured interview. The interview guide and interviewer probes and prompts were designed to elicit descriptions of pleasant and unpleasant meals and snacks (eating episodes, EE) including thoughts, feelings, and behavioral sequences among preschool age children and their parents. All interviews were recorded and transcribed verbatim. Transcripts were coded in Atlas ti independently by two trained coders using grounded theory to identify key points. Together, coders consolidated key points into themes.

Results

20 parents of preschool age children participated in interviews. Major themes in interactions during ‘pleasant’ EEs were engagement of all family members, enjoyment of eating, and lack of disruptive behaviors. Unpleasant EEs involved parent emotions of frustration and stress; child behaviors of food refusal, begging for alternate foods, and poor table manners; lack of time; and external influences (e.g., grandparents). Snacks and breakfast were mostly pleasant and child-centered. Lunch was variable, and the dinner meal was often unpleasant.

Conclusions

Parent/child interactions during EEs are complex and vary by meal or snack status. Child behaviors and environmental conditions interact and have a reciprocal relationship with parent emotions and behaviors. A conceptual model was created to depict these associations. Next steps are to test the model.

T-2747-P: Does Choice of Child Adiposity Measure Affect Estimation of the
Relationship between Parent Feeding Style and Change in Adiposity?

Stephanie Mazzucca; Dianne S. Ward, EdD;

Background

Determining the best measure of child adiposity remains controversial. Prior studies have been inconsistent, and this choice may impact results of studies of the relationship between parent styles and child weight. These studies have also been inconsistent, possibly due to this methodological issue.

Methods

Data were from the control group (n=124) of a larger study for parents of children 2-5 y. Uninvolved parent feeding style was collected from baseline parent report via the validated Caregiver’s Feeding Styles Questionnaire. Staff measured child height and weight at baseline and 9 months. We created four adiposity measures: BMI, BMI centile, BMI z-score, and BMI percent \([100\times\log(BMI/median\ BMI)]\). BMI centiles, z-scores, and median BMI were obtained from CDC growth charts. GLMs estimated associations of uninvolved feeding style (binary) with standardized changes in child adiposity, controlling for parent BMI, income, and race. Child sex and age were included in the BMI model.

Results

Children were 3.4 y and were at the 59th BMI centile, on average. Being an uninvolved parent was associated with increases in child BMI for all four outcomes. The association was strongest and statistically significant for \(\Delta\)BMI z-score (\(\hat{I}^2=0.52;\ 95\%\ CI: \ 0.05, 0.98\)), whereas the association approached significance for \(\Delta\)BMI centile (\(\hat{I}^2=0.43;\ 95\%\ CI: \ -0.37, 0.89\)) and \(\Delta\)BMI (\(\hat{I}^2=0.34;\ 95\%\ CI: \ -0.13, 0.81\)). The association was weakest for \(\Delta\)BMI% (\(\hat{I}^2=0.25;\ 95\%\ CI: \ -0.21, 0.70\)).

Conclusions

Results confirm that choice of BMI measure impacts estimation of relationships between parent practices and child weight. While the direction of the relationship was the same for all outcomes, strength of associations varied. Future studies should consider these differences when analyzing child BMI.

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T-2748-P: Eyes are Deceiving: Parent Characteristics in Estimating Young Children’s Weight Status

Dianne S. Ward, EdD; Stephanie Mazzucca;
Background

It is difficult for parents to identify weight status in young children. Failure to recognize overweight/obesity in children limits parents' ability to provide guidance for eating and activity. Efforts to identify parent groups that are likely to misclassify may help target intervention efforts.

Methods

Data were from a larger study for parents of children 2-5y (n=309, 38% African-American). Staff measured child and parent height and weight, and parents reported demographics. Parents reported child weight status as underweight, normal weight, overweight, or markedly overweight (interpreted as obese). BMI percentiles were calculated using CDC growth curves, and children were grouped into underweight (<5th %ile), normal weight (5th-84th %ile), overweight (85th-94th %ile), and obese (>=95th %ile). Measured parent and child weight status were cross-tabulated to examine correct or incorrect classification of child weight status and to compare parent and child characteristics across groups.

Results

33% of parents underestimated their child's weight status, i.e., reporting that the child was normal weight when he/she was overweight or obese. More parents who underestimated had at least a Bachelor's degree (83%) vs. those who correctly classified their child's weight status (76%). No differences were noted for other characteristics, including parent education, race, income, child age and gender for parents who correctly classified children vs. those who underestimated child weight status.

Conclusions

Results indicate that misclassification of child weight status is a wider problem for parents, not relegated to a parent subgroup. These data underscore the need for programs to help parents understand their child's weight status. Strategies to convey overweight risk to parents should be developed.

T-2749-P: Investigating the Relationship of Body Mass Index, Diet Quality and Physical Activity Level between Fathers and Their Preschool Age Children

Rachel L. Vollmer, PhD, RD; Kari Adamsons, PhD; Amy Gorin, PhD; Jaime S. Smith, MS, RD; Amy R. Mobley, PhD, RD;

Background
Few studies have investigated the novel role of fathers on their preschool age child's risk of obesity. The purpose of this cross-sectional study was to examine relationships between father and child body mass index, diet quality and physical activity.

**Methods**

One-on-one interviews with biological fathers (n=150) of children (ages 3-5 years old) were conducted by a trained interviewer to assess diet quality via 24 hour recall and Healthy Eating Index-2010, and physical activity using the Pre-Physical Activity Questionnaire. Height and weight for each father and child were also measured and body mass index (BMI) or BMI z-score calculated. Linear regression was used to test relationships between father and child body weight, diet quality, and physical activity, while controlling for father income level, race, and ethnicity.

**Results**

Overall, the findings revealed that there were significant, positive relationships between father-child BMI and BMI z-score ($R^2 = .03, p=0.05$), overall diet quality ($R^2 = .39, p<0.0001$), and weekday ($R^2 = .27, p=0.002$) and weekend ($R^2 = .62, p=0.001$) vigorous physical activity.

**Conclusions**

These results suggest that fathers may have an influence on their child's body mass index, dietary intake and physical activity level. Future research should consider the inclusion of fathers in obesity prevention programs for young children.

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**T-2750-P: Exploring the Influence of Paternal Race, Ethnicity, Education Level and Child Gender on Paternal Feeding Style: Implications for Childhood Obesity Prevention**

*Rebecca R. Albanese, BS Nutritional Sciences; Rachel L. Vollmer, PhD, RD; Jaime S. Smith, MS, RD; Amy R. Mobley, PhD, RD;*

**Background**

Parental feeding styles have been recognized as contributors to the risk of child obesity. The objective of this study was to determine if a father's feeding style is associated with characteristics such as his education level, race, ethnicity or his preschool age child's gender.
Methods

Fathers (n=150) with biological children (ages 3-5 years old) were interviewed one-on-one using the Caregiver Feeding Style Questionnaire to determine feeding style and a series of demographic questions. On average, fathers were 37.4 (+- 7.5) years old, white (57.3%) and non-Hispanic (81.3%). Most of the fathers had completed at least a high school degree (97.3%). Logistic regression was conducted to determine the likelihood a father would have a certain feeding style based on his race, ethnicity, education level and child's gender.

Results

Fathers with some college education were 4.817 times more likely (p=0.001) to have an authoritative (most desirable) feeding style than fathers with more or less education. At the same time, these fathers were 0.30 times less likely (p=0.041) to have an uninvolved (less desirable) feeding style. Furthermore, fathers who were married were 2.28 times more likely (p=0.047) to have an authoritative feeding style as well as fathers who stay at home (OR=4.09, p=0.05) or were not employed (OR=3.58, p=0.022).

Conclusions

These results reveal that certain characteristics such as a father's education level or marital status may indicate a more supportive family environment and desirable child feeding style.

T-2751-P: Sibling Circumstances as Predictors of Overweight among US Low-Income School Age Children

Rana Mosli, MS; Alison L. Miller, PhD; Karen E. Peterson, DSc; Niko Kaciroti, PhD; Katherine Rosenblum, PhD; Julie C. Lumeng, MD

Background

Sibling circumstances might be related to children's weight status. Findings are inconsistent in the literature. Several confounding variables and variables that might be in the causal pathway were not previously considered. The effects of sex and biological relatedness of siblings are not known.

Methods

Low-income mother-child dyads completed questionnaires and weight and height were measured. Multiple logistic regression was used to examine the effect of birth order, number of younger siblings, number of older siblings, having at least one brother, and having at least one sister on overweight risk. Analyses were repeated to additionally include non-biologically related children living in the household. Effect modification by index child's sex was examined. All models were adjusted for child's sex, child's
race/ethnicity, maternal age, maternal relationship status, maternal education, household food insecurity, maternal depressive symptoms, maternal obesity, and birth weight z-score.

Results

A total of 274 mother-child dyads participated. Only children and youngest siblings had higher overweight risk compared to oldest siblings (OR: 4.12, 95% CI: 1.68-10.08 and OR: 3.31, 95% CI: 1.49-7.34, respectively). Increase in the number of younger siblings was associated with a lower overweight risk (OR: 0.61, 95% CI: 0.41-0.91), as was having at least one brother (OR: 0.50, 95% CI: 0.30-0.85). Index child's sex did not modify any of these associations. Including non-biologically related children did not significantly alter the associations.

Conclusions

Sibling circumstances are associated with overweight risk among school age children. Behavioral characteristics rather than non-modifiable variables might explain these associations. Future studies are needed to examine the underlying mechanism in order to inform family-based intervention programs.

T-2752-P: Maternal Feeding-Related Overt and Covert Control Practices Differ for Boys Versus Girls: Results a Population-Based Sample of Preschoolers

Paulina Nowicka, PhD; Derek Hales, PhD; Carl-Erik Flodmark, MD PhD; Myles S. Faith, PhD;

Background

Overt and covert control represent two related, but distinct parental feeding practices. Research has linked covert control to healthier diet and lower child weight. Little is known about how these constructs differ for parents of girls vs boys.

Methods

Our aim was to examine how covert and overt feeding practices mediate the relationships between parent BMI, education and nationality and child BMI in boys compared to girls. All mothers of 4-year-olds from the population register (n=3007) in Malmö, Sweden were contacted by mail. Responses to the 9-item overt/covert control scale and demographic questionnaire were obtained from 876 mothers. Forty-eight percent had girls. Multi-group SEM was used to compare structural path estimates across groups. The measurement model was shown to be invariant by child gender. Overall the model explained about 5% of the variation in child BMI. Model fit was adequate (RMSEA=0.057; SRMR=0.055; CFI=0.87).
Results

College educated mothers had higher covert control for boys (path=0.20), but not for girls (path=0.05). As a mother's BMI increased, overt control decreased for boys (path=-0.17), but increased for girls (path=0.12). Higher covert control related to higher BMI in boys (path=0.19), not girls (path=0.02). Higher overt control related to lower BMI in both groups (path=-0.06). For both groups, paths from mother's BMI to covert control, education to overt, and nationality to child BMI were not significant.

Conclusions

Gender differences in parental feeding practices could have a significant impact on understanding and preventing unhealthy weight gain in young children.

T-2753-P: Associations of Caregiver Demographics with the Types and Quality of Snacks Offered to Low-Income Preschoolers

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Background

Snacking among young children has increased in recent decades and may lead to excess calories. This research described demographic characteristics associated with the types and quality of snacks offered by low-income caregivers to their preschoolers.

Methods

Participants were 59 low-income African American(AA), Hispanic(H) and White(W) caregivers of preschoolers. A mixed method approach used card sorts depicting 65 foods and beverages identified from three dietary datasets involving > 250 ethnically diverse children. The number of different types of snacks and the frequency of offering were assessed. Solid fat and added sugar (SoFAS) content per 100 g were estimated for cards using USDA Food Patterns Equivalents (2009-2010) database. Mean daily SoFAS energy (kcal)/100g content of snacks offered was calculated using frequency data and SoFAS/100g estimates. Race/ethnicity, education, and employment status were self-reported.

Results
Caregivers with a high school or less education offered children a greater variety of snacks (50±7 v. 43±8 types, p<0.001) with higher SoFAS (32.9±25.5 v. 20.8±12.2 kcal/100g, p<0.05) than more educated caregivers. Unemployed caregivers offered children a greater variety of snacks (49±8 v. 43±8 types, p<0.05) with higher SoFAS (32.4±24.4 v. 21.1±13.3 kcal/100g, p<0.05) than employed caregivers. AA caregivers offered children snacks with higher levels of added sugar than W caregivers (1.4±0.9 v. 0.8±0.4g/100g, p<0.05).

Conclusions

Caregiver education, employment, and race/ethnicity are associated with the SoFAS content of snacks offered to low-income preschoolers.

T-2754-P: Coping with Chaos: Food Choice Coping Strategies Mediate Relationships between Household Chaos and Hunger

Tiara N. Rosemond, MPH; Christine E. Blake, PhD, RD; Sonya J. Jones, PhD;

Background

Household food insecurity (FI) and the more severe very low food security (VLFS) affect many families in the US. Household chaos that is often a result of poverty and the food choice coping strategies (FCCS) families use to cope may influence the severity of household food insecurity.

Methods

The purpose of this study was to explore whether FCCS act as mediators between household chaos and household food security status. We used data from a multiethnic sample of adults with children who participated in the Midlands Family Study (n=521). Chaos was assessed using a 15 item validated scale. Food security status was assessed with the 16 item screener developed by the United States Department of Agriculture. Two FCCS were assessed including planning (3 items) and speeding up meals (2 items). Multinomial logistic regression with tests of indirect and direct effects was conducted to examine relationships between household chaos and food security status, and the mediated effects of FCCS.

Results

Household chaos was associated with an 11% increased odds of FI (p<0.01), and a 22% increased odds of VLFS (p<0.01). Meal planning significantly mediated the relationship between chaos and food security status (p=0.016) and was associated with a 46% reduced odds of being FI (p<0.01) and a 49% reduced odds of being VLFS (p<0.01). Speeding up was not a significant mediator between household chaos and food security status.
Conclusions

Household chaos is positively associated with food security status and FCCS, especially planning, which mediates this relationship. Future studies should emphasize holistic approaches for helping families reduce chaos and develop positive FCCS skills to improve household food security status.

T-2755-P: Disparities in Moderate-to-Vigorous Physical Activity among Overweight and Obese Schoolchildren During School- and Out-of-School Time

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Background

To promote health and energy balance, it is recommended that school-aged children engage in 60 minutes of moderate-to-vigorous physical activity (MVPA) per day, 30 minutes of which should be achieved within the school day.

Methods

MVPA was evaluated amongst 517 3rd-5th grade schoolchildren from 13 schools to examine physical activity patterns by child weight status. Demographics were collected by parent questionnaire. Measured height and weight were used to calculate BMI and categorize children by weight status. Accelerometer data were collected over 7 days; coded as minutes spent in MVPA; and further divided into 1) school-day, 2) weekday out-of-school, 3) weekend, and 4) total daily MVPA. Multivariate mixed models were used to examine the association of overweight/obesity on school-day, weekday out-of-school, and weekend MVPA while controlling for participant demographics, wear-time, and clustering within schools.

Results

393 participants (39.4% male; 9.1 years; 29% overweight/obese) had valid accelerometer wear time (>= 4 days, >=10 hr/day). Few met total daily (14.5%; 42.9 +/- 20.5 min) or school time (8%; 18.1+/- 8.0 min) MVPA recommendations. Compared to normal/underweight participants, overweight/obese participants engaged in fewer minutes of MVPA on weekends (25.5% less; p=0.02), weekdays out-of-school (28.4% less; p<0.001), and during school (30.0%; p<0.001), with this school-day effect being greater in overweight/obese females (27.8% vs. 10.3% less; p = 0.02).

Conclusions
These data demonstrate that disparities in MVPA by weight status span the school-time and out-of-school environments and underscore the need to identify and implement school-based and out-of-school time PA programs with equitable reach in these populations.

T-2756-P: A Systematic Review of Pre-Schoolers'‡Mealtime Observations: Relationships between Mother-Child Interactions, Child Eating and BMI

Helen Skouteris, PhD; Heidi J. Bergmeier, Psych Hons, PhD Candidate; Marion M. Hetherington, DPhil;


Darcy Thompson; Elizabeth A. Vandewater, PhD; Susan Johnson, PhD;

Background

Parents can minimize a child's exposure to food and drink marketing by limiting exposure to TV commercials yet little is known about this parenting practice. This study's objective was to evaluate whether maternal self-efficacy in this domain is associated with this parenting practice.

Methods

In this cross-sectional study, data was collected in Denver, Colorado in 2013-2014 from 302 low-income Latina mothers of Mexican descent with preschoolers. In phone surveys, mothers reported the frequency of their efforts to limit their child's viewing of TV commercials. Data were categorized as follows: never, at least sometimes. Mothers also reported their self-efficacy in this domain (none, some, a lot). Using logistic regression, we evaluated the relationship of maternal self-efficacy in this domain with frequency of efforts to limit exposure to TV commercials, adjusting for demographics and child daily TV viewing amount.

Results

Mean maternal age was 31(SD=6.5) and 60% had < a high school degree. The focal child was on average 3.9 years old (SD=0.8). Thirty percent of mothers reported never limiting their child's viewing of TV commercials. Self-efficacy in this domain was: none=19%, some=38%, and high=44%. Higher levels of
maternal self-efficacy in this domain are associated with increased frequency of limiting TV commercials (OR: 1.95; 95% CI: 1.3-2.9). Higher acculturation levels are also associated with increased limiting of commercials, OR (1.5; 95% CI: 1.2-1.9)

Conclusions

Low-income Latina mothers with higher self-efficacy are more likely to limit their child's exposure to TV commercials. Future research is needed to determine the direction of this relationship as well as the impact of this parenting practice on actual child exposure to food and drink marketing.

T-2758-P: First Steps Toward Efficacy in the Prevention of Pediatric Obesity: Findings from Implementation of the Expert Committee Recommendations in a Large Integrated Health System

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Background

Expert recommendations include identification, assessment, and prevention of obesity, each step signaling practice changes. Our purpose is to describe a clinical intervention to prevent obesity among 2-9 year olds, study design, and report early implementation findings.

Methods

We obtained EHR data (2001-2012) from Geisinger on 163,820 children aged 3-18 years in Pennsylvania. We used mixed effects linear regression to model growth curve trajectories for over 500,000 annual BMIs controlling for confounders. Models evaluated three kinds of associations of antibiotics with BMI trajectories - reversible (in children under observation in three windows - 1 year to 1 day, 1.5 to 0.5 years, and 2.5 to 1.5 years before BMI), persistent (controlling for reversible effects and adding a time-varying count of lifetime antibiotic orders up to the BMI), and progressive (adding a count of lifetime antibiotic orders up to the prior BMI) - and whether these varied by age.

Results

Seven clinics deliver the intervention; 9 control clinics provide usual care. Five visit types identified 76% of intervention and 66% of control visits with ≥98.6% accuracy. At baseline, the study population includes N=1,749 Intervention and N=611 control participants with no significance difference between groups in
gender or race but significant differences in age and weight category. Baseline BMI measures were missing for 0.7% of the intervention and 10.8% of the control participants.

Conclusions

A broadening of operational inclusion criteria may improve reliable identification of visits and intervention delivery. Staff education may reduce missing BMI measures. A continuous focus on implementation reliability is essential to realize intervention impact.

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T-2759-P: The “Weight” of the Conversation: Are Health Care Providers Talking To Patients About Their Weight?

Katlyn E. Cook; Jithinraj Edakkanambeth Varayil, MD; Paul S. Mueller, MD;

Background

Previous studies have shown that health care providers under-diagnose obesity and that obese patients’ attempt weight loss when their providers identify and share their weight related issues with them. The aim of this study was to understand the patients’ perspectives about whether or not healthcare providers initiated a conversation about weight, goals, motivations, and treatment options.

Methods

A nine item survey (4 demographic questions, 5 yes/no or MCQ) was administered by post mail to 737 overweight and obese patients with an outpatient appointment in the Division of General Internal Medicine, Mayo Clinic, Rochester, Minnesota from August to December, 2013.

Results

Overall, 184 (28%) patients responded to the survey. Of the responders, 55% were male, mean (SD) age were 65.6 (11.8) years and mean (SD) BMI were 34.7 (4.4) kg/m2, 166 (90%) self-reported being overweight or obese, 83% were trying to lose weight. A total of 117 (70%) patients reported that someone at the institution talked to them about their weight; 90% by doctors, 31% by dieticians, and 15% by nurses. Conversations about weight included goals about weight loss (32%), life-style modification (35%), motivation (26%), health risks (51%), benefits of weight loss (52%), and about resources for help (29%). In all patients self-reported BMI (30 kg/m2) was lower than their actual BMI (35 kg/m2).

Conclusions

Providers are initiating conversations about weight loss in over-weight and obese patients. More emphasis could be placed on motivation, resources for help, and formulating goals for successful management of obesity.
T-2760-P: Description of Comprehensive, Multidisciplinary Weight Management Services at Children’s Hospitals: A National Survey

Stephen Cook, MD; J Mitchell Harris, II, PhD; Karen Hill, BS; Stacy Biddinger, MPA;

Background

CDC Expert Committee Recommendations describes 4 stages of pediatric obesity treatment. Comprehensive, Multidisciplinary, Weight Management (CMWM) services (Stage 3) have the most evidence. USPSTF requires multidisciplinary, moderate to high intensity (25-75 hrs) treatment be covered for kids ≥ 6yrs.

Methods

The purpose was to describe the history, availability, structure and programmatic operations of CMWM services via a national sample of member of the Children's Hospital Association (CAH). An on-line survey was sent to 218 member institutions of the CHA, with 118 institutional responses (54%). The survey was sent to pre-identified medical directors, or to hospital administrators with instruction to forward to the most appropriate faculty or administrator for completion. Non-respondents were reached by two follow-up emails and then individually by the survey team. 118 institutions gave 124 survey responses. 85 respondents (69%) had CMWM services, while 74 had a single clinical division.

Results

CMWM services averaged 7.23 years in existence (0-26 yrs). CMWM were found in General Pediatrics (31%), Endo(21%), or GI(12%). CMWM staffing: RDs 97%, Exercise staff 67%, Psychology 59%, SW 32%, MD 86. Bariatric Surgery was offered by 26 CMWM services. Sites report 10.6% youth are overweight, 30.9% are obese, & 58.5% had severe obesity (BMI>99th %tile). 67.9 described a CLINIC with multi-provider, while 60.7% described a PROGRAM with a set curriculum, delivered over a specific number of visits & duration of time. 74 programs ran at a deficit.

Conclusions

There are 85 CMWM services at US pediatric centers in the Children's Hospital Association. These programs provide multidisciplinary treatment services for children, yet over half are already severely obese. Both the number of Stage 3 programs & patient acuity suggest a response already strained.
T-2761-P: Short-Term Changes in Physical Activity After Bariatric Surgery

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Background

Bariatric surgery is a prevalent method to reduce weight and improve health in severely obese individuals. However, post-surgical lifestyle changes may explain the variability in long-term success. Our aim was to assess physical activity patterns of patients pre- and post-surgery.

Methods

Physical activity patterns were assessed as changes in minutes per day spent in various intensities of physical activity, with principal interest in time spent in moderate to vigorous physical activity (MVPA). Walking cadence of ≥100 steps per minute defines MVPA. Seven gastric bypass and 17 sleeve gastrectomy patients were recruited (BMI: 44.0 ± 6.5) and completed 2 office visits (one 12±6 days pre- and one 35±10 days post-surgery) and wore an ActiGraph GT3X triaxial accelerometer activity monitor for 7 days pre-surgery and 7 days post-surgery. Assessments included body composition testing via Bod Pod, reporting of dietary intake, weekly exercise, and a physical activity questionnaire.

Results

Participants lost 11.69 ± 4.24 kg of body weight and did not significantly change their physical activity patterns post-surgery (p ≥ 0.05). Minutes per day of MVPA (pre-surgery: 1.48 ± 2.16, post-surgery: 2.62 ± 5.56), steps per day (pre-surgery: 4013 ± 1503, post-surgery: 4007 ± 1797). Minutes per day spent in sedentary behavior (walking cadence of 0 steps per minute) did not significantly change either (pre-surgery: 446.43 ± 110.62 minutes, post-surgery: 451.15 ± 122.68 minutes).

Conclusions

The absence of change in MVPA or sedentary behavior post-surgery identifies an area for intervention. Increasing physical activity, particularly MVPA may positively affect health and assist in the retention of weight loss.

T-2762-P: Physical Inactivity: A Potential Correlate of Weight Regain After Bariatric Surgery
Background

Bariatric surgery programs continue to seek successful long-term treatment strategies. Increasing evidence suggests that lifestyle-related variables impact outcomes. This study aimed to determine the relationship between lifestyle-related variables and weight maintenance after gastric bypass surgery.

Methods

The following variables were assessed >3 years post-operatively: physical activity patterns using triaxial accelerometers, cardiorespiratory fitness (CRF) with a graded exercise test, physical function with a hand dynamometer and up-and-go test, energy intake with a 24-hr recall interview, resting energy expenditure (REE) using indirect calorimetry, and body composition with a three-compartment model. Correlation coefficients adjusted for age determined the relationship between sedentary minutes daily, steps/d, energy expenditure (kcal/d), VO2peak, hand grip strength (kg), up-and-go time (sec), energy intake (kcal/d), REE (kcal/d), fat free mass to fat mass ratio, and normalized weight regain.

Results

Twenty five (23F,2M) were included. Mean age: 50+/-2.3, time post-op: 6.7+-0.41yrs, BMI: 32+-1.3, %EWL: 68+-6.1%, fat%: 40+-1.6%. Sedentary minutes daily: r=0.47, p=0.02; with age adjustment: r=0.47, p=0.02. VO2peak (L/min): r=0.43, p=0.04; r=0.72, p<0.001. VO2peak (mL/kgFFM/min): r=0.38, p=0.11; r=0.55, p=0.01. Hand grip: r=0.40, p=0.05; r=0.49, p=0.02.

Conclusions

These data indicate a positive correlation between sedentary time and weight regain. Although CRF (L/min) and weight regain were correlated, relative expressions did not confirm this result. Thus, physical inactivity may play a more important role in weight regain, but more data needed to confirm.

T-2763-P: A Comparison of Follow-Up Utilization and Spend between Surgical and Non-Surgical Obesity Treatment

Kael Haig, MS; Wade Bannister, PhD;

Background

The impact of bariatric surgery on subsequent cost and utilization is not well understood. This study seeks to compare the cost and utilization in the one year following surgery to costs and utilization for morbidly obese patients who do not have surgery.
Methods

The study population consisted of commercially insured members with a 12-month morbid obesity Episode Treatment Group (ETG) episode. Spend and utilization in the one year following the episode was compared between those having bariatric surgery and similar individuals known to have not had surgery. A two-to-one match method and propensity score weighting were used to adjust for demographic differences and risk characteristics between obese individuals who had a bariatric surgery (n=315) and obese individuals who did not have a bariatric surgery (n=630). Generalized linear models were used to measure the difference in post episode utilization and spend.

Results

Results indicate statistically significant differences in post-episode spend and utilization between members who had a bariatric surgery and members who did not. Post-episode physician cost and ER utilization was significantly lower (p < 0.05) among those who had a bariatric surgery versus those who did not. There were no significant differences in post-episode inpatient or outpatient measures.

Conclusions

After adjusting for demographic and risk factors, this study shows that bariatric surgery was associated with significantly lower ER utilization and physician spend in the 12 months following the episode.

T-2764-P: Who Is an Obesity Medicine Specialist? The Development of a New Specialty

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Background

The American Board of Obesity Medicine (ABOM), formed in 2011, merged the American Board of Bariatric Medicine (ABBM) and Certified Obesity Medicine Physician (COMP) initiatives into a single certification process for physicians seeking recognition of their competency in obesity medicine. This study identifies who the new ABOM diplomats are.

Methods

All candidates who registered for the 2012 and 2013 examination were asked to complete a brief questionnaire to assess demographic data (age, gender, race) and professional qualifications (medical specialty, board certification, years in practice, percent effort in obesity care). Data from physicians who were previously certified by the ABBM are not included in the present study. Data was obtained from the Professional Testing Corporation (PTC) who was responsible for administering the examination.
Results

395 doctors passed the ABOM examination process. Gender (40.5% M, 45.1% F, 14.4% no answ); Race (58% W, 17% Asian, 5.8% AA, 4.8% Hisp, 5.6% other, 8.9% no answ); Age (Mean 30-39 y, SD <10Y). Distribution of specialties is: Int Med 41.1%, Fam Med 23.6%, Other 10.1%, Peds 6.8%, Ob/Gyn, 6.3%, Endo 5.7%, Surg 3.7%, GI 1.1%, Prev Med 1.1%, and Sports Med 0.4%. 88.1% of successful examinees are MDs and 11.9% are DOs. Yrs in pract (mean 2y +/- SD >2y) and % effort in ob med (mean 25-50% +/- SD 25%).

Conclusions

This preliminary data describes the demographic and professional characteristics of physicians who chose to take the ABOM examination over the past 2 years. This data will be useful for stakeholders who wish to identify physicians who are recognized as obesity medicine specialists.

T-2765-P_DT: Overweight and Obesity in an Outpatient Service at a National Institute of Health in Mexico

Claudia De la Riva Espinosa, Dr.; Martha Kaufman Horwitz, ScD;

Background

Obesity is a public health problem in Mexico. Its association with multiple diseases creates a greater need for medical care. Our aim was to determine the prevalence of obesity and associated comorbidities in the Internal Medicine Outpatient Service (IMS) at a National Institute of Health in Mexico.

Methods

Medical records from 220 first time patients at the IMS at the National Institute of Medical Sciences and Nutrition (INCMNSZ) were reviewed; 28 patients were excluded for missing anthropometric data. Median age 45.5 years; 69.5% were women; 82.1% had low socioeconomic classification; 77.1% had middle school education or higher. Height and weight were used to obtain BMI, and patients were classified as low weight (LW; BMI<18.5), normal weight (NW; 18.5-24.9), overweight (OW; 25-29.9), or obese (OB; >=30). Main reason for medical consultation, number of comorbidities, and prevalence of previously diagnosed diabetes, hypertension and dyslipidemia were determined for each BMI stratum.

Results

5.5% of patients were LW; 30.9% NW, 30.5% OW, and 33.2% OB. Main reasons for medical consultation were endocrinological, gastrointestinal and rheumatological. Prevalence of 2 or more comorbidities was 41.7%, 33.8%, 46.3%, and 53.3% for LW, NW, OW, and OB. OW and OB patients had higher prevalence...
of diabetes, dyslipidemia and hypertension (13.4%, 10.4%, 25.4%; and 15.6%, 13.3%, 42.2%) compared to NW (10.3%, 2.9%, 10.3%); and took more prescription drugs (2.88+2.11 and 3.16+1.98, vs 2.31+2.09).

Conclusions

Prevalence of OW and OB was 63.7% with a higher prevalence of comorbidities -diabetes, hypertension and dyslipidemia- in OW and OB than in NW. Patients seeking medical care for reasons other than OW and OB already present comorbidities associated with excess weight and should start timely control.

T-2766-P: Prevalence of New-Onset Hypoglycemic Symptoms after Roux-en-Y Gastric Bypass and Vertical Sleeve Gastrectomy and Its Associated Risk Factors

Clare Lee, MD; Jeanne M. Clark, MD; Michael Schweitzer, MD; Thomas Magnuson, MD; Kimberley Steele, MD, PhD; Olivia Koerner, BS; Todd T. Brown, MD, PhD;

Background

Hypoglycemia after bariatric surgery is recognized as a serious complication; but prevalence data are limited. Our goals were to determine the prevalence of hypoglycemic symptoms after Roux-en-Y gastric bypass (RYGB) and vertical sleeve gastrectomy (VSG) and to examine the associated risk factors.

Methods

We mailed a self-administered questionnaire to 1174 patients who underwent either RYGB or VSG at Johns Hopkins between August 2008 and August 2012. We identified hypoglycemia based on clinical history and responses to the Edinburgh hypoglycemia scale and categorized the hypoglycemia as; i) possible if they had any of the symptoms from the scale, and ii) probable if they reported requiring assistance from others, loss of consciousness, seizure or if the hypoglycemia was medically confirmed. We compared characteristics of these individuals with those who remained symptom-free after the surgery.

Results

Of the 1154 patients with valid addresses, 35.1% responded. 28% reported new-onset hypoglycemic symptoms with 24% possible and 4% (18) probable cases. The patients with probable hypoglycemia had a mean age of 49 years and were 83% female, 56% Caucasian, 44% African-Americans. 89% reported dietary adherence, 18% had pre-existing diabetes, and the symptom onset was on average 42-months after surgery. Compared to those without symptoms, patients with probable hypoglycemia were more likely to have had RYGB (94 vs. 69%, p=0.02) and reported greater excess weight loss (81 vs. 76%, p=0.004).
Conclusions

A third of patients who underwent RYGB or VSG reported new hypoglycemic symptoms postoperatively and 4% were probable or definite. Most of the cases received RYGB, did not have diabetes, reported dietary adherence and lost more weight. Further studies are warranted to confirm these findings.

T-2767-P: Identifying Unique Factors Influencing Health Behavior Change in Overweight and Obese Veterans to Inform Intervention Development in Primary Care at the VA

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Background

Obesity affects 36% of Veterans. The Veterans Affairs (VA) System offers an intensive weight management program (MOVE!), but only 10% of eligible primary care (PC) patients attend. Veterans see their PCPs about 3.6 times a year, supporting the development of PC-based weight management interventions.

Methods

We conducted focus groups to explore unique VA patient lifestyle behaviors, weight management experiences with healthcare providers, and uses of goal-setting and health technology to inform intervention development. Overweight/obese VA patients (aged 18-75, BMI >=30 or >=25 with at least 1 co-morbidity) were recruited for 6 focus group sessions (2 female, 4 male) stratified by MOVE! referral and attendance. Each session was audio-recorded and professionally transcribed. Using an iterative coding approach, two coders separately reviewed and coded transcripts, and met frequently to negotiate codes and synthesize emerging themes.

Results

Fifty-four patients participated. The first theme was the impact of military service. Veterans had difficulty making autonomous decisions about lifestyle behaviors after leaving a highly structured and physically demanding military environment. The second theme was sustainability of healthy behaviors and weight. We identified individual, interpersonal, healthcare, and environmental factors, and received input about Veteran's preferences and experiences with technology and setting health goals.
Conclusions

These findings will inform the development of a technology-assisted weight management intervention within the VA PC setting that integrates (into current PC practice) patient preferences for user-friendly platforms, individually tailored information, and support from health coaches.

T-2768-P: Behavioral and Environmental Factors Influence Successful Weight Loss 3 Years after Laparoscopic Roux-en-Y Gastric Bypass

John Morton, MD; Ulysses Rosas, BA; Manuel Cardenas-Contreras, BS Biology;

Background

Bariatric surgery has proven to be the most effective and enduring treatment for morbid obesity. Roux-en-Y gastric bypass (RYGB) provides the greatest amount of weight loss and leads to the highest resolution rates of obesity-related comorbidities. However, long-term weight loss and maintenance can vary. In this study we examine a variety of behavioral habits and environmental factors that may influence successful weight loss 3-years after laparoscopic RYGB.

Methods

All bariatric patients, who were all greater than 3-years postoperative, were given a series of surveys. These surveys included the Three Factor Eating Questionnaire- R18, Stanford 7-Day Physical Activity Recall Patients, and a series of behavioral questions related to eating and activity habits. Additional questions examined adherence to bariatric diet, consumption of alcohol and sugar sweetened beverages, and total screen time. Other demographic measures such as education, income, marital status, insurance status, and race were also obtained. Patients were divided into three groups, based on weight loss at 3-years postoperative. Those with >= 85% excess weight loss (EWL) were considered to have a high weight loss response. Those patients with < 50% EWL were considered to have a low weight loss response. Data analysis was done using GraphPad Prism 6.

Results

At 3-years postoperative, 48.7% of RYGB patients had maintained weight loss of 85% EWL (high), 46.2% had EWL between 50-85% (medium), and 5.1% had EWL less than 50% (low). Current BMI for each group was significantly different (High 26.17, Medium 32.99, Low 40.92 kg/m2, p< 0.001). Patients with the highest postoperative weight loss (>85%) were more likely to have an advanced educational degree beyond high school (High 94.7%, Medium 66.7%, Low 50%, p=0.061), were more likely to have household incomes above $30,000 per year (High 94.4%, Medium 64.7%, Low 50%, p=0.062), were more likely to be white (High 77.8%, Medium 55.6%, Low 0%, p=0.063), and were more likely to have reported that their family members also lost weight (High 44.4%, Medium 25.0%, Low 0%). Additionally, those
patients who had higher weight loss reported attending more of their postoperative follow up visits (High 6, Medium 5, Low 1 visits, p=0.070). There were no significant differences in physical activity habits, measures of emotional eating, uncontrolled eating, or cognitive restraint as it relates to eating, or other behavioral habits.

Conclusions

Socio-economic factors such as race, income, and education may have a higher influence on long-term postoperative outcomes after laparoscopic Roux-en-Y Gastric Bypass than previously expected. Additionally, environmental changes in the home environment and family support for new post-surgery lifestyle may be critical to long term success as shown by those who had the highest weight loss, reporting the greatest proportion of family members also losing weight.

T-2769-P: Predictors of Change in Medical Students’ Implicit and Explicit Weight Bias during Medical School: A Report from the CHANGES Study

Sean M. Phelan, PhD; Michelle van Ryn, PhD, MPH;

Background

Physicians and medical students exhibit high levels of implicit (unconscious) and explicit bias against obese people. These attitudes may impact communication and clinical decision-making with patients who are overweight or obese, affecting quality and subsequent utilization of care.

Methods

In this longitudinal study of medical students, we administered web-based surveys, including measures of implicit and explicit weight bias, to 3,959 medical students from 50 U.S. medical schools. Students completed surveys during their 1st year and again at the end of their 4th year. We calculated attitude change, as well as the associations between characteristics of the medical school experience (e.g., experiences with obese students, faculty, and patients, anti-fat climate, training), student characteristics (e.g., empathy, attitudes toward patient-centered care, positive contact with obese individuals) and change in bias.

Results

Preliminary findings suggest that, on average, students' attitudes improve during medical school, but this is not true of all schools. Anti-fat attitudes may be affected by interactions in medical school with
obese/overweight patients, peers, and faculty. We will present school, curriculum, and student factors that predict individual attitude change.

Conclusions

This study is the first to report on change in weight bias during medical training in a large national sample of medical students. We will identify and discuss potential areas of intervention to improve attitudes of new physicians.

T-2770-P: Impact of a Clinical Quality Care Award (CQC) on Weight Management Program Engagement among Obese Adult Southern California (SC) Kaiser Permanente (KP) Patients

Jack K. Der-Sarkissian, MD; Christiane Rivard, MPH, RD

Background

The 2013 Adult Weight Management (AWM) CQC's (a performance-based award to recognize high-performing physicians in delivering quality care) goal was to increase attendance in five core AWM programs (single-session overview, three intensive multi-session group programs, and telephonic coaching.)

Methods

The AWM CQC was communicated to physicians through continuing medical education (CME) meetings focused on how to have sensitive yet effective conversations about obesity and referral to AWM programs. AWM physician and health education champions across SC provided on-going outreach and marketing to providers to encourage referrals. A pre-encounter electronic alert for obese members was triggered in the KP electronic medical record in specialty care departments to increase referrals. Attendance was tracked monthly in the five core AWM programs for a rolling 12-month period for members (≥18 yrs) with BMI ≥ 30. Weight loss was tracked in the group multi-session AWM programs.

Results

Senior leadership focus on the AWM CQC, CME activity, on-going metric reporting and provider outreach significantly improved AWM program attendance. In January 2013, 1.2% of obese patients or 8,337 patients attended at least one of the five core AWM programs during the previous 12 months. By October 2013, the percentage increased by 233% to 2.9% of obese patients or 19,737 patients. Obese patients attending a group multi-session program lost weight (range: 0.9 - 2.3 lbs/wk).
Conclusions

Incentivizing providers through a CQC award made a dramatic impact on the number of patients attending AWM programs, by encouraging providers to have meaningful and sensitive conversations with their patients about obesity and referring them to AWM programs when appropriate.

