

POSTER SESSIONS

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T1:PS1 – Genetics, Epigenetics, Omics

T1:P.001

Adult body mass and common fSNP variants of BBS genes

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Introduction: Bardet-Biedl syndrome (BBS) is a rare monogenic disorder manifesting with marked obesity, which can be caused by mutations in any of more than 14 different *BBS* genes. Association between common polymorphisms in all 14 genes as a group and body weight has not been tested.

Methods: We investigated association between tagging single nucleotide polymorphisms (tSNPs) of 14 *BBS* genes, and body weight and fat in 2462 adult women from the UK Twins study. Significant results were further tested in a confirmation sample of 2003 women from the same cohort and additionally in the GIANT consortium population (n=123,865).

Results: 105 SNPs in 14 *BBS* genes were selected and tested in the first cohort for association with body weight and fat phenotypes, i.e. weight, BMI, total body fat (assessed by DEXA), total fat/height², and total fat/weight. We used principal component (PC) derived using the latter five traits as a primary phenotype for this study. Of the 105 SNPs, 3 variants in *BBS9* and *BBS11* showed evidence of nominally significant association with elevated body weight and fat. However, none of the associations survived multiple-testing correction.

Conclusion: Common variation in 14 *BBS* genes are unlikely to have a substantial effect on body weight and fat in the European population.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was partly funded by ISF.

T1:P.002

Characterizations of the energy balance and circulating inflammation makers in a polygenic mouse model of obesity and type 2 diabetes

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Introduction: TALLYHO/JngJ (TH) mice are a polygenic model for type 2 diabetes characterized by obesity, hyperlipidemia, hyperinsulinemia, impaired glucose uptake and tolerance, and hyperglycemia. In this study, we characterized the energy balance and circulating cytokine/chemokine profile in TH mice.

Methods: To investigate energy balance, Comprehensive Laboratory Animal Monitoring System was used to measure heat production, respiratory exchange ratio (RER), locomotor activity, food intake, and water drinking in TH mice and non-obese and non-diabetic C57BL/6J (B6) mice at young (6–10 week) and old (16–25 week) ages. Plasma cytokine/chemokine profile was examined using multiplex fluorescent microbead immunoassay in 22-plex set up consisting of Eotaxin, G-CSF, GM-CSF, IFN γ , IL-10, IL-12(p70), IL-13, IL-17, IL-1 α , IL-1 β , IL-2, IL-5, IL-6, IP-10, KC, KIX, M-CSF, MCP-1, MIG, MIP-1 α , RANTES, and TNF α .

Results: A significant hypoactivity was observed in TH mice during the dark period at both ages compared to B6 mice. However, energy ex-

penditure, assessed by heat production (kcal/hour) calculated from VO₂, was largely increased in TH mice with age. So did water drinking. Fuel source preference, as RER, or food intake (g consumed/day) was not significantly different between TH and B6 mice. Compared with B6, the levels of plasma IL-1 α and IL-6 concentrations exhibited a significant rise in TH mice at young and old, respectively. There was a significant reduction in circulating G-CSF levels in TH mice at both ages.

Conclusion: Our data revealed the metabolic characteristics and alterations of circulating inflammatory cytokines in TH mice that encompass many aspects of polygenic human diabetes and obesity.

T1:P.003

Genetic determinism in weight bias reduction

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Introduction: One major approach to weight bias reduction consists of decreasing beliefs on the personal controllability of and responsibility for overweight by educating about the biogenetic causes of obesity. Evidence on the efficacy is mixed, and it remains unclear whether a deterministic view of obesity is promoted, potentially leading to detrimental side-effects.

Methods: A series of three independent studies served to (1) examine associations between genetic causal attributions, belief in genetic determinism, and stigmatizing attitudes (N = 432); (2) develop and pilot a brief, interactive stigma reduction intervention educating about gene x environment interactions in the etiology of obesity within a randomized-controlled trial (RCT) with N = 128 university students; and to (3) evaluate this intervention in an RCT in the general population (N = 128).

Results: The results showed (1) a significant positive association between genetic causal attributions and genetic determinism, and negative associations with stigmatizing attitudes; (2) decreased weight bias and controllability beliefs two weeks following the pilot intervention; and (3) increased genetic attributions, determinism, and knowledge as well as decreased internal attributions, controllability, and, for a trend, weight bias four weeks following the stigma reduction intervention in the general population. Lower controllability and genetic determinism longitudinally predicted less weight bias.

Conclusion: The results underline the usefulness of genetic causal attributions in the reduction of weight bias, however, with a risk of increasing genetic determinism even with a program focus on gene x environment interactions. The less the interactionist view is promoted, the less the stigma-reducing effect.

T1:P.004

Polymorphisms as predictors for lifestyle-induced weight loss in severely obese

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Background: Genetic predisposition for weight loss (WL) and its maintenance in obesity is still under debate. This study shows the contribution of several gene polymorphisms as predictors of short-term WL and its maintenance during a lifestyle intervention programme in severely obese individuals.

Methods: Our first analysis consisted of 561 clients (68.6% female; age 46.2 \pm 12.4 y; BMI 39.9 \pm 6.3 kg/m²) of a local obesity treatment centre. The clients were divided into two groups: low (LWL)($<$ 5%)(N=337) and high (HWL)($>$ 5%)(N=224) WL after 3 months of treatment. For the second analysis we selected all 457 clients with weight measurements at 3 and 6 months. They were also divided into two groups: HWL-maintenance, i.e. clients who maintained their $>$ 5% WL from 3 to 6 months of treatment (N=262), and the clients who did not achieve the

HWL at 3 months or failed to maintain the HWL up to 6 months (N=195). 30 candidate polymorphisms were analyzed for association.

Results: Our first analysis showed that the G/G genotype of PLIN1(rs1052700) and PLIN1(rs2304795)(OR 1.90;P=0.01 and OR 1.74;P=0.02), the T/T genotype of PLIN1(rs1052700)(OR 1.71;P=0.036) and the C/C genotype of MMP2(OR 1.87;P=0.01) were associated with higher odds for >5% WL in the first three months for all clients. The second analysis showed that the G/G genotype of PLIN1(rs1052700)(OR 1.85;P=0.023) and the T/T genotype of PLIN1(rs1052700)(OR 1.94;P=0.021) were associated with higher odds for maintenance of >5% WL after 6 months.

Conclusion: Polymorphisms in genes related to adipocyte fat metabolism and extracellular matrix are predictors for HWL (maintenance) in severely obese subjects.

1. Conflict of interest: None disclosed.

2. Funding: No funding.

T1:P.006

Characterization of MC4R, SIRT1 and FTO Gene Polymorphisms in Severely Obese Italian Subjects

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Introduction: Human obesity stems from alterations in energy intake/expenditure equilibrium. Genetic factors account for 30–40% of the obese phenotype. Aim of this study was to look for associations between SNPs in the melanocortin receptor 4 (MC4R rs12970134, rs477181, rs502933), silent mating type information regulation 2 homolog 1 (SIRT1 rs3818292, rs7069102, rs730821, rs2273773, rs12413112) and fat mass and obesity (FTO rs1421085, rs9939609, rs9930506, rs1121980) genes and obesity in a Southern Italy population.

Methods: One-thousand unrelated non diabetic and young severely obese patients (62% females, mean body mass index [BMI] 46.9 kg/m²) and 100 controls (33% females, mean BMI 23.2 kg/m²) were studied. SNPs were genotyped by RT Taqman assay. Anthropometric, clinical and biochemical data were collected for all enrolled subjects. Metabolic syndrome (MS) was diagnosed according to the American Heart Association criteria.

Results: MS was diagnosed in 37.2% of patients. The four FTO SNPs were significantly associated with the obese phenotype (0.0001<p<0.007), while no association was found for the tested SNPs in MC4R and SIRT1 and obesity. Binomial logistic regression analysis confirmed the rs9939609 in FTO to be significantly associated to obesity (OR/95%CI: 2.5/1.4–4.4 and 3.8/1.9–7.5, for the heterozygous and the homozygous mutated genotypes, respectively) and to MS presence (OR/95%CI: 2.5/1.1–5.5).

Conclusions: This study confirms that FTO is a susceptible gene for obesity risk; patients bearing the polymorphic allele in the rs9939609 SNP could be at high risk for MS, being preferential targets for preventive program.

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T1:P.007

A genome-wide SNP/CNV study on mental delay with severe obesity at early-onset: correlation molecular characterization-phenotype

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Introduction: Molecular characterization of new large chromosomal deletions/duplications and rare copy number variations (<500Kpb) which affect candidate obesity genes.