T-2771-P: Distinguishing Obese vs. Non-Obese Pediatric Patients Diagnosed with Type 2 Diabetes

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Background

Prevalence of pediatric type 2 diabetes (T2D) increased 31% in the last decade, popularly attributed to a concomitant increase in obesity. The objective was to contrast obese vs. non-obese children diagnosed with T2D in regards to demographics, socio-economic status, and cardiometabolic health.

Methods

A retrospective analysis was conducted of pediatric electronic medical records from Louisiana public hospitals and clinics from 2006-2012 (n=356,693). The final sample (n=2,789) consisted of patients diagnosed with T2D by ICD-9, reported as African American or Caucasian, and not an outlier for zBMI (< -4 or >5). Obesity was classified as at or above the 95th BMI percentile. Systolic (SBP) and diastolic (DBP) blood pressure percentiles were calculated based on age, sex, and height. Health coverage was categorized as government-assisted or private as a proxy for SES. T tests and relative risk were used to determine associations between independent variables and obesity status.

Results

The sample was composed of 60.1% African American, 66.9% female, and 16.5% on private insurance. The mean age of T2D diagnosis was 16.0 ± 3.7 y and 52.0% were obese. Compared to obese children, non-obese children were diagnosed at a younger age (15.5 vs. 16.5 y) and had lower SBP (67.1 vs. 85.5) and DBP percentile (55.0 vs. 67.3) at T2D diagnosis (all p values < 0.0001). Non-obese children were more likely to be Caucasian (RR = 1.1, 95% CI: 1.1 to 1.2), female (1.6, 1.5 to 1.7), and on private insurance (1.3, 1.1 to 1.5).

Conclusions

Nearly half of pediatric patients with T2D in this sample were not obese, and these children varied from obese children in demographics, SES, and blood pressure. The results indicate additional risk factors should be assessed clinically to screen for T2D in children.
T-2772-P: The 2013 Guideline for the Management of Overweight and Obesity in Adults Recommends Weight Loss Treatment for Up to 131 Million Americans

June Stevens, PhD, FTOS; Eva E. Erber Oakkar, MS; Zhaohui Cui, PhD;

Background

In November, 2013 guidelines for primary care physicians on weight management decisions for adults were released under the auspices of the American College of Cardiology, the American Heart Association and The Obesity Society.

Methods

Data from the 2005-10 NHANES were used to estimate the proportion of adults in the US for whom weight loss treatment was recommended by these guidelines. We also calculated the proportion of adults for whom pharmaceutical therapy and bariatric surgery could be considered. Domain analysis was used to extrapolate results to the civilian, non-institutionalized US population 18 years of age or older and not pregnant. The proportions obtained were applied to the Current Population Survey total (217.1 million) adjusted for the number of pregnant women. We also estimated the odds ratios for being in the treated vs the untreated group according to demographics and insurance coverage.

Results

Approximately 131 million American adults are recommended for behavioral weight loss treatment according to the guidelines. Of these up to 108.8 million could be considered for adjunctive pharmacotherapy along with behavioral treatment and 31.6 million could be considered for bariatric surgery. Adults who were older, Black (vs White), less educated and had health insurance from Medicaid or Medicare were more likely to be designated for treatment.

Conclusions

The huge number of Americans recommended for weight loss therapy according to the US 2013 guidelines combined with sweeping transformations in health care legislated by the 2014 Affordable Care Act may cause radical changes in obesity management in primary care settings.
T-2773-P: Age, Sex, and Race/Ethnicity Specific Waist Circumference Guidelines: A Novel Approach to Personalized Medicine

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Background

Current waist circumference guidelines and cutoffs are now quite broad and thus not discriminating for individual risk. These indicate a need for improved cutoff predictions at the individual level.

Methods

We developed four gender specific models that predict waist circumference as a function of BMI. The models were developed from two large population wide surveys; the US National Health and Nutrition Examination Survey (NHANES) 1999-2004 data set that measured close to 5000 subjects per year and the Korean National Health and Nutrition Examination Survey a similar program to NHANES where 10,000 subjects are measured each year.

Results

After verifying that waist circumference is an increasing function of BMI, we develop gender, age, and race specific cut-off values from BMI classifications. Deviations of waist circumference from model predicted indicate risk; for example waist circumference that exceeds cut-offs in the normal BMI classification offers an early opportunity to intervene. A user-friendly web-based program was developed to deliver waist circumference cut-offs after input of gender, age, and race/ethnicity.

Conclusions

The models and software form a growing list of technological tools that deliver personalized recommendations to inform and guide clinical practice.

T-2774-P: Barriers to Managing Obesity: Primary Care Physicians™ Perceptions About Bariatric Surgery
T-2775-P: Patient Survey on Weight Loss Medication Use in the US

Shaloo Gupta, MS; Zhixiao Wang, PhD; Annette Powers, PharmD, MBA;

Background

Perception of weight loss medications in patients with obesity has rarely been reported. This analysis explored current utilization and patient (pt) perception of weight loss medications in the American population who are overweight or obese.

Methods

Pts were identified from the 2012 U.S. National Health and Wellness Survey, a nationally representative online survey of 71,157 adult respondents, and categorized into overweight (BMI>=25 & <30 kg/m2), obese class (OC) I (BMI>=30 & <35 kg/m2), OC II (BMI>=35 & <40 kg/m2), and OC III (BMI>=40 kg/m2). Pts reported speaking to their physicians about weight management and subsequent recommendations, experience and perception on weight loss medications, and other related variables. Descriptive statistics and bivariate analyses were performed, with chi-square tests for categorical variables and ANOVAs for continuous variables.

Results

Among pts who were overweight and obese (N=45,641, average age 50.8 Ys, 54.2% male), 49.8% were overweight, 27.9% OC I, 12.5% OC II, and 9.8% OC III. Percentage of pts spoke to their doctors about weight management: overweight: 18.2%; OC I: 30.9%; OC II: 39.8%; OC III: 46.0%. 5.1% of pts tried prescription drugs but 20.4% reported that they would consider prescription drugs for weight loss (overweight: 13.6%; OC I: 23.8%; OC II: 30.4%; OC III: 33.1%). Less than 1% of the pts received physician recommendations to use weight loss medications.

Conclusions

Physicians seldom recommended weight loss medications and few patients have tried them, but many patients are willing to consider pharmacotherapy. There is a need to raise the awareness of newer pharmacotherapy as a potential component of weight management for both patients and physicians.
T-2777-P: Elevated secreted frizzled-related protein 4 in obesity and diabetes: a role in adipose tissue rarefaction

Gabriella Garufi
Steven Smith

T-2778-P: Transcriptome profiling reveals 6-month energy deficit down-regulates energy metabolism and stress response pathways in subcutaneous adipose tissue from overweight individuals

Yan Yan Lam
Anthony Civitarese

T-3000-OR: Differences in Fat Distribution, Inflammation and Insulin Resistance among Lean Mass Phenotypes in Obese, Aging Adults

Amy M. Goss, PhD; Jamy Ard, MD; Julie Locher, PhD; Brooks C. Wingo, PhD; Akilah Dulin-Keita, PhD; Barbara A. Gower, PhD;

Background
Visceral and ectopic adiposity, systemic inflammation, and insulin resistance may be linked to age-related loss of lean mass among obese adults. This study was designed to examine phenotypic differences among obese adults with and without relatively low lean mass.

**Methods**

Participants were 164 obese (BMI 30-40 kg/m²) men and women ≥ 65 y. Body composition was assessed by DXA, fat distribution by MRI, and insulin, glucose, HOMA-IR, CRP, IL-6, and TNF-Î± from a fasting blood sample. Participants were divided by sex-specific cut-points into high lean mass (HLM) or low lean mass (LLM) groups based on median score calculated from appendicular skeletal muscle mass and total body mass.

**Results**

Obese adults in the LLM group had lower total lean mass (-4.5%, p<0.01) and thigh skeletal muscle volume (-11.8%, p<0.001) and greater intra-abdominal adipose tissue (IAAT) volume (11.8%, p=0.05), thigh-intermuscular adipose tissue (IMAT) volume (32.1%, p<0.001), CRP (p<0.01), and IL-6 (p=0.06) than those in the HLM group. Within the LLM group, HOMA-IR was independently associated with thigh-IMAT (Std Î²=0.32, P<0.01). Within the HLM group, HOMA-IR was independently associated with IAAT (Std Î²=0.45, p<0.01).

**Conclusions**

Obese adults with a LLM phenotype had greater adiposity distributed to metabolically harmful depots, i.e. IAAT and IMAT, and greater systemic inflammation than those with a HLM phenotype. Further, thigh-IMAT appears to be uniquely related to insulin resistance among obese, aging adults with LLM.

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**T-3001-OR: Endoplasmic Reticulum Stress Selectively Up-Regulates TRIP-Br2, a Novel Transcriptional Co-Regulator for Adiposity and Energy Metabolism, in Visceral Fat During Obesity**

*Guifen Qiang, MD PhD; Hyerim Whang Kong, BS; Chong Wee Liew, PhD;*

**Background**
Obesity induced ER stress has been shown to promote insulin resistance and inflammation. Visceral but not subcutaneous fat accumulation has been associated with increased metabolic risks during obesity. However, the mechanism regulating differential metabolic risks in obesity is poorly understood.

Methods

We have recently shown that a novel transcriptional co-regulator, TRIP-Br2, is selectively up-regulated in visceral fat of obese humans and TRIP-Br2 ablation in mice exerts a protective effect on obesity and associated metabolic dysfunctions. In this study, using an in vivo mouse model and in vitro differentiated adipocytes in combination with a high-fat diet (HFD) and the ER chemical chaperone (TUDCA), we aim to identify the upstream regulators of TRIP-Br2 in visceral adipocytes. A better understanding of the mechanisms leading to selective regulation of TRIP-Br2 will likely provide mechanistic insight into the regulation of functional heterogeneity among the different white fat depots.

Results

We observed that TRIP-Br2 in adipocytes is induced by HFD fed mouse serum and macrophage conditioned media via the activation of ER stress pathway. This induction is abolished by TUDCA treatment. Interestingly, induction of ER stress in vivo in mice selectively up-regulates TRIP-Br2 in visceral but not subcutaneous fat as well as liver and heart despite elevated levels of ER stress. Thus far, our analysis has ruled out involvement of known ER stress activated transcription factors including XBP1, ATF4, ATF6, C/EBPb, CREB3 and CREB3L3.

Conclusions

Our data suggests that TRIP-Br2 is regulated by a currently unknown ER stress inducible-transcriptional regulator in visceral fat. Therefore, identification of this visceral-specific regulator could reveal a novel mechanism regulating differential metabolic risks in different fat depots in obesity.

T-3002-OR: Maternal Bisphenol A-Mediated Programmed Offspring Adiposity and Adipose Tissue Inflammation

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Background

Maternal exposure to bisphenol A (BPA) during pregnancy and lactation has been associated with increased risk of offspring obesity and insulin resistance. We hypothesized that maternal BPA programs increased adiposity, macrophage infiltration and resultant inflammation.
**Methods**

Two weeks prior to mating, and throughout pregnancy and lactation, dams had *ad libitum* access to filtered drinking water (Control) or drinking water containing BPA (5 mg/L; BPA). After birth litter size was standardized and pups nursed by the same dam. At 3 weeks of age, offspring adiposity (DEXA) and glucose tolerance were evaluated. Adipose tissue was collected from 1-day-old and 3-week-old offspring, for protein expression (Western Blot) of adipogenic and lipogenic transcription factors (PPARγ; SREBP1c), markers of inflammation (TNFα; pNF-κB) and macrophage infiltration (CD68).

**Results**

Although BPA newborns had similar birth weight to Controls, at 1 day of age they showed significantly increased protein expression of PPARγ (1.5-fold), TNF-α (1.5-fold), CD-68 (2-fold), and pNF-κB (1.8-fold). At 3 weeks of age, BPA offspring exhibited significantly increased body fat mass, impaired glucose tolerance and increased protein expression of SREBP1c (1.5-fold) and CD68 (3.5-fold).

**Conclusions**

Despite normal birth weight, offspring of maternal BPA exposure exhibit increased adiposity as a result of enhanced adipogenesis and lipogenesis. Further, increased CD68 suggests there is sustained adipose macrophage infiltration, which likely contributes to increased programmed inflammation.

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**T-3003-OR: Eicosapentaenoic Acid Induces Adipocyte Hypotrophy and Reduces Adipocyte Inflammation in an Adiposity-Independent Manner**

*Monique J. Lemieux; Nishan S. Kalupahana, MBBS, PhD; Shane Scoggin, BS; Naima Moustaid-Moussa, PhD;*

**Background**

Over 1/3 of American adults suffer from obesity, a disease that is associated with the over-expansion of adipose tissue, along with increases in blood pressure, glycaemia, inflammation and thrombosis. Therefore, research that can prevent or treat obesity and its associated diseases is greatly needed.

**Methods**

We previously reported Eicosapentaenoic Acid (EPA)'s ability to prevent high-fat (HF) diet-induced obesity, insulin resistance, and inflammation. In this study, we dissected mechanisms mediating anti-inflammatory and anti-lipogenic actions of EPA, using histology/immunohistochemistry, metabolomic and
energetic analyses of adipose tissue from HF and HF-EPA fed mice, or 3T3-L1 adipocytes treated with or without EPA.

**Results**

Histology and immunohistochemistry results showed a significantly lower mean adipocyte size and macrophage infiltration in mice fed a HF-EPA diet vs. HF, indicating that EPA prevented HF diet-induced adipocyte inflammation and hypertrophy. Additionally, adipose tissue metabolomic data and cultured adipocyte extracellular flux analysis assays indicate that EPA also altered mitochondrial function by increasing fatty acid oxidation and oxygen consumption, respectively.

**Conclusions**

In conclusion, our studies demonstrate that EPA ameliorates HF-diet effects at least in part by increasing oxygen consumption and fatty acid oxidation, reducing adipocyte size and adipogenesis and adipose tissue inflammation, independent of obesity.

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**T-3004-OR: Resident Adipose Tissue Macrophages Proliferate in Response to Rapid Diet Induced Fat Expansion**

*Lindsey A. Muir, PhD; Kae Won A. Cho, PhD; Kanakadurga A. Singer, MD; Gabriel Martinez-Santibañez, Graduate Student; Brian F. Zamarron, BA; Lynn Geletka, BS; Nidhi Maley, BA; Hannah Lucas, undergraduate; Robert W. O’Rourke, MD; Carey Lumeng, MD;*

**Background**

The mechanisms that regulate adipose tissue macrophage (ATM) accumulation and maintenance in obesity include recruitment and proliferation. How each contributes to the induction and maintenance of ATM subsets in relation to the duration of obesity is unknown.

**Methods**

White adipose tissue (WAT) was collected from mice fed normal or 60% fat chow (HFD) for short-term (ST; 3, 7, 14 days) or long-term (LT; 18 weeks, 1 year) durations. Human omental and subcutaneous WAT samples were collected from patients undergoing bariatric surgery. Stromal vascular cells (SVCs) were isolated from WAT for flow cytometry analysis of ATMs (CD45+CD64+), subpopulations (CD11c+/−), proliferating cells (Ki67), and lipid-laden cells (neutral lipid stain).

**Results**

Rapid fat expansion in mice with ST HFD induced ATMs, primarily due to an increase in resident ATMs. The frequency of Ki67+ ATMs increased with time on ST HFD. Similar ATM accumulation in WT and
CCR2ko with ST HFD implicates mechanisms independent of leukocyte trafficking. LT HFD induced ATM lipid accumulation and proliferation of CD11c+ ATMs, while proliferation of CD11c- ATMs decreased. Lipid-laden ATMs had a higher frequency of Ki67+ cells vs. ATMs with low lipid content. CD11c+ ATMs had more lipid content than CD11c- ATMs in mice and humans.

Conclusions

Rapid fat expansion stimulates the proliferation of resident ATMs, and chronic obesity triggers the accumulation of lipid in CD11c+ ATMs coupled to their proliferation. Differences between CD11c- and CD11c+ ATMs may relate to fundamental differences in recruited vs. proliferating resident cells.

T-3005-OR: The Role of Macrophages and Adipocyte Precursors in Adipose Tissue Fibrosis

Gabriel Martinez-Santibañez; Mark-Athonfy Lingaya; Kanakadurga A. Singer, MD; Carey Lumeng, MD;

Background

Obesity and metabolic dysfunction are associated with an increase in extracellular matrix (ECM) deposition in adipose tissue. The co-localization of adipose tissue macrophages (ATMs) and preadipocytes to ECM-dense regions suggests that communication between these cells may impact ECM deposition.

Methods

C57/BL6 male mice were fed either Normal Diet (ND) or 60% High Fat Diet (HFD) for 20 weeks. Flow cytometry was used to identify preadipocytes (CD31-CD45-Sca1+PDGFRα+), assess Collagen expression in visceral and subcutaneous fat, and for FACS purification of stromal cells for microarray analysis. For our in vitro studies, we cultured 3T3-L1 preadipocytes with bone marrow macrophage-derived conditioned media from M1 and M2 polarized macrophages, and with cytokines and growth factors.

Results

Microarray analysis identified preadipocytes as enriched for ECM genes in lean mice, compared to expression by ATMs. ECM genes were further induced in preadipocytes but not in ATMs with diet-induced obesity (DIO). Flow cytometry identified an increase in the number of preadipocytes in adipose tissue with with diet-induced obesity, as well as a significant increase in Collagen 1+ preadipocytes and expression. In vitro studies implicate M2 macrophage derived signals but no M1 in influencing ECM production in 3T3-L1 preadipocytes.

Conclusions
Obesity skews preadipocytes toward a pro-fibrotic phenotype. Remodeling M2 macrophage signals but not M1 signals contribute to this effect.

**T-3006-OR: The Relationship between Marital Status, Psychological Well-Being and Weight Loss Intervention Success**

*Jessica L. Lawson, MSc; Charles Swencionis, PhD; Elizabeth K. Seng, PhD; Judith Wylie-Rosett, Ed.D., RD;*

**Background**

This study examined the effect of marital status and psychological well-being on change BMI during a weight loss intervention. It was hypothesized that the protective effects of marriage, for both genders, would increase psychological well-being, which would moderate greater weight loss.

**Methods**

This study utilizes data from a 12 month weight loss intervention randomized controlled trial, with three incremental levels of weight loss intensity treatment, consisting of: workbook only, computer guided intervention (CGI), and CGI plus staff support. Secondary analyses were conducted using longitudinal mixed modeling (*N*=588). Missing data was estimated as part of the mixed model procedure. BMI was captured at baseline and every three months over the 12 month study. Psychological well-being was assessed at baseline using the Psychological General Well-Being Index and a standard demographic questionnaire was used to assess gender and marital status.

**Results**

Mixed models for repeated measures analysis revealed that the main effect of psychological well-being *F*(1,589)=4.58, *p*<.05 was qualified by a significant three way interaction of time by treatment group by gender, *F*(2, 575)=4.04, *p*<.05, and a significant four way interaction of time by treatment group by gender by psychological well-being, *F*(1, 572)=3.20, *p*<.05. Results indicate that greater change in BMI, over time, is dependent on the intensity of treatment, the gender of the participant and a higher level of psychological well-being.

**Conclusions**

Marital status was not found to be a moderator effect within this model. Results indicate the clinical importance of gender and baseline psychological well-being as moderators on the success of obese or overweight individuals participating in weight loss interventions.
T-3007-OR: The KP Personal Shopper™ A Pilot Randomized Trial of Point-of-Purchase Dietary Advice

Kristina H. Lewis, MD; Douglas W. Roblin, PhD; Michael Leo, PhD; Jason P. Block, MD MPH;

Background

Clinic-based nutrition counseling has a limited impact on diet and health. More effective methods of delivering dietary advice, including point-of-purchase education, may be needed to induce behavior change around nutrition.

Methods

We randomized 55 obese participants to receive one-on-one registered dietitian (RD) counseling in a grocery store or in clinic. All received a 30-minute phone call with the RD, followed by 3, monthly in-person 60-min visits. Using written surveys at baseline and follow-up, we assessed change between groups during the 3-month study period for the following outcomes: dietary quality using the 2005-Healthy Eating Index (0-100 points), reported caloric intake and other dietary measures using the Block Food Frequency Questionnaire (3-month version), nutritional knowledge using a modified version of a UK-based assessment tool (0-65 points), self-efficacy around behavior change (4-12 point scale), household spending on food (categorical) and self-reported weight (lbs). We used residualized change ANCOVA (SAS 9.2) to test for statistical significance on the 50 persons with complete follow-up.

Results

Mean(sd)participant age was 44.3(9.2)y, 64% were female, and 87% were non-Hispanic Black. Both groups improved dietary quality and reported a decrease in caloric intake as well as improvements on numerous other dietary measures. There were no significant between-group differences in these changes. Grocery store participants had significantly greater increases in knowledge scores (mean(sd) change 5.7(6.1)pts) than clinic participants (mean(sd) change 3.2 (4.0)pts) (p=0.04). Grocery participants lost more weight (4.5(6.8)lbs) than clinic participants (2.6(7.0)lbs), but the difference was NS.

Conclusions

Point-of-purchase sessions with a registered dietitian produced greater gains in knowledge than clinic-based sessions, with similar impacts on reported diet and other measures. Grocery store-based visits offer a promising new approach for dietary counseling.
T-3008-OR: A Randomized Controlled Trial Examining a Cost-Benefit Approach to Weight Loss Maintenance

Tricia M. Leahey, PhD; Andrew Seiden, BA; Denise Pierre, B.S; Caroline Doyle, BA; Kimberly Kent, BA; Michael Schembri, BS; Leslee Subak, MD; Rajiv Kumar, MD; Rena Wing, PhD;

Background

Weight loss maintenance is a significant challenge in obesity treatment. During maintenance the 'costs' of adhering to weight management behaviors may outweigh the 'benefits.' This study examined the efficacy of a novel approach to weight loss maintenance based on modifying the cost:benefit ratio.

Methods

Individuals (N=76) with a recent 5% weight loss were randomized to 1 of 3, 10-month, maintenance interventions. The control condition received weight maintenance information and self-monitoring tools. To increase benefits/rewards for maintenance behaviors, the 2 intervention conditions received weekly monetary rewards for self-monitoring and social reinforcement via e-coaching. To decrease behavioral costs (boredom) and increase novelty, they were also instructed to monitor a variety of evidence-based behaviors, and behaviors changed every 2 weeks (e.g., weeks 1-2: red foods; weeks 3-4: pedometer steps). The primary difference between intervention arms was type of coach: Professional or Lay.

Results

Retention was 99%. Intervention arms yielded significantly better weight loss maintenance than the control arm (p's<.05), and did not differ from each other (p=.50). Specifically, control participants gained 3.2kg; in contrast, participants in the cost:benefit professional coach arm lost an additional 2.1kg, and those in the cost:benefit lay coach arm maintained their weight loss (-0.0kg). An analysis of program expenses showed that the lay condition was significantly less expensive than the professional ($185 vs. $308, p<.05).

Conclusions

A cost:benefit approach to weight loss maintenance may be efficacious and using lay coaches may be particularly inexpensive.

T-3009-OR: Food Craving and Self-control of Eating are Predictors of Weight Loss in the POUNDS LOST Trial
Background

Eating habits and food craving are strong correlates of obesity but how psychological and behavioral factors may influence weight loss is not well understood. We aimed to identify predictors for successful weight loss in the Preventing Overweight Using Novel Dietary Strategies (POUNDS LOST) trial.

Methods

A total of 811 overweight and obese participants (age 51±9 y [mean±SD], 64% female, BMI 33±4 kg/m2) were randomly assigned to one of the four diets with targeted percent energy from fat, protein and carbohydrates (carbs) as 20-15-65, 20-25-55, 40-15-45, and 40-25-35 for 2 y. Simple and multivariate logistic regression analyses were performed to identify predictors of weight loss. Chi-square test was performed to compare weight loss among diet assignments.

Results

Average weight loss achieved at 6 and 12 months were 5.8±5.7 kg and 5.6±7.0 kg, respectively. At baseline, less craving for carbs, fruits and vegetables, and, less cognitive restraint of eating predicted weight loss at 6 months and 1 y. Less craving for fast foods, more cognitive restraint of eating, and less disinhibition of eating at 6 months also predicted subsequent weight change between 6 and 12 months. Diet assignment did not have any significant impact on weight loss or its interaction with the psychological measurements.

Conclusions

Food craving is a durable predictor for short- and long-term weight loss. Self-control of eating during the intervention may be more important in yielding weight loss. Interventions to decrease food craving and enhance dietary restraint skills are likely to lead to more successful weight loss.

T-3010-OR: A Postpartum Lifestyle Intervention Reduces Postpartum Weight Retention: The Gestational Diabetes™ Effects on Moms Cluster Randomized Controlled Trial

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Background

Despite data showing that diabetes is preventable through weight loss and that women with gestational diabetes (GDM) with postpartum weight retention are at higher risk for diabetes, it remains to be determined whether weight loss intervention is effective during the postpartum in women with GDM.

Methods

Among women with GDM, we compared usual care alone to usual care plus lifestyle intervention in a pragmatic cluster randomized trial of 44 medical facilities (22 in the intervention with 1,105 women; and 22 in usual care with 1,215 women). The intervention included mailed gestational weight gain recommendations in pregnancy, and 13 individual, telephone-based weight management sessions with a lifestyle coach between 6 weeks and 6 months postpartum. The primary outcome was whether women: a) reached pregravid weight if their pregravid BMI was <25 kg/m² or b) achieved a 5% reduction from pregravid weight if overweight or obese (pregravid BMI >=25 kg/m²). Intention to treat analyses were performed.

Results

At 6 months postpartum, among women with BMI <25, 45.9% in the intervention and 34.1% in the usual care returned to their pregravid weight [OR (95%CI): 1.54 (1.05-2.27)]; among women with BMI >=25, 22.5% in the intervention and 18.6% in the usual care lost 5% of their pregravid weight [1.35 (1.03-1.76)]. The average effect of the intervention during 12 months was statistically significant in both BMI strata. Women in the intervention showed a significant greater increase in vigorous activity (PA). No differences in calorie intake were observed.

Conclusions

A telephone-based intervention in women with GDM is effective in reducing postpartum weight retention, in helping overweight/obese women to lose weight, and in increasing vigorous intensity PA. Since the intervention was delivered by telephone, it would be transportable in other health systems.

T-3011-OR: Improving Weight Loss: Is it a Matter of (Diet) Choice?

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Background

Allowing individuals to choose diet type has been recommended to increase dietary adherence but was marginally less effective than being randomly assigned a diet in our recent randomized trial. In secondary analyses, we evaluated whether the effect of choice was moderated by diet type.
Methods

Participants were adult Durham VA Medical Center outpatients with BMI >=30. Control participants were randomized to a low-fat/reduced-calorie diet (LFD) or a low-carbohydrate diet (LCD). Choice arm participants learned detailed information about the 2 diets and how their food preferences aligned with the diets using the Geiselman Food Preference Questionnaire, then made a choice. In both arms, counseling by a dietitian occurred in small groups separated by arm and diet type in 19 sessions supplemented by one-on-one telephone sessions over 48 weeks. Unadjusted linear mixed models followed by models adjusted for baseline characteristics were used to examine weight loss within arms.

Results

In 207 participants, mean age was 54 years, weight was 109 kg, and BMI was 36; 27% were women and 49% were minority race. In the Choice arm, 61 (58%) chose the LCD and 44 (42%) chose the LFD. Unadjusted mean weight loss at 48 weeks for Choice LFD was -3.6% and for Choice LCD was -6.3% (p=0.02); for Control LFD, weight loss was -6.2% and for Control LCD was -6.2% (p=1.0). In adjusted models, the weight loss difference in the Choice arm shrank and was no longer significant (LFD -4.0%, LCD -5.6%, p=0.17).

Conclusions

Allowing individuals to choose diet type did not increase weight loss; in fact, participants choosing an LFD had less weight loss than those choosing an LCD or those randomly assigned to either diet. Baseline characteristic of those who chose an LFD at least partially explained their lower success.

T-3012-OR: Recent Trends in Added Sugar Intake among U.S. Children and Adults from 1977 to 2010

Elyse Powell; Lindsey P. Smith, MPH; Barry M. Popkin, PhD;

Background

Added sugars increase excess energy and reduce nutrient density. While recent studies indicate that added sugars have begun to decline, to our knowledge no research has examined whether these changes have persisted, or are consistent across critical subpopulations or the distribution of consumers.

Methods

5 nationally representative surveys of food intake in the US from 1977 to 2010 we used linear regression to estimate adjusted added sugar intake in children and adults >=2y. We use multinomial logistic regression to examine whether critical subpopulations, including racial/ethnic minorities and low income populations, had a higher probability of being in the highest quintile of added sugar intake in 2009-2010.
Results

Estimated adjusted added sugar intake rose from 277 kcal/day in 1977 to 388 kcal/day in 2004, and then decline to 329 kcal/day in 2010 for children 2-18y. Adult intake similarly rose from 109 kcal/day in 1977 to 317 kcal/day in 2004, and then decreased to 283 kcal/day in 2010. However, this decline was not significant for children 12-18y and adults >40y. or adults in 2009-2010, the 5th quintile of added sugar consumers consumed a mean of 721 kcal/day.

Conclusions

Added sugar consumption has decreased from a peak in 2003-2004 to 2009-2010. However, declines were not found in certain sub groups, including children 12-18y and adults >40y. Despite declines, all but the lowest quintiles did not meet recommended levels for added sugar consumption.


Liping Pan; Lisa McGuire, PhD; Laurence Grummer-Strawn, PhD; Ashleigh L. May-Murriel, PhD; Heidi M. Blanck, PhD;

Background

Our previous research reported the overall obesity trend from 1998 through 2010 among low-income children aged 2-4 years. The objective of this study was to examine trends in obesity (BMI-for-age and sex>= 95th percentile) prevalence by race/ethnicity from 1998 through 2011 for the same population.

Methods

We used data in the Pediatric Nutrition Surveillance System collected from participants of federally funded health and nutrition programs from 30 states and the District of Columbia which provided data each year from 1998 through 2011. Children's weights and heights were measured. Missing, miscoded, or biological implausible values were excluded, leaving about 29 million young low-income children in analytic sample. We used Joinpoint regression to identify the inflection years when significant changes in obesity trends occurred and piecewise logistic regression to examine annual changes in obesity prevalence before and after the inflection years controlling for age, sex, and race/ethnicity.

Results
The overall obesity prevalence increased from 13.1% in 1998 to 15.2% in 2003, and then decreased slightly to 14.7% in 2011. The upward trends among non-Hispanic white, non-Hispanic black, and Hispanic children turned downward in 2003. Asian/Pacific Islander was the only racial/ethnic group with a continued decrease in obesity from 1998 (14.3%) through 2011 (11.7%). Among American Indian (AI)/Alaska Native (AN) children, obesity prevalence consistently increased from 16.3% in 1998 to 21.1% in 2011 although the annual increases slowed since 2001.

**Conclusions**

Our study indicates modest progress in obesity prevention and control for most racial/ethnic groups of young low-income children. However, the prevalence of obesity is still too high. Culturally appropriate interventions may further reduce childhood obesity and related health inequities.

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**T-3014-OR: Did the Great Recession Widen Disparities in Nutrients Obtained from US Packaged Food Purchases?**

*Shu Wen Ng, PhD; Barry M. Popkin, PhD;*

**Background**

Recent studies found that the Great Recession that started at the end of 2007 (measured by unemployment rates) was linked with increased package foods purchases (PFP), and reduced away-from-home consumption. However, how recessions affect nutrient intake of race-ethnic subgroups is unknown.

**Methods**

Using nationally representative 2005-2012 Nielsen Homescan household PFP data from 76 markets (geog. areas) with sociodemographic data (household age-gender makeup, income, education, race-ethnicity, and sampling weights), we linked PFPs to Nutrition Facts data to derive daily nutrients (calories, saturated fat, total sugar and sodium) per capita. We ran multilevel models over 457,180 household-quarters to estimate how market-level unemployment related to nutrients from PFPs, controlling for household and time measures. We tested for differential effects of unemployment on nutrients from PFP, and estimated nutrients from PFPs at the lowest and highest quintiles of unemployment (4% vs 10%).

**Results**

Compared to NHANES 2005-2010, PFPs account for about 56-66% of calories. Results suggest significant associations between unemployment rates and nutrients obtained from PFPs. When market unemployment rose from 4% to 10%, non-Hispanic White households' PFP per capita per day rose by 12 kcal and 38mg for sodium; non-Hispanic Black households' PFP rose by 55kcal, 3g sugar, and 86mg sodium; Hispanic households' PFP rose 46 kcas, 3g sugar, 78mg sodium; and Other non-Hispanic households' PFP rose 59kcs, 1g sat-fat, 3g sugar and 77mg sodium.
Conclusions

We find significant changes in nutrients from PFPs since the onset of the Great Recession. Non-White households' PFPs contained more sugar and calories, and Black households' PFPs had the highest increase in sodium. The Great Recession widened race-ethnic disparities in nutrients obtained from PFPs.

T-3015-OR: Changes in the Duration of Obesity over Time

Anna Peeters, Stephanie Tanamas, PhD; Evelyn Wong, MBBS(Hons) MPH; Rory Wolfe, PhD; Jan Barendregt, MA, PhD;

Background

The duration of obesity is a risk factor for chronic disease and mortality independent of body mass index. The extent to which duration of obesity has changed over time is unclear. We aimed to estimate the changes in the duration of obesity between 1980 and 2010 in American adults.

Methods

We performed linked cohort analysis of national cross-sectional surveys with measured height and weight between 1960 and 2010 (using the NHANES survey series). We analysed the prevalence of obesity of at least twenty years duration in those aged 40-59 or 60-74 in 1980, 1990, 2000, and 2010. We assumed little change in prevalence prior to 1980 and post 2010 and tested the impact of these assumptions.

Results

For those obese at ages 40-59 we estimate that the proportion with duration of obesity of 20 years or more decreased from around 60% in 1960 to around 30% in 2000 in American adults, as the prevalence of obesity increased most rapidly in adulthood. It then increased again to around 50% in 2010. We estimate that with no further increases in adult obesity beyond 2010 duration of obesity of 20 years or more will increase to 70% by 2020 and 90% by 2030.

Conclusions

The duration of obesity in American adults appears to have decreased prior to the year 2000 due to large numbers of newly obese middle aged adults. We estimate that it is now increasing and will lead to increases in the risk of adverse health events in those with obesity in coming decades.
**T-3016-OR: The Association between BMI and Diabetes in US Adults: Examination of Secular and Race/Ethnic Trends**

*Sandra S. Albrecht, PhD; Elizabeth Mayer-Davis, PhD; Barry M. Popkin, PhD;

**Background**

In the US, diabetes prevalence among non-whites has been observed to exceed that among whites, especially among those with lower BMI. We examined trends over the past 20 years in this race/ethnic disparity, and in the BMI-diabetes relationship within race/ethnic groups.

**Methods**

Data came from 12,827 non-pregnant adults aged 20-74 years from two periods in the National Health and Nutrition Examination Surveys (NHANES III: 1988-1994; and 2007-2012). Diabetes was defined as having self-reported diagnosed diabetes or having a fasting plasma glucose >=126 mg/dL. Weighted multivariate logistic regressions adjusted non-linearly for age, sex, race/ethnicity, BMI, and year. Relevant interactions were tested.

**Results**

At all BMI values, non-whites had twice the odds of diabetes than whites. These disparities were stable over time, and were largest at lower BMI. For example, at 'normal' BMI (<25 kg/m2), diabetes odds were three times as high among Mexican-Americans (M-As) (odds ratio (OR): 3.2 (95% CI: 1.7-5.9) and twice as high among blacks (OR: 2.1 (95% CI: 1.1-3.8) relative to whites. However among only M-As, significant BMI*year interactions (p=0.048) indicated that diabetes prevalence rose more rapidly among those with higher BMI.

**Conclusions**

The same BMI was associated with more diabetes for non-whites than whites, and the disparity was stable over time. However, among M-As, the disproportionate burden of diabetes at lower BMI together with steeper secular trends at higher BMI has troubling implications for future disparities.

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**T-3017-OR: Circulating Ovarian Hormones May Regulate Subcutaneous**
Abdominal Adipogenesis in Premenopausal Women

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Background

Menopause is associated with abdominal fat accumulation regardless of changes in body weight. However, it is unclear if de novo generation of adipocytes underlies the increase in central adiposity. This pilot study evaluated if the loss of ovarian hormones in premenopausal women triggers adipogenesis.

Methods

Healthy premenopausal women (n=23) underwent 60 days of gonadotropin releasing hormone agonist therapy (GnRHAG, monthly leuprolide acetate 3.75 mg) to suppress ovarian hormones, with add-back of transdermal estradiol (0.075 mg/d E2, n=12) or placebo patch (PL, n=11). A subset of women underwent total body water enrichment with daily deuterium dosing (2H2O; E2 n=4, PL n=5) for determination of in vivo adipogenesis. Subcutaneous abdominal adipose tissue biopsies were taken at baseline (BL), 30 and 60 days for qPCR of adipogenic markers and 2H-DNA incorporation. GnRHAG did not change body weight in either group (PL BL 73.1+- 4.4 to 60d 73.1+-4.4 kg ; E2 BL 83.3+- 4.2 to 60d 84.2+-4.2 kg).

Results

Changes in serum E2 were different between groups (time x drug p=0.04). E2 decreased in GnRHAG+PL (BL 102+-18, 60d 15+-3 pg/mL) and was maintained in GnRHAG+E2 (BL 73+-21, 60d 49+-15 pg/mL). GnRHAG increased PPARÎ³ (p=0.02) and SREBP-1c (p=0.01) mRNA regardless of add-back. Although small sample sizes limited statistical comparisons for 2H incorporation, the fraction of adipocytes enriched with 2H tended to be higher at day 60 than 30 and slightly lower in E2 add-back versus PL (PL 0.33+-0.04 to 0.41+-0.1, E2 0.28+-0.1 to 0.38+-0.1 fraction of new cells).

Conclusions

Ovarian hormone deficiency appears to increase adipogenic signals in adipose tissue of premenopausal women prior to changes in weight. The specific role of estradiol in adipogenesis and if increases in abdominal adiposity after menopause are resultant to de novo adipogenesis warrant further study.

T-3018-OR: Greater In Vitro Basal Lipolysis Predicts a Slower Rate of
Weight Gain, as well as Whole Body Lipid Oxidation and RQ

Joseph Frankl; Susanne B. Votruba, PhD, RD;

Background

Lower relative lipolysis and lipid oxidation leads to lipid and weight accumulation. However, the contribution of adipocyte lipolysis absent the effects of the multiple biochemical and hormonal signals that regulate enzymatic and regulatory protein function in those cells remains to be shown.

Methods

Volunteers (n=401; Sex: 221 M, 180 F; Race: 76 C, 325 NA; Age=23.9+-8.4y; pfat=31.6+-10.0%) were admitted to our unit for a study examining risk factors for type 2 diabetes. Body composition was assessed by underwater weighing and subcutaneous abdominal adipose tissue biopsies were collected. Adipocytes were isolated and in vitro cell lipolysis was performed. Subsets of subjects also had a measurements of energy expenditure and substrate oxidation during a 24 hour stay in a metabolic chamber (n=122) and/or repeated body composition assessments (n=269). Basal lipolysis (BASLIP) was log transformed to meet assumptions of linearity in analyses.

Results

BASLIP was higher in men than women and positively correlated with percent body fat at baseline (both p<.001). No differences in BASLIP were found between races or with aging. Elevated BASLIP was associated with a lower RQ (p=.031) and increased lipid oxidation (p=.039) during a stay in a metabolic chamber. There was a negative correlation between BASLIP and weight gain at follow-up (p=.020). This effect on weight gain did not change fluctuations in body composition. Adjusting BASLIP for cell surface area did not attenuate or alter any results.

Conclusions

In vitro measurements of lipolysis predicted whole body lipid metabolism in this population. Individuals whose isolated adipocytes had elevated unstimulated lipolysis gained less weight. An increased propensity for adipocytes to release free fatty acids may be protective against weight gain.