Methods: 30 patients with severe obesity early-onset, between 4 to 16 years of age, who also had mental delay: 10 patients (a) exhibited a Prader-Willi-like phenotype, 3 a Fragile X Syndrome phenotype (b), 8 had dismorphic signs and/or malformations (c) and 9 without abnormal physical aspect (d). Methylation pattern of the Prader-Willi/Angelman SNRPN region, CGG repeats alleles of the FMR1 gene and BDNF gene, were normal in the whole series. Affymetrix[®] CytoScan Whole-Genome technique was carried out in all the patients. Two patients were sequenced for the LMF1 high susceptibility gene.

Results: 4 identified rare copy number variants (<500Kpb) appeared as pathogenic in the ISCA database, two were deletions of the same exon of the LMF1 gene in both of the patients of the group a, involved in the LDL function (Figure). 5 patients of the c group, carried: two large deletions (3.8 and 7.7 Mb) recently associated to mental delay with severe obesity (Unique, Decipher), duplication of 6.8 Mb (PCSK2 gene included), dup11p15.5 (Beckwith-Wiedemann region) and del6q25.2–25.3 (3.5 Mb). None variant in the BDNF gene was identified apart from the V66M (23%).

Conclusions: 5 patients harbouring larger chromosomal anomalies developed obesity with malformation syndrome. Other four rare CNVs encompassed candidate obesity genes among obese children with different phenotypes, two were Prader-Willi-like. Our strategy allows towards an evidence-based process for clinical interpretation of copy number variation, for genetic obesity research.

T1:P.008

The association between variation in CNR1 gene with BMI and leptin concentration is modulated by vegetable intake in a high cardiovascular risk population

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Introduction: Endocannabinoids through CB1 receptor (CNR1) gene regulate energy balance. Leptin, an adipocytokine, is also involved in body weight regulation. Vegetable intake is associated with decreased appetite due to high fiber content. Our aims were to study the association between the CNR1 gene's rs806381 and rs6454674 polymorphisms and anthropometric, life-style variables and plasma leptin concentrations in a high cardiovascular risk population.

Methods: We studied 816 high cardiovascular risk subjects participating in the PREDIMED (PREvención Dieta MEDiterránea) Study and recruited in Valencia. Anthropometric, genetic and life-style variables were obtained. Leptin was determined by validated ELISA kits and rs806381 and rs6454674 determined by allele-specific assays.

Results: Minor allele frequencies for the rs806381 and rs6454674 were G=0.324 and G=0.297, respectively. We detected a strong linkage disequilibrium between polymorphisms (D'=0.959, LOD=190, 86, r²=0.888). For the rs806381, GG homozygotes presented significantly

higher BMI and leptin concentrations. (BMI: GG: 31.2 ± 4.2 kg/m²; GA: 30.0 ± 4.0 kg/m²; AA: 30.1 ± 4.3 kg/m²; $p=0.041$; leptin: GG: 34.2 ± 29.5 ng/ml; GA: 25.1 ± 21.5 ng/ml; AA: 26.1 ± 21.7 ng/ml; $p=0.005$). Concurrently, there was an interaction between rs806381 and vegetables intake in determining BMI and leptin concentrations (BMI:Pinterac. <0.001 ; leptin:Pinterac. <0.001), with differences per genotype among those with lower intake (less than 2 times/day), GG homozygotes again presenting higher BMI and leptin concentrations (BMI:GG: 32.9 ± 4.8 kg/m²; GA: 29.8 ± 3.7 kg/m²; AA: 30.9 ± 4.4 kg/m²; $p<0.001$; leptin: GG: 51.3 ± 35.3 ng/ml; GA: 23.8 ± 20.3 ng/ml; AA: 28.6 ± 24.4 ng/ml; $p<0.001$), but no differences per genotype being detected between those with higher intake (BMI: $p=0.129$; leptin: $p=0.437$).

Conclusion: The G allele of the CRN1 gene's rs806381 polymorphism is associated with increased BMI and leptin concentration, this effect being modulated by vegetable intake in this high cardiovascular risk population.

T1:P.009

Preliminary evidence for the association of two common variants in the CD36 'fat taste receptor' gene and body fat in adults

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Introduction: Recent evidence suggests that genetic variation in CD36 may be involved in oral detection of fatty acids and preference for added fats. The current study explored whether two common CD36 variants were related to hedonic responses for high-fat foods, energy intake, and body composition.

Methods: One-hundred and eighty participants (BMI: 23.5 ± 3.8 kg/m²; Age: 26.1 ± 9 yrs) were recruited from two areas of the UK following identical protocols and procedures. Laboratory measures of food hedonics, eating behaviour, food choice and anthropometric measures, including body composition, were taken. DNA was isolated from saliva and genotyped for the rs1761667 and the rs2151916 polymorphisms in the CD36 gene.

Results: Participants with the CC genotype at rs2151916 had lower fat mass ($p<0.001$), BMI ($p<0.01$) and waist circumference ($p<0.01$) than CT or TT. Individuals who had the GG genotype at rs1761667 had lower fat mass compared to GA or AA. These effects were independent of age and gender and appeared specific to markers of adiposity as there were no differences in fat free mass between genotypes. Finally, there were no differences in ratings of liking for high-fat foods or energy intake.

Conclusion: These preliminary findings add to previous research that has shown common variants in the CD36 gene may enhance oral sensitivity to dietary fat by demonstrating their association with reduced body fat. A potential behavioural mechanism for this effect was not identified but warrants further investigation.

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T1:P.010

Transcriptomic and epigenetic profile in high-fat diet-induced early liver steatosis and the preventive effect of dietary methyl donor supplementation

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Introduction: Non-Alcoholic Fatty Liver Disease is an important metabolic syndrome feature. Dietary methyl donor-supplementation may protect this disorder during early developmental stages. The aim was to investigate the transcriptomic and epigenetic mechanisms implicated in liver fat accumulation as a result of an obesogenic diet and the role of dietary methyl donors.

Methods: Forty-eight male Wistar rats were assigned into four dietary groups for 8 weeks; control, control methyl-donor-supplemented, high-fat-sucrose and high-fat-sucrose supplemented with a cocktail containing betaine, choline, vitamin B₁₂ and folic acid.

Results: Liver fat accumulation induced by a high-fat-sucrose (HFS) diet was prevented by methyl donor supplementation in HFS-fed animals. According to microarray results twelve genes (Lepr, Btc, Srebf2, Mme, Fbxo21, Agpat3, Esr1, Mif, Mst1, Fat1, Gsr, Acp1) were selected and positively validated by RT-qPCR. Liver global DNA methylation was decreased by methyl donor supplementation, but only in control-fed animals. Methylation levels of several CpG sites from Btc, Srebf2, Mme and Mif promoter region showed changes due to the obesogenic diet and the supplementation with methyl donors, although no associations with mRNA levels were found. Interestingly Srebf2 CpG23_24 methylation levels (corresponding to -167bp and -156bp respect to the transcriptional start site) correlated with HDLc plasma levels, whereas Esr1 CpG14 (-2623 bp) methylation levels were associated with body and liver weights and fat content.

Conclusion: HFS diet-induced liver fat accumulation was prevented by methyl donor supplementation. Both obesogenic diet and methyl donor supplementation modified the mRNA hepatic profile as well as global and specific gene promoters DNA methylation.

1. Conflict of interest: None Disclosed

2. Funding: Línea Especial "Nutrición, Obesidad y Salud" (LE/97) from University of Navarra.

T1:P.011

Short-term dietary supplementation with n-3 or n-6 PUFA and DNA methylation in peripheral blood mononuclear cells

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Introduction: n-3-PUFA supplementation has beneficial effects on human health. In peripheral blood mononuclear cells (PBMC), supplementation with EPA/DHA down-regulate the gene expression of metabolic enzymes such as pyruvate dehydrogenase kinase 4 (PDK4) and fatty acid desaturase 1 (FADS1), fatty acid receptors like CD36 molecule (CD36) and fatty acid receptor 3 (FFAR3), and the macrophage CD14 receptor (CD14). However, few studies have investigated the effect of dietary fatty acids on DNA methylation. Then, we hypothesized that n-3 PUFA supplementation may modify the DNA methylation pattern of PDK4, FADS1, CD36, FFAR3 and CD14 genes in PBMC.