T-3019-OR: The Ubiquitin Ligase Siah2 Regulates Early Events in Adipogenesis

Gail Kilroy, BS; Heather Kirk-Ballard, PhD; Lauren E. Carter, BS; Elizabeth Floyd, PhD;
Background

Obesity-related insulin resistance is associated with adipocyte hypertrophy and impaired adipogenesis. Obese Siah2KO mice remain insulin sensitive although the adipocytes are enlarged. The aim of this study was to begin examining the role of Siah2 in determining adipocyte size and number in obesity.

Methods

Adipogenesis was examined in nonprecursor fibroblasts and 3T3-L1 preadipocytes transfected with Siah2 shRNA alone or in combination with beta-catenin siRNA. Primary stromal vascular cells from Siah2KO adipose tissue were induced to undergo adipogenesis under standard conditions and in the presence of BMP4. Adipogenesis is impaired by Siah2 deletion while overexpression of Siah2 in nonprecursor cells stimulates adipogenesis, indicating Siah2 promotes adipogenesis. Loss of Siah2 is associated with sustained beta-catenin expression post induction and depletion of beta-catenin in 3T3-L1 preadipocytes expressing Siah2 shRNA partially restores PPARgamma expression and adipocyte formation.

Results

Consistent with increased beta-catenin levels, Wnt10b is elevated in Siah2KO adipose tissue and remains elevated in Siah2KO primary SVF cells after addition of the induction cocktail. Inhibition of adipogenesis in Siah2KO primary cells is attenuated by BMP4. Addition of BMP4 in the Siah2KO cells reduces Wnt10b expression and increases expression of ZFP423, a transcriptional regulator of PPARgamma expression that controls commitment of preadipocytes to adipocyte formation.

Conclusions

Our results indicate obese Siah2KO mice remain insulin sensitive although adipogenesis is impaired. Siah2 controls adipogenesis via regulation of factors controlling early events in the differentiation of committed preadipocytes to adipocytes, possibly by acting upstream of BMP4.

T-3020-OR: Adenoviral Protein E4orf1 Enhances Cellular Glucose Uptake Independent of Insulin Receptor and PPARgamma

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Background
Impaired insulin receptor (IR) signaling contributes to insulin resistance linked to obesity. Activation of PPAR\(^\beta\) helps in reversing insulin resistance, but promotes adipogenesis. Adenoviral protein E4orf1 (E4) down-regulates IR signaling, up-regulates PPAR\(^\beta\), and enhances cellular glucose uptake.

**Methods**

We determined the contribution of IR and PPAR\(^\beta\) signaling to E4-mediated increase in glucose uptake, by knocking down IR with siRNA in mouse embryonic fibroblasts that lacked the PPAR\(^\beta\) gene (MEF-\(-/\)-). About 24 h post IR knockdown, MEF-\(-/\)- cells were infected with vector expressing E4 or a null vector (NV). As a positive control, cells with or without IR knockdown were treated with anti-diabetic agent rosiglitazone (TZD). Basal and insulin stimulated cellular glucose uptakes were determined 48h post infection. Protein abundance of the transmembrane glycoprotein ENPP1 was determined. Overexpression of ENPP1 impairs IR signaling.

**Results**

Compared to basal condition, insulin could not increase glucose uptake in MEF-\(-/\)- cells, when IR was knocked down. However, even in presence of IR knock down, insulin significantly increased glucose uptake in cells treated with TZD or E4. TZD, but not E4 treatment, reduced ENPP1 abundance, suggesting differences in signaling pathways contributing to enhanced glucose uptake.

**Conclusions**

Similar to the action of TZD, E4 enhances cellular glucose uptake independent of IR or PPAR\(^\beta\) signaling. The results suggest that E4 may offer a template to improve insulin resistance induced by impaired IR signaling, and without inducing adipogenesis.

**T-3021-OR: Sex and Site Distribution of Adipose Tissue GPAT Activity**

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**Background**

There are wide variations in adipose tissue fatty acid storage between males and females and between different adipose depots. The factors we previously assessed could not entirely account for the observed variations.

**Methods**

We optimized an assay for total glycerol 3-phosphate acyltransferase (GPAT) (the initiating enzyme for triacylglycerol (TAG) synthesis) and GPAT1 (the only NEM insensitive isoform – thought to be insulin-independent and to play a role in \(\Delta^Y\)-oxidation) activity in human adipose tissue. We assessed
GPAT/GPAT1 activity in omental and abdominal subcutaneous adipose tissue collected from age-matched obese and non-obese men and women undergoing elective abdominal surgery. We tested whether site and sex differences in GPAT activity are consistent with the known variations in adipose fatty acid storage tendencies. GPAT activity is expressed as pmol LPA/mg lipid/min.

Results

Total GPAT activity was greater ($p = 0.0002$) in omental (11.9 ± 2.0) than subcutaneous (5.1 ± 1.4) fat and greater in women (7.2 ± 2) than men (2.7 ± 0.9) in subcutaneous fat. Total GPAT decreased as a function of adipocyte size for both depots ($r = -0.71$ to -0.58, $p <= 0.04$). The proportion of GPAT1 activity increases as a function of adipocyte size for both depots ($r = 0.62-67$, $p <= 0.01$); GPAT1 accounted for > 50% of GPAT activity in individuals with the largest adipocytes.

Conclusions

The differences in GPAT activity between adipose depots and the sexes are consistent with patterns of fatty acid storage. Thus, adipose GPAT may be regulating sex and depot differences in fat storage. To our surprise, GPAT1 can account for the majority of total GPAT activity in large adipocytes.

T-3023-OR: The Effects of Cognitive Strategies on Neural Food Cue-Reactivity

Kathryn E. Demos, PhD; Jason Lillis, PhD; Kimberly Kent, BA; Anne Goldring, BA, MS; Jeanne M. McCaffery, PhD; Rena Wing, PhD;

Background

Recent use of functional magnetic resonance imaging (fMRI) has revealed key roles for reward-related and inhibitory control brain regions in response to food cues. This study examines whether neural food cue-reactivity is affected by manipulating the cognitive strategy used while viewing liked foods.

Methods

In a within-subject design, overweight/obese individuals (N=25) were taught to use four cognitive strategies: DISTRACT based on cognitive behavioral therapy, ALLOW, a strategy derived from acceptance and commitment therapy, LATER focusing on long-term negative consequences, and NOW (control condition), in which participants focused on immediate rewards of food. Participants were scanned via fMRI in a block-design paradigm wherein they were instructed to use each of the strategies (presented in random order) while viewing highly tempting food images. Following each block participants were asked to rate their urge to eat at that moment on a 4-point Likert scale.

Results
Urge to eat was highest for NOW 3.4+-.5, followed by ALLOW 2.4+-8, DISTRACT 2+-7, and LATER 1.7+-.7p's<.05. NOW>LATER revealed activity in visual, inferior parietal, orbital frontal cortices, and middle frontal gyrus, suggesting sensory, attention, and reward processing, and action intention. In LATER>NOW dorsolateral prefrontal cortex (DLPFC) activity was observed, indicative of inhibition. Superior frontal activity (higher order processing) was observed in ALLOW>NOW, and DISTRACT>NOW revealed anterior PFC which may reflect prospective memory.

Conclusions

These results suggest that simply having different mindsets while viewing tempting foods can alter the brain's response to these cues. Since focusing on long-term consequences led to both a decrease in the desire to eat and an increase in inhibitory control, this may be a promising treatment strategy.

T-3024-OR: The Effect of Real Time fMRI Neurofeedback on Cognitive Regulation of Food Cravings

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Background

Disordered food intake behaviors are due, in part, to dysregulation in mesolimbic reward and cognitive control neurocircuitry. Novel therapeutics, such as real time fMRI neurofeedback, targeting these disrupted brain systems may enhance treatment outcomes in disorders of ingestive behavior.

Methods

16 fasted healthy-weight (BMI < 25) participants completed two sessions of rtfMRI neurofeedback training in a 3 Tesla MRI machine. First, participants performed a functional localizer task (Stop Signal Task) in order to identify a region of interest (ROI) for neurofeedback training in the lateral inferior frontal cortex (LIFC), an area involved in cognitive control. Participants then attempted to self-regulate brain activity within this ROI using cognitive regulation strategies (cognitive reappraisal and upregulation) while viewing highly palatable food images. Participants also recorded their subjective cravings in response to the food images throughout the session.

Results

Compared to upregulation trials, participants had less reward circuit activity (VTA, ventral striatum, amygdala, hypothalamus, and medial PFC) and decreased craving when using reappraisal strategies (ps < .01). In addition, the difference in activity in the VTA and hypothalamus during upregulation vs. reappraisal was correlated with craving (rs = .59 and .62). Neurofeedback training led to improved control of LIFC; however, this was not related to mesolimbic reward circuit activation or craving.
Conclusions

rtfMRI neurofeedback training led to increased control of brain activity in healthy-weight participants; however, neurofeedback did not enhance the effect of cognitive regulation strategies on mesolimbic reward circuit activity or craving after two sessions.

T-3025-OR: TFEQ Disinhibition and Post Glucose Brain Response to Food Cues

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Background

Elucidation of the endophenotypes of abnormal eating and obesity is an expanding research area. Past work indicates that the Three Factor Eating Questionnaire disinhibition subscale is associated with BMI, decreased orbitofrontal cortex volume and limbic responses to food cues and liquid meals.

Methods

Nineteen volunteers (mean age 22±2 yrs) with a BMI ranging from 19.6 to 45.36 kg/m2 participated in the study. Participants completed the TFEQ during basal conditions. fMRI scans were performed using a 3 Tesla Scanner after the ingestion of glucose (75 g glucose in 300mL water) or water (300 mL). Following ingestion, subjects completed a food cue task containing high sugar (e.g. chocolate), low sugar but savory (e.g. hamburger), and neutral non-food images. Neural response was averaged across eight individual limbic and frontal ROIs and was compared with the TFEQ disinhibition subscale using Pearson's non-parametric correlations.

Results

In line with prior work, TFEQ disinhibition positively correlated with BMI (r=0.50, p=0.031). Amygdala responsivity to savory food vs non-food cues following glucose positively correlated with disinhibition (r = 0.56, p =0.012), whereas there was no correlation between amygdala responsivity to high-sugar food vs non-food cues and disinhibition. Post-water ingestion neural response was not associated with disinhibition.

Conclusions

These results suggest that hyper-responsivity of the amygdala after the ingestion of glucose is related to disinhibited eating behavior, which may increase susceptibility for overeating particularly in an environment with abundant access to highly palatable foods.
T-3026-OR: Characterization of Hypothalamic Function in Humans in Vivo with Pulsed Arterial Spin Labeling MRI

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Background

The hypothalamus is the center for energy homeostasis in the brain. Our aim was to characterize hypothalamic signals by magnetic resonance imaging (MRI) with pulsed arterial spin labeling (PASL) after a nutrient drink, and identify gastrointestinal functions associated with these signal changes.

Methods

We prospectively studied the hypothalamic response to feeding using PASL MRI (3 Tesla MRI scanner) in 40 subjects. Sequential dynamic PASL MRI scans were obtained from each subject after a period of 8 hours fast and during a liquid meal tolerance test with Ensure ingested at 30mL/min. PASL MRI scans were repeated after first drink, at the time of reported maximum tolerated volume (MTV), and 30 minutes after MTV. In 20 participants, we concurrently measured gastric emptying of solids and liquids by scintigraphy, gastric volumes by SPECT, fasting and post prandial plasma ghrelin, GLP-1, PYY, and CCK. Repeat measures (RM) ANOVA, and multivariate linear regression were used for the analysis.

Results

The cohort was 62% female, age 33+/-7.9 (SD) y, BMI 30+/-5.5 kg/m2 and MTV was 1290 ± 344 ml. On RM-ANOVA, and compared to the control region (posterior frontal cortex, which did not change with meal ingestion), hypothalamic PASL MRI signal decreased significantly after ingesting the MTV of the liquid meal and this persisted 30 min later (p=0.03). Changes in PYY and GLP-1 at MTV levels correlated with changes in hypothalamic PASL MRI signal: $\hat{F}$ - 0.55 (p= 0.019) and - 0.50 (p = 0.028), respectively.

Conclusions

PASL MRI demonstrates changes in hypothalamic signals postprandially. PASL MRI provides a novel brain imaging technique to dynamically quantify satiation signals within the hypothalamus and to study neural circuits of appetite and satiation, without requiring ionizing radiation, in health and obesity.

T-3027-OR: Additional Analyses of the Weight-Lowering Efficacy of Liraglutide
3.0 mg in Overweight and Obese Adults: The SCALE Obesity and Prediabetes Randomized Trial

Frank L. Greenway, MD; Carel W. le Roux, FRCP, FRCPath, PhD; David CW. Lau, MD, PhD, FRCPC; Arne Astrup, MD, DMSc; Ken Fujioka, MD; Alfredo Halpern, MD; Michel Krempf, PhD; Rafael Violante Ortiz, MD; John Wilding, DM FRCP; Claus B. Svendsen, MD, PhD;

Background

This trial investigated the safety and efficacy of liraglutide 3.0 mg, as adjunct to a 500 kcal/day deficit diet and exercise program, for weight management. Clinicaltrials.gov ID: NCT01272219. Funding: Novo Nordisk.

Methods

Adults (BMI >=27 kg/m2 with >=1 comorbidity or >=30 kg/m2) were randomized 2:1 to once-daily s.c. liraglutide 3.0 mg (n=2487) or placebo (n=1244). Data are observed means for the full analysis set (exposed individuals with >=1 post-baseline assessment) with LOCF at week 56, unless stated otherwise. Statistical analyses are estimated treatment differences (ED; ANCOVA, continuous variables) or odds ratios (OR; logistic regression, categorical). Baseline BMI subgroups were <=29.9, 30-34.9, 35-39.9 and >=40 kg/m2. Baseline characteristics: age 45.1 y, 78.5% female, body weight (BW) 106.2 kg, BMI 38.3 kg/m2, 61.2% with prediabetes.

Results

92% on liraglutide lost BW vs 65% on placebo. BW loss >=5% occurred in 63% (liraglutide) vs 27% (placebo; OR 4.8, p<0.0001). BW loss >10% and >15% with liraglutide vs placebo was seen in 33% vs 11% (OR 4.3, p<0.0001) and 14% vs 3.5% (OR 4.9, p<0.0001). Completers on liraglutide (n=1789, 72%) lost 9.2% (9.7 kg) of BW vs 3.5% (3.8 kg) on placebo (n=801, 64%; ED -5.7%, p<0.0001). BW loss with liraglutide was similar in those with/without prediabetes at screening (-8.0% vs -7.9%,p=0.59) and similar across baseline BMI subgroups (p=0.054,%; p=0.54,kg)

Conclusions

Liraglutide was generally well tolerated: safety profile was consistent with previous trials; gastrointestinal disorders were most commonly reported. Liraglutide 3.0 mg, as adjunct to diet and exercise, induced significant weight loss compared to placebo, independent of prediabetes status and BMI.
T-3029-OR: Variable Weight Loss Resulting from Individual Responses to Short-Term Fasting and Overfeeding

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Background

Individuals with a smaller 24-hour energy expenditure (24h-EE) reduction during short term fasting (F), and a greater increase in 24h-EE with short term overfeeding (OF) may respond differently to weight loss attempts than those with the opposite phenotype.

Methods

We admitted twelve non-diabetic subjects (7m/5f; BMI 38.0 +- 6.3; age 33.7 +- 8.6 y) to our metabolic ward. During a weight maintaining period, 24h-EE responses to F and 200% OF were measured in a respiratory chamber. Volunteers then underwent 6 weeks of 50% caloric restriction (CR). During CR, we calculated the daily energy deficit (Kcal/d) as follows: energy intake [kcal of duplicated meals - kcal excreted in urine and stool, all assessed by bomb calorimetry] minus estimated 24h-EE [calculated as the closest 24h-EE (measured weekly in the metabolic chamber) x daily activity factor equal to the ratio of activity (activity monitors) on the ward vs in the chamber]. Weight was measured daily.

Results

24h-EE decreased by 9.42+-1.8% in response to F (â”5.3 to â”12.1%; P<0.0001) and increased by 7.63+-4.6% (â”0.1 to 13.6%; P=0.0003) in response to OF. A smaller reduction in 24h-EE during 24h of F and a larger 24h-EE response to OF predicted more weight loss even after accounting for age, sex, race and baseline weight (F: Î²=â”0.61 kg, P=0.01; OF: Î²=â”0.33 kg, P=0.06), as well as an accelerated energy deficit accumulation, adjusted for age, sex, race and baseline weight (F: Î²=â”123.51 kcal/d, P=<0.0001; OF: Î²=â”37.02 kcal/d, P=<0.0001).

Conclusions

Less energy efficient, obese individuals lose more weight and accumulate a greater energy deficit during 6 weeks of supervised caloric restriction. The success of dietary weight loss efforts is influenced by the energy expenditure response to caloric restriction.

T-3030-OR: Weight Loss with Liraglutide 3.0 mg Is Associated with Improved
Health-Related Quality of Life (HRQoL) and Treatment Satisfaction in Overweight or Obese Adults with Type 2 Diabetes (T2D): The SCALE Diabetes Randomized, Double-Blind, Placebo-Con

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Background

Obesity is a chronic disease associated with T2D and low HRQoL, which can be improved by a 5-10% weight loss. We studied the impact of weight loss with liraglutide 3.0 mg, as an adjunct to diet and exercise, compared with placebo and liraglutide 1.8 mg on HRQoL in overweight/obese adults with T2D.

Methods

846 participants (means: age 55 years; males 50%; BMI 37 (27-68) kg/m2; HbA1c 7.9%; diabetes duration 7.3 (0.2–36) years; 11% on diet + exercise, 57% on metformin monotherapy, 31% on combination OADs) were randomized (2:1:1) to 56 weeks of once-daily s.c. liraglutide 3.0 mg (n=423), 1.8 mg (n=211) or placebo (n=212) treatment + guided diet (500 kcal/day deficit) and exercise. The Impact of Weight on Quality of Life (IWQoL) Lite and Diabetes Treatment Satisfaction Questionnaire (DTSQ) were used to assess health-related outcomes. [Clinicaltrials.gov ID: NCT01272232. Funding: Novo Nordisk]

Results

At week 56, weight loss (mean+SD) was 5.9+-5.5%, 4.6+-5.5% and 2.0+-4.3% with liraglutide 3.0 mg, 1.8 mg, and placebo, respectively. The mean total score of the IWQoL-Lite improved with 3.0 mg (11.7+-14.7), but not 1.8 mg (9.1+-14.1), vs. placebo (7.6+-12.6; estimated difference (ED) and 95%CI: 2.7 [0.6?4.9]; p=0.014); this was driven by an improved physical function score (15.4+-17.1 with 3.0 mg vs. 9.5+-16.6 with placebo; ED: 4.9 [2.1?7.7]; p=0.0006). Liraglutide 3.0 mg, but not 1.8 mg, also improved the DTSQ vs. placebo (ED: 1.4 [0.4?2.5]; p<0.01).

Conclusions

In overweight/obese individuals with T2D, liraglutide 3.0 mg, as adjunct to diet and exercise, was superior to placebo and 1.8 mg on weight loss (p<0.0001 and p=0.0024, respectively), and also significantly improved HRQoL and diabetes treatment satisfaction.
T-3031-OR: Liraglutide 3.0 mg Reduces Body Weight and Improves Health-Related Quality of Life (HRQoL) in Overweight or Obese Adults without Diabetes: the SCALE Obesity and Prediabetes Randomized, Double-Blind, Placebo-Controlled, 56-week Trial

Ken Fujioka, MD; Arne Astrup, MD, DMSc; Frank L. Greenway, MD; Alfredo Halpern, MD; Michel Krempf, PhD; David CW. Lau, MD, PhD, FRCP; Carel W. le Roux, FRCP, FRCPATH, PhD; Rafael Violante Ortiz, MD; John Wilding, DM FRCP; Michael L. Wolden, Msc; Chri

Background

Obesity is a chronic disease associated with physical and mental health problems and reduced HRQoL, which can be improved by weight loss (WL). The effects of liraglutide 3.0 mg, as adjunct to diet and exercise, on body weight (primary endpoint) and HRQoL in overweight/obese adults were investigated.

Methods

Individuals (BMI >=27 kg/m2 with >=1 comorbidity or >=30 kg/m2) were advised on a 500 kcal/day deficit diet and exercise program, and randomized 2:1 to once-daily s.c. liraglutide 3.0 mg (n=2487) or placebo (n=1244). Baseline characteristics: age 45.1 years, 78.5% female, weight 106.2 kg, BMI 38.3 kg/m2, 61.2% with prediabetes. The Impact of Weight on Quality of Life -Lite (IWQoL), Short-Form (36) Health Survey (SF-36) and Treatment Related Impact measure-Weight (TRIM-W) questionnaires were used to assess health-related outcomes (score ranges 0?100). Data were observed means+SD and estimated treatment differences (ED), with LOCF. Clinicaltrials.gov ID: NCT01272219. Funding: Novo Nordisk.

Results

At week 56, individuals on liraglutide 3.0 mg had more WL (8.0+-6.7%) vs placebo (2.6+-5.7%; ED -5.4% [95%CI -5.8;-5.0]; p<0.0001). WL was accompanied by improvements in the total IWQoL score with liraglutide (10.6+-13.3) vs placebo (7.6+-12.8; ED 3.1 [2.2;4.0], p<0.0001), mostly driven by improved physical function. The TRIM-W total score (ED 2.1 [1.3;3.0], p<0.0001) the SF-36 summary physical/mental health scores (ED 1.7 [1.2;2.2], p<0.0001; 0.9 [0.3;1.5], p=0.003), and all domain scores of the IWQoL and SF-36 improved with liraglutide vs placebo.

Conclusions
Weight loss with liraglutide 3.0 mg, as adjunct to diet and exercise, was accompanied by weight-related improvements in HRQoL, including physical function and mental health. Greater weight loss led to greater improvements in HRQoL scores.

T-3032-OR: Evidence of Metabolic Adaptation after 2 Years of 25% Calorie Restriction in Non-Obese Humans

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Background

Calorie restriction (CR) is a dietary intervention with anticipated benefits for healthspan and lifespan extension in humans. Reduced energy flux (metabolic adaptation) in association with less reactive oxygen species production is one theory supporting lifespan extension with CR.

Methods

In this study we tested if metabolic adaptations persist with prolonged CR over 2-years when weight loss is maintained. As an ancillary study to CALERIE 2, a 2-year study of 25%CR in 61 non-obese (BMI: 22-28 kg/m2) men and women (25%CR=37; Control=24), we assessed the metabolic adaptation in sedentary energy expenditure (24 EE and Sleep EE) measured in a metabolic chamber at the Pennington Biomedical Research Center. Results are presented as LSmean±SE. The CR group achieved 17±1% and 14±1% CR after 1 and 2-y, leading to significant weight loss (-9±0.5 at 1-y; -8±0.5 kg at 2-y) and losses in both fat and fat-free mass. The control group maintained weight during the 2-y trial.

Results

With CR, the decreases in 24hEE and sleep EE adjusted for the changes in fat-free mass and fat mass, were significantly larger (All P<0.01) than expected at both 1-y (24hEE: -128±29, Sleep EE: -86±25 kcal/d) and 2-y (24EE: -108±29, SEE: -77±25 kcal/d) indicating metabolic adaptation. Adaptation was not evident in the control group. Despite weight stability during year 2, a hypometabolic state was evident in CR subjects associated with significant reductions in thyroid hormones (T4, T3, TSH) and leptin.

Conclusions

In conclusion, CR in normal weight individuals can be sustained for 2 years, and produce significant weight loss with persistent metabolic slowing.
T-3033-OR: Reaction Time but Not Response Inhibition Shares Genetic Influences with Later BMI in 7-10 Year Olds

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Background

BMI is associated with differences in cognitive performance. Such differences may include slower and more variable reaction times (RTs) on simple RT tasks and an increased error rate on inhibition tasks.

Methods

Why such associations emerge is unclear, but as BMI and cognitive performance are heritable, our aim was to provide the first examination of whether there are shared genetic pathways between BMI and cognitive performance. We measured RT on a four-choice RT task (the fast task) and the go/no-go task, and commission errors (a measure of response inhibition) on the go/no-go task for 1,312 twins ages 7-10 years. BMI was measured at 12 years. Biometric genetic models gave an estimate of the genetic correlation (rG) between BMI and three cognitive measures: mean RT and RT variability (the standard deviation of RTs) on the fast and go/no-go tasks, and commission errors on the go/no-go task.

Results

Genetic correlations between mean RT and BMI indicated that up to 30% of the genes underlying mean RT and BMI were shared (fast task: rG=0.25, 95% CI .01-.50; go/no-go task: rG=0.31, 95% CI .08-.64). The genetic associations between RT variability and BMI did not reach significance in either task (fast task rG=.18; 95% CI -.04-.47; go/no-go task rG=.19, 95% CI -.06-.62). However, we observed only small phenotypic correlations between RT data and later BMI (rPh=.1; P<.05), and commission errors were unassociated with BMI (rPh = -.03, ns).

Conclusions

We delineate, for the first time, shared genetic effects between RT performance and BMI, adding biological support to the notion that obesity occurs concurrently with slower RTs. However, our results also emphasize the small nature of the association, which may explain previous negative findings.

T-3034-OR: Modification of Genetic Influences on Adiposity between 36-63
Years of Age by Physical Activity and Smoking in the 1946 British Birth Cohort Study

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Background

Studies of the interaction between physical activity and genetic susceptibility to obesity have been cross-sectional and have not considered the effects of other behaviors. We examined modification of genetic influences on changes in adiposity during mid-adulthood by physical activity and smoking.

Methods

The sample comprised 2444 participants who were genotyped for 11 obesity variants and had body mass index (BMI), waist circumference-to-height ratio (WHtR), and physical activity and smoking measures at ages 36, 43, 53, and 60-64 years. A genetic risk score (GRS) comprising the sum of risk alleles was computed. Structural equation models investigated modification of the longitudinal GRS associations by physical activity (active versus inactive) and smoking (non-smoker versus smoker), using a latent linear spline to summarise BMI or WHtR (*100) at age 36 years and their subsequent rates of change.

Results

Physical activity at age 36 years attenuated the GRS associations with BMI and WHtR at the same age. Further, physical activity at age 53 years attenuated the GRS association with rate of BMI change between ages 53-63 years (by 0.012 kg/m²/year (95% CI 0.001, 0.024), p-interaction 0.004). Conversely, smoking at age 43 years showed a trend towards augmenting the GRS association with change in WHtR between ages 43-63 years (by 0.012 (95% CI 0.001, 0.026), p-interaction 0.07). Estimated GRS effect sizes were lowest at all ages in active non-smokers.

Conclusions

Healthy lifestyle behaviors appeared to attenuate the genetic influence on changes in BMI and central adiposity during mid-adulthood. An active lifestyle and not smoking may have additive effects on reducing the genetic susceptibility to obesity in adults.

T-3035-OR: Birth Weight and Later Life Adherence to Healthy Lifestyles in Predicting Type 2 Diabetes
Background

Compelling evidence has shown that intrauterine developmental programming and unhealthy lifestyles in adulthood are each associated with elevated risk of type 2 diabetes (T2D). However, no study has examined how these factors are jointly related to incidence of T2D.

Methods

To prospectively assess the joint association of birth weight and established lifestyle risk factors in adulthood with incident T2D, and to quantity decompose the attributing effects to birth weight only, to adulthood lifestyle only and to their interaction, respectively, We followed 149,794 men and women from the Health Professionals Follow-up Study (HPFS 1986-2010), the Nurses’ Health Study (NHS 1980-2010) and NHS II (1991-2011). We excluded participants with diabetes, cardiovascular disease, cancer at baseline. Unhealthy lifestyle was defined based on body mass index (BMI), smoking, physical activity, alcohol consumption, and the Alternate Healthy Eating Index.

Results

We documented 11,709 incident T2D during 20-30 years of follow-up. The adjusted relative risk of T2D was 1.45 (95% CI: 1.32-1.59) per 1-kg birth weight decrease and 2.10 (95%CI: 1.71-2.58) per 1-point unhealthy lifestyle score increase. In addition, a significant additive interaction between birth weight and lifestyle was observed (Pinteraction<0.001). The attributable proportions were 22.4% (95%CI: 18.3-26.4) to birth weight, 59.3% (95%CI: 57.1-61.5) to unhealthy lifestyle and 17.6% (95%CI: 13.9-21.3) to their interaction.

Conclusions

Our findings support the hypothesis that low birth weight and unhealthy lifestyle are jointly associated with the development of type 2 diabetes, in an additive manner to some degree. Our findings highlight the importance of both fetal and adulthood risk factors in the prevention of type 2 diabetes.
Fetal development is a critical driver of obesity throughout the life span. The extent to which healthy lifestyle behaviors can mitigate elevated obesity risk in individuals born at low or high birth weight (LBW, HBW) is unknown.

Methods

We tested if associations between birth weight and adiposity varied by self-reported moderate-vigorous physical activity (MVPA) among adolescents in the National Health and Nutrition Examination Survey (1999-2006; 12-15 years; n=6,693). Using gender-stratified linear regression, we modeled BMI z-score [BMI] and waist circumference [WC] as a function of low, normal (NBW), and high birth weight, MVPA (weekly MET-hours), and MVPA*birth weight cross-product terms, adjusting for sociodemographics and diet. Using regression estimates, we calculated birth weight-specific predicted BMI z-score and WC for the observed range of MVPA, given an average covariate profile.

Results

Among those with no MVPA, predicted BMI was 0.6 z-scores greater in HBW than LBW girls and boys [coeff (95% CI): Girls: 0.63 (0.30, 0.95); Boys: 0.62 (0.07, 1.16)]. This difference diminished with greater MVPA, reaching similar predicted BMI at the 95th percentile (≈60 min/day of vigorous [7.7 MET] physical activity) [coeff (95% CI): Girls: 0.02 (-0.28, 0.33); Boys: 0.16 (-0.20, 0.52)]. Associations between LBW (versus NBW) and BMI, and between birth weight and WC did not vary by MVPA.

Conclusions

Findings suggest that MVPA may mitigate relationships between HBW and BMI, but not WC, in adolescents. MVPA exceeding minimum physical activity recommendations may be required. These findings have important implications related to the modifiability of HBW-related cardiometabolic risk.

T-3037-OR: Genetic Variability and The Hypothalamic Control of Energy Balance

Mary Sailors, PhD; Tanya Agurs-Collins; Molly Bray, PhD;

Background

The energy balance is a critical component in the development of obesity. Evidence suggest that energy intake is controlled in part by genes related to hypothalamic control of energy balance. This study examined the joint relationships between eating behavior, body size and genetic variation.

Methods

Subjects in the study were young adults (18-35 y) from the Training Interventions and Genetics of Exercise (TIGER) Study. Genotyping was completed on the Illumina BeadStation Platform for 18 SNPs. Linear regression was used to examine the associations between eating behavior and food intake (Emotional
Eating Scale [EES], Eating Attitudes Test-26 [Eat-26], Block98 Food Frequency Questionnaire (FFQ), body size (body mass index [BMI], waist and hip circumference, waist/hip ratio [WHR], and percent body fat [%fat]), and genetic variation, controlling for appropriate covariates. Bayesian networks were constructed to examine the multivariate relationships among these variables.

**Results**

EAT-26 score, but not EES score, was significantly associated with BMI, WHR, %fat, and circumferences (p<0.01). Total energy intake (kcal) and percent dietary fat intake were only associated with body size in females (p<0.05). Variation within DRD2 and HTR2A was found to be associated with EAT-26 score in African Americans. In addition, variation in the ghrelin gene (GHRL) was significantly associated with daily energy intake. Variation in POMC was significantly associated with both EAT-26 and hip circumference (p<0.05).

**Conclusions**

We have shown that genetic variation in genes related to the hypothalamic control of feeding was associated with a number of eating behaviors and that genetic variation may interact with eating behavior to influence body size.

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**T-3038-OR: Savings in Medical Expenditures Associated with Reductions in Body Mass Index among Adults with Obesity by Diabetes Status**

*John Cawley, PhD; Chad Meyerhoefer, PhD; Mette Hammer, MSc.Econ; Neil Wintfeld, PhD;*

**Background**

This study estimates the medical care cost savings that can be achieved from a given amount of weight loss by people of different starting values of body mass index (BMI), for all adults and by diabetes status.

**Methods**

We estimate two-part models of instrumental variables using data from the Medical Expenditure Panel Survey (MEPS) for 2000-2010. Models are estimated for all adults as well as separately for those with and without diabetes. We calculate the causal impact of changes in BMI on medical care expenditures, cost savings for specific changes in BMI (5%, 10%, 15%, and 20%) from starting BMI levels ranging from 30 to 45 kg/m², as well as the total excess medical care expenditures caused by obesity.

**Results**
In the U.S., adult obesity raised medical care costs by $3,508 per obese individual, for a nationwide total of $315.8 billion (in year 2010 USD). However, the relationship of medical care costs over BMI is J-shaped; costs rise exponentially for those with BMI≥35. The reduction in medical care costs associated with a given percent reduction in BMI is greater the starting BMI of the obese individual. Medical care expenditures are higher, and rise more with BMI, among individuals with diabetes than those without.

Conclusions

This study provides accurate and up-to-date estimates of the change in medical care expenditures resulting from weight loss, which is critically important information in calculating the cost effectiveness of interventions to prevent and treat obesity.

T-3039-OR: Comparative Effectiveness of Three Policy Alternatives for Reducing Added Sugar Consumption: How do Cap and Trade, Taxation of Added Sugars and Taxation of Sugar-Sweetened Beverages Stack Up in Terms of Impact on Obesity and Type 2 Diabetes?

Sanjay Basu, MD PhD; Kristina H. Lewis, MD;

Background

Added sugar intake in the U.S. exceeds recommended levels and contributes to obesity and type 2 diabetes. Reducing added sugars in the food supply through a cap-and-trade policy has been proposed to generate financial incentives for food manufacturers to lower the added sugar content of foods and beverages, but has not been previously evaluated or compared to alternative policy proposals.

Methods

Using large-scale data on food content and formulations (USDA and U.S. Census Bureau Annual Survey of Manufacturers), along with nationally-representative data on food consumption behaviors among the U.S. population (NHANES, 1999-2010), we constructed a mathematical model of a cap-and-trade policy to decrease added sugar emissions into the food supply by 20% over 20 years, and compared its public health implications to proposals to tax sugar-sweetened beverages or added sugars. We modeled the projected effects of the three policies on consumption, as well as on obesity prevalence and type 2 diabetes incidence over a 20-year time horizon, and compared effects across racial and ethnic groups.
Results

Capping added sugar emissions by food manufacturers into the food supply at a rate of 1% per year would be expected to reduce the prevalence of obesity by 1.7 percentage points (95% CI: 0.9-2.4, a 4.6% decline) and the incidence of type 2 diabetes by 21.7 cases per 100,000 people (95% CI: 12.9-30.6, a 4.2% decline) over 20 years, averting approximately $9.7 billion in healthcare spending (95% CI: $4.5-14.9 billion). Racial and ethnic minorities would be expected to experience the largest declines in obesity prevalence and type 2 diabetes incidence. By comparison, exacting equivalent price penalties through excise taxes on sugar-sweetened beverages or added sugars would be expected to generate smaller benefits for health and health disparities.

Conclusions

A cap and trade policy to reduce added sugar intake may significantly reduce obesity and type 2 diabetes, meriting consideration alongside other policies currently being evaluated.

T-3040-OR: Better for You Products: Good for Business and Public Health

Hank Cardello, MBA; Lori Kaley;

Background

There has been growing momentum among policymakers at all levels to pass and implement laws to improve the food environment, including changing school nutrition and improving access to affordable healthy foods. Many have suggested that the consumer packaged food and restaurant industries should help to solve the obesity crisis by making the U.S. food supply more nutritious, which some have made voluntary pledges to do. Given that these companies still report to shareholders, using a metric of maintaining or growing sales volume, we sought to understand whether driving Better For You/lower-calorie (BFY/LC) product sales was associated with increases in overall packaged food company or restaurant chain sales.

Methods

Data were drawn from various publicly available datasets or data purchased from third-party research groups including: A.C. Nielsen Company, NPD Group, Nutrition Facts Panel and public nutrition websites. Specific criteria to determine lower-calorie foods and beverages were developed in conjunction with the University of Minnesota's Nutrition Coordination Center (NCC). Across the three studies conducted by Hudson Institute, a total of 23 Consumer Packaged Goods (CPG) companies and 21 national restaurant chains (NRC) were analyzed.

Results
For CPG companies, BFY products delivered 71.8% of dollar sales growth over a 5-year period, despite only accounting for 38.6% of sales. A second study of CPG firms showed similar results with 82% of the growth coming from lower-calorie items. NRCs that increased their lower-calorie servings also reported superior same-store-sales performance compared to those chains that decreased their lower-calorie servings (+5.5% vs. -5.5%).

Conclusions

Taken together, these results suggest that companies can grow their revenues while contributing to an improved food environment by emphasizing BFY/LC options.

T-3041-OR: More Treatment, Less Dough? Cost-Effectiveness of Family-Based Pediatric Obesity

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Background

To combat pediatric obesity, comprehensive interventions are recommended, but are typically not covered by insurers who cite lack of data of their economic impact. The current study examined cost-effectiveness using collapsed data from multiple multidisciplinary pediatric obesity interventions.

Methods

Participants were 298 parent-child dyads with baseline and 3-month assessment data. Cost-effectiveness was assessed through the calculation of internal rate of return (IRR), which accounts for BMI change over time, using participants' BMI (Caregiver; CG) and BMIz (Youth; Y) change according to CG baseline weight status category (i.e., Overweight, Obese I, Obese II, Obese III). IRR calculations utilized average national attributable cost per high BMI employee and child (i.e., medical cost and work loss cost) across overweight/obese categories, and assessed cash flow over a 5-year period. Cost per dyad equaled $2,000 across programs, which was used for calculations.

Results

Analyzed by CG baseline weight category, 3-month change in CG BMI and Y BMIz were: Overweight (N=73): CG=-0.30, Y=-0.06; Obese I (N=88): CG=-0.25, Y=-0.05; Obese II (N=60): CG=-0.41, Y=-0.04; Obese III (N=77): CG=-0.64, Y=-0.40). A one-unit BMI decrease avoided costs of $137 (CG) and $192 (Y) per year. The IRR was negative when CG and Y did not maintain weight loss, and positive when interventions resulted in continuing weight loss/maintenance. Specific IRR calculations will be discussed.

Conclusions
Interventions resulted in employer cost savings when weight loss was sustained or continued up to 5 years post-intervention; however, interventions resulted in employer expenditures when weight loss was not maintained. These results have significant implications for healthcare policy.

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**T-3042-OR: The Future Impact of a Reduction in SSB Consumption in Mexican Population’s Health to 2022. Results from the CVD Policy Model Mexico**

*Luz Maria Sanchez Romero; Antoinette Mason, BS; Pamela Coxson, PhD; Kirsten Bibbins-Domingo, PhD, MD, MAS; Simon Barquera, MD, PhD;*

**Background**

High consumption of sugar sweetened beverages (SSB) is a health problem in Mexico. It is associated with risk of obesity, type 2 diabetes (T2DM) and coronary heart disease. The aim of this study is to project the impact on health outcomes of a reduction in consumption of SSB in the adult population.

**Methods**

A nationwide tax on these beverages has been recently approved as a SSB reduction in consumption policy in Mexico. Using the Cardiovascular Disease Policy Model (CVD Policy Model) adapted to Mexico, a microsimulation model of diabetes and cardiovascular disease, we examined the impact on health and costs in Mexican adults 35-94 years from 2013-2022. We model three possible reductions in SSB consumption scenarios: 10%, as it is proposed as the results of taxation, 20% and 40%. We calculated averted cases of myocardial infarction, coronary heart disease (CHD), stroke and diabetes and CVD mortality, as well as diabetes health care cost.

**Results**

During this 10 year period, the projected reduction in SSB could cut decrease between 46,000 and 177,000 new cases of CHD, from 6,400 to 25,000 the incidence of stroke and a decline of 180,000-655,000 new cases of T2DM. Additionally to the 11,000-44,000 CVD deaths that could be averted. A reduction in SSB consumption over the next decade could save as much as 2,091 million (2012 US dollars) in diabetes medical costs.

**Conclusions**
These results prove evidence that national policies that impact the consumption of SSB by the Mexican population could substantially reduce the health effects of diabetes, cardiovascular disease and obesity, and costs of diabetes and cardiovascular diseases.

T-3043-OR: Testing the Waters: Beverage Taxes and Purchasing in Preschool Households

Christopher N. Ford; Shu Wen Ng, PhD:

Background

A number of prominent obesity researchers have advocated for a tax on beverages high in sugar. However, it is unclear how these beverage taxes might change food and beverage purchases among households with preschool-aged (2-5 yr) children.

Methods

We included 37,726 households with a 2-5y child from the 2003-2012 Nielsen Homescan Panel. A two-part marginal effects model, comprising probit and linear regression (respectively), to estimate the relationship between price and household consumer packaged goods purchases. We simulated the relationship between a 10% increase in the prices of soft drinks, low-fat high-sugar milk, and juice drinks, and household consumer packaged goods purchases by volume (grams). Survey weighting and bootstrapping (1000 reps) were used to adjust standard errors.

Results

A 10% increase in the price of soft drinks was associated with a fewer purchases of 100% juice (-2.4%), juice drinks (-2.3%), and all beverages (-0.8%), but not with soft drink purchases. A 10% tax on juice drinks was associated with higher purchases of 100% juice (+6.1%) and fewer purchases of juice drinks (-5.3%). Increasing the price of low-fat, high-sugar milk by 10% was associated with fewer purchases of low-fat, high-sugar milk (-2.3%), low-fat, low-sugar milk (-1.6%) total consumer packaged foods (-0.1%), and grain products (-0.3%).

Conclusions

While a soft drink tax may not affect food or beverage purchases for households with preschoolers, a tax on juice drinks may shift purchases from juice drinks to 100% juice. These findings suggest that a tax on juice drinks may promote healthier purchasing habits for households with preschoolers.
T-3044-OR: The Impact on Future Weight Gain of the 24-Hour Energy Expenditure Response to Fasting and Overfeeding

Mathias Schlögl; Paolo Piaggi, PhD; Jonathan Krakoff, MD; Marie S. Thearle, MD;

Background

The association of the 24h energy expenditure (EE) response to fasting and overeating to future weight change in humans is unclear. The aim of this study was to determine whether the metabolic response to overfeeding with diets of varying macronutrient content relates to future weight change.

Methods

We investigated 24h-EE measures in 41 subjects (30M/11F; 8AA/12C/9H/12NA; Age 36.8+-9.8y; BMI 26.3+-4.1 kg/m2; %body fat 28.6+-11.6%) with normal glucose regulation (as assessed by a 75g OGTT) via a whole-room indirect calorimeter during energy balance (EB), fasting (FST), and 3 different overfeeding diets with 200% energy requirements: 51% carbohydrates (C), 46% fat (F), 3% protein (P) (LPF); 20% C, 60% F, 20% P (FNP); 75% C, 5% F, 20% P (CNP). The diets were given in random order, over 24h each, and with an intervening 3 day washout period. All subjects returned for a follow-up visit after 6 months (mean = 7.9+-1.1 months; weight change = 1.2+- 4.3 kg (range: -6.1 to 11.2 kg)).

Results

Compared to EB, 24h-EE decreased with FST (-8.0+-5.0%) and increased with OF (LPF: 3.0+-4.8%; CNP: 14.0+-5.6%; FNP: 8.2+-5.9%). A greater reduction in 24h-EE during FST was associated with a larger %change in body weight at follow-up (r= âˆ’0.32, p= 0.04). A smaller EE response to LPF overfeeding also was associated with a larger %change in weight over time (r=-0.38, p=0.02). There were no associations between %change in weight at follow-up and the EE responses to FNP and CNP overfeeding (r=0.22, p= 0.20; r=0.28, p= 0.07, respectively).

Conclusions

At 6 months, in subjects not attempting voluntary weight change, a greater EE reduction during fasting, and a smaller response to low-protein overfeeding was related to increased weight. The ability to conserve energy during caloric and protein deprivation may increase risk of future weight gain.
T-3045-OR: Breath Carbon Stable Isotope Ratio Does Not Respond to Diet During Energy Deficit

Leah D. Whigham, PhD, FTOS; Daniel E. Bâ¼tz, PhD; Dale A. Schoeller, PhD; Warren P. Porter, PhD; David H. Abbott, PhD; Mark E. Cook, PhD;

Background

The ratio of carbon stable isotopes (Î´13C) in breath typically reflects those of the diet. Upon consumption of a 13C-enriched food, breath Î´13C will increase.

Methods

During a study in which we showed that a shift from chronic negative to acute positive energy balance can be detected by changes in breath Î´13C, we discovered breath Î´13C responds to changes in diet Î´13C during positive but not negative energy balance. Volunteers (n=5) consumed a 40% energy restricted diet for 6 days followed by a 50% energy excess diet on day 7. Breath was sampled prior to and at 1 and 2 h after each meal. Exhaled breath Î´13C was analyzed by cavity ring-down spectroscopy. Diet Î´13C was analyzed by isotope ratio mass spectroscopy.

Results

During 40% energy restriction (days 1-6), maximum breath Î´13C was -22.0â€° despite maximum diet Î´13C reaching -19.6â€°. On day 7 during 50% excess energy, maximum breath Î´13C (-21.0â€°) was comparable to maximum diet Î´13C (-20.9â€°).

Conclusions

These data show breath Î´13C does not respond to shifts in diet Î´13C during energy-restriction, potentially due to increased reliance on lipid oxidation for energy. This finding could be used to develop a test for negative energy balance for use in weight loss therapy and other clinical applications.

T-3046-OR: Early Modification of Fatty Acid Metabolism after Biliopancreatic Diversion with Duodenal Switch (BPD-DS)
Background

The insulin-resistant state of obese subjects is characterized by overproduction of non-esterified fatty acids (NEFA) during fasting and NEFA spillover in the bloodstream after meal. According to our hypothesis, NEFA metabolism is normalized early after BPD-DS contributed to T2D reversal.

Methods

Patients with severe obesity with T2D (n=8) or normal glucose tolerance (n=4) awaiting BPD-DS, underwent metabolic studies before, 3-4 days and 3 months after surgery. Muscle insulin sensitivity (SI) and glucose-stimulated insulin secretion were respectively measured by euglycemic and hyperglycemic clamp. NEFA and glycerol appearance was measured using i.v. administration of [U-13C]-palmitate and [1,1,2,3,3-d5]-glycerol. IV lipid overload was performed with heparin and Intralipid™ perfusion supplemented with [9,10-3H]-triolein during the euglycemic clamp. HOMA-IR and disposition index (DI) were calculated to assess hepatic insulin sensitivity and pancreatic function.

Results

HOMA-IR, but not SI or DI, was normalized three days after the surgical intervention. We found reduced NEFA appearance rate during fasting and i.v. administration of Intralipid™ during the clamp in T2D patients three days after BPD-DS. This suggests reduced intracellular lipolysis and improved NEFA storage in adipose tissues. Reduction in HOMA-IR was very closely associated with reduction in NEFA appearance rate (r=0.96, P=0.003). After 3 months, patients with T2D increased their SI and DI. NEFA metabolism remains improved.

Conclusions

In T2D, hepatic and adipose tissue insulin sensitivities are rapidly reversed after BPD-DS, independently of weight loss. Muscle insulin sensitivity, on the other hand, improves only with weight loss after BPD-DS.

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T-3047-OR: Effects of Progressive Weight Loss on Hepatic and Skeletal Muscle Insulin Sensitivity: A Randomized Controlled Trial

Faidon Magkos, PhD; Gemma Fraterrigo, MD; Courtney Luecking, MPH, MS, RD; Bruce Patterson, PhD; Samuel Klein, MD;
Background

Insulin resistance in the liver and skeletal muscle is an important contributor to the cardio-metabolic diseases associated with obesity. Although weight loss improves insulin sensitivity, it is not known how much weight loss is needed to affect insulin action in these two key metabolic organs.

Methods

Twelve obese subjects, who had normal oral glucose tolerance, were randomized to weight maintenance (n=6, BMI=38±2 kg/m²) or progressive 5%, 10%, and 15% diet-induced weight loss (n=6, BMI=38±2 kg/m²). Hepatic and skeletal muscle insulin sensitivity were determined by using a two-stage (low-dose and high-dose insulin infusion) hyperinsulinemic-euglycemic clamp procedure in conjunction with stable isotopically labeled glucose tracer infusion. Hepatic and skeletal muscle insulin sensitivity did not change in the weight maintenance group, whereas both improved in the weight loss group (P=0.012 and P<0.001, respectively).

Results

Insulin-mediated suppression of glucose production (hepatic insulin sensitivity) increased from 67±5% at baseline to 76±5% after 5% weight loss, but did not improve further with 10% and 15% weight loss (74±4% and 78±1%, respectively). Insulin-mediated stimulation of glucose disposal (muscle insulin sensitivity) increased from 132±27% at baseline to 191±38% after 5% weight loss and 277±45% after 10% weight loss, but did not improve further with 15% weight loss (298±34%).

Conclusions

We conclude that moderate 5% weight loss increases insulin sensitivity in both liver and skeletal muscle, whereas additional weight loss improves muscle but not hepatic insulin sensitivity in obese subjects with normal oral glucose tolerance.

T-3048-OR: TAp63 in the Arcuate Nucleus Regulates Energy Homeostasis in Both Genders

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Background

It is reported that mice with global deficiency in TAp63 are more susceptible to diet-induced obesity (DIO). However, little is known about where and how TAp63 defends against DIO. We hypothesized that the hypothalamic arcuate nucleus (ARC) is an important site where TAp63 regulates energy homeostasis.
Methods

The expression of TAp63 protein in the hypothalamus was first examined in mice at fasted or fed stage, after feeding with a high fat-diet (HFD). We also compared hypothalamic TAp63 protein levels between young and old mice. AAV-Cre (or AAV-GFP as negative control) virus was injected into the ARC of male and female TAp63 flox/flox mice (8 weeks of age) to delete TAp63 from the ARC. Both AAV-Cre and AAV-GFP-injected mice were fed on HFD for one month. Body weight, body composition, food intake and energy expenditure were monitored during this period.

Results

We showed that TAp63 is highly expressed in hypothalamus and hypothalamic TAp63 protein can be regulated by feeding behavior, HFD feeding and aging. Deletion of TAp63 from the ARC caused massive body weight gain in both male and female mice (male: 20 g; female: 16 g gain) in 1 month. The majority of body weight gain was reflected by increased fat mass, while only marginal increases were observed in lean mass. AAV-Cre-injected mice displayed significantly increased food intake and decreased energy expenditure, compared to AAV-GFP-injected mice.

Conclusions

Collectively, we demonstrate that TAp63 in the ARC suppresses food intake and increases energy expenditure in both genders. These TAp63 functions are important defending mechanisms against DIO.

T-3049-OR: Hepatic and Adipocyte-Derived Hormones: Response to Dietary Intervention and Relationships to Metabolic Variables

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Background

Previous data suggest that dietary composition modulates changes in energy expenditure and insulin sensitivity achieved during weight loss, but the mechanisms mediating these effects remain unknown.

Methods

Following 10-15% weight loss, 21 overweight subjects consumed 3 weight maintenance diets [low fat (LF), low glycemic index (LGI) and very low carbohydrate (VLC)] in random order for 4 weeks. At baseline (BL) and at the end of each treatment period, fasting samples for fibroblast growth factor (FGF)-21, heme-oxygenase-1 (HO-1), chemerin, and total bile acids; hepatic and peripheral insulin sensitivity (IS)
and energy expenditure (EE) were obtained. Repeated measures mixed effects models were used to evaluate effects of dietary composition on changes from baseline, controlling for age, gender, baseline body mass index, and sequence order.

**Results**

FGF-21 decreased (P<0.0001), with differential effect by diet (change from BL+-SE: LF -49.4+-16.6, LGI -58.6+-16.3, VLC -76.7+18.2 pg/mL, P=0.0002). Change in FGF-21 was inversely associated with change in hepatic IS [Beta=-0.583 units/log(ng/mL), P=0.02], but not with peripheral IS or EE. HO-1 increased (P=0.01; change from BL+-SE: LF 0.69+-0.33, LGI 1.27+-0.66, VLC 0.75+-0.37 ng/mL) and chemerin decreased (P=0.001; change from BL+-SE: LF -7.9+-2.1, LGI-9.7+-2.1, VLC -8.5+-2.4 ng/mL;) without specific diet effect, while bile acid levels did not change.

**Conclusions**

FGF-21 levels decrease in response to weight loss in proportion to carbohydrate content, and correlate with hepatic insulin sensitivity, suggesting a pattern of improving FGF-21 resistance. Weight loss affected HO-1 and chemerin concentrations, independent of dietary composition.

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**T-3050-OR: Mechanism of Programmed Obesity: Altered Central Insulin Sensitivity in Growth Restricted Juvenile Female Rats**

*Tatsuya Fukami, MD, PhD; Mina Desai, PhD; Michael G. Ross, MD, MPH;*

**Background**

Intrauterine growth restricted (IUGR) offspring are at increased risk of adult obesity, as a result of changes in energy balance mechanisms. We hypothesized that impairment of hypothalamic insulin signaling contributes to hyperphagia and excessive liver glucose production in IUGR offspring.

**Methods**

Studies were approved by the Animal Research Committee and were in accordance with the Laboratory Animal Care guidelines. Pregnant dams were 50% food restricted from days 10 to 21 to create IUGR newborns. At 5 weeks of age, food intake was measured prior to and following intracerebroventricular injection (icv) of vehicle or insulin (10 mU) in control and IUGR pups. At 6 weeks of age, pups in fed or fasted (48 hours) states received icv vehicle or insulin after which they were decapitated, and the hypothalamic arcuate nucleus (ARC) and liver dissected for mRNA (NPY; orexigenic, POMC; anorexigenic, PEPCK; gluconeogenesis, glucokinase: glycolysis) and protein expression.
**Results**

At birth, IUGR pups had 19% lower body weights as compared to control pups. IUGR rats consumed more food than control rats under basal conditions, consistent with upregulated ARC NPY mRNA expression. Consistent with anorexigenic stimulation, central insulin decreased NPY and increased POMC mRNA expression and pAkt/Akt protein ratio, with significantly reduced responses in IUGR as compared to control rats. IUGR showed a significantly increased PEPCK and decreased glucokinase mRNA expression compared with control rats.

**Conclusions**

IUGR offspring exhibit a persistent state of orexigenic stimulation in the ARC and excessive liver glucose production. These results suggest that impaired insulin signaling contributes to hyperphagia, obesity and hyperglycemia in IUGR offspring.

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**T-3051-OR: Selective Reduction of Dietary Fat, but Not Dietary Carbohydrate, Normalizes Dopamine D2-Like Receptor Binding Potential in the Dorsolateral Striatum of Obese Humans**

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**Background**

We recently discovered that dopamine D2-like receptor binding potential (D2BP) was positively correlated with both opportunistic eating behavior and body mass index (BMI) in the dorsolateral striatum, a region supporting habit formation, and was significantly greater in people with obesity.

**Methods**

We investigated changes in striatal D2BP in obese subjects after short-term caloric restriction using [18F]fallypride and PET in 23 non-obese controls with BMI=22.4+0.5 kg/m2 (mean +- SEM) and 15 obese subjects with BMI=36+1 kg/m2 at baseline and following 5 inpatient days of 30% caloric restriction achieved through selective reduction of dietary fat or carbohydrate in a randomized, cross-over design.

**Results**

Striatal D2BP was unchanged after 5 days of dietary carbohydrate restriction. However, dietary fat restriction decreased D2BP by 0.78+0.2 and 0.99-0.3 in right and left dorsolateral striatal clusters,
respectively (both P<0.01). The left cluster overlapped by 1930 mm3 with the region where D2BP was significantly correlated with baseline BMI. In this overlapping region, there was no longer a significant difference in D2BP between obese vs. non-obese subjects (5.7±0.7 vs. 4.9±0.6, P=0.4).

Conclusions

Our results demonstrate that short-term restriction of dietary fat, but not dietary carbohydrate, normalized D2BP in the dorsolateral striatum of obese subjects.

T-3052-OR: Diet-Induced Plasticity in the Lateral Hypothalamus

Victoria Linehan; Michiru Hirasawa, PhD, DVM;

Background

Orexin and melanin concentrating hormone (MCH) neurons are activated by high-fat food consumption. Mechanisms underlying the diet effect on these neurons are unknown. We tested the hypothesis that acute exposures to a palatable high fat diet induce synaptic plasticity to activate these neurons.

Methods

Three week old male Sprague Dawley rats were fed a palatable high-fat Western Diet (WD) or a control low-fat diet for either 1 or 4 weeks. WD rats consistently ate more calories than those on control diet; however, it took 4 weeks of WD feeding for rats to begin to gain excess weight compared to controls. To investigate diet-induced synaptic plasticity, whole cell patch-clamp recordings were taken from acute 250µm hypothalamic slices from these animals. We assessed membrane properties and synaptic transmission, including pharmacologically isolated evoked excitatory postsynaptic currents and miniature inhibitory and excitatory postsynaptic currents (mIPSCs and mEPSCs, respectively).

Results

After 1 week of WD, the amplitude of mEPSCs in orexin neurons was increased without changes in mIPSCs, which would promote excitation of these neurons. Preliminary data in MCH neurons showed no diet-induced changes with this brief WD feeding. In contrast, after 4 weeks of WD, orexin neurons no longer showed increased mEPSC amplitude but the frequency of both mEPSCs and mIPSCs was increased, indicating synaptic remodeling. Additionally, MCH neurons were significantly depolarized and had a higher firing rate, indicating an increased excitability.

Conclusions

Palatable high fat diet induces time-dependent plasticity in orexin and MCH neurons. While the transient activation of orexin neurons may influence initial caloric overconsumption, MCH neurons may be more involved in the onset and maintenance of weight gain with their later onset plasticity.
T-3053-OR: Link between Satiety Gut Hormones and Reduced Food Reward After Gastric Bypass Surgery for Obesity in Humans

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Background

Patients after Roux-en-Y gastric bypass surgery for obesity have lower brain-hedonic responses to food than BMI-matched patients after gastric banding [Scholtz S et al. Gut 2014]. This may at least partially be related to elevated plasma satiety gut hormones such as PYY and GLP-1 after RYGB

Methods

We hypothesised that food hedonic-reward responses would be enhanced after suppression of these gut hormones after RYGB. In a randomised cross-over design study of 9 weight stable adults (mean ± SEM age 47.0 ± 1.8 years, 6 female) after RYGB (pre-operative BMI 52.8 ± 2.0 kg/m2, current BMI 37.3 ± 2.6, 15.6 ± 2.5 months since surgery), subjects participated in a functional MRI paradigm evaluating food pictures, in the post-prandial state (95 mins after a 385 kCal liquid meal), after either saline injection or combined subcutaneous administration of Octreotide (to suppress PYY and GLP-1) and short-acting insulin (to attenuate hyperglycemia).

Results

Compared to Saline, Octreotide administration increased food appeal ratings (2.79 ± 0.28 vs. 3.14 ± 0.19 (out of 5), P<0.05). Octreotide also increased % BOLD signal averaged across a priori regions of interest involved in reward processing (nucleus accumbens, caudate, anterior insula and amygdala: -0.013 ± 0.033 vs. 0.049 ± 0.023, P<0.05) and in the nucleus accumbens alone (-0.076 ± 0.053 vs. 0.025 ± 0.037, P<0.05).

Conclusions

Acute suppression of the exaggerated post-prandial rise in plasma PYY and GLP-1 after RYGB using Octreotide increases anticipatory food reward. This suggests that increased satiety gut hormones may mediate lower brain hedonic-reward responses to food after RYGB.
T-3054-OR: Weight Perturbation Induced Modification of Leptin-Sensitive Circuits in the CNS

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Background

Diet-induced obesity (DIO) resulting from consumption of high fat diet (HFD) attenuates normal neuronal responses to leptin and results in the metabolic defense of a higher body weight. The molecular basis for the persistence of this defense is unknown.

Methods

6 week old mice were fed either a high-fat diet (HFD) (60% kcal/fat) or a control diet (10% kcal/fat) for 30 weeks, at which time they were divided into 4 groups for 4 additional months: CON-AL, maintained on control diet ad lib; DIO-AL, maintained on HFD ad lib; DIO-WR, calorically restricted on HFD to maintain 20% weight loss; DIO-CON, switched from HFD to ad lib control diet. Mice were fasted overnight and administered either 3 mg/kg leptin or 0.9% saline ip 30 minutes prior to perfusion with 4% PFA. Brain sections were stained for pSTAT3 and hematoxylin and images of perfused brain sections were analyzed using HALO software to measure cell-by-cell pSTAT3 positivity in 15 brain regions.

Results

Compared to CON-AL mice, DIO-AL mice displayed reduced sensitivity to leptin in all brain regions analyzed. Although DIO-CON mice reverted to the same body weight and fat mass as CON-AL mice, leptin sensitivity was restored to CON-AL levels in only 7 of 15 brain regions. DIO-WR mice recovered leptin sensitivity in 8 of 15 brain regions, though only the locus coeruleus, medial mammillary nucleus and nucleus accumbens showed similar results in DIO-CON mice. Weight loss did not restore pSTAT3 in the arcuate nucleus or dorsomedial hypothalamus.

Conclusions

The return to a normal body weight/composition from the obese state does not restore normal leptin sensitivity throughout the brain. Weight loss following DIO restores central leptin signaling variously by brain region, dependent on the method of weight loss.

T-3055-OR: Maternal High-Fat Diet: Consequences for Offspring Cognitive
Function and Hippocampal Gene Expression

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Background

Exposure to a high-fat (HF) diet increases one's risk for obesity, diabetes, and the metabolic syndrome, which have been associated with an increased risk of cognitive deficits. Few studies, however, have assessed the effects of maternal high fat diet on cognitive function in offspring.

Methods

We used a rat model to determine how maternal diet during pregnancy and lactation impacts cognitive behavior and hippocampal gene expression of offspring. Pregnant Sprague-Dawley rats were given ad libitum access to standard chow (n = 12) or high fat (HF) diet (n = 12). On postnatal day (P)21, brains were collected from 2 males per litter for gene expression analysis. All other pups were weaned onto chow. Starting on P90, one male per litter was used for behavioral testing. On P150, brains were collected from one male per litter for gene expression analysis.

Results

At P21, mRNA expression of Insr, Lepr, and Slc2a1 (GLUT1) was decreased in the hippocampus of HF male offspring. The decreased expression of Insr and Lepr persisted in adulthood at P150. As adults, male offspring of HF fed mothers weighed more, had increased food intake and increased preference for a HF diet. Further, HF offspring were hypoactive, less responsive to amphetamine, and had impaired object recognition compared to offspring of chow fed dams. We found similar results in female offspring.

Conclusions

Together, our results suggest that maternal HF diet during pregnancy and lactation has significant lasting effects on the brain, behavior, and cognition of rat offspring.

T-3056-OR: Use of Geographic Information Systems and Electronic Health Records to Integrate Primary
Care with Community Assets to Reduce Childhood Obesity

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Background

Novel approaches to care delivery that leverage clinical and community resources and address socio-contextual factors could improve outcomes for high-risk, overweight and obese children.

Methods

We used geographic information systems (GIS) and BMI data of 49,770 children ages 4 to <19 who receive their care at 14 pediatric practices in Massachusetts to identify obesity 'hotspots', defined as ZIP codes where >15% of children are obese. Using GIS we characterized the food and physical activity environment in all of the ZIP codes. Through interviews with parents, environmental health experts, and community partners, and with the use of GIS databases, we identified community assets that could support behavior change. These assets were then mapped on an interactive online map to be used in an obesity intervention that seeks to integrate primary care with community assets.

Results

Children lived in 198 ZIP codes, 66 were hotspots. Hotspots (v.non-hotspot) had a lower neighborhood median income ($63,655 v. $97,100; p<0.001). After adjustment, greater distance to a supermarket (OR:1.85 per km increase, 95%CI:[1.24, 2.77]), fewer open spaces (OR:1.46 [1.20, 1.84]), and less sidewalk completeness (OR:4.57 [1.87, 11.16]) were associated with higher odds of being a hotspot. Based on these data and interviews, we created a map with places to access healthful foods, spaces for recreation, social support and transportation.

Conclusions

Hotspots are characterized by lower median income, greater distances to supermarkets, fewer open spaces and sidewalk completeness. Connecting patients to community assets, including social support and transportation options to reach them, could help combat obesity in low-income neighborhoods.

T-3057-OR: Cardiovascular Disease Risk in Adolescents Undergoing Bariatric Surgery: The Teen Longitudinal
Assessment of Bariatric Surgery (TeenLABS) Study

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Background

Weight loss surgery (WLS) is used to treat severe adolescent obesity and co-morbid diseases. Our objective was to assess baseline prevalence and predictors of cardiovascular disease (CVD) risk in adolescents undergoing WLS.

Methods

A prospective cohort study involving five adolescent WLS centers in the U.S. enrolled consecutive patients <= 19 years of age. Demographic, anthropomorphic, and CVD risk factors (glucose, lipids, insulin, HbA1c and hs-CRP, comorbidities and medications) were examined. The prevalence of CVD risk prior to WLS and associations between CVD risk factors and body mass index (BMI), age, sex and race were analyzed.

Results

Mean age of 242 participants was 17.1±1.6 years; median BMI was 50.5 kg/m2. Dyslipidemia, hypertension (HTN), diabetes, elevated insulin and elevated hs-CRP were observed in 50%, 49%, 14%, 75% and 75% of subjects, respectively. Increasing BMI was associated with an increased risk for HTN (p < 0.01) and elevated serum glucose (p < 0.01). In addition, male sex was an independent predictor of HTN (p < 0.01) and dyslipidemia (p < 0.01).

Conclusions

Cardio-metabolic risk factors are prevalent among adolescents undergoing WLS, especially in white males. Subjects with lower BMI had fewer CVD risk factors. These data suggest that even among the severely obese, earlier recognition and treatment to limit further weight gain should be beneficial.

T-3058-OR: The Effect of Beverage Type and Portion Size on Snack Energy Intake in Preschool-Aged Children

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Background

The relationship between 100% fruit juice intake and adiposity in children may be due to incomplete compensation to energy consumed from juice, contributing to excessive energy intake. This study investigated beverage type and size on beverage and overall snack intake in preschool-aged children.

Methods

Using a 2x2x2 design (between-subjects factor of order and within-subjects factors of beverage type [100% fruit juice vs. water] and beverage size [6 oz vs. 12 oz]), 26 children (3.9 ± 0.6 years of age, 50% female, 73% white, and 88.5% non-Hispanic/Latino) completed 20-minute snack sessions on four consecutive Wednesday afternoons. Snacks consisted of 200 g of applesauce, 60 g of graham crackers, and either 6 oz or 12 oz of 100% fruit juice or water. Measured intakes of applesauce, graham crackers, and beverages were obtained.

Results

Mixed-factorial analyses of covariance found an interaction for grams of beverage, with significantly more juice consumed in the 12 oz vs. 6 oz conditions (226.6 ± 116.4 g vs. 143.7 ± 54.6 g, p < 0.05), with no difference in water intake (12 oz = 121.2 ± 87.0 g; 6 oz = 99.0 ± 65.2 g). A significant main effect of beverage type was found for overall snack energy intake (energy from beverage, applesauce, and graham crackers), with energy intake greater with juice than water (175.5 ± 61.3 kcal vs. 105.1 ± 72.4 kcal, p < 0.05).

Conclusions

Serving preschool-aged children larger portions of 100% fruit juice can lead to increased juice intake during snack time. Drinking 100% fruit juice during a snack increases overall snack energy intake, indicating poor compensation to liquid calories during a snack.

T-3059-OR: Comparative Effectiveness of Pediatric Obesity Treatment Provided by an Obesity Specialty Clinic Versus Primary Care

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Background
Pediatric obesity specialty clinics (OSCs) are challenged to meet the increasing demand for weight management services. This feasibility study explored the comparative effectiveness of obesity treatment provided by an OSC to that of primary care (PC)-based nurses trained as lifestyle coaches.

**Methods**

Eligible obese (BMI≥95th percentile), 6-19 years old, 54% female, 74% white youth (n=100) were randomized to a hospital-based OSC or one of ten participating community-based PC practices for monthly evidence-based, family-centered, motivational interviewing-style counseling focused on lifestyle behavior modification and goal setting. Changes in weight (BMI z-scores), weight-related behaviors (measured by an 18-item tool adapted for clinical use from the validated Family Nutrition and Physical Activity screener), quality of life (QoL, measured by the PedsQL), and participant/parent satisfaction were compared between groups after 3 months.

**Results**

52% of OSC and 57% of PC participants lost weight with comparable BMI z-score changes (-0.09±0.12 and -0.12±0.13, respectively; p=.4). Weight-related behaviors improved for both groups on 12/18 items and significantly improved on 4 items: smaller portions, avoiding sweet beverages, structured meal times, and healthy eating behaviors (p<.05). QoL scores did not differ between groups. Program satisfaction was similarly high for both groups; however, PC participants rated ease of traveling to visits higher than the OSC group (94% vs 82%; p=.04).

**Conclusions**

These early findings suggest that integrating pediatric obesity care into PC practices may be as effective as OSCs in producing comparable initial weight loss, in equal percentages of participating youth, together with behavior change while concurrently addressing ease of access to health care.

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**T-3060-OR: Automating Behavioral and Environmental Risk Assessment for Pediatric Obesity Prevention in a Large Integrated Health System**

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**Background**

Assessment of behavior and environmental risks is recommended to guide pediatric obesity prevention. Geisinger integrated the Family Nutrition and Physical Activity (FNPA) risk assessment into annual well child visits (ages 2-9 years). The utility of FNPA in identifying obesity risk is examined.
Methods

The FNPA is a validated tool that identifies parenting practices, child behaviors, and home environment factors associated with obesity risk among elementary-age children. Parents completed the FNPA prior to annual visits (via web portal, iPad, or kiosk) and results were automatically linked to the child’s electronic medical record for physician access. FNPA assessments were available for a sample of 1,749 children (47.7% females; 92.6% white) with measured height and weight at baseline. Logistic regression was used to examine the association between FNPA total score with the likelihood of being overweight or obese in younger (2-5 years) and older (6-9 years) children.

Results

Using CDC growth charts, 15% of participants were overweight and 13% were obese. Among older children, significant odds ratios (OR) were observed between the low risk and high risk FNPA tertiles (2.35, 95% CI: 0.95-3.95) and between the low risk and intermediate risk FNPA tertiles (1.60, 95% CI: 1.14-2.24). However, among younger children, there were no significant associations between FNPA total score and overweight/obesity risk.

Conclusions

The baseline FNPA is associated with overweight/obesity in elementary-age children but not among younger children. Evaluation of change in weight status will determine the utility of the FNPA for obesity prevention.

T-3061-OR: Laparoscopic Roux-en-Y Gastric Bypass for Adolescents (13 â€“ 17 y) with Severe Obesity â€“ Medium Long Term Outcome in AMOS, a Swedish Nationwide Study

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Background

We lack effective treatment strategies for adolescents having severe obesity. These are preliminary five-year data from the prospective non-randomized controlled study-Adolescent Morbid Obesity Surgery study (AMOS), comparing bariatric surgery vs. non-operated adolescent control group.
Methods

Eighty-one adolescents (mean 16.5y) underwent laparoscopic gastric bypass surgery. Weight inclusion criteria was BMI >40 or >35 with co-morbidities. Follow up visits were scheduled at one, two and five years postop. Weight and age matched adolescents (n=81) were contemporary identified in a national registry and assessed after five years. An adult group undergoing gastric bypass (n=81) was also followed prospectively. Inclusion weight was 133 kg, BMI 45.5 kg/m2; 124 kg, BMI 42.2 kg/m2; 127 kg, BMI 43.5 kg/m2 in adolescent surgical group; adolescent controls and adult controls respectively. Neuropsychiatric and psychiatric diseases were frequently found at baseline in surgical group.

Results

At five years postop weight was in mean 96 kg (total weight loss 27%, BMI 32 kg/m2) (p<0.001). Adolescent controls gained 10% in weight. Weight loss in adult control group was 29%. Waist circumference decreased from 134 to 98 cm in adolescent surgical group (p<0.001). Cardiovascular risk factors and inflammatory markers were significantly reduced in surgical vs. non-surgical group. Twelve adolescents (14.8%) had laparoscopic remedial surgeries including internal hernias and cholecystectomies. Psychosocial issue from baseline often continued.

Conclusions

Gastric bypass in adolescents leads to substantial weight loss and metabolic improvements over 5 years compared to a non-operated control group. Intervention was generally well tolerated. 1/7 had a possibly preventable remedial surgical procedure. Postoperative psychological surveillance is warranted.

T-3062-OR: A Prospective Study of Maternal Prenatal Weight and Offspring Cardiometabolic Health in Mid-Childhood

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Background

Maternal weight entering and during pregnancy are associated with offspring adiposity, but few studies have examined relations of maternal peripartum weight with offspring body composition or cardiometabolic biomarkers during childhood.

Methods
We studied 1090 participants of Project Viva, an ongoing Boston-area cohort of pregnant women and their children. We collected self-reported pre-pregnancy weight and height at enrollment in 1999-2002, and calculated pre-pregnancy BMI (ppBMI) and total gestational weight gain (GWG). At age 6-10 y, we measured overall (DXA total fat; BMI z) and central adiposity (DXA trunk fat) in offspring. We assayed fasting blood for insulin and glucose (used to calculate HOMA-IR), triglycerides, leptin, adiponectin, CRP, and IL-6, and measured systolic blood pressure (SBP). Using multivariable linear regression, we examined differences in offspring outcomes per 1 SD ppBMI and GWG.

**Results**

After accounting for confounders, each 5 kg/m² of ppBMI predicted higher total fat (0.92 kg [95% CI: 0.70, 1.14] fat mass and 0.27 [0.21, 0.32] units BMI z), and trunk fat (0.39 kg [0.29, 0.49] fat mass). Higher ppBMI was also related to higher HOMA-IR, leptin, CRP, IL-6, and SBP; and lower adiponectin. These associations were not attenuated after adjusting for GWG. Independently of ppBMI, each 5 kg GWG was related to overall (0.33 kg [0.11, 0.54] total fat) and central adiposity (0.14 kg [0.04, 0.23] trunk fat); and higher leptin (6% [0%, 13%]).

**Conclusions**

In addition to having more overall and central fat, children born to heavier mothers exhibited a worse cardiometabolic profile. Offspring of women with higher GWG had greater adiposity and higher leptin.

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**T-3063-OR: Maternal Pre-Pregnancy Obesity and Her Depressive Symptoms 6 Months after Delivery**

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**Background**

Pre-pregnancy overweight and obesity may increase risk for post-partum depression. It remains unclear, however, if this risk reflects prenatal depression, which is a risk factor for post-partum depression and which often co-occurs with obesity in pregnant and non-pregnant states.

**Methods**

We examined if pre-pregnancy overweight and obesity and post-partum depressive symptoms are associated after adjustment for prenatal depressive symptoms. Our study sample comprised 1917 pregnant women who participated in the Prediction and Prevention of Preeclampsia Study (PREDO). According to birth register data, 1393 were normal weight (BMI<25kg/m2), 399 overweight (25-29.99 kg/m2), and 125 obese (≥30 kg/m2) before pregnancy. The women filled in the Center for Epidemiological Studies
Depression Scale (CES-D) biweekly throughout pregnancy from 10-12th gestational week onwards and at six months post-partum.

**Results**

In comparison to normal weight counterparts, women who were overweight (mean difference, [MD] = 0.23 in standard deviation [SD] units, 95% Confidence Interval [95%CI] 0.12-0.34, P < .001) or obese (MD = 0.34 SD units, 95%CI 0.16-0.52, P < .001) before pregnancy had higher levels of depressive symptoms 6 months post-partum (P for a linear trend < .001). The effects remained after adjustments for maternal age and education level (P for linear trend < .001), and further adjustments for depressive symptoms during pregnancy (P for linear trend = .003).

**Conclusions**

Maternal pre-pregnancy overweight and obesity carry risks for post-partum depressive symptoms, over and above the risk of maternal prenatal depressive symptoms. Interventions targeting overweight and obese mothers during and after pregnancy may benefit the wellbeing of the mothers and their offspring.

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**T-3064-OR: Associations of Maternal Body Mass Index and Gestational Weight Gain with Neonatal Adiposity in the Healthy Start Study**

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**Background**

Maternal obesity and weight gain during pregnancy are risk factors for child obesity. The associations may be due to causal effects of the intrauterine environment. We estimated associations of maternal pre-pregnancy body mass index (BMI) and gestational weight gain (GWG) with neonatal adiposity.

**Methods**

Participants were 826 women in a Colorado pre-birth cohort who delivered term infants (2010-2013). GWG to 39 weeks of gestation was predicted using linear mixed models. Observed overall GWG and period-specific GWG (0-17, 17-27, and 27-39 weeks) were calculated from repeated pregnancy weight measures. Neonatal body composition was measured using air displacement plethysmography. Multiple linear regression models were used to estimate associations of BMI, overall GWG, and period-specific GWG with neonatal fat mass, fat free mass, and percent body fat.
Results

Each 0.1 kg/week increase in GWG was associated with increases of 24.0g in fat mass (95% CI 17.4, 30.5), 34.0g in fat free mass (95% CI 21.4, 46.6) and 0.55% in percent body fat (95% CI 0.37, 0.72). GWG in excess of IOM guidelines was associated with increased neonatal fat mass and fat free mass relative to adequate GWG, but not with percent body fat. Early, mid-, and late pregnancy GWG were independently associated with neonatal fat mass and percent body fat.

Conclusions

While associations of late pregnancy GWG with neonatal adiposity may partly be explained by the contribution of fetal weight to late pregnancy weight, associations of early and mid-pregnancy GWG with neonatal adiposity support the hypothesis that GWG may promote the development of infant body fat.

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T-3065-OR: Is Low Infant BMI “Protective”? Counterintuitive Relationship of Infant BMI Z Score with Later Life Body Composition Trajectories

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Background

Infant BMI is being used as a marker of later obesity risk, but infant BMI fluctuates, rising rapidly to 9 months of age before falling, and is inconsistently associated with current adiposity. Whether infant BMI predicts adverse body composition and its changes later in life is unclear.

Methods

BMI Z score at 9 months of age (using WHO 2006 Standard) was measured in 404 (188 female) white non-Hispanics in the Fels Longitudinal Study and was categorized as Low (Z< -0.67), Average/Referent (Z = -0.67 to +0.67), or High (Z> +0.67). BMI Z was then entered into mixed effects regression models to test its association with serially measured BMI (mean of 6.8 observations / subject), and fat mass index (FMI, kg/m2) and fat-free mass index (FFMI, kg/m2) (both with mean of 3.5 observations / subject) between ages 20-60 years. Covariate adjustment was made for sex, birth year, and interactions, and random effects for both intercept (age 20) and a fractional polynomial of age (change over time).

Results
Low infant BMI was associated with lower BMI at age 20 (-3.2 kg/m², p=0.003) as compared to the referent group, a difference that did not change over time. However, body composition analysis showed that low infant BMI was accompanied not by lower FMI at 20 years (-0.18 kg/m², p=0.82) or any difference in FMI change over time, but rather by lower FFMI (-2.4 kg/m², p<0.001), a difference that did not change over time. High infant BMI was also counterintuitively associated with slower increases in adulthood BMI (p<0.001) and FMI (p=0.065).

Conclusions

Neither low nor high infant BMI Z score at 9 months is informative with regard to excess adiposity in adulthood, but is in fact associated with lean mass trajectories. Caution regarding the use of infant BMI as a predictor of adulthood adiposity is warranted.

T-3066-OR: Weight Gain Before and during Pregnancy and Risk of Gestational Diabetes Mellitus (GDM)

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Background

Weight gain before and during pregnancy have both separately been associated with an increased risk of gestational diabetes mellitus (GDM). However, the combined effect of weight trajectory both before and during pregnancy on risk of GDM is unknown.