Methods: In a single blinded randomized study, twelve women followed a 30% energy-restricted diet and were divided into two groups: seven of them received n-3 (fish oil, especially EPA and DHA) and the other five n-6 (sunflower oil, rich in linoleic acid) PUFA during eight weeks (6 capsules/day). PBMC were isolated at baseline and endpoint and, after bisulfite conversion, DNA methylation was measured at both times by Sequenom EpiTYPER.

Results: Both groups, orally supplemented with n-6 or n-3 PUFA during eight weeks, similarly reduced body weight. The energy restriction-induced weight loss decreased the methylation percentage of a CpG site located in the promoter region of CD36 (-477). n-3 PUFA supplementation did not significantly alter the methylation patterns of genes that are usually downregulated by EPA/DHA in PBMC, although very small changes ($<5\%$) were observed in FADS1 and PDK4.

Conclusion: Short-term oral supplementation with n-3 PUFA did not significantly alter the methylation pattern of genes in PBMC.

1. Conflict of Interest: None Disclosed

2. Funding: Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP) from Brazil and Línea Especial "Nutrición, Obesidad, Salud" from University of Navarra.

T1:P.019

Developmental trends in the expression of obesity-related genes from early to late childhoodLlewellyn CH^{1,2}, Trzaskowski M², Boniface D¹, Plomin R², Wardle J¹¹University College London, London, United Kingdom, ²King's College London, London, United Kingdom

Introduction: A recent meta-analysis established that the heritability of BMI increases over childhood (Elks et al. 2012); suggesting that genetic regulation of weight becomes stronger during this developmental period. The same phenomenon has been observed with FTO insofar as the association with BMI increases from 4 to 7 to 10 years (Haworth et al. 2008). We tested the hypothesis that common single nucleotide polymorphisms (SNPs) combined into a polygenic risk score (PRS) would show the same increasing heritability from early to late childhood.

Methods: Data were from 914 unrelated children from a British birth cohort. BMI standard deviation scores (BMI-SDS) were calculated from validated parent-reported heights and weights at 4, 7 and 10 years using UK 1990 reference data. A PRS was created by summing common obesity SNPs weighted for their effects on BMI from a recent meta-analysis (Speliotes et al. 2010). Bootstrapping was used to test the increase in the association between PRS and BMI-SDS from 4 to 7 to 10 years.

Results: There was a linear increase in the variance in BMI-SDS explained by the PRS from 4 years (0.012; 95% CI: 0.003-0.030) to 7 years (0.026; 95% CI: 0.010-0.052) to 10 years (0.038; 95% CI: 0.016-0.066). Bootstrapping confirmed that the PRS explained significantly more variance in BMI-SDS at 10 years compared to 4 years.

Conclusion: In line with twin estimates of heritability, the association between BMI-SDS and PRS rose developmentally with age. These results confirm that genetic influence on adiposity increases significantly from early to late childhood.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded by: the UK Medical Research Council (G0901245; and previously G0500079), the US National Institutes of Health (HD044454; HD046167), the UK Biological and Biotechnology Research Council (D19086), and the Wellcome Trust Case Control Consortium 2 project (085475/B/08/Z; 085475/Z/08/Z).

T1:P.020

Finding the missing heritability in paediatric obesity: The contribution of genome-wide complex trait analysisLlewellyn CH^{1,2}, Trzaskowski M², Plomin R², Wardle J¹¹University College London, London, United Kingdom, ²King's College London, London, United Kingdom

Introduction: Known single nucleotide polymorphisms (SNPs) explain less than 2% of the variation in body mass index (BMI) despite evidence of >50% heritability from twin and family studies; a phenomenon termed 'missing heritability'. Genome-wide Complex Trait Analysis (GCTA) is a novel method using whole genome arrays to estimate total additive genetic influence due to common SNPs. GCTA has made major inroads into explaining the 'missing heritability' of BMI in adults. This study provides the first GCTA estimate of genetic influence on adiposity in children.

Methods: Participants were from a British twin birth cohort. BMI standard deviation scores (BMI-SDS) were obtained from validated parent-reported anthropometric measures at age 10 years. Selecting one child per family (n=2269), GCTA results from 1.7 million DNA markers were used to quantify the additive genetic influence of common SNPs. For direct comparison, a standard twin analysis in the same families estimated the additive genetic influence.

Results: The twin analysis estimated the additive genetic influence as 82% (95% CI: 0.74-0.88, p<.001). GCTA explained 30% of the variance in BMI-SDS (95% CI: 0.02-0.59; p=0.02).

Conclusion: These results indicate that 37% of the 'missing heritability' (30%/82%) can be explained by additive effects of multiple common

SNPs, and provide compelling evidence for strong genetic influence on adiposity in childhood.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded by: the UK Medical Research Council (G0901245; and previously G0500079), the US National Institutes of Health (HD044454; HD046167), the UK Biological and Biotechnology Research Council (D19086), and the Wellcome Trust Case Control Consortium 2 project (085475/B/08/Z; 085475/Z/08/Z).

T1:PS2 – Mitochondrial Function / Central Regulations

T1:P.022

Lipoic acid stimulates oxygen consumption and genes related to mitochondrial biogenesis in subcutaneous adipocytes from Overweight-Obese SubjectsGonzalez-Muniesa P, Fernandez-Galliea M, Prieto-Hontoria PL, Sirvent A, Martinez JA, Moreno-Aliaga MJ

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Introduction: Altered mitochondrial biogenesis and function in adipose tissue has been observed in obesity and type 2 diabetes in rodents and humans. Several studies in rodents have suggested that the protective effects of lipoic acid (LA) in obesity-associated metabolic disturbances could be related to improved mitochondrial function. The aim of this study was to determine the ability of lipoic acid (LA) to promote mitochondrial biogenesis and function in human adipocytes from overweight subjects.

Methods: Human subcutaneous preadipocytes from 4–7 female overweight-obese (BMI: 26.85–33.37 kg/m²) subjects were differentiated according to the manufacturer procedures. Fully differentiated adipocytes were treated with LA (0.1–250 µM) during 24 h. Changes in mRNA expression were investigated using real-time RT-PCR. Oxygen consumption was measured in a BD Oxygen Biosensor System plate (BD Biosciences).

Results: LA (100 µM) significantly upregulated key genes governing the transcriptional control of mitochondrial biogenesis and respiratory function, including the mitochondrial transcription factor A (TFAM), the nuclear respiratory factor-1 (NRF-1) as well as the peroxisome proliferator-activated receptor-γ coactivator (PGC)-1β and sirtuin 1 (SIRT1). In parallel LA treatment (100 and 250 µM) promoted a significant increase in oxygen consumption.

Conclusions: Our data suggest the ability of LA to promote mitochondrial biogenesis in human overweight-obese subcutaneous adipocytes, which could contribute to the beneficial effects observed after LA treatment in obesity-related metabolic disorders.

1. Conflict of Interest: None

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T1:P.023

Beta-lapachone regulates brown adipocyte differentiationJeong MY¹, Hong SH², Um JY¹¹Department of Pharmacology, College of Korean Medicine, Institute of Korean Medicine, Kyung Hee University, Seoul, Republic of Korea,²Department of Oriental Pharmacy, College of Pharmacy, Wonkwang University, Iksan, Republic of Korea

Introduction: The quinone-containing compound, β-lapachone (3,4-dihydro-2,2-dimethyl-2H-naphthol [1,2-b]pyran-5,6-dione; [βL]) has been used for medical purposes. Brown adipocytes play an important role in regulating energy balance, and there is a good correlation between obesity and the amount of brown adipose tissue. This study exam-

ined the regulatory action of β -lapachone in brown adipogenic differentiation using primary brown preadipocytes.

Methods: The mitochondrial mass in primary brown adipocytes was assessed by MitoTracker Red probe staining. Expression of UCP-1 and PGC-1 α was determined by real-time RT-PCR. Western blot was used to know the protein level of pAMPK.

Results: Our results clearly showed that staining of differentiated brown adipocytes with MitoTracker Red revealed stronger staining of β L-treated cells than that of control cells. Expression of brown adipocyte-related genes, such as UCP-1 and PGC-1 α were dramatically up-regulated by treatment with β L. In addition, β L increased the phosphorylation of AMPK, a key player in adipocyte differentiation. These effects were blocked by pretreatment with AMPK α siRNA and β L. These results indicate that β L has a potent adipogenic effect in brown adipocytes cells due to the stimulation of adipocyte differentiation. β L is capable of increasing differentiation of brown adipocytes via activation of pAMPK, suggesting its potential therapeutic application in the treatment or prevention of obesity.

Conclusion: Our results indicate that, with the continuing spread of obesity prevention as a fundamental medicine strategy, β L may be beneficial in the treatment of obesity and can be used as a safe natural promoter of health.