Methods

A nested case-control study was conducted among women who participated in a health exam and had a subsequent pregnancy on average 6 years later at Kaiser Permanente Northern California. Cases were 257 women who developed GDM. 514 controls were matched for year of exam, age at exam, age at pregnancy, and number of intervening pregnancies. Conditional logistic regression models adjusted for race-ethnicity, BMI, parity and family history of diabetes. Women who gained or lost weight were compared with those with a stable weight (within 0.5 kg/year). Excess gestational weight gain (GWG) before the GDM screening test was defined according to the Institute of Medicine (IOM) guidelines.

Results

In a single multivariate model, excess GWG (OR 2.24; 95% CI: 1.44-3.50; referent=met IOM); and pregravid weight gain (≥ 1.5 kg/year) increased the odds of GDM (OR 2.94; 95% CI: 1.67-5.42; referent=stable weight). In a joint effects model, the ORs for pregravid weight loss and excess GWG was 1.28 (95% CI: 0.64-2.54), pregravid weight gain and met the IOM was 2.01 (95% CI: 1.20-3.38) and pregravid weight gain and excess GWG was 5.86 (95% CI: 3.00-11.86) compared to having a stable weight and meeting the IOM guidelines. Results did not vary by BMI.
Conclusions

Weight gain before and during pregnancy are both associated with risk of GDM. When considered simultaneously, pregravid weight gain and exceeding the IOM had an additive effect on GDM risk. Helping women achieve a healthy pre-pregnancy weight and manage early GWG may be optimal for preventing GDM.

T-3067-OR: Weight Retention or Weight Gain? The Influence of BMI on Weight Changes among Ethnic Minority Mothers Over the First Postpartum Year

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Background

Obese, ethnic minority mothers are twice as likely to weigh 5kg more than their pre-pregnancy weights at 12 months postpartum compared to healthy BMI mothers. We studied whether excess weight accrued is true retention (i.e., failure to lose pregnancy weight) or instead due to postpartum weight gain.

Methods

We analyzed data on 182 women enrolled in a longitudinal study of ethnic minority mothers in Philadelphia, PA (69% Black, 31% Hispanic, 100% received Medicaid). We prospectively assessed weight, measured at 1 month, 5 months, and 12 months after childbirth. Information about demographics and pre-pregnancy BMI was self-reported at mothers’ first postpartum visit. We examined the trajectory of mean postpartum weight change over time and then stratified our analyses by pre-pregnancy BMI category.

Results

Mean weight change was greatest at 1 month after delivery (-8.3kg) and then stabilized from months 1 to 12 (0.7kg). Stratification by pre-pregnancy BMI revealed that obese and healthy BMI mothers lost weight from delivery to 1-month postpartum (-7.6kg and -8.5kg, respectively); however, healthy BMI mothers lost an additional -2.7kg over the first postpartum year (-0.1kg from 1 to 5 months; -2.6kg from 5 to 12), while obese mothers gained 5.3kg (2.6kg from 1 to 5 months; 2.7kg from 5 to 12). Few (36%) returned to their pre-pregnancy weights.

Conclusions
Our findings highlight the role of postpartum weight gain in excess adiposity accrued after childbirth among obese, ethnic minority mothers. Interventions designed to slow the trajectory of postpartum weight gain among these high risk mothers are sorely needed.

T-3068-OR: Evaluating the Impact of a Local Staple Food Ordinance on Fruit and Vegetable Availability

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Background

Local policies may have an impact on food access, particularly in underserved areas. Minneapolis has been the first and only city to enact minimum stocking requirements for 'staple foods,' including >=5 varieties of fresh fruits and vegetables, as a condition of food store licensing in 2008.

Methods

Our aim was to examine policy impact by comparing fruit and vegetable availability in small stores in Minneapolis to that of a control site, St. Paul, where no such policy exists. Using administrative lists of licensed stores, we randomly selected 60 Minneapolis and 60 St. Paul stores, focusing on those most likely to be challenged by the ordinance (non-supermarkets/specialty stores, non-WIC vendors) and those not exempted from the ordinance (<300 ft² food retail area). Audits were conducted using the Yale Rudd Center NEMS-S instrument.

Results

Overall, 55.8% of stores stocked fruits and 30.0% stocked vegetables. Stores in Minneapolis had more varieties of fruits and vegetables compared to St. Paul (5.1+-0.9 vs. 2.6+-0.5, respectively, p<0.01). Only 40% of Minneapolis stores had >=5 varieties, compared to 17% in St. Paul. Analyses with a subset of 71 stores indicated that those in Minneapolis were larger than those in St. Paul; however, significant differences in fruit/vegetable varieties remained when larger stores were excluded (>5 aisles, n=25; p<0.05).

Conclusions

The IOM, CDC and others have identified improving healthy food access as a key strategy for obesity prevention. Despite some need for improvements, the Minneapolis Staple Food Ordinance illustrates a unique mechanism for local policies to improve food access through business licensing.
T-3069-OR: Decreasing Calories, Fat and Sodium in Restaurant Meals for Widespread Industry Adoption

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Background

The frequency of dining out continues to rise, with American adults eating restaurant meals an average of five to six times per week. Restaurant fare tends to contain more calories, fat, saturated fat and sodium. This study assesses the acceptability of small reductions to current restaurant recipes.

Methods

Thirteen menu items (consisting of nachos, salads, hummus, pasta, seafood and various burgers) from four restaurant chains were tested. The current and two modified recipe versions, with reductions in high-fat ingredients, such as oil, cream sauces and dressings, as well as high-sodium constituents, such as salt, bacon and cheese, were tested. Restaurant guests (n=1,231 participants) were recruited for a monadic-sequential randomized taste test and were blinded to the recipe version. Acceptability was measured using the nine-point scale, Just-About-Right (JAR) five-point scale and open-ended questions. General Linear Models, Alienation, JAR, Penalty and Qualitative analyses were performed.

Results

Modified versions for 11 menu items rated similarly to (and some significantly better than) current versions. Compared to the current version, lower sodium versions of a seafood item rated significantly higher in overall taste (p<0.05). The lower fat and sodium versions of a burger and hummus side item rated significantly closer to JAR for overall flavor and texture, respectively, compared to their current versions (p<0.05). Acceptable versions included reductions of up to 120 calories, 11g fat, 5g saturated fat and 970mg sodium per serving.

Conclusions

Acceptability of restaurant items with reductions of fat and sodium are promising. Recipe modifications improve the nutrition profiles of individual menu items and remove excess fat and sodium from the marketplace. Research looking at recipe modifications and its impact on satiety may be warranted.

T-3070-OR: Energy Content of Restaurant Foods Without Stated Calorie
Information: A Multi-Site Randomized Study

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Background

National recommendations emphasize self-monitoring for prevention and treatment of obesity; however, little information is available on the dietary energy contents of meals obtained from non-chain restaurants, which account for 3%-50% of restaurants in the US.

Methods

Using bomb calorimetry, we determined gross energy of a nationally representative sample of the 36 most popular meals from 123 randomly selected restaurants within the 9 most common ethnic restaurant categories from Massachusetts, California, and Arkansas (n=367 meals). Matching meals from chain restaurants (n=55) were analyzed for comparison.

Results

Mean energy was 1204 (461, SD) kcal, which is 60% of typical daily energy requirements. All meal categories provided much more energy than required for weight maintenance; 66% of meals had >50% of typical daily energy requirements, and 4% had >100%. Italian meals provided the most energy on average (1546 kcal, P<.05). There were between site differences for entrees (P=.01). Chain restaurant meals contained 113 (312, SD) more energy than matched non-chain meals (P=.38).

Conclusions

Non-chain and chain restaurants may be important contributors to the obesity epidemic because, nationally, they provide large amounts of dietary energy incompatible with weight management. Non-chain restaurants are particularly problematic providing excess energy without any nutrition information.

T-3071-OR: The Impact of FDA-Proposed Modifications to Nutrition Facts Panels on Consumer Visual Attention and Food Choice

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Background

The United States Food and Drug Administration (FDA) recently proposed a modified format for the Nutrition Facts Panels (NFPs) that appear on U.S. food packaging. FDA has solicited feedback regarding whether the proposed changes increase consumers' ability to make informed, healthy food choices.

Methods

85 adults (>=18 years) completed an in-person computerized food selection task, viewing 64 foods in random order and indicating whether they would purchase each food. A high-speed eye-tracking camera recorded where participants looked every millisecond. Participants were randomly assigned to see 1) NFPs that currently appear on food packaging, or 2) FDA's proposed NFPs. All other information presented about each food (i.e., image, price, description, and ingredients list) was held constant across groups. Milliseconds spent viewing NFP components were compared via t-test. The percent of participants in each group (existing NFP vs. proposed NFP) who chose each product was compared via chi-square.

Results

More attention was paid to percentage daily values when they appeared on the right hand-side of the NFP (i.e., the current location) vs. the left-hand side (i.e., the proposed location). No additional attention was paid to the calorie or serving size sections of the NFP on the new labels despite the proposed increase in font size of these portions of the NFP. The new NFP section, 'added sugars,' was viewed by 56% of participants on >=1 label. Participants' food selections were not significantly different across label groups.

Conclusions

NFP changes proposed by FDA did not significantly impact foods selected by young adult consumers in an online food selection task, nor did the key label modifications elicit increased attention. More substantial NFP changes (e.g., adding colors, symbols) may be needed to impact consumer behavior.

T-3072-OR: Changes in Caloric Content of Chain Restaurant Menu Items in the US: Implications for Obesity Prevention and Evaluations of Menu Labeling

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Background
Obesity is a key public health priority primarily driven by overconsumption of calories. Supply side reductions to the calories available in chain restaurants are a possible benefit of upcoming menu labeling requirements.

Methods

Data are from the MenuStat project, a census of menu items in 66 of the 100 largest U.S. restaurant chains, for 2012 and 2013 (N = 19,417 items). We used generalized linear models to calculate: 1) the mean change in calories from 2012 to 2013, among items on the menu in both years; and 2) the difference in mean calories, comparing newly introduced items to those items on the menu in 2012 only (overall and between core vs. non-core items).

Results

Large restaurant chains in the U.S. had overall declines in calories in newly introduced menu items (-56 calories or 12% decline). These declines were concentrated in new main course items (-67 calories or 10% decline). New beverage (-26 calories or 8% decline) and children’s (-46 calories or 20% decline) items also had fewer mean calories. Among chain restaurants with a specific focus (e.g., burgers), average calories in new menu items not core to the business declined more than calories in core menu items.

Conclusions

Supply side changes in the caloric content of chain restaurant menus may have a significant impact on obesity and should be considered in future studies evaluating the impact of menu labeling regulations.

T-3073-OR: Simulating the Impact of Food Store Interventions on Adolescent Obesity Risk: Implications for Policy to Improve the Urban Food Environment

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Background

High rates of obesity are common among low-income, ethnic minority populations, and have been linked to the food environment. Mandating food stores to stock a minimum variety and quantity of healthy options (i.e., a staple foods ordinance) is one potential approach for improving healthy food access.

Methods
We developed an agent-based model of adolescents in low-income areas of Baltimore City, including 313 corner stores and carryouts, 7 recreation centers, and 57 schools. We incorporated modifiable parameters associated with food access in each venue. The model was run with 200 African American children (10-14 yrs), each represented by a computational agent using data collected on gender, age, BMI, frequency of and type of food source visits, and food purchases. We assessed childhood obesity outcomes after 5 years with: 1) no food store interventions; 2) implementation of a staple foods ordinance; and 3) implementation of a staple foods ordinance in combination with in-store promotional signage.

**Results**

Preliminary findings show that over a 5-year period, with no food store interventions, adolescent BMI is expected to increase by more than 10 percentile points, with boys increasing at a slightly greater rate than girls. Rate of increase in BMI percentile is slightly attenuated with the implementation of a staple foods ordinance, and the effect is greater when in combination with promotions.

**Conclusions**

We utilized a novel and highly visual tool for analyzing and communicating the potential impacts of food store interventions to stakeholders. The model suggests that obesity prevention efforts are likely to be more effective when intervening with multiple and complementary strategies.

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**T-3074-OR: Higher Daily Energy Expenditure, Carbohydrate-to-fat Oxidation Ratio and Spontaneous Physical Activity Inside a Metabolic Chamber Determine Greater Ad Libitum Food Intake**

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**Background**

Daily energy balance is the net difference between energy intake (EI) and expenditure (EE). It has been proposed that EE may affect EI by acting as a physiological signal for body energy requirements, inducing hunger and influencing daily energy balance and short-term weight change.

**Methods**

One-hundred-seven healthy individuals (62M/45F, 84 Native Americans/23 Whites; age: 33+8 yrs.; BMI: 33+8 kg/m2; body fat: 31+8%) had 24-h measures of EE in a respiratory chamber during energy balance
followed by 3 days of *ad libitum* food intake using computerized vending machine systems (CVMS). Spontaneous physical activity (SPA) in the respiratory chamber was measured by radar sensors. Residuals of 24-h EE, respiratory quotient (RQ), carbohydrate (CHO-OX) and fat (FAT-OX) oxidation rates were calculated after adjustment for known covariates including body composition estimated by DXA. EI was expressed as the 3-day average and as percent of weight-maintaining energy needs (WMEN).

**Results**

In separate models, EE, RQ and SPA were independent predictors of EI (all \( P<0.01 \), so that increases of 100 kcal/day in 24-h EE, 0.01 in 24-h RQ and 1% in SPA were each associated with 175/204/131 kcal-increase in EI per day (5/8/5% of WMEN), of which 87/79/57 kcal derived from carbohydrates, 70/94/74 kcal from fats and 18/31/0 kcal from proteins, respectively. Higher rates of CHO-OX (\( \bar{I} =0.29, P=0.004 \)) and lower FAT-OX (\( \bar{I} =\ddot{a}``0.24, P=0.01 \)) determined greater EI. SPA predicted higher CHO% (\( \bar{I} =\ddot{a}``0.22, P=0.02 \)) and lower FAT% (\( \bar{I} =0.26, P<0.01 \)) intakes.

**Conclusions**

Higher metabolic rates and SPA along with a shift from fat toward carbohydrate oxidation all predicted greater *ad libitum* EI as measured by our CVMS paradigm. Our results indicate that higher energy demands trigger appetite and in a food rich environment may induce EI above body energy requirements.

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**T-3075-OR: Targeting the Endocannabinoid/CB1 Receptor System for the Treatment of Obesity in Prader-Willi Syndrome**

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**Background**

Extreme obesity is a core phenotypic feature of Prader-Willi syndrome (PWS). The endocannabinoid (eCB) system is involved in the control of feeding and body weight, and cannabinoid-1 (CB1) receptor blockade reduces food intake and reverses obesity in obese animals and humans.

**Methods**

Using an established mouse model for obesity in PWS, *Magel2*-null mice, we measured the gene and protein expression of CB1 receptor as well as the endogenous levels the main eCBs, anandamide (AEA) and 2-arachidonoylglycerol (2-AG). We then determined the efficacy of a peripherally restricted CB1 antagonist, JD5037, in reducing body weight and food intake in obese *Magel2*-null mice and their
littermate controls. To assess the relevance of our findings to humans, we measured eCB levels in the serum of individuals with PWS and their age-, sex- and BMI-matched healthy controls.

**Results**

Increased eCB 'tone', as reflected by increased expression of CB1 receptor and elevated levels of AEA, was observed in 13 week old *Magel2*-null mice. Daily oral treatment of high-fat diet-induced obese *Magel2*-null mice and their littermate controls with JD5037 (3 mg/kg/d for 7 days) resulted in significant and comparable reductions in body weight and food intake in both mutant and control mice. Human patients with PWS showed increased levels of 2-AG, but not AEA.

**Conclusions**

Increased activity of the eCB/CB1 system may contribute to obesity in *Magel2*-null mice and humans with PWS. Promising findings with JD5037 in *Magel2*-null mice may provide the rationale for clinical testing of peripherally restricted CB1 receptor antagonists for the treatment of obesity in PWS.

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**T-3076-OR: Overfeeding-Induced Deterioration in Insulin Sensitivity is not Associated with Visceral or Liver Fat Accumulation in Non-Obese Males**

*Darcy L. Johannsen, PhD; Charmaine S. Tam, PhD; Jean-Marc Schwarz, PhD; Eric Ravussin, PhD;*

**Background**

Accumulation of fat in the visceral abdomen and liver has been implicated as a primary driver of insulin resistance (IR); however, a direct link in humans between fat deposition in these depots and onset of IR remains to be prospectively demonstrated.

**Methods**

We overfed 29 healthy males (10 African-American [AA], 19 Caucasian, 27±5 y, BMI 25.5±2.3; mean±SD) 40% above baseline energy requirements for 8 weeks (15% protein, 44% fat, 41% CHO). All meals were consumed under supervision. Whole-body insulin sensitivity was determined by a hyperinsulinemic-euglycemic clamp (10 mU/m^2^-min insulin for 3 h with 6,6-2H2 glucose tracer), visceral adipose tissue (VAT) by MRI, intrahepatic lipid (IHL) by 1H-MRS, and body composition (fat mass [FM], fat-free mass [FFM]) by DXA.

**Results**
Participants gained 7.6±2.1 kg (9.3±2.8%) comprised of 4.2±1.4 kg of fat. Glucose infusion rate (adjusted for plasma [insulin]) decreased from 2.9±0.9 to 2.4±0.8 mg/kg FFM - min (p<0.0001) but was not associated with the increase in VAT (r=-0.02, p=0.94), IHL (r=-0.09, p=0.65) or total weight gain (r=-0.18, p=0.37). The decline in insulin sensitivity was associated with the increase in adiposity (relative FM gain; r=-0.47, p=0.01) and plasma free fatty acids (FFA; r=-0.37, p=0.05). Adjusting for endogenous glucose (n=19) did not alter the results.

Conclusions

Our findings suggest that a greater expansion of subcutaneous adipose tissue, rather than visceral or liver fat deposition, drives the early impairment in insulin sensitivity during diet-induced weight gain possibly by increasing FFA (and other cytokine and adipokine) release.

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T-3077-OR: Role of gastric behaviour in hunger suppression by aerated drinks: assessment by Magnetic Resonance Imaging

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Background

We have previously shown that structured, aerated drinks (foams) markedly reduce post-ingestion hunger compared to isocaloric non-aerated control drinks. Increased gastric distension and delayed gastric emptying are likely mechanisms, but have not been tested.

Methods

To test the hypothesis that gastric-stable foams produce more sustained gastric distension and hunger reduction than less stable foams, 18 healthy males were fed three skimmed milk-based test products (all 110 kcal) in a randomised, partly blinded, crossover study. These were a non-aerated drink (liquid control, LC; 140 ml), and two drinks aerated to foams by whipping (to 490 ml), one stable in the stomach (stable foam, SF), and one less stable (LSF). Over 4 hours stomach contents (foam, air, liquid) were imaged using magnetic resonance imaging (MRI) and self-reported appetite ratings were collected and quantified by AUC or Time-To-Return-To-Baseline (TTRTB: Appetite 59:601-9, 2012).

Results

Both foams caused significantly increased gastric volumes, slower gastric emptying and reduced hunger (all P<0.001) compared to LC. Compared to LSF, SF further produced a significantly slower decrease in
total gastric content (P<0.05) and foam volume (P<0.0001), and a longer TTRTB (248 vs. 197 min; P<0.05), though hunger AUC values were not statistically different. There was a modest but significant negative correlation between total gastric volume and hunger scores, particularly 10 min after ingestion (r = -0.5, P < 0.0001).

Conclusions

MRI makes it possible to measure separate volumes of foam, liquid and air in the stomach. This measurement suggests that the hunger suppression induced by foams could largely be explained by effects on gastric volumes and emptying. Those effects may be further enhanced by foam stability.

T-3078-OR: Estradiol Add-Back Therapy Preserves Resting and Exercise Energy Expenditure in Women During Ovarian Hormone Suppression

Edward L. Melanson, PhD; Kathleen M. Gavin, PhD; Ellie Gibbons, BS; Anne Stavros, BS; Karen L. Shea, MD; Pamela Wolfe, MS; Wendy M. Kohrt, PhD;

Background

Acutely suppressing (6 days) ovarian hormones reduces resting energy expenditure (REE), but effects of chronic suppression are not known. The purpose of this study was to compare the effects of chronic ovarian hormone suppression with placebo or E2 add-back on 24-h EE and its components.

Methods

Ovarian hormones were suppressed for 5 months in premenopausal women (mean+-SD; age 35.0+-8.7; BMI 26.8+-5.7 kg/m2) using gonadotropin releasing hormone agonist therapy (GnRHAG, leuprolide acetate 3.75 mg/mo). Women were also randomized to receive either transdermal E2 (0.075 mg/d; GnRHAG+E2; n=24; mean+-SD, age=37+-8 yr, BMI=27.3+-6.2 kg/m2) or placebo patch (GnRHAG+PL; n=21; age=34+-9 yr, BMI=26.8+-6.2 kg/m2). Changes [mean, 95%CI] in 24-h EE, REE, sleeping EE (SEE), exercise EE (ExEE), non-exercise EE, and thermic effect of feeding (TEF) were determined using whole-room indirect calorimetry. During Ex, subjects performed 2x30 min bouts of bench stepping exercise.

Results

24-h EE decreased in GnRHAG+PL [-128 (-200, -55) kcal/d] and GnRHAG+E2 [-100 (-178, -23) kcal/d]. REE [-57 (-96, -18) kcal/d] and ExEE [-0.5 (-0.8, -0.1) kcal/min] decreased in GnRHAG+PL, but not in GnRHAG+E2 [-4 (-45, +36) kcal/d, -0.3 (-0.6, 0.1) kcal/min, respectively]. The between-group difference in change in REE over time was -53 (-109, +3) kcal/d (P=0.06). The group differences in changes in 24-h EE
and ExEE over time were not significant. There were no changes in SEE, TEF, or non-exercise EE in either group.

**Conclusions**

Chronic ovarian hormone suppression reduced 24-h TEE, REE, and ExEE, and the decreases in REE and ExEE were attenuated by E2 replacement. If pharmacologic suppression of ovarian function mimics the effects of menopause, the decreases in EE may explain the propensity for fat gain across the menopause.

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**T-3079-OR: Whereâ€™d That Fat Go? Different Patterns of Free Fatty Acid Storage in Subcutaneous Fat between Fasted and Fed Conditions**

*Kazanna C. Hames, PhD; Shichun Du, MD; Michael D. Jensen, MD;*

**Background**

We've shown that adipose free fatty acid (FFA) storage rates increase as a function of FFA concentrations; whether this occurs after mixed meal ingestion is unknown. Thus, we examined how the FFA storage pathways differed in fat depots across metabolic states ranging from postprandial to high FFA.

**Methods**

We measured direct FFA/palmitate storage rates in abdomen (AB) and thigh fat in 8 adults (5 men) under conditions of fasted, high plasma palmitate (150±17 ÂµU/ml) using somatostatin to suppress insulin (0.2±0.1 µU/ml) and reduced plasma palmitate (78±15 ÂµM) created by high fat meal ingestion that slightly raised insulin concentrations (9.6±5.5 µU/ml). Continuous infusions of [U-13C]palmitate and [U-13C]linoleate were used to trace FFA kinetics and boluses of [3H] and [14C]palmitate were used to measure adipose FFA storage using the bolus/biopsy technique. We assayed for adipocyte CD36 content, and acyl-CoA synthetase (ACS) and diacylglycerol acetyltransferase (DGAT) activity.

**Results**

Palmitate storage in ABSQ fat was 47% greater in the fed than the high FFA condition (p<0.05) despite no change in CD36, ACS and DGAT in the fed state. Palmitate storage in thigh fat was not different in the two conditions. Palmitate storage rates (0.72±0.19 vs. 0.45±0.09 Î¼mol/min/kg lipid; p=0.05) and DGAT activity (11.1±1.8 vs. 8.0±3.0 pmol/min/mg lipid, p=0.02) were greater in ABSQ than thigh fat in the fed, but not the fasted state.

**Conclusions**
The greater ABSQ postprandial palmitate storage despite lower palmitate concentrations suggests that ABSQ, but not thigh fat, adapts to postprandial conditions to increase FFA storage through as yet unidentified mechanisms.

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**T-3080-OR: Redefining the Synaptic Projection Patterns of the Hypothalamic Proopiomelanocortin Circuit**

*Aaron J. Mercer, PhD; Stephen I. Lentz, PhD; Flavio SJ. de Souza, Investigator; Marcelo Rubinstein, PhD; Malcolm J. Low, MD, PhD;*

**Background**

Proopiomelanocortin (POMC) neurons in the arcuate nucleus (ARC) represent a critical anorexigenic node in the CNS, but a lack of distinct cytoarchitecture has made it difficult to extensively map the axodendritic connections of the hypothalamic POMC circuit.

**Methods**

We developed two models to classify POMC axons, boutons and terminals: POMC-Cre mice were injected with viral vectors expressing a LoxSTOP-synaptophysin (syp)-mCherry reporter (AV-syp-mCherry), and our newly developed tamoxifen-inducible POMC-Cre (POMC-CreERT) mouse line was crossed with a LoxSTOP-syp-tdTomato reporter line. Injections of AV-syp-mCherry into POMC-Cre mice or treatment of POMC-CreERT animals with 150 mg/kg tamoxifen for 5 days resulted in mosaic syp expression in 234 ± 58 and 157 ± 26 POMC neurons, respectively. Reporter expression was restricted to the ARC, and all syp neurons were validated as bona fide POMC neurons by dual-label immunohistochemistry (N = 6 mice per model).

**Results**

We observed syp projections in the forebrain, midbrain and hindbrain intermingled with POMC-peptidergic fibers, but many of these fibers only contained syp or peptide. The farther these fibers projected away from the ARC, the less likely they were to overlap (r = -0.57, P<0.005), suggesting that POMC neurons communicate synaptic or peptidergic signals in different efferents. We are further validating POMC innervation sites by quantifying syp overlap with postsynaptic markers, and classifying syp boutons with markers for GABA and glutamate.

**Conclusions**

Our findings indicate that POMC efferents diverge in their distal signaling mechanisms. Because the POMC circuit is an attractive target for alleviating obesity, it is of utmost importance to determine its synaptic physiology and how this network integrates throughout the brain.
T-3081-OR: Melanocortin 4 Receptors in Sympathetic Pre-Ganglionic Neurons Regulate Energy Balance, Glucose Homeostasis and Thermogenic Properties of Adipose Tissue

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Background

Melanocortin 4 receptors (MC4Rs) are expressed by extra-hypothalamic neurons including autonomic preganglionic cholinergic neurons. However, whether MC4Rs in these neurons control energy and glucose homeostasis is unclear.

Methods

To study requirement(s) for MC4Rs in the autonomic nervous system (ANS) to modulate energy and glucose homeostasis including role(s) of brown adipose tissue and 'browning' of white adipose tissue, we generated genetically modified mice selectively lacking pre-ganglionic MC4Rs in the SNS and/or PNS. Recently described Mc4rfloxflox mice and animals expressing cre-recombinase (cre) in choline acetyltransferase positive neurons (Chat-cre) were used to target the SNS. Novel mice lacking Mc4rs in Phox2B-positive neurons were used to study the PNS.

Results

We found that ablating MC4Rs in cholinergic neurons including sympathetic pre-ganglionic neurons lowers energy expenditure resulting in obesity and directly impairs glucose homeostasis and insulin sensitivity. This deletion also blunts cold-induced thermogenesis in brown adipose tissue and maintenance of core body temperature. In contrast, deleting MC4Rs in parasympathetic preganglionic neurons (vagal motor neurons) causes hyperinsulinemia and insulin resistance, but does not significantly impact energy balance.

Conclusions

These results suggest that MC4Rs in autonomic regulatory neurons are required to maintain energy and glucose homeostasis and that MC4Rs expressed by these neurons are required for the thermogenic properties of adipose tissue following exposure to a calorically dense diet.
T-3082-OR: Specific Ablation of Lateral Hypothalamic Neurotensin Neurons Promotes Obesity by Decreasing Energy Expenditure

Juliette Brown, BS; Thomas Mayer, HSD; Raluca Bugescu, BS; Hillary Woodworth, BS; Patrick Fuller, PhD; Gina Leinninger, PhD;

Background

Lesion of the lateral hypothalamic area (LHA) blunts all motivation to drink, eat and move. The LHA is a cellularly heterogeneous region, however, and traditional lesion studies cannot resolve how specific LHA neuronal populations regulate energy balance.

Methods

We examined how LHA neurons that express the anorectic neuropeptide neurotensin (Nts) contribute to energy balance. Using mice that express Cre recombinase in Nts neurons (NtsCre mice) we selectively identified Nts neurons and their neuronal projections. To study the specific contribution of LHA Nts neurons to energy balance, we injected adult NtsCre mice in the LHA with an AAV that permits Cre-dependent expression of the diphtheria toxin subunit Δ (AAV-DTA) to selectively ablate LHA Nts neurons.

Results

LHA Nts neurons are activated by stimuli that suppress feeding and promote locomotor activity, including dehydration and the hormone leptin. These cue-activated LHA Nts neurons project into the midbrain, where Nts has been shown to activate dopamine (DA) neurons, decrease feeding and increase locomotor activity. Mice with ablated LHA Nts neurons mice have a lower metabolic rate and exhibit decreased locomotor activity (ambulatory movement and motivated wheel running) that increases their adiposity.

Conclusions

These data suggest that LHA Nts neurons regulate midbrain DA neurons to stimulate weight loss. Loss of action via LHA Nts neurons, however, decreases energy expenditure and contributes to the development of obesity. Supported by NIH DK090101, Michigan Diabetes Research Center NIH Grant 5P60 DK020572
micro-dissected and dissociated from acute sections of brain. From the resulting cell suspension

16 fluorescent cells were manually sorted

washed

and reveal potential signaling mechanisms in MC4R control of satiety

thyroid

and stress hormones.

"T-3084-OR: Central Neural Pathways Directed to White, Brown and Transformed Brite / Beige Fat

Brian Oldfield, PhD; Aneta Stefanidis, PhD; Nicole M. Wiedmann, Bsc. Hons;

Background

Brown adipose tissue (BAT) is present in adult humans in inverse proportion to BMI and fat mass. Moreover, white adipose tissue (WAT) can be transformed to 'brown - like' (brite / beige) fat. Currently there is only a rudimentary understanding of the innervation of each of these fat types.

Methods

Neurotropic viruses were injected into fat depots in rats to trace multisynaptic central neural pathways directed to WAT, BAT and Brite / Beige fat. Specifically, pseudorabies virus (Bartha) was injected into inguinal WAT (iWAT), interscapular BAT (iBAT) and i WAT transformed to include Brite / Beige fat cells by exposure of rats to 8 C for 7 days. After injection of neurotropic viruses, rats were allowed to survive for
Results

After injection of pairs of viruses expressing either red or green fluorescent protein into each of the fat depots, distinct labeling patterns were observed in 1st to 4th order neurons in paravertebral ganglia, spinal cord, brain stem, midbrain and hypothalamus. In addition to these ‘private lines’ of communication to various fat pads, populations of ‘command neurons’ amounting to 10% of total labelled neurons were identified. These had collateral axonal projections to different fat pads including those to both brown and white fat.

Conclusions

These data including the unique identification of ‘command’ controllers of fat involved with both storage and burning of energy provide a neuroanatomical basis for differentiating the central neural control of white, brown and white fat transferred into brite / beige fat.

T-3085-OR: Alcohol Metabolism and the Subjective Response to Alcohol Ingestion after Roux-en-Y Gastric Bypass (RYGB) Surgery

Yanina Pepino, PhD; J. Christopher Eagon, MD; Bruce Bartholow, Ph D; Bruce Patterson, PhD; Kathleen Bucholz, PhD; Samuel Klein, MD;

Background

Although RYGB surgery is associated with an increased risk of developing alcohol use disorder (AUD), little is known about the effects of RYGB on the pharmacokinetics and subjective effects of ingested alcohol.

Methods

An alcohol challenge test was performed in 7 women (BMI=29+-5 kg/m2, 42+-8 yrs old) who had RYGB surgery (RYGB+) 2+-1 years earlier and 6 (BMI=43+-4 kg/m2; 42+-7 yrs old) scheduled to have RYGB (RYGB-). Women were studied on three separate days. Blood samples were taken before and at 5, 15, 25, 35, 50, 65, 80, 95, 110, 125, 140, 150 and 200 min after a small or large dose of alcohol (0.35 or 0.50 g/kg fat-free mass) or a non-alcoholic drink was consumed. Blood alcohol concentrations (BAC) were determined by gas chromatography and subjective ratings of the effects of alcohol were measured by the Biphasic Alcohol Effects Scale.
Results

Peak BAC occurred sooner (5±2 vs. 19±2 min) and was ~two-fold greater in RYGB+ than in RYGB- subjects (78±5 vs. 47±10 mg/dl and 111±15 vs. 56±8 mg/dl after small and large alcohol dose, respectively; P <0.0001). RYGB+ subjects felt more stimulant and sedative effects of alcohol than RYGB- subjects (P=0.003), and even different when BACs were identical in both groups (i.e. 50-200 min after alcohol consumption).

Conclusions

RYGB causes marked alterations in the response to alcohol ingestion, manifested by a higher peak in BAC and greater subjective stimulant and sedative effects of alcohol. These effects could contribute to the observed increase risk of developing AUD after RYGB.

T-3086-OR: Effect of Bariatric Surgery on Long-Term Survival of Veterans

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Background

Evidence regarding the survival benefit of bariatric surgery is inconsistent. Prior results from high-risk populations failed to demonstrate a benefit. We compared long-term survival in a multi-site veteran cohort of higher-risk bariatric patients and matched controls.

Methods

We matched a retrospective cohort of 2,533 veterans undergoing bariatric surgery from 2000-2011 to up to 3 controls of the same sex, race and diabetes status from the same VA network using sequential stratification and a distance function of age, BMI, and comorbidity (n=7,561). Procedures included RYGB (74%), sleeve gastrectomy (15%), and banding (10%). Most patients were male (74%), had diabetes (55%), mean age (52-53), mean BMI (46-47 kg/m2), and mean follow-up of 7.0 years. All-cause mortality through 12/31/2013 was compared using Kaplan-Meier estimators and adjusted Cox regression. We explored effect modification by sex, diabetes status, and surgery year (2000-2005 vs. 2006-2011).

Results

Kaplan-Meier estimated 1-year (2.5% vs 1.8%) and 5-year mortality rates (6.5% vs 10.4%) were different for surgical patients and matched controls. Adjusted analysis found higher 1-year mortality after surgery (HR=2.67; 95% CI:1.97-3.61), no association 1-5 years after surgery (HR=1.03), and lower mortality 5+ years after surgery (HR=0.44, 95% CI:0.36-0.53). Veterans undergoing surgery in 2006-2011 had lower 1-
year mortality (HR=0.82 vs. 3.32) and 1-5 year mortality (HR=0.36 vs. 1.14) than surgical patients from 2000-2005.

Conclusions

All-cause mortality was reduced 5+ years after bariatric surgery. Shorter-term survival was particularly improved for patients undergoing surgery in 2006-2011, suggesting that procedure and patient selection changes improved outcomes.

T-3087-OR: Benchmarking National 30-day Readmission Rates After Bariatric Surgery

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Background

Mortality and severe adverse events (SAE) rates after bariatric surgery have stabilized at very low levels but readmissions remain a target for further quality improvement with a particular need for national benchmarks.

Methods

Patients undergoing Roux-en-Y gastric bypass (RYGB), adjustable gastric bands (AGB) and sleeve gastrectomies (SG) between 6/2007 and 03/2012, in Bariatric Surgery Centers of Excellence (BSCOE) and registered in the Bariatric Outcomes Longitudinal Database (BOLD) with 30-day follow-up were included (N=282478). Rates and reasons for readmissions for were quantified and analyzed by demographic and other baseline variables including age, gender, race, baseline BMI, and comorbidities. t-tests and chi-square were used where appropriate. ASMBS and IRB approval were obtained.

Results

11,389 (4%) patients were readmitted. Most common reasons were nausea/vomiting 2263 (24%), dehydration 1348 (14%), bleeding 675 (6%), surgical infections 656 (6%) and obstruction 466 (5%). Their primary operations were RYGB 8989 (79%), AGB 1241 (11%) and SG 1159 (10%). Readmissions had significantly more patients with BMI>50 (34 vs.29%), Blacks (15 vs. 12%), LOS>4 days (.9 vs. .2%), SAE (2.2 vs. .1%), mortality (.1% vs. 0%), and more HTN (47 vs. 45%), DM (26-% vs.24%), lipids (26 vs.23%), and GERD (24 vs. 20%). Age and gender were not different

Conclusions
Readmissions were quantified by type of bariatric operation and most common reasons for readmissions were identified and quantified. These are prime targets for developing strategies that will reduce readmission rates resulting in better quality and lower costs associated with bariatric surgery.

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**T-3088-OR: Impact of Bariatric Surgery on Work Status and Productivity**

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**Background**

Obesity is associated with higher sick leave, disability use, and workplace injuries. Our aim was to assess the impact and the duration of the effect of bariatric surgery for obesity on work status and productivity in the US.

**Methods**

A cohort from the Longitudinal Assessment of Bariatric Surgery (LABS), a prospective, multicenter observational study of adults undergoing bariatric surgery at 10 clinical sites in the US, provided information on work status and completed the Work Productivity and Activity Impairment (WPAI) questionnaire. We compared the changes in working status and productivity, from baseline to 3 years after bariatric surgery. Demographic, socio-economic, clinical, and surgical variables were used for adjustment.

**Results**

Participants (n=2,458) were 79% females, mean age: 46 y, median BMI: 46 kg/m2, with 4 chronic conditions, on average. 69% were working for pay. Most participants did not change employment status during follow up. 28% of those working part-time at baseline ended working full-time at 3 years. Improvements from baseline for unproductive work days due to health problems, impaired while working for health problems and overall work impairment were significant every year. More weight loss and fewer chronic comorbidities were associated with better productivity.

**Conclusions**

Participants who underwent bariatric surgery increased their productivity. Greater weight loss and fewer preoperative chronic conditions were associated with better productivity at follow-up after 3 years of surgery.
T-3089-OR: Changes in Neural Responsivity to High-Calorie Foods After RYGB vs. Sleeve Gastrectomy: An fMRI Study

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Background

Preliminary studies suggesting neural changes after bariatric surgery have implicated brain regions encoding the hedonic value of food. However, prior studies have failed to include vertical sleeve gastrectomy (VSG) patients and are further limited by short follow-up periods and no control groups.

Methods

In this prospective, observational fMRI study, changes in BOLD response before, and 6 months after, surgery in 22 Roux-en-Y gastric bypass (RYGB) and 17 VSG patients were compared to those in 19 weight-stable obese controls. In a fasted state, participants were scanned as they viewed pictures of high- and low-calorie foods. A-priori ROIs included regions involving the mesolimbic pathway (ventral tegmental area [VTA], nucleus accumbens [NAcc]), emotion processing (OFC, amygdala, insula, hippocampus, superior temporal gyrus [STG]), homeostatic regulation of intake (hypothalamus), and attention (anterior cingulate, thalamus).

Results

At 6M RYGB and VSG patients lost 23.6 and 21.1% of initial weight, respectively, and controls gained 1%. Significantly greater reductions (from baseline to 6M) in BOLD signal response to high calorie foods in RYGB vs control patients were observed in the left hippocampus, with trends towards greater reductions in the VTA and STG. Significant differences in similar brain areas (left hippocampus, VTA, right thalamus) were observed between VSG and control patients. No differences between controls and either surgery group were observed in other areas.

Conclusions

Results underscore the importance of a control group when evaluating neural changes after bariatric surgery and differentiates sub-nuclei within the mesolimbic pathway which may change in response to different surgeries.
T-3090-OR: Pre-Pregnancy Bariatric Surgery and Risk of Preeclampsia: A Population-Based Matched Cohort Study

Martin Neovius, PhD; Kari Johansson, PhD; Sven Cnattingius, MD, PhD; Ingmar Naslund, Md, PhD; Nathalie Roos, MD, PhD; Anna-Karin Wikstrom, MD, PhD; Olof Stephansson, MD, PhD;

Background

Preeclampsia is a serious pregnancy complication associated with maternal obesity. The influence of pre-pregnancy bariatric surgery on the risk of preeclampsia is not well-established.

Methods

In the Swedish Medical Birth Register between 2006 and 2011, we identified 628,778 singleton pregnancies of which 1755 occurred after bariatric surgery. To each pregnancy after bariatric surgery, 5 comparator pregnancies were matched by age, early pregnancy BMI, chronic hypertension, parity, smoking, education level, and delivery year. To post-surgery pregnancies with available pre-surgery BMI (n=670), a secondary control group was matched by the same factors, but using pre-surgery BMI instead of early pregnancy BMI and excluding chronic hypertension as a matching factor. Preeclampsia diagnoses were ascertained from the Swedish Medical Birth Register.

Results

Lower risk of preeclampsia was observed in post-surgery versus matched comparator pregnancies, both when matching on early pregnancy BMI (2.5% vs 4.3%; odds ratio [OR] 0.56, 95%CI 0.40-0.77; P<.001) and when matching on pre-surgery BMI (1.8% vs 8.8%; OR 0.16, 0.05-0.50; P=.006). When excluding women with chronic hypertension, lower preeclampsia risk remained when comparing post-surgery pregnancies with the primary (2.4% vs 4.3%; OR 0.54, 0.39-0.76; P<.001) and the secondary control group (1.6% vs 8.8%; OR 0.17, 0.06-0.55; P=.01).

Conclusions

Women with bariatric surgery history have a lower risk of preeclampsia than matched comparators. This suggests that pre-pregnancy bariatric surgery may have a preventive impact on preeclampsia development in obese women.

T-3091-OR: Obstructive Sleep Apnea is associated with Nonalcoholic Steatohepatitis and Hepatic Fibrosis
Kathleen Corey, MD; Joseph Misraji, MD; Louis Gelrud, MD; Lindsay Y. King, MD; Hui Zheng, PhD; Atul Malhotra, MD; Raymond Chung, MD;

Background

Animal models suggest that obstructive sleep apnea (OSA) may contribute to the development and progression of nonalcoholic steatohepatitis (NASH). We sought to evaluate whether OSA was associated with advanced NASH histology.

Methods

213 individuals undergoing weight loss surgery (WLS) were evaluated for OSA by patient self-report. The cohort study included consecutively enrolled patients who underwent WLS between 2010 and 2012. NAFLD was defined by the presence of >= grade 1 steatosis not meeting criteria for NASH. NASH was defined as lobular inflammation >=1, hepatocyte ballooning >=1 and steatosis grade >=1. Advanced fibrosis was defined as stage 3-4 fibrosis. Multivariable regression modeling was used to assess the independent association of OSA with liver histology. Variables that were significant on univariate analysis were used in multivariate analysis.

Results

Patient with OSA were older (51.0 vs. 43.8 years, p<0.0001), more frequently male (29.5% vs. 5.0%, p<.0001), white (75.0% vs. 55.5%, p<0.0001), and diabetic (49.6% vs. 18.2%, p<0.0001) than those without OSA. OSA was associated with NASH and remained so after adjusting for age, sex, race, and diabetes (OR 2.01; p=0.03). OSA was associated with steatosis, lobular inflammation and fibrosis on multivariable analysis (OR 2.3 p =0.004; OR 2.06 p=0.02; and OR 2.01 p=0.04, respectively). Advanced fibrosis was found only in subjects with OSA.

Conclusions

OSA is associated with NASH, steatosis, lobular inflammation and fibrosis. Advanced fibrosis (stage 3-4) was found only in those with OSA. Further studies are needed to evaluate the relationship of OSA defined by polysomnography and NASH as well as the impact of the treatment of OSA on NASH.

T-3092-OR: Does Size Matter? Small Differences in Epoch Size Result in Large Errors in Accelerometer Measures in Children

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Background

Accelerometer epoch lengths used in studies often differ from the epoch lengths used to derive cut-points for wear time, sedentary behavior, and physical activity levels. Studies convert these cut-points to match their measured epoch length without knowing the validity of this common practice.

Methods

268 overweight and obese 7-11 year-olds wore ActiGraph GT3X+ monitors on the right hip for 7 days. Min/day of wear time (WT), and min/day and percent time in sedentary behavior (SB), light (LPA), moderate (MPA), vigorous (VPA), and moderate and vigorous (MVPA) physical activity (PA) were determined using the NHANES wear time algorithm and multiple standard activity cut-points at epoch lengths of 1, 5, 10, 15, 30, and 60 sec. Cut-points were converted to match measured epoch lengths (e.g., a cut-point of 25 counts/15 sec epoch was converted to 100 counts/60 sec epoch). Wald tests examined if WT, SB, LPA, MPA, VPA and MVPA estimates vary significantly when using different epoch lengths.

Results

Substantial differences in min/day and percent of time estimates for WT, SB, and PA levels were observed for the different epoch lengths for all the cut-point definitions (p's < .0001). For example, for a commonly used set of 15 sec epoch cut-points (Evenson et al, 2008), percent of time spent in SB was underestimated by an average of 12% when using 60 sec epochs and overestimated by 16% when using 1 sec epochs, and min/day in MVPA was underestimated by an average of 12 min/day at a 60 sec epoch and overestimated by 10 min/day at a 1 sec epoch.

Conclusions

Converting WT, SB, and PA cut-point definitions to epochs that differ from those originally used to derive the cut-points introduces significant and biased errors into the resulting estimates. Research using different epoch lengths are not comparable and should be interpreted with caution.

T-3093-OR: Antibiotics and Childhood Body Mass Index (BMI) Trajectories using Electronic Health Records (EHR)

Lisa Bailey-Davis, EdD; Jonathan Pollak, MPP; Annemarie Hirsch, PhD, MPH; Claudia Nau, PhD; Thomas A. Glass, PhD; Karen Bandeen-Roche, PhD; Brian S. Schwartz, MD, MS;

Background

Antibiotics are commonly prescribed for infants and children. Use of antibiotics early in life has been linked to weight gain but there are no large-scale, population-based, longitudinal studies.
**Methods**

We obtained EHR data (2001-2012) from Geisinger on 163,820 children aged 3-18 years in Pennsylvania. We used mixed effects linear regression to model growth curve trajectories for over 500,000 annual BMIs controlling for confounders. Models evaluated three kinds of associations of antibiotics with BMI trajectories - reversible (in children under observation in three windows - 1 year to 1 day, 1.5 to 0.5 years, and 2.5 to 1.5 years before BMI), persistent (controlling for reversible effects and adding a time-varying count of lifetime antibiotic orders up to the BMI), and progressive (adding a count of lifetime antibiotic orders up to the prior BMI) - and whether these varied by age.

**Results**

Reversible effects were demonstrated in three windows and associations were modified by age (p < 0.001) with stronger effects in younger children (N=116,769). Persistent effects were observed as increasing order counts were associated with higher BMIs and this association was stronger with increasing child age (p < 0.001) (N=142,824). Significant progressive effects were observed among children with at least three BMIs (N=79,752), which did not vary with age.

**Conclusions**

This is the first study to provide evidence of reversible, persistent, and progressive effects of antibiotic use on child BMI trajectories, which raises interesting questions regarding the role of gut microbiota.

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**T-3094-OR: Factors Associated with Weight Maintenance in Finnish Young Adults**

_Ulla Kärkkäinen; Linda L. Mustelin, MD, PhD; Anu A. Raevuori, MD, PhD; Jaakko J. Kaprio, MD, PhD; Anna A. Keski-Rahkonen, MD, PhD, MPH_

**Background**

To assess factors associated with successful weight maintenance over 10 years in a prospective general population sample of young adults.

**Methods**

Our study comprised 2452 women and 2227 men from the nationwide FinnTwin16 study, born in Finland in 1975-1979 (mean age at baseline 24 years, attrition 24.6%). Weight maintenance was defined as weight maintained within ±5% of baseline body mass index (BMI) using self-reported weight at and height. We examined the role of food and beverage intake, exercise and sociodemographic and lifestyle factors in successful weight maintenance (vs. weight gain) using logistic regression.
Results

Only a minority of young adults were able to maintain their weight over ten years (28.6% of women vs. 23.0% of men). Net weight loss was even more uncommon (7.5% of women and 3.8% of men). The rest gained weight (mean weight gain 9.2 kg in women and 10.3 kg in men). Among women, exercise was associated with successful weight maintenance, but more frequent use of sweet drinks, irregular eating, intentional weight loss attempts, having two or more children, and being less satisfied with their life was associated with weight gain. Among men, higher baseline BMI and higher education were associated with successful weight maintenance, whereas irregular eating, intentional weight loss attempts, and smoking were associated with weight gain.

Conclusions

Factors associated with successful weight maintenance were highly gender-specific. Potentially modifiable lifestyle factors appeared more important for women, whereas difficult-to-modify factors, such as baseline weight and education, appeared to have a bigger role among men.

T-3095-OR: Identification of Sex-Specific Thresholds for Accumulation of Visceral Adipose Tissue in Adults.

Tyler A. Bosch, PhD; Julia Steinberger, MD, M.S.; Alan Sinaiko, MD; Antoinette Moran, MD; Aaron S. Kelly, PhD; Donald Dengel, PhD;

Background

The body preferentially stores fat subcutaneously; at some point, however fat accumulates in the visceral region which results in adverse cardiometabolic outcomes. We hypothesized a threshold exists at which excess fat begins to accumulate in the visceral region.

Methods

Data were obtained from 735 (330F/405M) adults age 19-47 years. Body mass index ranged from 15-52 kg/m2. Total and regional body composition, including visceral fat was measured using dual energy X-ray absorptiometry (DXA). Blood was drawn to measure cardiometabolic risk factors and insulin sensitivity was measured using the hyperinsulinemic euglycemic clamp. Segmented linear regression identified sex-specific thresholds. T-tests compared cardiometabolic risk factors and body composition above and below each sex specific threshold. Partial correlations measured the association of VAT mass, total fat mass and subcutaneous fat with cardiometabolic risk factors above and below threshold.

Results
Adiposity thresholds were identified at 25.4% body fat in males and 40.3% body fat in females beyond which VAT accumulation increased significantly with increased adiposity. Below threshold females had higher subcutaneous fat depots than males but similar visceral fat was observed (0.3±0.3 vs 0.3±0.2 kg) between sexes. With few exceptions cardiometabolic risk factors were similar between sexes below threshold. Above threshold males had higher visceral fat (1.4±0.8 vs 0.9±0.6 kg, p<0.01) and a worse cardiometabolic risk profile.

Conclusions

Accumulation of visceral fat is not linear with increasing adiposity; distinct sex specific thresholds exist at which excess fat is distributed to the visceral region. The increase in visceral fat accumulation after threshold is associated with increased cardiometabolic risk, especially in males.

T-3096-OR: IRF4 is a Key Thermogenic Transcriptional Partner of PGC-1alpha

Xingxing Kong, MD, PhD; Tiemin Liu, PhD; Evan Rosen, MD, PhD;

T-3097-OR: Inositol Hexakisphosphate Kinase-1 (IP6K1) Regulates Lipid Accumulation via Modulation of Adipose Tissue Browning Mediated Thermogenesis

Anutosh Chakraborty, PhD; Qingzhang Zhu, PhD; Sarbani Ghoshal, PhD;

T-3098-OR: Cold-Induced Brown Adipose Tissue Activation and Appetite Regulation in Overweight/Obese Men.
T-3099-OR: Thiazolidinediones Induction of Brite Phenotype in Subcutaneous Human Adipose Tissue

MiJeong Lee; Felicia Lesman, None; Susan K. Fried, PhD; Vishwajeet Puri, PhD;

T-3100-OR: Characterization of Thermogenic Responses to Different Environmental Temperatures in Healthy Young Men

Robert Brychta; Jacob D. Hattenbach, BS; Sarah A. Smyth, BS; Paul Lee, MD PhD; Christopher R. Idelson, BE; Rachel Perron; Juan Wang, MD; Hiroyuki Sasai, PhD; Kong Y. Chen, PhD;

T-3101-OR: Skin Temperature Signatures for Detecting Brown Adipose Activation and Non-Shivering Thermogenesis in Healthy Young Men

Sarah A. Smyth, BS; Jacob D. Hattenbach, BS; Paul Lee, MD PhD; Christopher R. Idelson, BE; Rachel Perron; Juan Wang, MD; Hiroyuki Sasai, PhD; Kong Y. Chen, PhD; Robert Brychta;
T-3102-OR: Pilot Randomized Trial Demonstrating Reversal of Obesity-Related Abnormalities in Reward System Responsivity to Food Cues with a Behavioral Intervention

Sai Krupa Das, PhD; Susan B. Roberts, PhD; Lorien Urban, PhD; Taylor Salinardi, PhD; Payal Batra, Dr, PhD; Alexandra M. Rodman, BA; Amanda R. Arulpragasm, BS; Darin D. Dougherty, MD; Thilo Deckersbach, PhD;

T-3103-OR: Individual Differences in Reward-Related Neural Response to Food Commercials Predict Weight Gain in Adolescents

Sonja Yokum; Ashley Gearhardt, PhD; Jennifer Harris, PhD, MBA; Kelly Brownell, PhD; Eric Stice, PhD;

T-3104-OR: Homeostatic and Mesolimbic Reward Circuitry Activity is Associated With Reported Glycemic Load in Obese Women

Laura M. Holsen, PhD; Priyanka Moondra, BA; Kara Christensen, B.A.; David S. Ludwig, MD, PhD; Jill M. Goldstein, PhD;

T-3105-OR: Amylin Receptor Activation in the Ventral Tegmental Area
Preferentially Suppresses Fat over Sucrose Intake

Elizabeth G. Mietlicki-Baase, PhD; Lauren E. McGrath, BS; David J. Reiner, BS; Diana R. Olivos; Brianne A. Jeffrey, BA; Matthew R. Hayes, PhD;

T-3106-OR: Fasting Enhances Brain Responses to Anticipation of Monetary Reward in Humans

Sarah N. Ali, MD; Roberta Bowie, BA(Hons), MSc; Giuliana Durighel, MSc; John McGonigle, PhD; Anne R. Lingford-Highes, MD PhD; David J. Nutt, MD PhD; E Leigh Gibson, PhD; Jimmy D. Bell, PhD; Anthony P. Goldstone, MD;

T-3108-OR: How Does Meal Timing During Alternate Day Fasting Affect Weight Loss and Coronary Heart Disease Risk in Obese Adults?

Krista Varady

T-3109-OR: Dietary Adherence and Weight Loss are Similar Between Alternate-Day Fasting and Daily Calorie Restriction During a 24-Week Trial

John Trepanowski; Cynthia M. M. Kroeger, BaSC; Kristin Hoddy, BS; Jennifer C. Rood, PhD; Eric Ravussin, PhD; Krista A. Varady, PhD;
T-3110-OR: Long-term Consumption of a Low Carbohydrate, Low Saturated Fat Diet Improves Glycemic Control and Reduces Diabetes Medication Use and Cardiovascular Risk Factors in Type 2 Diabetes

Jeannie Tay; Natalie Luscombe-Marsh, PhD; Campbell H. Thompson, MD, DPhil; Manny Noakes, PhD; Jon D. Buckley, PhD; Gary A. Wittert, MD; William S. Yancy, Jr, MD; Grant D. Brinkworth, PhD;

T-3111-OR: Heads Up: A Statewide Translation of Surgical and Nonsurgical Weight Management Reimbursed by Insurance

Phillip J. Brantley, PhD, FTOS; Timothy Church, MD; Molly R. Matthews-ewald, PhD; Ricky D. Brock, RN; Catherine Champagne, PhD; Melissa Harris, MS; Valerie Myers, PhD; Robert Newton, Jr., PhD; Tipton McKnight, MD; Donna Ryan, MD;

T-3112-OR: Long-Term Effects of Very Low Carbohydrate and High Carbohydrate Weight Loss Diets on Mood Response in Overweight and Obese Adults with Type 2 Diabetes

Grant Brinkworth, PhD; Natalie Luscombe-Marsh; Campbell H. Thompson, MD, DPhil; Manny Noakes, PhD; Jonathan Buckley, PhD; Gary A. Wittert, MD; Carlene Wilson, BA (Hons) MBA PhD;
T-3113-OR: Dietary Fiber Intervention Results in Weight Loss and Improvements in Multiple Areas of Diet

Sherry L. Pagoto, PhD; Kristin L. Schneider, PhD; Effie Olendzki, MS, MBA; Barbara Olendzki, RD, MPH; Hua Fang, PhD; Gioia M. Persuitte, MPA; Yunsheng Ma, PhD;

T-3114-OR: Maternal Intuitive Eating: A Protective Variable Against Restrictive Child Feeding

Tracy L. Tylka, PhD; Jessica C. Hummel, BA; Rosara Milstein, MS; Rosanna Watowicz, MS, RD, LD; Julie C. Lumeng, MD; Ihuoma Eneli, MD, MS;

T-3115-OR: Toddler General Self-Regulation and Later Eating Habits: Does Parental Rule About Food Type Matter?

Neha N. Sharma, BS; Xiaozhong Wen, MD, PhD; Rina D. Eiden, PhD; Kai Ling K. Kong, PhD; Chuanbo Xie, PhD;

T-3116-OR: The Connections between a Chaotic Home Environment, Maladaptive Maternal Eating and Feeding Behaviors and Child Eating Behaviors
T-3117-OR: Availability and Access to Candy within the Home is Associated with Children’s Candy Intake in a Free Access Setting and Frequency of Candy Intake in the Home

Julia A. Bleser; Brandi Y. Rollins, PhD; Jennifer S. Savage, PhD; Leann L. Birch, PhD;

T-3118-OR: Are Covert Feeding Practices Beneficial? The Effects of Covert Feeding on Children’s Candy Intake in a Free Access Setting Differ by General Parenting Practices

Brandi Y. Rollins, PhD; Jennifer S. Savage, PhD; Leann L. Birch, PhD;

T-3119-OR: Disordered Eating Behaviors Among Obese Children Living in Food-Insecure Households: A Qualitative Study

June Tester, MD; Tess Lang, MD; Barbara Laraia, PhD RD MPH;

Louise A. Baur, PhD, FRACP; Li Ming Wen, MD, MMed, PhD; Chris Rissel, PhD; Judy Simpson, PhD;

T-3121-OR: STIVI Pilot RCT on Lifestyle Impact on Obesity and Other Health Outcomes in Participants in Cancer Screening: Preliminary Results

Livio giordano, MD; andrea pezzana; federica gallo, dr; andrea menardi, RD; caterina anatrone, biologist; carlo senore, MD; nereo segnan, MD;

T-3122-OR: Weight and Glucose Outcomes of the Fit Body and Soul Study: A Randomized Controlled Diabetes Prevention Program Conducted Through African-American Churches

Lovoria B. Williams, PhD; Jane T. T. Garvin, PhD, FNP-BC, RN; Richard Sattin, MD;
T-3123-OR: Repeated Lifestyle Intervention Leads to Weight Loss Maintenance

Sune Dandanell; Christian Ritz, PhD; Flemming Dela, MD; Jørn W. Helge, PhD;

T-3124-OR: Do Financial Incentives Promote Uptake of Telephonic Health Coaching Within a Health Plan?

Jason P. Block, MD; Dennis Ross-Degnan, ScD; Matthew Gillman, MD, SM; Sheryl Rifas-Shiman, MPH; Renata L. K. Smith, MPH; Ken Kleinman, ScD;

T-3125-OR: A Comparison of Choice Architecture and Chef-Enhanced Meals on Healthier School Food Selection and Consumption

Juliana FW. Cohen, ScM, ScD; Ellen Parker, MBA, MSW; Scott Richardson, MBA; Eric B. Rimm, ScD;

T-3126-OR: The Association between Calorie Intake, Macronutrient Intake, and Physical Activity with Obesity over Time

Ruth E. Brown, MSc; Arya M. Sharma, MD, PhD; Chris I. Ardern, PhD; Jennifer L. Kuk, PhD;
T-3127-OR: Effect of Dietary Protein Intake on Diet-Induced Thermogenesis During Overfeeding

Elizabeth A. Frost, ; Leanne M. Redman, PhD; George Bray, MD;

T-3128-OR: PTP1B Is a Novel Physiological Regulator of BDNF/TrkB Signaling in the Brain

Ceren Ozek; Scott E. Kanoski, PhD; Zhong-Yin Zhang, PhD; Harvey J. Grill, PhD; Kendra K. Bence, PhD;

T-3129-OR: Meal Size and Meal Frequency in Pediatric Overweight

Hayley Syrad; Clare H. Llewellyn, PhD; Laura Johnson, PhD; David Boniface, MA, MSc, MA.; Cornelia HM. van Jaarsveld, PhD; Jane Wardle, PhD;

T-3130-OR: Influence of Gene-By-Smoking Interaction on Obesity-Related Traits: The GIANT (Genetic Investigation of ANthropometric Traits) Consortium

Kristin Young; Virginia Fisher, MA; Anne Justice, PhD; Thomas Winkler, Mr; Jacek Czajkowski, MS; Misa Graff, PhD; Luting Xue, PhD; Qibin Qi, PhD; Anubha Mahajan, PhD; Lu Qi, MD, PhD; David Hadley, PhD; Julius Ngwa, PhD; Nancy L. Heard-Costa, PhD; Tarunve
T-3131-OR: Quantitative Gastrointestinal and Psychological Traits and Latent Dimensions in Normal Weight, Overweight and Obese Adults

Andres Acosta
Maria Vazquez Roque

T-3132-OR: Associations among diet, physical activity, and the changing distribution of BMI in Chinese adults over 16 years of modernization

Samantha Attard
Amy Herring

T-3133-OR: Mind the gap: electroencephalographic record of brain reactivity to visual food cues is different in successful and unsuccessful dieters

David Hume
Fleur Howells
T-3134-OR: Glucagon like peptide-1 receptor signaling in the paraventricular nucleus of the thalamus reduces chow intake and progressive ratio responding for sucrose

Zhi Yi Ong
Amber Alhadeff

T-3135-OR: Dysfunctional adipose tissue drives obesity-related colorectal cancer

Vanessa Declercq
David McMurray

T-3136-OR: Cold-Induced Thermogenesis Does Not Correlate with Diet-Induced Thermogenesis in Lean Healthy Men

Courtney Peterson
Virgile Lecoultre

TLB-2000-P: Adrenergically stimulated glucose uptake in brown fat is dependent on mTOR complex 2
**Background**

An important function of brown fat is that it can, upon adrenergic stimulation, increase glucose uptake to a very large degree and consume, in addition to free fatty acids, a high amount of glucose per gram tissue from the blood. This makes brown fat a potentially important therapeutic target for metabolic diseases.

**Methods**

In this study, ß3-adrenoceptor stimulated glucose uptake was measured in vitro and in vivo using primary brown adipocytes and 129SV mice. Experiments were performed with KO mice, siRNA and pharmaceutical inhibitors of specific targets.

**Results**

Our data puts a light on a novel pathway demonstrating that mTOR is necessary for ß3-adrenoceptor stimulated glucose uptake in brown fat. More specifically we show that mTOR complex 2, rather than mTOR complex 1, is necessary for stimulation of glucose uptake. We show that stimulation of ß3-adrenoceptors increases glucose uptake via a signalling pathway divided into two parts. The first part is dependent upon increased cAMP levels, a large increase in GLUT1 transcription and de novo synthesis of GLUT1, which is not dependent on mTOR. The second part involves translocation of the produced GLUT1 to the plasma membrane by a mTORC2 mediated pathway leading to a great increase in glucose uptake.

**Conclusions**

This is the first time mTORC2 is demonstrated to be necessary for adrenergically stimulated glucose uptake in brown fat. We show that glucose uptake in brown fat is dependent on two pathways, GLUT1 transcription and mTORC2 mediated translocation, and that both processes most likely must be stimulated if brown fat is to be used as a therapeutic target.

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**TLB-2001-P: Interleukin 6 and Human Gut Microbiota in Overweight and Obese Adults**

**Background**

Intestinal microbiota have a profound effect on health and inflammatory response. Interleukin 6 plays a crucial role in inflammation and chronically high levels are associated with disease states such as obesity and diabetes. Linking the two would open up new diagnostic and treatment possibilities.
Methods

To investigate the fermentability of a novel fiber 22 humans participated in a crossover study with 3 arms: high, low, or control fiber levels. Each 3-wk arm was separated by 2-wk washouts. Feces was collected during washouts when subjects ate their usual diets, and in the 3rd wk of each arm when subjects consumed a controlled diet and a fiber treatment. Test days with blood draws were held at the end of treatments. Fecal bacterial 16S rRNA genes were sequenced to determine microbiota diversity and relative abundance. Plasma was assayed for Interleukin 6 concentration (IL-6). Relationships between microbiota and IL-6 were determined in R.

Results

As no strong treatment effects were seen, microbial abundance and IL-6 were examined with data from all treatments. Subjects were classified by IL-6 concentration (pg/mL), and microbiota of those with high IL-6 (16.6 ± 1.0) was compared to those with low IL-6 (7.9 ± 0.9). Using Partial Least Squares Regression clear separation was seen between the abundance of microbiota in high vs. low IL-6 subjects. MANOVA testing showed a significant difference (p = 0.02619) between the abundance of Clostridium leptum, Blautia hydrogenotrophica, Ruminococcus and Bifidobacterium pullorum in the two groups.

Conclusions

This study shows an association between abundance of particular microbes and circulating IL-6. It also pinpoints microbes that may either participate in altering IL-6 levels, or may be sensitive to changes in inflammatory condition. Future research is needed to determine the causal factor.

TLB-2002-P: Probiotic Supplement Attenuates Body Weight and Fat Gain During High Fat Feeding in Humans

Kevin Davy, PhD; Kristin Osterberg, PhD, RD; Nabil Boutagy, PhD; Ryan McMillan, PhD; Madlyn Frisard, PhD; Brenda Davy, PhD RD FTOS; Matthew Hulver, PhD

Background

Background: Probiotic supplementation with a multispecies probiotic, VSL#3, attenuates body fat gain and improves insulin sensitivity during high fat feeding in animal models. We tested the hypothesis that VSL#3 would attenuate the increase in body weight and fat gain and the reduction in insulin sensitivity with high fat feeding in humans.

Methods

Twenty non-obese males (18-30 y) volunteered to participate in the study. Following a 2-week eucaloric control diet, subjects underwent measurements of body composition (DEXA) and insulin sensitivity (IVGTT). In addition, skeletal muscle biopsies were obtained for in vitro measurements of substrate
oxidation (1-14C palmitic acid and U-14C glucose). Serum endotoxin was measured (Recombinant Factor C Endotoxin Detection Assay). Subsequently, subjects were randomized to receive either VSL#3 (900 billion live bacteria) or matching placebo during 4-weeks of consuming a high fat (55% fat), hypercaloric diet (+1,000 kcal/day) and baseline measurements were repeated again at completion.

**Results**

There were no differences between the groups in the dependent variables at baseline. Body weight (1.42 Â± 0.42 vs. 2.30 Â± 0.28 kg) and body fat (0.64 Â± 0.09 vs. 1.29 Â± 0.27 kg) increased less (both P<0.05) following the high fat diet with VSL#3 compared with placebo. However, insulin sensitivity, skeletal muscle substrate oxidation, and serum endotoxin did not change (all P>0.05) with high fat diet or VSL#3 treatment.

**Conclusions**

VSL#3 attenuated body weight and fat gain following a 4-week high fat diet compared with placebo. There were no significant effects of the high fat diet or VSL#3 on insulin sensitivity, skeletal muscle substrate oxidation, or serum endotoxin concentrations.

**TLB-2003-P: Metreleptin therapy alters appetite and neural responses to food stimuli in brain areas of leptin sensitive subjects without altering brain structure.**

*Olivia Farr, PhD; Panagiotis Papageorgiou; Mary Brinkoetter, MS; Florencia Ziemke, MD; Rafael Rojas, MD; Christos Mantzoros, MD*

**Background**

Leptin is a key regulator of energy intake and expenditure. Individuals with congenital leptin deficiency demonstrate structural and functional brain changes when given recombinant human leptin (metreleptin). However, whether acquired leptin deficiency may operate similarly is unclear. Here, we sought to determine whether the brains of individuals with acquired leptin deficiency may react to leptin in a similar manner. We hypothesized that metreleptin treatment would increase brain activity in areas related to cognitive control and inhibition, and would decrease brain activity in areas related to reward processing as compared to their normoleptinemic counterparts.

**Methods**

Thus, we used fMRI before and after short (1 week) and long-term (24 weeks) metreleptin treatment in three leptin sensitive patients with acquired hypoleptinemia. Nine healthy women were scanned as normoleptinemic controls.
Results

Unlike patients with congenital leptin deficiency, hypoleptinemic patients demonstrated no structural brain differences from healthy controls and/or structural changes in response to metreleptin. Short-term metreleptin treatment in leptin-sensitive hypoleptinemic subjects enhances areas involved in detecting the salience and rewarding value of food during fasting, while long-term treatment decreases attention to and the rewarding value of food after feeding. Furthermore, hypothalamic activity is modulated by metreleptin treatment and metreleptin decreases functional connectivity of the hypothalamus to key feeding-related areas in these hypoleptinemic subjects.

Conclusions

Metreleptin replacement in acquired hypoleptinemic women did not alter brain structure but did alter functional cortical activity to food cues in key feeding and reward-related areas.

TLB-2004-P: Liraglutide alters activation of the parietal cortex with high fat food cues.

Olivia Farr, PhD; Michael Tsoukas, MD; Bindiya Thakkar, MD; Fadime Dincer, MD; Lesya Zaichenko, BS; Christos Mantzoros, MD

Background

Obesity is a growing problem in industrialized countries, and effective treatments are increasingly required to treat it. Liraglutide is a glucagon-like peptide-1 (GLP-1) analog which has been found to successfully treat diabetes and promote weight loss. The mechanism by which liraglutide may confer weight loss is unclear- whether peripherally through actions on the digestive system and/or centrally through the brain. Thus, we attempted to delineate how liraglutide may impact neural responses to food cues.

Methods

In a randomized, placebo-controlled, double-blind, cross-over study, we examined how brain responses to high fat and low fat images may differ after short-term liraglutide treatment using fMRI in 19 subjects who were treated with placebo or liraglutide for a total of 17 days each (0.6 mg for 7 days, 1.2 mg for 7 days and 1.8 mg for 3 days).

Results

When participants were on liraglutide, they showed significantly increased fasting GLP-1 levels (p<0.001), decreased fasting blood sugar levels (p<0.002), and decreased fasting leptin levels (p<0.010). Liraglutide decreased activation of the parietal cortex for high fat as compared to low fat food images (p<0.001, uncorrected).
**Conclusions**

Liraglutide may alter brain activity related to attention to high fat food cues thus conferring a central mechanism underlying its effects on metabolism/weight loss.

**TLB-2005-P: Food Order has a Significant Impact on Post-prandial Glucose Levels**

*Alpana Shukla, Other; Radu Iliescu, BS, MS; Catherine Thomas, BS; Louis Aronne, MD*

**Background**

Large interventional studies have shown that maintaining near-normal glycemic control reduces the risk for microvascular and macrovascular complications in type 2 diabetes. Post-prandial glucose levels are an important contributor to overall glycemia and an independent risk for atherosclerosis and cardiovascular mortality. Previous studies utilizing an Eastern diet have shown that eating vegetables before rice lowers post-prandial glucose levels. Ingestion of protein before a meal has also been shown to lower post meal glucose spikes. The aim of this study is to examine the effect of food order on post prandial plasma glucose levels by replicating a standard Western meal pattern incorporating vegetables, protein and carbohydrate.

**Methods**

Six overweight/obese subjects (BMI 25-40kg/m2) with type 2 diabetes (HbA1c ≈ 8%) on metformin were studied using a within subject crossover design. After a 12 hour fast, subjects consumed an isocaloric meal with the same composition on 2 separate days. At the first visit, the food order was carbohydrate (bread) followed 15 minutes later by protein (chicken) and vegetables; the food order was reversed a week later. Plasma glucose was measured at baseline and 30, 60 and 120 min after the meal.

**Results**

The mean fasting plasma glucose levels were similar on the 2 days. The average plasma glucose level at 60 min was 40% lower (124±30 vs. 207±51 mg/dl, p=0.0005) and the incremental area under the curve (iAUC) for plasma glucose was significantly less (1637±1324 vs. 8043±3526 mg/dl/120min, p=0.002) when vegetables and protein were consumed first before carbohydrate, compared to the reverse food order.

**Conclusions**

Food order has a significant impact on post-prandial glucose levels and may be an effective strategy to improve glycemic control in overweight/obese patients with type 2 diabetes.
TLB-2006-P: A high-protein intermittent-fasting (HP-IF) diet enhances body composition, arterial function, and toxin mobilization following weight-loss maintenance in obese adults

Paul Arciero, PhD; Emery Ward, M.Sc.; Olivia Minicucci, Student; Allison Keller, BS; Feng He, PhD; Eric Gumpricht, PhD

Background

Recently, we reported a low-calorie higher-protein intake combined with intermittent-fasting (HP-IF) elicited significant weight loss and other health benefits over 10-weeks. Herein, we compared the effects of continued adherence to HP-IF vs. an established "heart healthy" (HH) diet during a 6 month weight maintenance (WM) follow-up in the same subjects.

Methods

Thirty-four men and women participated in WM phase and were divided into either HP-IF (n=18; requiring 2 daily servings of ~20 grams high-quality protein) and fasting (1-2X/month) or approved HH diet (n=16). Subjects consumed food ad libitum and met with a dietitian monthly. Waist circumference (WC), % body fat (%BF), lean body mass (LBM), arterial function (return time, RT; pulse wave velocity, PWV), and biomarkers (PCB; insulin, INS; total antioxidant capacity, TAC) were measured following 6 month WM.

Results

Compliance was >85% for WM phase. Groups had similar baseline characteristics (48±3 vs. 49±2, years; 98±4 vs. 95±4, Kgs; 42±2 vs. 39±2, %BF; 34±1 vs. 33±1, BMI) HP-IF and HH, respectively. Following WM, HP-IF significantly (P<0.05) reduced WC (-2.0 vs. 2.0 cm) and PWV (-0.5 vs. 0.6 m/s), increased RT (10.1 vs. -12.2 ms) and PCB mobilization (11.1 vs. -31.0 ng/g lipid) and showed a tendency (P<0.07) for greater loss of %BF (2.0% vs. 0%) and increased %LBM (2.0% vs. 0%) compared to HH. Both groups improved plasma INS (-1.1 vs. 0.9 ÅµU/ml) and TAC levels (6.3 vs. 6.5 nmol/ml).

Conclusions

Our findings demonstrate subjects may adhere to an HP-IF diet for at least 6 months post initial-weight loss and HP-IF was more effective than HH on body composition, cardiovascular health and PCB mobilization.
TLB-2007-P: Race and sex differences in weight change in the Low-Carbohydrate Diet versus the Orlistat Plus Low-Fat Diet trial.

Bryan Batch, MD; Hayden Bosworth, PhD; Linda Sanders, MPH; Amy Jeffreys, MStat; William Yancy, MD

Background

The prevalence of obesity differs among sex and racial subgroups. In weight management trials, sex and race differences are seen regarding magnitude of weight loss. Understanding differences among various interventions might lead to insights regarding obesity management and improved tailoring of therapy.

Methods

The study compared body weight change over 48 weeks in Durham NC Veterans Affairs Medical Center outpatients enrolled in the Low-Carbohydrate Ketogenic Diet (LCKD) versus Orlistat plus Low Fat diet (O+LFD) randomized trial. The primary outcome for this analysis was percent change in weight at 48 weeks.

Results

Among the 146 participants included in the analysis, 74 were randomized to the O+LFD and 72 were randomized to the LCKD. 57% of participants were African American and 28% were women, with similar demographics between arms. The average percent weight loss in men in each group was 9.4% (O+LFD) and 10.2% (LCKD). Women in each group lost 10.3% (O+LFD) and 8.9% (LCKD). African Americans in each group lost 9.1% (O+LFD) and 7.3% (LCKD). Whites in each group lost 13.0% (LCKD) and 10.6% (O+LFD). Within group comparisons showed women and men in the O+LFD group lost 10.3% and 9.4% respectively. Whites and blacks in the LCKD group lost 13.0% and 7.3% respectively.

Conclusions

In a post-hoc analysis of a randomized trial, women lost as much weight as men in the orlistat +LFD group, and whites lost almost twice as much weight as blacks in the LCKD group. These patterns of weight change by sex and race have the potential to inform the design of future behavioral interventions focused on eliminating disparities in obesity.
Can congruency between food preferences and weight loss dietary approach improve weight loss?

Megan McVay, PhD; Corrine Voils, PhD; Valerie Smith, MS; Paula Geiselman, PhD; Cynthia Coffman, PhD; William Yancy

Background

When choosing between different dietary approaches to weight loss, individuals may choose the diet that is most congruent with their food preferences. However, it is not known if congruency between food preferences and diet are related to weight loss.

Methods

We conducted a secondary analysis of data from a clinical trial in which participants were randomized to either a “choice” arm, in which they were allowed to select between a low-fat diet (LFD; n=44) and low-carbohydrate diet (LCD; n=61), or to a “no choice” arm, in which they were randomly assigned to an LFD (n=49) or LCD (n=53). Participants were provided a 48-week weight loss lifestyle counseling program. Food preferences were measured at baseline and at 48 weeks with the Geiselman Food Preference Questionnaire (FPQ), which was used to calculate a LCD/LFD congruency score. Linear regression was used to determine if baseline LCD/LFD congruency scores and FPQ high-fat/high-sugar food preference scores were associated with weight change at 48 weeks in four conditions: 1) LFD/choice, 2) LFD/no choice, 3) LCD/choice, and 4) LCD/no choice. Additionally, changes in food preferences from baseline to 48 weeks were tested for associations with weight change at 48 weeks in each of the diet/choice conditions.

Results

Participants were 73% male, 51% African American, and had a mean age of 55. Baseline LCD/LFD congruency and baseline high-fat/high-sugar food preferences were not associated with 48 week weight change in any diet/choice conditions. An increase in preference for LCD foods from baseline to 48 weeks was associated with weight loss in the LCD/no choice condition (p=.03), while change in LCD/LFD congruency was not associated with weight change in the other 3 diet/choice conditions. Change from baseline to 48 weeks in FPQ high-fat/high-sugar food preference was not associated with weight change in any of the diet/choice conditions.

Conclusions

Results suggest that choosing a dietary approach based on congruency with food preferences will not influence weight loss. The development over time of greater congruency between food preferences and diet may contribute to greater weight loss in LCD but not LFD.
Background

Cardiovascular disease (CVD) is the leading cause of death in the United States for middle-aged men and women despite the fact that prevention and control of CVD is achievable by modifying risk factors through lifestyle changes and diet therapy. We examined the impact of four diet programs (plant-based (Vegan), Mediterranean, Paleolithic (Paleo) and DASH diets) on the CV risk factor profile of adults in the Hampton Roads area of Virginia.

Methods

Nondiabetic adults (ages 35-85) with one or more risk factors for CVD were invited to participate in 1 of the 4 diet arms. Participants underwent a comprehensive nutrition education program prior to a 60-day diet intervention in which they kept a daily food log and met weekly with a multi-disciplinary study team. An initial health screen was performed to assess weight, blood pressure (BP), fasting glucose (FPG), A1C, lipids and lipoprotein particles, and repeated after 60 days on the diet and at 6-months follow-up.

Results

279 subjects completed the 60-day dietary intervention (58 Vegan, 80 Mediterranean, 76 Paleo, 65 DASH), and 199 returned for 6-month follow-up. Most subjects were female, Caucasian, mean age 56, mean BMI 33 kg/m2. At baseline, mean FPG, TG and HDL-C were within the normal range, whereas LDL-P and BP were elevated. After 60 days on the respective diets, subjects lost an average of 9 lbs (4.7% body weight, total 2,576 lbs), which was associated with improvements in BP across all groups. Subjects on the Vegan and Paleo diets lost the most weight (~6.5%) and showed the greatest improvement in lipid risk factors (11-14% decrease in LDL-P; 10-20% decrease in VLDL and TG).

Conclusions

All four diets promoted weight loss and improved BP but had variable effects on lipid risk factors. Effects were greatest and sustained in those subjects that attended regular diet support group meetings.
TLB-2010-P: A preliminary investigation into whether early intervention can improve weight loss among those initially non-responsive to an Internet-based behavioral program

Jessica Unick, PhD; Leah Dorfman, MS, MPH; Tricia Leahey, PhD; Rena Wing, PhD

Background

Low initial weight loss (WL) in behavioral programs is predictive of poor WL long-term. Thus, it has been suggested that early rescue (ER) efforts may increase the number of individuals successfully treated. To date, ER has not been tried within Internet programs. This study examined whether providing ER to those with poor WL at week 4 in an Internet program improves WL post-treatment.

Methods

100 subjects (33.4±6.6kg/m²) were randomly assigned to a 12-week Internet behavioral WL program (IBWL; n=50) or the identical Internet program plus ER if needed (IBWL+ER; n=50). All subjects were instructed to view weekly video lessons and self-monitor calories, weight, and exercise daily. IBWL+ER subjects with a 4-week WL <2.3% (early non-responders; n=12) received ER, consisting of 1 face-to-face meeting, 2 follow-up phone calls, and the provision of meal plans. IBWL+ER early non-responders were compared to IBWL early non-responders who were not offered ER (n=21), and initial responders from both treatment arms (4-week WL ≥2.3%; n=58).

Results

12-week WL in IBWL+ER early non-responders was twice as large as early non-responders in IBWL alone, who did not receive ER (-3.94±2.0% vs. -1.84±2.9%; p=0.07; d=0.84), yet still less than initial responders (-6.42±3.4%; p<0.02). IBWL+ER early non-responders viewed more video lessons (8.2 vs. 5.4 videos out of 12) and logged calories on more days (81.9% vs. 58.9% of days) compared to IBWL early non-responders (p<0.05), and had similar adherence as initial responders (p>0.05).

Conclusions

This study provides initial evidence that the provision of ER efforts to those with poor initial WL in an Internet program improves treatment adherence and post-treatment WL, compared to those not receiving ER. Future studies should examine whether these improvements are maintained long term and whether ER is cost effective.
TLB-2011-P: Short-term stress management program produces improvements in BMI, blood pressure, depression, perceived stress, and quality of life

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Background

Effective non-surgical long-term weight loss solutions remain elusive, perhaps because standard programs do not address the complexity of the issue, such as the role of stress, which promotes weight gain. The purpose of this study was to compare a behavioral weight loss (BWL) program with a stress management-based program, Emotional Brain Training (EBT), an integrative behavioral and emotional skills training program, on weight loss, blood pressure, depression, perceived stress, and quality of life (QoL).

Methods

49 participants were randomized to EBT or BWL for a 10 week group-based intervention followed by a 10 week low-contact period. At baseline, the two groups did not differ: participants were 83.7% female, 81.6% Caucasian, age = 44.7 + 8.4 years, BMI = 36.6 + 4.5 kg/m2. Assessments were at baseline, 10, and 20 weeks. T-tests were used to compare groups and paired t-tests for within group changes.

Results

At 10 weeks, EBT improved BMI (0.5 +1.0 units; p=0.02), depression (p=0.05), perceived stress (p<0.001), mental and physical QoL (p<0.001, p=0.02), and systolic blood pressure (p=0.05) and BWL improved BMI (1.2 + 1.1 units; p<0.001), diastolic blood pressure (p=0.01), and mental QoL (p=0.02). BWL produced greater improvement in BMI than EBT (p=0.04) and EBT produced greater improvement in perceived stress than BWL (p=0.04). At 20 week follow-up, EBT maintained improvements in BMI (p=0.05), systolic blood pressure (p=0.002), perceived stress (p=0.001), and mental QoL (p=0.001), BWL maintained changes in BMI (p<0.001). The two groups differed at 20 weeks on BMI only (p=0.03).

Conclusions

While both groups produced sustained weight loss, EBT also produced sustained improvements in related health outcomes. A more holistic program, such as EBT, may produce greater sustained changes in weight and health outcomes over the long-term.
TLB-2012-P: Interrupting Sedentary Time Improves Postprandial Metabolism in Older Adults

Kate Lyden, PhD; Tracy Swibas, MS; Kerry Hildreth, MD; Edward Melanson, PhD

Background

Sedentary behavior (SB) is a major modifiable risk factor associated with chronic disease and disability in older adults (OA). Studies in middle-aged adults show that interrupting SB with short intermittent walking bouts reduces postprandial glucose and insulin responses, but this has not been studied in OA. The purpose of this on-going study in OA is to compare 1) postprandial glucose and insulin metabolism during an intermittent walk (IW) condition versus a no walk (NW) control period and 2) insulin sensitivity in response to IW versus a continuous walk (CW) condition.

Methods

Healthy, overweight/obese OA (BMI = 33.7 +/- 3.2, age = 68.6 +/- 3.7y) completed a no walk (NW) control period and 2, 24h conditions in a controlled setting; 1) IW: for 12h, SB was interrupted every 30m with 1.5m of moderate intensity walking (36m total) and 2) CW: a continuous walking bout (36m) was performed in the morning (~8AM) followed by uninterrupted SB for the remainder of the waking day. Postprandial glucose and insulin were measured for 5h during IW and NW. Insulin sensitivity (hyperinsulinemic-euglycemic clamp) was measured immediately following IW and CW.

Results

In all participants (N=5), insulin but not glucose AUC was reduced following IW compared to NW (mean +/- SE insulin AUC = -3023 +/- 1221, insulin AUC = 1572 +/- 479). Insulin sensitivity was not different after IW compared to CW (mean +/- SE glucose disposal rate: IW = 5.5 +/- 1.0 mg/kg/m, CW = 5.5 +/- 1.1).

Conclusions

These preliminary data suggest intermittently interrupting SB improves postprandial metabolism by reducing insulin concentrations. Additionally, intermittently interrupting SB has a similar affect on insulin sensitivity as a traditional exercise prescription, suggesting this may be an effective strategy to improve glucose and insulin metabolism in OA.

TLB-2013-P: A Randomized, Double-blind, Placebo-Controlled Study Using Low-Level Laser Therapy for Reducing
Hip, Waist and Upper Abdomen Circumference of Obese Individuals

Steve Shanks; Victoria Hagstrom, MD

Background

Previous studies demonstrated the effectiveness of low-level laser therapy (LLLT) for reducing hip, thigh and abdomen circumference of persons with a body mass index (BMI) <30 kg/m². This randomized, double-blind, placebo-controlled parallel group study assessed the effectiveness of a LLLT device for reducing body circumference of persons with a BMI of 30-40 kg/m².

Methods

Obese but otherwise healthy adult men and women with a BMI of 30-40 kg/m² were enrolled. The LLLT device consists of 10 independent 17 mW, 532 nm green laser diodes positioned 120 degrees apart and titled 30 degrees (Erchonia® Obesity Laser; Erchonia Corporation, McKinney, TX). The sham LLLT device emits similar inert visible light when activated. The hips, waist and upper abdomen circumference of each subject was measured prior to treatment. Each subject received three weekly 30-min LLLT treatment sessions over a 4-week period, treating the front and back of the target areas for 15 minutes. Outcome measures included a significant difference in the proportion of subjects with a ≥3-inch reduction in combined baseline hip, waist and upper abdomen circumference and subject satisfaction. ClinicalTrials.gov Identifier: NCT01821352.

Results

Fifty-three subjects were randomized to the LLLT (N=28) and the placebo groups (N=25). Among LLLT group, 71.43% attained a ≥3-inch decrease in combined circumference measurements vs. 12% in the sham group (p<0.00005). Among subjects with a ≥3-inch decrease, the mean decrease was 6 inches. Most subjects (79%) in the LLLT groups were Very or Somewhat Satisfied with their results vs. 16% of sham-treated subjects. There was no changes in body weight or BMI. There were no adverse events.

Conclusions

LLLT safely and effectively reduces hip, thigh and abdomen circumference of persons with a BMI of 30-40 kg/m².

TLB-2014-P: Chronic Administration of Gelesis100 to Non-Diabetic Overweight and Obese Subjects Significantly Decreases Fasting Glucose and
Normalizes Fasting Glucose Status in Prediabetic Subjects Through Both Weight-Dependent and Weight-Independent Mechanisms

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Background

Gelesis100 is a novel hydrogel with weight-loss properties.

Methods

The effect of Gelesis100 (2.25 g and 3.75 g, twice daily) on body weight, fasting glucose, and fasting glucose status was assessed in 128 non-diabetic overweight and obese adult subjects. Treatment was administered orally in capsules, before lunch and dinner, in a double-blind, parallel-group fashion, over 12 weeks, in subjects on hypocaloric diet (-600 kcal/day).

Results

In the intention-to-treat population (n = 125), body weight changes (mean ± SD) from baseline to the end of treatment were -6.1 ± 5.1% (P = 0.026 vs placebo), -4.5 ± 4.5%, and -4.1 ± 4.4%, with Gelesis100 2.25 g (n = 42), Gelesis100 3.75 g (n = 41), and placebo (n = 42), respectively. In prediabetic subjects (n = 29), weight loss was dramatic in subjects on Gelesis100 2.25 g (-10.9 ± 4.3%; P = 0.019 vs placebo). Fasting glucose changes (mean ± SD) from baseline to the end of treatment were -5.8 ± 9.9% (P = 0.003 vs placebo), -3.3 ± 9.8%, and 1.2 ± 11.1%, with Gelesis100 2.25 g, Gelesis100 3.75 g, and placebo, respectively. Conversion from prediabetes status at baseline to normal fasting glucose status at the end of treatment was observed in 56%, 78%, and 27% of the subjects, with Gelesis100 2.25 g, Gelesis100 3.75 g, and placebo, respectively. The improvement of glycemic control with Gelesis100 was observed in both weight responders (≥ 5% weight loss) and weight non-responders (< 5% weight loss). The safety profile of Gelesis100 was similar to or better than placebo. No subject developed hypoglycemia.

Conclusions

Chronic administration of Gelesis100 to non-diabetic overweight and obese subjects significantly decreases body weight and fasting glucose and normalizes fasting glucose status in prediabetic subjects through both weight-dependent and weight-independent mechanisms. The treatment is well tolerated.
Optimizing exercise stimuli is important for preventing adverse health outcomes associated with obesity. Low-volume high-intensity interval training (HIIT) has recently been shown to improve a number of cardiometabolic health outcomes similarly to moderate intensity exercise training (MIT) despite requiring 1 hr of training per week for HIIT vs 6 hrs for MIT. Purpose: To compare the effects of HIIT vs MIT for improving cardiovascular fitness, blood lipids, vascular hemodynamics, body composition, and insulin sensitivity (SI) in a cohort of sedentary, overweight, adolescent males.

Methods

Subjects were 21 overweight sedentary males (Age: 20 ± 1.5, % fat: 31.8 ± 6.4%). Outcomes were measured at baseline and 6 weeks post training.

Results

These preliminary data demonstrate a significant time effect for VO2 peak (P = 0.01), cholesterol (P = 0.04), systolic (P = 0.02) and diastolic blood pressure (P = 0.01) (SBP, DBP), systemic vascular resistance (P = 0.03), % fat (P = 0.01), and body weight (P = 0.04) following training. A significant time x group interaction was observed for VO2 peak (P = 0.04), SBP (P = 0.01), and DBP (P = 0.01) following training; such that MIT participants experience significant improvements compared to the HIIT group. No significant improvements were observed for SI, resting metabolic rate, or other blood lipid and vascular hemodynamic measures.

Conclusions

These preliminary data confirm that both HIIT and MIT can decrease body weight, adiposity, blood cholesterol, and vascular resistance; however MIT exercise may be a superior training mode for improving cardiovascular health outcomes.
TLB-2016-P: Infants eating junk food? Feeding practices in a diverse population of infants

Anna Brannen, MS; Rocio Gonzalez, Student; Chantelle Hart, PhD; Rena Wing, PhD; Suzanne Phelan, PhD

Background

Early introduction of solids (< 6 months) and child intake of non-nutritive, high-fat/high-sugar foods are risk factors for obesity. However, few prospective studies have evaluated infant intake in the first year of life.

Methods

The purpose of this study was to describe intake of non-nutritive foods (NNF) in a diverse sample of 285 infants. Mothers were 153 normal weight (NW) and 132 overweight/obese (OW/OB) mothers enrolled in a prenatal lifestyle intervention trial; 67% non-Hispanic white. Mothers completed CDC infant feeding practices (IFP) questionnaire to assess food intake, including sweet foods (SF) (candy, cookies, cake), sugar-sweetened drinks (SSD) (soft drinks, soda, Kool-Aid) and French fries (FF) at 6 weeks, 6 months, and 12 months.

Results

Solids were introduced before 6 weeks in 18% of mothers; and prior to 6 months in 70%. At 6 months, < 4% reported feeding NNF. By 12 months, infant intake of SF, FF, and SSD increased to 32.2%, 21.2%, and 9.2% of children, respectively. More low-income than high income mothers reported feeding FF at 6 months (3.8% vs 0%; p = 0.01) and 12 months (33 vs16%; p = 0.001) and SSD at 12 months (18.5% vs 5.5%; p = 0.002). Intake of NNF was not related to infant anthropometrics.

Conclusions

A significant portion of mothers reported feeding solid foods before 6 months and providing of SF, SSD and FF before 12 months. NNF can displace other vital nutrients and lead to early obesity. Future research should study ways to improve IFP, focusing on low-income mothers.

TLB-2017-P: The role of health information sources in decision-making
among Hispanic mothers during their children’s first 1000 days of life

Shaniece Criss, MPH; Jennifer Woo Baidal, MD, MPH; Roberta Goldman, PhD; Meghan Perkins, MPH; Courtney Cunningham, MPH; Elsie Taveras, MD, MPH

Background

This qualitative research aimed to explore how health information sources inform decision-making among Hispanic mothers during their children’s first 1000 days of life (conception-age 24 months), and to generate appropriate health information sources and communication strategies for future interventions.

Methods

We conducted 7 focus groups with 49 Hispanic women who were pregnant or had children < 2 years old. Domains included interpersonal and media sources, source trustworthiness, dealing with contradictory information, and how information affects decision-making. We used immersion/crystallization process for analysis.

Results

Health sources included health care providers, female and male family members, BabyCenter.com and other Internet sources, social media (but did not trust Facebook), television, and printed materials. Some immigrant women reported preferring the Internet citing less established local support networks. Women highlighted the importance of validating health information through checking multiple sources for consistency and resolving contradictory information. Mothers expressed interest in receiving reliable website links from healthcare professionals and outreach to extended family.

Conclusions

Cultural factors, including immigration status, are important in understanding the use of health information sources and their role in decision-making about pregnancy and child health among Hispanic mothers. Healthcare providers and public health professionals should consider Hispanic mothers health information environment and provide culturally-relevant communication strategies and interventions during the high information-seeking time period.

TLB-2018-P: Where do women get advice about weight, eating, and physical activity during pregnancy?

Adrian Mercado; Becky Marquez, PhD; Barbara Abrams, DrPH; Maureen Phipps, MD; Rena Wing, PhD; Suzanne Phelan, PhD
Background

Excessive gestational weight gain (GWG) is a risk factor for long-term obesity in mothers and offspring. Most (60%) women report receiving no information about GWG from providers. The purpose of this study was to describe sources of prenatal advice and relationships with exceeding IOM GWG guidelines.

Methods

Participants were 169 normal weight (NW) and 156 overweight/obese (OW/OB) women (68% non-Hispanic white; 28.6 y) who had enrolled in a prenatal lifestyle intervention trial. At 6 weeks postpartum, women were asked whether they had received information about diet, physical activity, or weight control from 12 sources uninvolved in the trial (e.g., physician, nurse, dietitian, book, internet, magazine, TV, friend, family member). Information source was examined in relation to odds of exceeding IOM GWG guidelines based on measured weights.

Results

Women received information from a book, internet, magazines and friends (60.6%, 58.3%, 52%, and 51.1% respectively). Advice from physicians, dietitians & nurses was reported in 54%, 48%, & 34% of women, respectively. More NW than OW/OB reported information about diet, physical activity, or weight control from a physician (60.9% vs 48.4%; p=0.03). Information from a physician reduced odds (B= 0.56 [.33 -.97]; p = 0.04) and information from a magazine increased odds (B = 2.3 [1.3, 4.0]; p = 0.003) of exceeding IOM GWG guidelines.

Conclusions

Efforts are needed to increase practitioner provision of information about prenatal weight gain, eating, and activity, particularly among overweight/obese women who face the greatest risk of excessive GWG.

TLB-2019-P: Bottle size at 2 months predicts weight gain in formula fed infants

Charles Wood; Ashley Skinner, PhD; Shonna Yin, MD, MS; Russell Rothman, MD MPP; Lee Sanders, MD, MPH; Alan Delamater, PhD; Eliana Perrin, MD MPH

Background

Different size bottles are used for feeding infants, and research suggests that larger bottle size is related to greater formula intake. We examine if the bottle size used at 2 months of age independently predicts greater change in weight and weight-for-length z-scores from 2 to 6 months of life.

Methods
Longitudinal analysis of infants enrolled in Greenlight, a cluster randomized trial to prevent childhood obesity at 4 pediatric resident clinics. Caregivers of exclusively formula-fed infants reported bottle size at the 2 month (baseline) visit. Bottle size was dichotomized as regular (<6 oz) or large (> 6 oz). We used change in weight (kg) and weight for length z-score (WFLZ) from 2 and 6 months as outcomes in OLS regression models. Bottle size was the main predictor; we also controlled for study site, birthweight, sex, firstborn status, weight or WFLZ at 2 months, age in weeks, time between visits, WIC enrollment, and caregiver race/ethnicity, education, household income and size.

Results

44% (n=378; 22% white, 41% black, 35% Hispanic, 2% other) of 2 month-old infants in Greenlight were exclusively formula-fed, and nearly half (46%) of exclusively formula fed babies were fed with large bottles at 2 months of age. When adjusted for covariates, infants gained 0.23 kg more over the subsequent 4 months if they used a large bottle at 2 months (95% CI: 0.06-0.39; p=0.01) and WFLZ increased by 0.34 (95% CI: 0.10-0.58; p=0.01).

Conclusions

Using a large bottle at 2 months of age independently contributed to greater weight gain and change in WFL z-score at 6 months of age. Among exclusively formula fed infants, bottle size may be a modifiable risk factor for rapid infant weight gain and deserves controlled intervention study.

TLB-2020-P: New school meal regulations increase fruit consumption and do not lead to overall increases in plate waste

Marlene Schwartz, PhD; Margaret Read, MA; Jeannette Ickovics, PhD; Nicole Danna, Student

Background

As part of the Healthy, Hunger-Free Kids Act, students participating in the national school lunch program were required to include a fruit or vegetable with their reimbursable meal in the fall of 2012. Questions have been raised about produce consumption and a potential increase in plate waste.

Methods

In spring 2012 (pre-policy) and 2013 and 2014 (post-policy), a cohort of middle school students from twelve schools in a low-income, racial and ethnically diverse small city were observed at lunch. The cohort was in 5th grade in 2012 (n=511), 6th grade in 2013 (n=465) and 7th grade in 2014 (n=373). Student selection and pre- and post-consumption weights of all meal components were recorded. Generalized linear regression was used to analyze changes in meal component selection and consumption pre and post-policy implementation.

Results
The percentage of students selecting fruit significantly increased from 54% (pre-policy) to 71% (2013) and 66% (2014). Students consumed the same percentage of each fruit serving before and after the policy change (averages range from 61% to 74%), indicating that the overall quantity of fruit consumed by the cohort increased after policy implementation. Vegetable selection rates were extremely variable across schools reflecting no significant trends over time. Once selected, however, vegetable serving consumption increased significantly from 46% in 2012 to 64% in 2014, indicating a significant drop in vegetable plate waste. Entrée selection remained consistently high (over 90%) over time, and entree consumption increased from 71% to 84%.

**Conclusions**

In contrast to the concern that students would refuse to eat the healthier school lunches, these data suggests that the new policies have resulted in a greater number of students selecting and eating fruit, and lower rates of plate waste of vegetables and entrees.

**TLB-2021-P: Relationships between painful life events and eating behaviors in Sicilian children**

*Mindy Dopler Nelson, PhD; Leland Ackerson, ScD*

**Background**

Family is an interpersonal system where rules, routines, rituals, habits allow members to grow up, change and improve during the life cycle. Specific events, circumstances and interpersonal dynamics could produce distress. A disfunctional behavior with food could be a way of expressing discomfort. The purpose of the correlational research was to determine the relations among the number of painful family events and children's BMI.

**Methods**

Participants included 129 Sicilian subjects: 32 children with a diagnosis of obesity and overweight (25 obese and 7 overweight), 20 normal weight children aged between 5 and 11 years old (8.59 ± 1.86); 52 parents of obese and overweight children and 25 parents of normal weight children aged between 22 and 54 years old (39.77±6.18). Measures were a questionnaire to collect socio-demographic informations and anthropometric measurements and an interview about Family Stories build ad hoc to collect informations about Family of Origin, Normative Life Events, Non-Normative Life Events, Family Relations, Social Relations, Weight / food / eating behaviors. Semi-structured interviews were audio-recorded and transcribed according to the standardized rules of psychotherapy by Mergenthaler. Data were compared with nonparametric Kendall tau correlation coefficient by using SPSS.

**Results**

The study showed a positive correlation between the number of painful life events and children's BMI (p < 0.01).
Conclusions

Higher child BMI was related to higher numbers of painful life events experienced by families. The correlation between weight and painful events reinforces the idea that obesity and overweight cannot be considered only medical conditions but also psychological and systemic disorders.

TLB-2022-P: Association between ADHD and food addiction

Dörthe Krömker; Andreas Stolberg, Student; Claudia Müller; Alexandr Parlesak, PhD

Background

Currently more than 75 million people in the United States are obese and 5% of the population has ADHD. Food addiction (FA) has been shown to be positively correlated with BMI and may be one of many etiologies of obesity. The objective of this investigation is to determine whether Attention Deficit/Hyperactivity Disorder (ADHD) is associated with FA in an urban population of college students. We hypothesized that individuals with ADHD are at increased risk of diagnosis or high symptomatology (HSx) of FA related to the hedonic reward stimuli of highly palatable food due to compromised decision-making ability.

Methods

Data for this cross-sectional study were collected using a voluntary online survey. Participants consisted of a convenience sample of students from a public university in New England, aged eighteen and older, with and without ADHD, including both females and males. Questions targeted age, gender, race, socioeconomic status, symptomatology and diagnosis of ADHD, and symptomatology and diagnosis of food addiction using a modified version of the Yale Food Addiction Scale.

Results

Approximately 18% of the participants had a positive diagnosis of ADHD (> 4 symptoms of ADHD) with HSx (> 3 symptoms of food addiction; p<0.0001, OR=3.29 C.I.= 2.33-4.65) whereas 6% of the participants without a positive diagnosis of ADHD had HSx. Approximately 4% of the participants had a positive diagnosis for both ADHD and food addiction (> 4 symptoms of ADHD and > 3 symptoms of food addiction with clinical impairment of food addiction; p<0.0001, OR=4.83 C.I.= 2.13-10.97) whereas 1% of the participants without a positive diagnosis of ADHD met diagnostic criteria for food addiction. Females have more than twice the likelihood of HSx (OR=2.43 C.I.= 1.71-3.46; p <0.0001).

Conclusions

There is a strong association between diagnosis of ADHD and food addiction.
TLB-2023-P: Psycho-social influences on adolescent overweight and obesity – a German cohort study

Jennifer Webb; Abigail Hardin, BA

Background

It is important to understand parents' and their children's perceptions, norms and attitudes with respect to nutrition and exercising in order to develop more effective healthy weight promotion measures. It was the purpose of this study to analyze the interplay of parental and children's psycho-social factors and their influence on eating behavior and the BMI.

Methods

Based on survey data from a random sample of N = 2,681 students between 13-18 years old and their parents (N=1,210), a comprehensive path model was built using structural equation analysis. The dependent variable was the zBMI calculated on self-reported and measured parameters. The model considered eating behavior and specific dietary practices and a broad set of personal (e.g. beliefs concerning nutrition and body), situational (e.g. availability of snacks) and contextual (parents' attitudes) factors.

Results

The zBMI r squared was .29 and directly and most strongly linked with the child’s restrained dietary behavior. Also higher mother’s BMI and parents’ dieting orientation, further lower joy in exercising contributed to a higher zBMI. A double role was observed for emotional eating and internalization of slim body image: while these factors have a direct and negative influence on the zBMI, they have an indirect positive link with zBMI, mediated through the restrained dietary behavior. Parents’ dieting orientation on the other hand, is not only positively linked with the zBMI, but also positively with the child's restrained dietary behavior.

Conclusions

Restrained dietary behavior seems an unsuccessful weight management strategy that is influenced by broader emotional and normative factors. Parents contribute to the development of dieting practices, however their exact role needs to be better understood in future research.

TLB-2024-P: Does self-compassion moderate the indirect effects of weight
bias internalization on mindful and intuitive eating via body shame among weight-diverse college women?

Marc Bomhof, BSc; Heather Paul, BSc; Lindsay Eller, PhD; Raylene Reimer, PhD, RD

Background

Research indicates that weight-related stigmatization poses myriad adverse biopsychosocial consequences for overweight and obese individuals. Contemporary scholars are now also concerned with uncovering the detrimental effects of internalized weight bias on the health and well-being of individuals who are objectively overweight and those who may perceive themselves to be. The primary aims of the present study were: 1) to examine the relationships between weight bias internalization (WBI) and two adaptive approaches to eating (i.e., mindful eating and intuitive eating), 2) to ascertain whether body shame helps to explain these associations, and 3) to explore whether the level of Buddhism-inspired self-compassion further moderates these likely indirect effects in a weight-diverse sample of 204 college women.

Methods

Participants completed self-report measures of the constructs of interest through an online administration format. Total, direct, indirect, and conditional indirect effect regression estimates were generated using bootstrapping methods based on 10,000 resamples per analysis. Bias-corrected and accelerated parameter estimates and the corresponding 95% confidence intervals (CI) were interpreted.

Results

A significant direct effect was found between WBI and intuitive eating ($\hat{\beta} = -.20, p < .01$) but absent with mindful eating. Yet, an indirect effect of WBI on both intuitive ($\hat{\beta} = -.22, 95\% CI: -.34 to -.12$) and mindful ($\hat{\beta} = -.13, 95\% CI: -.25 to -.04$) eating via body shame emerged. The size of these indirect effects was larger at low relative to high levels of self-compassion.

Conclusions

Body shame may be a useful intervention target to consider in efforts to promote more adaptive eating among weight-diverse college women reporting internalized weight bias. Bolstering self-compassionâ€™s shame regulatory skills may be beneficial in this context.

TLB-2025-P: Antibiotics negate the beneficial effects of oligofructose on
intestinal permeability and insulin sensitivity in obese rats

Nabil Boutagy, PhD; Andrew Neilson, PhD; Kristin Osterberg, PhD, RD; Brenda Davy, PhD RD FTOS; Matthew Hulver, PhD; Kevin Davy, PhD

Background

Prebiotics, which are indigestible carbohydrates that are selectively fermented in the gut, have been demonstrated to improve metabolism in obesity and associated chronic disease. It is believed that prebiotics mediate improved metabolic health through compositional and functional changes in gut microbiota.

Methods

Our aim was to assess the dependence of prebiotic-mediated improvement in body weight, adiposity, intestinal permeability, and glycemia on gut microbiota changes using a model of selective, antibiotic-induced intestinal decontamination. Forty diet induced obese rats were assigned to one of four groups: 1) High energy (HE); 2) HE+Ampicillin (AMP); 3) HE + 10% Oligofructose (OFS); 4) HE+ OFS/AMP for 6 weeks.

Results

OFS, but not AMP, reduced body weight as a main effect (P<0.05). Although OFS (P<0.05) and AMP (P<0.05) reduced caloric intake, OFS and AMP interacted to prevent the decrease in body fat composition elicited by OFS (P<0.05). While AMP did not decrease total bacteria numbers, AMP prevented OFS induced increases in Bifidobacterium spp. (P=0.012) and Lactobacillus spp. (P<0.001). All three treatment groups had a reduced Firmicutes to Bacteroidetes ratio relative to HE (P<0.05). OFS and AMP interacted (P<0.05) to prevent the improvements in intestinal permeability and plasma LPS observed with individual treatment of OFS or AMP. OFS increased GLP-1 (P<0.01) and GLP-2 (P<0.01) as a main effect. Independently, OFS (P<0.05) and AMP (P<0.05) reduced area under the curve during an OGTT. Insulin sensitivity, assessed using the composite insulin sensitivity index, was improved with OFS (P<0.05) but not AMP.

Conclusions

Altogether, these results provide evidence that OFS-mediated improvements in adiposity and intestinal permeability are dependent upon OFS-induced changes in gut microbiota. Funded by CIHR, NSERC, and AIHS.

TLB-2026-P: Probiotic Supplementation and Trimethylamine-N-Oxide Production Following High Fat Feeding
Background

The gut microbiota plays an obligatory role in the metabolism of the nutrients L-carnitine and choline, which leads to the production of the proatherogenic, trimethylamine-N-oxide (TMAO). Probiotics have been demonstrated to modulate TMAO production in humanized microbiome mouse models. The purpose of this study was to test the hypothesis that the multi-strain probiotic, VSL #3, would attenuate the increase in fasting plasma concentrations of TMAO following high fat feeding.

Methods

Nineteen healthy, non-obese males (18-30 years) participated in the present study. Following a 2-week eucaloric control diet, subjects were randomized to either VSL #3 (900 billion live bacteria) or placebo (cornstarch) during the consumption of a hypercaloric (+1,000 kcal/day), high fat diet (55% fat) that contained 94±2 mg/day of L-carnitine, 226±5 mg/day of betaine, and 516±12 mg/day of choline for four weeks. Plasma TMAO, L-carnitine, choline, and betaine were measured with UPLC-MS/MS at baseline and following high fat feeding.

Results

Plasma TMAO significantly increased 89±66 vs. 115±61 % in both the VSL#3 and placebo, respectively, however the magnitude of change in TMAO was not different (P>0.05) between them. Plasma L-carnitine, choline, and betaine concentrations did not increase following high fat feeding in either group.

Conclusions

High fat feeding increases plasma TMAO in healthy non-obese, young males. However, VSL #3 treatment does not appear to influence plasma TMAO concentrations following high fat feeding. Future studies are needed to determine whether other therapeutic strategies can attenuate the production of TMAO.

TLB-2027-P: Taurocholic acid increases in oral vs. gastrostomy tube mixed meal feeding early after Roux-n-Y gastric bypass surgery in adults with type 2 diabetes

Viorica Ionut; Rebecca Paszkiewicz, BA; Miguel Burch, MD; Ashkan Moazzez, MD, MPH, FACS; Erlinda Kirkman, DVM; Ram Elazary, MD; Richard Bergman, PhD
Background

Animal studies show that bile acids (BAs), besides their traditional role in digestion, play an important role in energy metabolism through activation of the TGR5 and FXR receptors. Taurocholic acid (TCA) is one of the most potent activators of TGR5 and chenodeoxycholic acid (CDCA) may be the most potent BA activating the FXR receptor. Our hypothesis was that Roux-en-Y gastric bypass (RYGB) leads to an early increase in postprandial responses of these BAs.

Methods

12 obese type 2 diabetic adults (BMI: 50.4±2.6 kg/m2, HbA1c:7.5±0.4%) underwent mixed-meal tolerance tests (MMTT) before (pre-RYGB), and 2-wks after RYGB with either gastrostomy tube (G-tube) or oral feeding (Oral). MMTT-derived glucose, insulin and C-peptide were used to calculate beta-cell function. Plasma BAs were measured using liquid chromatography-tandem mass spectrometry (LC-MS/MS). BAs levels are presented as median with interquartile range (IQR).

Results

Patients’s weight decreased by 9.7±1.4 kg. Compared to Pre-RYGB, beta-cell function increased following Oral but not G-tube (0.05±0.01 vs. 0.10±0.03 vs. 0.05±0.06). TCA total AUC was higher in Oral vs. Pre-RYGB and G-tube (tAUC60=6.3 (7.6) vs. 3.4 (1.1) vs. 3.1 (4.1)). Compared to Pre-RYGB, CDCA was lower in Oral and G-tube (tAUC60=31.1 (7.7) vs. 10.1 (4.8) and 6.7 (6.0)). The higher pre-RYGB tAUC60 occurred despite a negative incremental response in Pre-RYGB (iAUC60 =- 4.93 (7.7)), and was explained by higher fasting levels in Pre-RYGB vs. Oral and G-tube (0.6 (1.0) vs. 0.12 (0.3) and 0.10 uM (0.31), respectively).

Conclusions

These RYGB changes in TCA are consistent with an observed rise in beta-cell function. These finding suggests that earlier nutrient passage to the distal intestine alters TCA levels and is consistent with the hypothesis that altered concentrations of TCA may contribute to the metabolic effects of RYGB.

TLB-2028-P: Duodeno-jejunal bypass (DJB) induces dramatic improvement in oral glucose tolerance without changing GLP-1

Heather Paul, BSc; Marc Bomhof, BSc; Raylene Reimer, PhD, RD

Background

Bariatric/metabolic surgery is one of the most successful interventions for weight loss and improving glucose tolerance. The mechanism(s) responsible for these effects are not well understood, and the role of
The aim of our study was to determine the impact of DJB - a metabolic surgery procedure similar to RYGB but without the stomach restriction component - on oral glucose tolerance and gut hormones, in a recently established canine model of obese type 2 diabetes.

**Methods**

Fat-fed moderately obese animals were treated with streptozotocin to model type 2 diabetes. Animals (n=3) underwent DJB. Oral glucose tolerance tests (OGTT) and measurements of glucose homeostasis hormones were performed before and 1 month after DJB.

**Results**

Despite stomach conservation, animals lost weight (BW before: 26.7± 0.9 vs. 23.8 ± 1.5 kg after surgery), possibly due to temporarily decreased food intake. DJB resulted in reduction of fasting plasma glucose, fasting plasma insulin, improvement in oral glucose tolerance (glucose peak 168 ± 20 before vs 127 ±1 mg/dl after surgery) and a corresponding decrease in insulin secretion (293 ± 89 vs. 106 ± 37 pM). Surprisingly, we did not measure increases in total GLP-1, intact GLP-1 or PYY after DJB compared to before.

**Conclusions**

DJB results in dramatic improvements in oral glucose tolerance, without increases in GLP-1 and PYY. These data argue that improvements in incretin hormones are not necessary to obtain improvements in glucose homeostasis observed after metabolic surgery.

**TLB-2029-P: Maternal prebiotic fibre supplementation alters maternal and offspring gut microbiota and maternal metabolomic profiles in obese rats**

*Jose Alberto Lopez-Dominguez; Lucia Fernandez del Rio, student; Kevork Hagopian, PhD; Jose Villalba, PhD; Jon Ramsey, PhD*

**Background**

Obesity is associated with dysbiosis of the gut microbial profile. Establishment of the gut microbiota begins at birth, making maternal gut microbiota a potential target for obesity prevention in offspring. The prebiotic fibre oligofructose (OFS) beneficially alters the microbiota profile and the secretion of appetite-regulating gut hormones, which are thought to improve obesity-related metabolic health.

**Methods**
We assessed the effect of supplementing a maternal high energy (HE) diet with OFS on the gut microbiota of dams and their offspring and on maternal metabolomic profiles. Forty-two diet-induced obese rats were randomized to 1 of 3 groups for pregnancy and lactation: 1) HE; 2) HE + 10% OFS (OFS group); 3) limited HE weight-matched to group 2. Body weight, body fat, gut microbiota, and plasma satiety hormones were measured. 1H-NMR metabolomics analysis was performed on maternal serum to investigate systemic metabolism.

**Results**

Diet-induced obesity decreased bifidobacteria and lactobacilli levels (p<0.001). OFS dams weighed less than HE dams by their due date until weaning (p<0.05). OFS feeding increased bifidobacteria (p<0.001) and plasma levels of the gut hormones PYY and GLP-1 in both OFS dams and offspring (p<0.05). OFS offspring also had the highest levels of Enterobacteriaceae and Bacteroides spp., while HE offspring had the lowest levels of lactobacilli (p<0.05). HE dams and their offspring had the highest % body fat at weaning (p<0.01). Finally, metabolomic profiles were clearly distinguishable between dietary groups at lactation, suggesting a distinct impact of OFS on whole-body substrate metabolism.

**Conclusions**

Supplementing maternal HE diet with OFS improved maternal and offspring gut microbiota composition and satiety hormone levels, and may help to establish a healthy microbiota profile in offspring that protects against obesity.

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**TLB-2030-P: Low Carbohydrate Diets Induce Shifts in Mouse Liver and Skeletal Muscle Energy Metabolism without Changes in Mitochondrial Content**

*Tonia Schwartz, PhD; Renee Gainer, BS; Erik Dohm, DVM; Maria Johnson, PhD; J Michael Wyss, PhD; David Allison, PhD*

**Background**

Sustained shifts in energy metabolism and increases in mitochondrial content have both been proposed as possible mechanisms contributing to the positive life span effects of calorie restriction (CR). The aim of this study was to determine whether low carbohydrate diets could mimic these changes in energy metabolism and mitochondrial content.

**Methods**

Groups of C57BL/6 mice were fed one of four different diets for 30 days: Control diet (AIN93G), Ketogenic Diet (10% protein, < 1% carbohydrate, % kcal), Low Carbohydrate Diet 1 (20% protein, 10% carbohydrate, % kcal) or Low Carbohydrate Diet 2 (30% protein, 10% carbohydrate, % kcal). The activities of enzymes involved in fatty acid beta-oxidation, glycolysis, gluconeogenesis and ketone bodies
metabolism were measured in liver and skeletal muscle from the mice. The activities of citrate synthase and electron transport chain complexes I and IV were also measured in tissue homogenates as an indication of mitochondrial content.

**Results**

In liver, the activities of enzymes were shifted in a manner consistent with an increase in gluconeogenesis and fatty acid beta-oxidation and decrease in glycolysis in all low carbohydrate groups compared to the control mice. Similar trends were also observed in skeletal muscle. However, in both liver and skeletal muscle, shifts in metabolism occurred without any change in mitochondrial content.

**Conclusions**

Our results support the idea that shifts in energy metabolism with low carbohydrate diets can occur independent of changes in mitochondrial content. The influence of these shifts in metabolism on aging remains to be determined.

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**TLB-2031-P: Second-Hand Eating? Maternal perception of the food environment affects reproductive investment in mice.**

*TJ UNGER; Thomas Sanford, AS; Jennifer Lachey, PhD; Jorge Plutzky, MD; Mark Graham, MS; David White, PhD; Jasbir Seehra, PhD*

**Background**

While it is established that maternal diet during pregnancy has effects on both mother and offspring; little if any information exists on how perception of the food environment affects body composition and reproductive investment. Using mice, we test the hypothesis that visual, auditory and olfactory exposure to a conspecific eating a varied rich “cafeteria diet” (while consuming a standard low fat chow diet oneself) will affect weight gain in the dams and body composition of her pups.

**Methods**

Female subject mice were raised on a cafeteria diet until maturity, and then ALL were switched to a standard chow diet. Subjects eating the standard chow were assigned to live with a cage mate that was either consuming a Cafeteria diet (treatment, n=19), or the standard chow (control, n=20). Subjects were mated, and pups raised to weaning. Body composition was analyzed on all animals: adults by quantitative magnetic resonance imaging, pups by carcass analysis.

**Results**
The treatment (visual, auditory and olfactory exposure to a cage mate eating a cafeteria diet while consuming a standard chow diet oneself) caused a reduction in pups' body weight (LSM: 8.5gm ± 0.5 vs. 10.1gm ± 0.5, p<0.05), and fat mass (LSM: 0.77gm ± 0.02 vs. 0.83gm ± 0.02, p<0.05). No statistically significant effect was found on dams’ body weight or composition. Furthermore, we found nearly significant effects for the treatment to cause delay in achieving a successful pregnancy (Avg. 55 vs. 44 days, p=0.2) as a result of an increase in failed first pregnancies, e.g. miscarriages and stillborn (74% vs 42%, p=0.01).

Conclusions

These data indicate that the perceived food environment (as compared to the diet actually consumed) can affect physiological variables associated with reproduction and ultimately decrease body fat in the pups, possibly via the energy transfer across generations.

TLB-2032-P: Targeted Knockdown of Retinaldehyde Dehydrogenase 1 with an Antisense Oligonucleotide Reduced Adiposity and Improved Metabolic Parameters in DIO Mice through Increased Energy Expenditure

Kate Claycombe
Emilie Vomhof-DeKrey

TLB-2033-P: Maternal Low Protein Diet Causes Body Weight Loss in Male, Neonate Sprague-Dawley Rats Involving UCP-1 Mediated Thermogenesis

Labros Sidossis, PhD; Craig Porter, PhD; Tony Chao, MS; Maria Chondronikola, MS, RDN; Manish Saraf, PhD; Ludwik Branski, MD; Ravi Radhakrishnan, MD, MBA; David Herndon, MD

Background
Brown adipose tissue (BAT) plays an important role in regulating body weight (BW) by modifying thermogenesis. Maternal low protein (LP) diets reduce offspring birth weight. Increased BAT thermogenesis in utero may be one mechanism for the lower BW. However, whether maternal LP nutrition alters BAT thermogenesis and BW of offspring in utero is not yet known.

**Methods**

We fed obese-prone Sprague-Dawley dams 8% low protein (LP) or 20% normal protein (NP) diets for 3 weeks prior to breeding and through pregnancy. BW and gene expression of interscapular BAT (iBAT) thermogenic markers were measured in male fetal (gestation day 18) and neonatal (day 0 or 1) offspring.

**Results**

BW of neonatal LP males was lower than NP males but no difference was observed in females. Gene expression of thermogenic factors UCP-1 and UCP-3 and transcription factors PRDM16 and PPARÎ± in iBAT were 2- to 6-fold greater in LP than NP male neonatal offspring. FNDC5, a precursor of irisin and activator of thermogenesis, was expressed 2-fold greater in neonatal LP iBAT than NP males. However, fetal iBAT UCP-1, PRDM16, PPARÎ± and irisin mRNA did not differ between LP and NP groups. Maternal LP diet had no effects on placental irisin and UCP-2 expression.

**Conclusions**

These results suggest that prenatal protein restriction increases the risk for low BW through mechanisms affecting full-term offspring iBAT thermogenesis but not greatly altering fetal iBAT or placental thermogenesis. This work was supported by USDA Agricultural Research Service Project #5450-51000-047-00D. The funders had no role in study design, data collection and analysis, decision to publish or preparation of the manuscript.

**TLB-2034-P: Browning of white adipose tissue in humans: effects on energy expenditure**

**Joanna Buscemi, PhD; Kristoffer Berlin, PhD; Tiffany Rybak, BA; Linda Schiffer, MS, MPH; Angela Kong, PhD, MPH, RD; Melinda Stolley, PhD; Marian Fitzgibbon, PhD**

**Background**

In the context of the global obesity epidemic, the ability to impact energy balance without altering either energy consumption or physical activity would have significant clinical implications. The discovery of brown adipose tissue (BAT) in adult humans has renewed interest in BAT and its role in energy expenditure. Intriguing data from cells and rodents suggest that subcutaneous white adipose tissue (WAT) can adopt a BAT-like phenotype (i.e. increased mitochondrial number and UCP1 expression). However, if this browning of WAT can occur in humans, remains to be seen. Here, we investigated whether subcutaneous WAT of humans can adopt a BAT-like phenotype following prolonged stress.
Methods

Subcutaneous WAT samples were collected from 42 severely burned children and 12 healthy children. Browning of WAT was determined by the presence of UCP1, increased uncoupled mitochondrial respiration (thermogenesis), and increased whole body energy expenditure.

Results

A 600-fold increase in UCP1 mRNA expression was accompanied by a 3-fold increase in UCP1 protein content in WAT of burn victims in the month following injury (p<0.05 for both). Uncoupled mitochondrial respiration in WAT significantly increased from 1 to 3 weeks post burn (0.71±0.08 vs. 1.12±0.20 pmols/sec/mg. P<0.05). This was associated with increased whole body REE, which correlated with days post injury (R=0.74, P<0.001).

Conclusions

Our data demonstrate that the development of thermogenic energy dissipating subcutaneous WAT in humans is associated with increased whole body energy expenditure. Inducing WAT thermogenesis may be a novel anti-obesity measure for humans.

TLB-2035-P: Relation between Parent and Child Health Behavior Changes in a Randomized Preschool-Based Obesity Prevention Trial for African-American Children

Background

Parent health behavior changes associated with obesity are related to child changes cross-sectionally, but less is known about the relation between parent and child changes longitudinally among African-American preschoolers. The Hip-Hop to Health Jr. Obesity Prevention Effectiveness Trial was a 14-week teacher-delivered intervention targeting African-American preschool children. The purpose of this study was to determine whether parent health behavior changes and feeding practices predicted changes in child body mass index z-scores (BMI z-scores) and related health behaviors from baseline to 14-weeks and from 14-weeks to 1 year follow-up.

Methods

Anthropometric data from 587 child-parent dyads were collected at baseline, 14 weeks (post-intervention), and 1 year. Additionally, parent screen time and feeding practices and child dietary consumption and quality, physical activity, and screen time were collected.
Results

Random effects growth models revealed that higher initial child BMI z-scores, caloric intake, and screen time predicted less change in these variables over time. Changes in child screen time moved in tandem with parent screen time. Higher levels of parent food restriction, monitoring, and pressure to eat predicted less change in these variables. Greater parental monitoring predicted greater reduction in calories at 1 year.

Conclusions

Given that baseline weight, caloric intake, and screen time were predictive of child weight change, earlier and more intensive intervention programs may be necessary for families of children who are overweight and exhibit less helpful behaviors at baseline. Future studies should also include innovative ways to explicitly engage parents in prevention efforts.

TLB-2037-P: Fit Families: Specifying an Adaptive Behavioral Treatment for Obese African American Adolescents With a Sequential Multiple Assignment Randomization Trial (SMART)

April Idalski Carcone, PhD; Sylvie Naar, PhD; Deborah Ellis, PhD; Thomas Templin, PhD; Angela Jaques-Tiura, PhD; Kathryn Brogan, PhD, RD; Phillippe Cunningham, PhD; Kai-Lin Catherine Jen, PhD

Background

Behavioral weight loss intervention for obese African American adolescents (OAAA) has had limited success. Motivation enhancement and skill development integrated into home-based treatment addresses retention and motivation, but is costly. We used a SMART to test intervention components and the efficacy of adaptive behavioral treatment for weight loss in OAAA. Moderators of treatment effect (adolescents' age, initial weight, confidence for making weight-related lifestyle changes, depression, executive functioning and caregivers' marital status) were explored.

Methods

OAAA and caregiver dyads (N=181) were randomized to home- or office-based motivation-enhancing skills training (HB-MIS or OB-MIS). After 3 months, nonresponders (<3% weight loss) were re-randomized to 3 more months of home-based skills training (CS) or contingency management (CM); responders continued a lower 'maintenance' dose of their initial treatment (M).

Results
At the end of the trial, OAAA assigned to HB-MIS+CM reduced their percent overweight by 2.27% versus adolescents in HB-MIS+CS (1.15%); OB-MIS+CM (1.05%); or OB-MIS+CS (1.53%); however, differences among groups were not significant. Youth with higher confidence (3.68%, p=.06) and EF lost more weight (3.58%, p=.04) than those with low confidence and EF regardless of treatment assignment. Older youth in HB-MIS+CM lost more than same age peers in other treatments and younger peers in HB-MIS+CM and HB-MIS+CS (p=.01). Baseline weight, depression and caregiver marital status did not moderate weight loss.

Conclusions

As weight loss was low, more potent interventions may be needed for OAAA. Interventions may need to be tailored (e.g., confidence and age) and address novel targets (e.g., EF). Overall, starting in home-based treatment and adding incentives for weight loss (CM) resulted in greater (nonsignificant) weight loss.

TLB-2038-P: Origins of Food Reinforcement in Infants

Kai Ling Kong, PhD; Denise Feda, PhD; Rina Eiden, PhD; Leonard Epstein, PhD

Background

Rapid weight gain in the first two years of life is associated with increased risk for obesity. Children raised in an enriched environment had a lower risk of becoming obese later in life. Lean, but not overweight/obese children, find non-food alternatives more reinforcing than food; however, there is no research on how and when food reinforcement develops.

Methods

Reinforcing values were assessed using progressive ratio schedules of reinforcement presented in a sequential fashion, counterbalanced between food and non-food alternatives. Two non-food reinforcers [Baby Einstein- Baby MacDonaldâ™ shows (DVD) or bubbles (BUB)] were tested in this study against babyâ€™s favorite food. Infants 9-18 months were recruited to join these two experiments (DVD: n = 27; BUB: n = 32). Food reinforcement was quantified as food reinforcing ratio of favorite food (FRR) by measuring reinforcing value of food (Food Pmax) in proportion to total reinforcing value of food and non-food alternative (DVD/BUB Pmax).

Results

Greater weight for length z-score was associated with greater FRR (DVD: r = 0.60, p < 0.001; BUB: r = 0.43, p = 0.013), primarily due to the strong association between greater weight for length z-score and lower DVD Pmax (r = -0.71, p < 0.0001) and BUB Pmax (r = -0.46, p = 0.008). Infant monthly weight gain was positively associated with FRR (DVD: r = 0.51, p = 0.006; BUB: r = 0.40, p = 0.024).

Conclusions
Using two different non-food alternatives, our newly developed paradigm successfully demonstrated that lean infants find non-food alternatives more reinforcing than do overweight/obese infants. This observation suggests that by strengthening the alternative reinforcers of children may have a protective effect against obesity.

**TLB-2039-P: Interaction Between Dietary Composition and Gastric Emptying in Children with Prader-willi Syndrome (PWS)**

Ann Scheimann, MD; Timothy Moran, PhD, FTOS; Sarah Barlow, MD, MPH; Stephanie Abrams, MD, MS; Harvey Ziesman, MD; Victor Seghers, MD, PhD; Nancy Butte, PhD; Jennifer Fisher, PhD

**Background**

Prader-willi syndrome is a disorder of genetic imprinting characterized by loss of the paternal copy of 15q11.2-13 and characterized by early feeding problems followed by the development of obesity with impaired satiety. Unlike other patients with obesity, individuals with Prader-willi syndrome are at increased risk for gastric dilation and necrosis.

**Methods**

Children with genetically confirmed diagnosis of Prader-willi syndrome and obese matched controls consumed radiolabelled mixed test meals (high fat vs low fat) with banking of blood in fasting and fed state for measurement of gut peptides. Studies were carried out to 4 hours whenever possible. Patients were queried re: appetite using a validated visual analogue scale. Statistical methods used included T-test and Fisher’s exact test where appropriate. Protocol was IRB approved by Baylor College of Medicine.

**Results**

A total of 6 children with Prader-willi syndrome and 4 controls were enrolled in the study. There was no difference in mean age or BMI across the patient groups. Children with PWS had lower fasting glucose (86.5 vs 109.2 p=0.045), lower insulin response at 30 minutes post-ingestion (35.9 vs 98.9, p=0.028) with no significant difference in glucose and insulin levels at 2 hours post-ingestion. Children with PWS had increased in reported hunger at baseline (7.9 vs 3.8 p=0.011), amount they could consume at baseline (6.9 vs 3.1, p=0.015), and perceived hunger at 4 hours (9.78 vs. 6.65, p=0.008). Despite the perceived increase in hunger at 4 hours, gastric emptying of high fat meals was delayed in 4/6 children with PWS in comparison to 0/4 matched controls (p=0.06).

**Conclusions**

Children with Prader-willi syndrome have slower gastric emptying and impaired sensation of satiation.
TLB-2040-P: Gut Bacterial Translocation is Associated With Increased Adiposity and Further Related to Elevated Liver Fat in Overweight and Obese Hispanic Children With GG PNPLA3 Variants

Tanya Alderete, PhD; Claudia Toledo-Corral, PhD; Lauren Gyllenhammer, BS; Michael Goran, PhD

Background

The aim of this study was to examine interrelationships between plasma markers of gut bacterial translocation and measures of adiposity, liver fat (LF), metabolic health, and the influence of genetic predisposition to LF based on PNPLA3 genotype.

Methods

Sixty-five Hispanics aged 8-15 years (BMI percentile: 95.6±4.8) were examined. Total body fat percent (BF%) was obtained from DEXA and subcutaneous abdominal adipose tissue, visceral adipose tissue (VAT), and LF fraction from 3-Tesla MRI. Fasting insulin and glucose, insulin sensitivity, acute insulin response (AIR), and disposition index were obtained from a FSIVGTT with minimal modeling. Lipopolysaccharide binding protein (LBP)/sCD14 ratio and 16S rDNA copy number were assayed from fasting plasma as markers of gut bacterial translocation. PNPLA3 genotype was categorized as 0-1 (CC/CG) or 2 risk alleles (GG). Dietary intake was assessed using 24-hour dietary recalls. General linear models were used to test for associations (adjusting for BF%, age, and sex) and partial correlations are reported.

Results

Log LBP/sCD14 positively associated with BF% (r=0.36; p<0.01) and log VAT (r=0.34; p<0.01). 16S rDNA was associated with log LF (r=0.63; p=0.02) in those with 2 but not 0-1 PNPLA3 risk alleles (pinteraction=0.03). Log LBP/sCD14 was associated with a higher log AIR (r=0.28; p=0.05). LBP/sCD14 and 16S rDNA were not associated with other metabolic indices, total energy intake, or dietary macronutrients.

Conclusions

These findings suggest that among overweight and obese Hispanic children, increased gut bacterial translocation contributes to elevated total and visceral adiposity and a further increase in LF in those already possessing a genetic predisposition to LF accumulation.
TLB-2041-P: Fuel for Fun improved self-efficacy, attitude and preference for fruits and vegetables in impact assessment using cohort delayed intervention design

Barbara Lohse, PhD; Stephanie Smith, MS RD; Leslie Cunningham-Sabo, PhD, RDN

Background

School-based interventions on food and physical activity integrated with diverse educational domains have potential to improve eating behaviors among children. Curricular adoption and support requires establishing an evidence base for behavior change. This study examined the evidence base for Fuel for Fun (FFF), a yearlong intervention for 4th or mixed 4/5th grade classrooms that integrates diverse subject domains with cooking, physical activity and family involvement experiences.

Methods

Using 3 tested, reliable surveys, fruit & vegetable preference (FVP), self-efficacy (SE) for and attitude (AT) toward cooking were assessed at the start and end of an academic year in 2 cohorts with 4th and 4/5th mixed classrooms in the same 8 schools. Cohort 1 (C1) was the control in 2012–2013; cohort 2 (C2) received FFF programming during the 2013-2014 academic year. Trained staff measured heights, weights. Survey items were summed and analyzed using GLM with repeated measures, with cohort and gender as fixed factors.

Results

C1 (n=415) had 2 mixed 4/5th grade classes and was 2 mo older than C2 (n=352). C1 had more girls (52% vs 45%, P=.049). Both cohorts were > 75% white; BMI z-scores were similar (.25 ± 1.0 vs .22 ± 1.1). C1 baseline SE & AT were > C2 after controlling for gender and grade (34.4 ± .4 vs 33.6 ± .3, P=.02; 26.5 ± .3 vs 25.4 ± .2, P<.01 respectively). Each cohort baseline AT, SE, FVP did not differ among schools. Compared to controls, FFF students had > improvements in AT (C1 26.2 ± .2 to 26.0 ± .2; C2 25.4 ± .2 to 25.8 ± .2; P=.015) and SE (C1 34.4 ± .3 to 35.5 ± .2; C2 33.6 ± .3 to 35.6 ± .3; P=.004) with a trend for > FVP (C1 64.8 ± .6 to 64.9 ± .6; C2 64.2 ± .2 to 65.4 ± .6; P=.085).

Conclusions

FFF improved AT toward & SE for cooking and tended to lead to increased FVP. FFF is evidence-based for use in SNAP-Ed. USDA AFRI A2101
TLB-2042-P: Preventing weight-gain in young adults: a randomised controlled trial.

Charoula Nikolaou, RD; Catherine Hankey, PhD, RD; Michael Lean, MA MB BChir MD FRCP

Background

Obesity is a major public health problem, yet to be solved. Obesity prevention appears a preferable public health approach, but no reliable sustainable solution has yet been developed. The aim of this study was to evaluate online interventions, based on two behavioural models, for effectiveness in preventing weight gain.

Methods

20,975 young adults were allocated randomly to one of two ‘treatment™ groups or one control. Treatment groups were sent information, by email, about 19-week on-line programmes, one on weight control ('Not-The-Ice-Cream-Van', 'NTICV'), and the other discussing political, environmental and social issues around food ('Goddess Demetra™', 'GD™'). ‘Control’ subjects received no contact. Weights and heights were collected through on-line questionnaires, independently of this study. Self-reported anthropometric data were validated against two sets of independently measured data.

Results

Mean within-group weight-changes over the 9-month study period were: Control (n=1,734): +2.1kg (95%CI 1.3, 2.8kg); NTICV (n=1,310): -1.1kg (95%CI -1.8, -0.4kg); and GD (n=849): -1.5kg (95%CI -1.7, -0.9). Weight changes were different between groups, p<0.001. Self-reporting weights and heights data correlated strongly with measured data (r=0.999). Relative risks for weight gain compared to the control group, were; NTICV=0.13 (95% CI 0.11-0.15) p<0.0001, GD=0.07 (95% CI 0.05-0.1) p<0.0001.

Conclusions

Both interventions were associated with significant weight losses, compared with the expected weight gain among young adults, observed in control subjects. This low-cost intervention could be widely transferable to combat the obesity epidemic, enhanced by supporting advertising and social media outside the RCT setting.

TLB-2043-P: Lifestyle and obesity: Is this a real challenge for Saudi residents?

Azzam Al-Kadi; Arshad Malik, MBBS, FCPS; Ali Mansour, MD
**Background**

Obesity is thought to correlate very strongly with individuals’ general lifestyles. This study was conducted to determine whether lifestyle patterns were potential risk factors for morbid obesity in Saudi residents.

**Methods**

This descriptive cross-sectional study was conducted in Unaizah City, Kingdom of Saudi Arabia over a 1-year period from March 2013 to March 2014. The study included 646 residents from the general public of Unaizah who were selected randomly at a mall and a public sector university, regardless of age and gender, and were given questionnaires regarding the details of their lifestyle patterns. The studied variables included demographic details, dietary habits, physical activity, occupation, body mass index (BMI), and unhealthy behavioural habits. The data were collected and statistically analyzed using SPSS version 20 software.

**Results**

The mean age population was 30.13 ± 12.15 years and comprised 202 (31.3%) male and 444 (68.7%) female subjects. The study subjects were students (39.2%), employees (35.3%), unemployed (23.8%), and others (1.7%). Overall, 79.4% comprised Saudi nationals and the majority (48.3%) had a university-level education. A reasonably high proportion of study population was found to have sedentary habits with physical activity levels far below the standard. Obesity was found in 42% of the study population with low physical activity levels and unhealthy dietary habits. Varying proportions of concomitant hypertension, hyperglycemia, and hypercholesterolemia were also observed.

**Conclusions**

Sedentary habits, low physical activity levels in younger populations, and unhealthy dietary habits are major factors causing obesity in the general public. Serious insight into this problem at the governmental level is needed to improve the overall activity level and avoidance of a sedentary lifestyle.

**TLB-2044-P: Transcriptomic differences in intra-abdominal adipose tissue in extremely obese adolescents with different stages of nonalcoholic fatty liver disease**

Scott Rector, PhD; Ryan Sheldon, MS; Kayla Kanosky, MS; Melissa Linden, MA; Kevin Wells, PhD; Lili Miles, MD; James Perfield, PhD; Stavra Xanthakos, MD, MS; Thomas Inge, MD, PhD

**Background**
Mechanisms responsible for progression of nonalcoholic fatty liver disease (NAFLD) to steatohepatitis (NASH) remain poorly defined.

**Methods**

To examine the potential contribution of adipose tissue to NAFLD progression, we performed a complete transcriptomic analysis using RNA-sequencing (RNA-seq) on intra-abdominal adipose tissue (IAT) from obese adolescents (Mage 16.9±0.4 yrs; BMI z-score 2.7±0.1) undergoing bariatric surgery and liver biopsy categorized into 3 groups; No steatosis (Normal, n=8), steatosis only (n=13), or NASH (n=10) by liver histology.

**Results**

Age, body weight, and BMI did not differ among groups, but NASH were more insulin resistant (increased HOMA-IR, p<0.05 vs. other groups). Crown-like structures in IAT did not differ among groups, but NASH tended to have larger adipocytes (+25%), higher serum TNFα and MCP-1, and lower serum adiponectin (p=0.1 compared with Normal). RNA-seq revealed 175 up- and 492 down-regulated mRNA transcripts (≥± 1.5 fold; FDR <0.10) in IAT between NASH vs. Normal, with "Mitochondrial Dysfunction; p=4.19E-7" being the top regulated canonical pathway identified by Ingenuity Pathway Analysis; only 19 mRNA transcripts were up- and 148 down-regulated when comparing Steatosis vs. Normal, with suppression of "EIF2 Signaling: p=1.79E-27" being the top regulated pathway indicating increased cellular stress. A comparison of IAT between NASH vs. Steatosis found 515 up- and 175 down-regulated genes, with "Antigen Presentation; p=6.03E-18" being the top regulated canonical pathway and "Inflammatory Response" the top diseases and disorders function.

**Conclusions**

Unique transcriptomic differences exist in IAT from severely obese adolescents with distinct stages of NAFLD, providing an important resource for identifying potential novel therapeutic targets for childhood NASH.

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**TLB-2045-P: A single dose of emulsified versus capsular fish oils has equivalent effects on chylomicron fatty acids over 8 hours.**

*Susan Raatz, RD; LuAnn Johnson, MS; Douglas Bibus, PhD*

**Background**

Long chain omega-3 fatty acids are important in nutrition and disease management. Flavored emulsified fish oil supplements provide an alternative to encapsulated fish oils. Oil in water emulsions may offer an advantage in bio-availability of the fatty acids. Chylomicrons transport triglyceride from the gut to the liver and other organs.
Methods

We evaluated the effect of a single dose of three emulsified fish oils (Barleans Swirlâ"¢, Coromega Omega-3 Squeezeâ"¢, and Coromega Nectarâ"¢) vs. an encapsulated fish oil (Nordic Naturalsâ"¢) on chylomicron fatty acid content over 8 hours. In a randomized, cross-over designed trial, participants consumed a single dose of fish oil supplement after a baseline blood draw. Additional samples were obtained at 2, 4 and 8 hours.

Results

Repeated measures ANOVA showed a reduction in percentage of 18:2n6 and the n6:n3 ratio and an increase in percentage of 20:5n3, 22:6n3, and total n3. However, no differences between treatments were observed in the 8 hour area-under-the-curve responses.

Conclusions

Chylomicron fatty acid content was not different after intake of emulsified and capsular fish oil suggesting that absorption from the gut for the dose provided was the same for all supplements evaluated.

TLB-2046-P: Safety and efficacy of the Duodenal-jejunal bypass liner (DJBL, EndoBarrierâ®) in clinical practice.

Alex Escalona, MD; Fernando Pimentel, MD; Erick Castillo, MD; Veronica Irribarra, MD; Alejandra Alarcón, RN; Palmenia Pizarro, BS; Ricardo Funke, MD; Allan Sharp, MD

Background

EndoBarrier is a duodenal-jejunal bypass liner (DJBL) that mimics the duodenal-jejunal exclusion component of the Roux-en-Y gastric bypass. The endoscopically delivered DJBL exhibited a significant weight loss in morbidly obese subjects in a clinical trial setting. The aim of this study was to evaluate safety and efficacy of the DJBL in clinical practice.

Methods

All patients implanted with the DJBL in our institution from November 2010 to July 2014 were included in this analysis.

Results

The device was implanted in 196 patients (Two patients were re-implanted). Mean age, weight and BMI were 44.2±14.4 yr, 98.8±22.4 kg, and 34.4±5.8 kg/m2, respectively. Female 112 (57.1%). Mean procedure and fluoroscopy time were 24Â±14.6 and 2.8Â±4 min, respectively. Among the 198 implanted
patients, 29 (15%) were admitted during the follow-up due to complications. Fourteen patients (7%) were admitted due to abdominal pain, device obstruction or migration. Thirteen patients (6.5%) presented gastrointestinal bleeding, 7 of them (3.5%) were explanted. Three patients (1.5%) were admitted because of liver abscess. All of them were successfully managed with medical treatment and endoscopically explanted. There were no deaths. Until now, 130 patients have been explanted at a mean of 53±21 weeks. One subject (0.8%) was surgically explanted due to device migration. Two patients (1.6%) presented GI bleeding after explantation. Mean weight loss was 13.2±7.9 kg. (p<0.0001) equivalent to 13.3±7.5% of total body weight.

Conclusions

Effectiveness of the DJBL in this clinical serie is comparable to the previous results in clinical trials. Early explantation is lower in this experience but there is a higher rate of serious adverse events, including adverse events not described before. Randomized clinical trials and long-term results are necessary to evaluate safety/efficacy ratio.

TLB-2047-P: Heterogeneous Changes in Anxiety and Depression Symptoms Before and After Bariatric Surgery

Ingrid Rocha, MS; Marcela Rodríguez-Flores, MD; Verónica Vázquez-Velázquez, PhD; Eduardo García-García, MD; Valeria Soto-Fuentes, Psychologist; Ruth Soriano, MSP

Background

Anxiety (A) and Depression (D) are frequent in subjects attending Bariatric Surgery Program (BSP). Some cases experience improvement while a significant number have worsening symptoms or new-onset symptoms after BS. Practical procedures are needed to monitor psychological distress during follow-up. We aimed to describe changes in A and D symptoms after Roux-en-Y gastric bypass using the Anxiety and Depression Scale (HAD)

Methods

Patients in BSP at our Institute completed HAD questionnaire before and during the following 31.8±20 months after BS. Four categories according to the HAD scores were determined for A and D validated for Mexican patients: 1. Without (A<8, D<7), 2. Mild (A=8, D=7), 3. Moderate (A 9-10, D 8-10) and, 4. Severe (A>10, D>10). Improvement, worsening or no changes were established according to changes in these four categories. A multivariate analysis was performed to assess the correlation of gender and percentage weight loss (%WL) with change in categories.

Results

50 subjects (69.8% female, mean age 41.3 ± 10.9 years) completed HAD before and after BS. Mean %WL was 28.6% (6%-47%). The proportion of patients with A symptoms increased from 20% before BS to 36% after BS (p=0.04. Changes in categories of A after surgery were as follow: 6% improved, 22%
worsened and 72% remained the same. For D there was no significant change in the proportion of patients with D symptoms before and after follow-up. Gender, time after BS and %WL did not predict improvement or worsening in A and D symptoms.

**Conclusions**

In most cases, patients remain the same in their A and D symptoms before and after BSP. BS per se does not determine changes in A and D symptoms in all patients. In fact, these results suggest that A can negatively change in some cases. Further studies on emotional determinants on patients attending BSP are necessary.

**TLB-2048-P: Mediating role of television time, diet patterns, physical activity and sleep duration in the association between television in the bedroom and adiposity in 10-year-old children**

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**Background**

It is not known how lifestyle behaviours (television viewing time, diet patterns, physical activity, and sleep habits) mediate the association between TV in the bedroom and adiposity in children. The objective of this study was to compare percent body fat (% BF) and lifestyle behaviors between children with and without a television (TV) in the bedroom and to examine the potential mediation of these lifestyle behaviors on the association between TV in the bedroom and % BF.

**Methods**

Cross-sectional data from 1201 children (57.3% female; mean age = 9.8 years) from Ottawa, Canada and Baton Rouge, US were examined. Height, weight and % BF were directly measured. Accelerometers were used to determine physical activity and sleep duration (24-h, 7-day protocol). Questionnaires were used to assess TV viewing time, diet patterns, and sleep quality.

**Results**

Girls with a TV in their bedroom (vs. those without) had higher % BF (25.1 % vs. 22.1%, p<0.001), were more likely to be overweight/obese (35.9% vs. 22.2%, p=0.001), reported watching TV ~2 additional hours/day, and had poorer diet patterns and levels of moderate-to-vigorous physical activity (MVPA). Boys with a TV in their bedroom had higher % BF (21.5 % vs. 18.3%, p<0.001) and reported watching TV 1
more hour/day than those without. There were no differences in sleep habits in boys or girls. TV viewing
time, independent of diet patterns, MVPA, sleep duration, and demographic covariates, mediated the
association between having a TV in the bedroom and % BF in girls; none of the mediators were significant
in boys.

Conclusions

TV viewing time mediates the association between having a TV in the bedroom and adiposity in girls,
independent of diet patterns, MVPA, and sleep duration.

TLB-2049-P: Obesity as a Risk Factor for
Pediatric Venous Thromboembolism

*Elizabeth Halvorson, MD; Sean Ervin, MD; Thomas Russell, MD; Joseph Skelton, MD, MS; Stephen
Davis, MA; John Spangler, MD MPH*

Background

The incidence of venous thromboembolism (VTE) is increasing among pediatric patients in the United
States. Previous studies on obesity as a risk factor have produced mixed results. Our hypothesis is that
obesity will increase the incidence of VTE in pediatric inpatients.

Methods

We completed a retrospective chart review of patients ages 2-18 years with VTE identified by International
Classification of Diseases, Ninth Revision code and confirmed by imaging admitted to Brenner
Children’s Hospital between January 2000 and September 2012. Cases were matched on age, gender,
and presence of a central venous catheter. Data were collected on weight, height, and VTE risk factors,
including bacteremia, intensive care unit admission, immobilization, use of oral contraceptives, known
thrombophilia markers, malignancy, and fracture. Underweight patients and those without documented
height and weight were excluded. We identified independent predictors of VTE risk by univariate and
multivariate analysis.

Results

We identified 88 cases plus matched controls. The majority of cases experienced thrombotic events (77%)
of the lower extremity (25%) or head and neck (22%) confirmed by ultrasound (43%) or CT scan (41%).
We found a statistically significant association between VTE and increased weight (p=0.02). In
multivariate analysis, BMI z-score (OR1.5, p=0.01), bacteremia (OR 10.0, p=0.05), ICU stay (OR 3.3,
p=0.01), immobilization (OR 5.3, p=0.004), and use of OCPs (OR 12.8, p=0.02) were the most significant
predictors.

Conclusions
In this single-institution study, we found that overweight and obesity were significantly associated with increased incidence of VTE. Weight status should be considered for inclusion in guidelines for VTE prophylaxis among pediatric inpatients.

**TLB-2050-P: Type 2 Diabetes Mellitus is Associated with Heightened Risk for Musculoskeletal Fragility**

*Peng Zhang, PhD; Mark Peterson, PhD, MS; Meng Tan, MD; Lu Wang, PhD; Grace Su, MD; Stewart Wang, MD, PhD; William Herman, MD, MPH*

**Background**

Storage of adipose tissue in ectopic compartments is a hallmark attribute linking obesity with cardiometabolic abnormalities. Emerging research has highlighted the interrelationships among muscle, fat, and bone, and demonstrated that ectopic lipid accumulation (e.g., in muscle) is a major driver of insulin resistance, independent of visceral adipose tissue (VAT). However, research on the associations between musculoskeletal quality and type 2 diabetes mellitus (T2DM) is still limited.

**Methods**

We have developed a novel high-throughput process to measure granular information about geometry and tissue characteristics from Computed Tomography (CT) images. Recently, we completed a large cross-sectional study of 2,214 patients, 18 or older, identified through a Trauma Registry, who had CTs at the L4 vertebral level. T2DM was identified from medical records. 64% were men and 7.5% had a diagnosis of T2DM. Morphologic features including VAT area, psoas muscle quality (PMQ), and trabecular bone density (TBD) were measured. Univariate analyses were performed using two-sample t tests and area under the receiver operating characteristic curve (AUC). Multivariate logistic regression was used to develop a prognostic model using demographic, anthropometric, and morphologic features.

**Results**

All three morphologic features differed between men and women with and without T2DM (p<0.001). Overall, PMQ had the largest AUC (0.80) followed by TBD (0.79) and VAT (0.78). Stratified by sex, AUCs were PMQ (0.84), TBD (0.80), and VAT (0.78) in men, and 0.78, 0.76, and 0.79 in women. A multivariate model with age, TBD, body depth (BD), PMQ, age*PMQ, and TBD*BD has an improved overall AUC at 0.86 (p<0.001).

**Conclusions**

Diminished musculoskeletal quality is as strongly associated with T2DM as VAT, and can provide additional prognostic value for risk stratification in T2DM.
TLB-2051-P: Barriers Preventing Primary Care Provider Referral of Obese Ethnic Minority Urban Adolescents to a Comprehensive Weight Management Program

Rachel Taniey, RD, CDN; Joshua Sapadin, BA; Andrew Racine, MD, PhD; Jessica Rieder, MD, MS

Background

Severe obesity affects at least 6% of U.S. youth. Understanding barriers preventing referral to weight management programs will improve access to such services. We evaluated barriers preventing primary care provider (PCP) referral of obese and severely obese ethnic minority urban youth to a comprehensive adolescent weight management program (Bâ€™N Fit).

Methods

83 of 266 solicited PCPs (31%) responded to a 20-item on-line survey assessing: awareness of 2007 Expert Committee obesity treatment recommendations; obesity treatment options; and Bâ€™N Fit referral barriers. Respondents were 80% female; 65% white, 14% Black and 18% Asian; 19%<35 yrs, 49% 36-55yrs, 32%>55yrs; 18% self-identified as â€œoverweightâ€, 80% as â€œnormal weight.â€

Results

57% reported familiarity with Expert Committee recommendations. Treatment options used included: websites (37%), handouts (64%), nutritionist (54%), health educator (57%), Bâ€™N Fit (67%). For the Bâ€™N Fit program, 19% were â€œunawareâ€ 63% reported â€œbasic awareness,â€ 18% were â€œknowledgeable.â€ Bâ€™N Fit referral was reported as likely or very likely (81%). 93% requested information as email newsletter (67%), on-site visit (50%), website (46%), presentation (31%). 38% used the electronic medical record for referral and 52% the phone. Provider referral barriers included other treatment options (32%); unclear program success (26%); unclear insurance coverage (25%); lack of time (19%); no barriers (33%). Perceived patient barriers: time commitment (84%); not ready (70%); travel (57%); interested (48%)

Conclusions

Provision of accurate program information and referral process are necessary for PCPs seeking access to adolescent weight management services for patients who may already face many barriers to achieving weight loss.
TLB-2052-P: Randomized trial of a family-based obesity prevention intervention that embeds weight-related messages within a general parenting program: The Parents and Tots Together Study

Deborah Gross, PhD; Julia McDonald, MS, MPH; Matthew Gillman, MD, SM; Sheryl Rifas-Shiman

Background

Formative research shows that parents of young children are enthusiastic about learning general parenting skills, but less interested in nutrition and physical activity. The objective of this randomized controlled trial was to evaluate the effectiveness of Parents and Tots Together, a family-based obesity prevention intervention that embeds weight-related messages within a general parenting program among a sample of racial/ethnic minority families with children age 2 to 5 years.

Methods

We randomized 56 families to the Parents and Tots Together intervention and 56 to a minimal attention control. Children were primarily Hispanic (58%) or Black/African American (23%). The intervention included: 1) 9, weekly group parenting sessions, 2) a children’s program, and 3) weekly homework assignments. At baseline, post-intervention, and 9-month follow-up, trained staff assessed children’s weight and height. Parents also completed surveys assessing parenting skills, parental feeding behaviors, and children’s diet, activity, and TV viewing patterns.

Results

At 9-month follow-up, children in the intervention and control groups experienced similar mean changes in BMI (intervention-control mean = -0.23; 95% confidence interval [CI] -0.75, 0.29; P = 0.38). Parents in the intervention decreased restrictive feeding practices relative to control parents (-0.31; 95% CI -0.54, -0.08; P = 0.01). Intervention and control groups showed similar changes in children’s television viewing, physical activity, sleep, and intake of sugar-sweetened beverages.

Conclusions

After 9 months, the Parents and Tots Together intervention improved feeding behaviors among parents of preschool children, but did not improve children’s BMI, diet, activity, sleep, or sedentary behaviors.
TLB-2053-P: Combination Weight Management (WM) Pharmacotherapy with Lorcaserin (LOR) and Immediate Release (IR) Phentermine (phen)

Timothy Garvey
Frank Greenway

TLB-01-OR: Low levels of energy expenditure are associated with higher disinhibition of appetite and 1-year weight gain

Robin Shook, PhD; Gregory Hand, PhD, MPH; James Hebert, ScD, MSPH; Clemens Drenowatz, PhD; Steven Blair, PED

Background

Appetite may be dysregulated at low levels of activity, resulting in weight gain. The purpose of this paper is to examine relationships between energy intake (EI), energy expenditure (EE), appetite and subsequent weight gain during a 1-year follow-up period in a large sample of young adults.

Methods

Participants included 421 young adults (mean age 27.6±3.8 years), with nearly equal numbers of males (n=205) and females (n=216). EI was assessed using interviewer-administered dietary recalls, EE using an arm-band activity monitor (SenseWear®, Body Media, Inc.), body composition using dual energy X-ray absorptiometry, questionnaire-derived perceptions of dietary restraint, disinhibition, hunger and control of eating. Participants were grouped at baseline into quintiles of EE adjusted for body weight for each sex. Measurements were repeated every 3 months for 1-year. Linear mixed modeling was performed to analyze changes in body composition.

Results

An inverse relationship was found between body weight and EE group (P for trend <.01), with the least active having the highest body weight (89.0 kg) and the most active the lowest body weight (66.7 kg). The lowest two activity groups reported higher levels of disinhibition (P<.05) and the least active group had significantly higher cravings for savory foods (P=.03). The least active group gained the largest amount of...
both total body mass (2.1 kg) and fat mass (2.0 kg) over 12-months of follow-up after adjusting for age, race, and sex.

Conclusions

In young adults, low levels of EE were associated with higher levels of disinhibition and certain food cravings than those having moderate and high levels of EE. Additionally, individuals at this low level of EE gained the largest amount of both total body mass and fat mass over the following year.

TLB-02-OR: Newborn dried blood spot measured adipokines in association with childhood growth: the Upstate KIDS study

Edwina Yeung, PhD; Rajeshwari Sundaram, PhD; David Lawrence, PhD; Charlotte Druschel, MD, MPH; Nancy Anderson, BA; Alexander McLain, PhD; Erin Bell, PhD

Background

Adipokines play important roles in regulating satiety and metabolism but how newborn measures are associated with later growth remains unclear.

Methods

2169 singletons from Upstate KIDS (2008-2010) had adipokines measured by Luminex multiplex using newborn dried blood spots and had weight information beyond birth. Birth certificates for birth weight and maternal queried pediatrician measures for weight and length were analyzed. Mixed linear models with random slope, cubic splines for age and age-gender interactions, estimated mean differences in infant growth from birth to 18 months in association with each log unit increase in adiponectin and resistin. Logistic regression estimated odds ratios for high BMI (>90th percentile) at 18 months and 3 years. Models adjusted for maternal age, prepregnancy BMI and race.

Results

Adiponectin and resistin were significantly associated with increased weight-for-age z-scores from birth to 18 months of age (+0.17 and +0.12 per log unit, respectively) and increased BMI z-scores (+0.14 and +0.06, respectively). Adiponectin was also associated with increased weight-for-length (+0.10, p=0.004) while the association was borderline for resistin (+0.04, p=0.10). Additional adjustment for insurance, education, maternal complications, and c-reactive protein had no impact. After adjusting for birthweight, adiponectin was no longer associated with growth measures but resistin remained associated with weight-for-age (+0.04). Adiponectin and resistin were not associated with risk of high BMI at either 18 months or 3 years (p>0.3).
Conclusions

Adiponectin measured using newborn dried blood spots may be associated with increased infant growth from birth to 18 months largely due to its association with birthweight, while higher resistin levels may be an indicator of increased infant weight-for-age irrespective of birthweight.