T1:P.024

Increased skeletal muscle mitochondrial efficiency in a model of obesity induced by diets rich in fructose

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We have shown that high-fructose diet administered for 8 weeks to adult rats not only induces obesity but also stimulates hepatic de novo lipogenesis and causes hypertriglyceridemia and higher plasma non esterified fatty acids (NEFA). Although about 90% of fructose coming from the diet is metabolised in liver, higher lipid circulation can influence other tissues, such as skeletal muscle. In addition, increased plasma NEFA are considered to be responsible for skeletal muscle mitochondrial derangement and insulin resistance.

On the basis of these considerations, we investigated the effect of long term fructose feeding on skeletal muscle mitochondrial energetics and insulin resistance. We assessed mitochondrial mass, respiratory activity and energetic efficiency, together with Western blot analysis of p-Akt/Akt ratio in skeletal muscle from fructose-fed and control rats.

The results show increased mitochondrial mass and efficiency of oxidative phosphorylation, that implies a lower level of fuel oxidation. In addition, when p-Akt levels were normalised to insulin plasma levels, significantly lower values were found in fructose-fed rats compared to controls. Therefore, in skeletal muscle, high fructose feeding lowers insulin sensitivity, stimulates mitochondrial biogenesis but induces increased energetic efficiency. This latter effect could have detrimental metabolic effect by causing energy sparing that contributes to the high metabolic efficiency of fructose-fed rats.

T1:P.025

The epigallocatechin-gallate (EGCG) increased AMPK α 1/2 phosphorylation and AMPK β 1 and SIRT1 protein content in gastrocnemius muscle

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Introduction: Skeletal muscle is an endocrine organ which modulates important molecules that participate in the metabolism control. Changes in these molecules promote mitochondrial dysfunction, decrease fat oxidation, increase ectopic fat accumulation that contribute to insulin resistance in muscle. Green tea is widely consumed and has been described as an anti-oxidant and insulin-sensitizing agent. The most abundant catechin found in green tea is epigallocatechin-3-gallate (EGCG), which has been suggested to be responsible for many of the potential health effects of tea.

Methods: 30 days old mice were divided in two groups: C (0.1 ml of water by gavage/day) and CEGCG (0.1 ml of EGCG – 50 mg/Kg b.w./day) and received control diet (AIN-93) and water *ad libitum*. After 8 weeks of treatment the animals were sacrificed and the gastrocnemius was removed for pAMPK α 1/2, AMPK α 1/2, pAMPK β 1, AMPK β 1, SIRT1, PGC1 α determination by Western blotting.

Results: Table 1. pAMPK α 1/2, AMPK α 1/2, pAMPK β 1, AMPK β 1, SIRT1, PGC1 α protein content in gastrocnemius of control (C) or EGCG (CEGCG) treated mice.

	C	CEGCG
pAMPK α 1/2	110.43 \pm 11.37	172.14 \pm 27.49*
AMPK α 1/2	100 \pm 5.43	161.28 \pm 51.20
pAMPK β 1	100 \pm 2.66	91.55 \pm 14.90
AMPK β 1	100 \pm 11.49	186.35 \pm 43.22*
SIRT1	100 \pm 9.79	181.10 \pm 34.14*
PGC1	100 \pm 8.14	125.81 \pm 35.33

* p<0.05. Number of animals = 4-6.

Conclusion: Our results suggest that the green tea improve insulin sensitive partially by AMPK and SIRT1 increasing fat oxidation in muscle.

1. Conflict of Interest: None Disclosed

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T1:P.026

Common variation in mitochondrial DNA is not associated with obesity

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Introduction: Heritability estimates of the variance of the body mass index (BMI) are high. For mothers and their offspring higher BMI correlations have been described than for fathers. Variation(s) in the exclusively maternally inherited mitochondrial DNA (mtDNA) might contribute to this parental effect.

Methods: A maximum of 40 mitochondrial SNPs were available from genome-wide association study (GWAS) SNP (single nucleotide polymorphism) arrays (Affymetrix 6.0). In the discovery step, we analyzed association in a case-control sample of 1157 extremely obese children and adolescents and 434 lean adult controls. In the independent confirmation step, 7007 population-based adults (KORA, SHIP and POPGEN) were analyzed as case-control samples (BMI ≥ 30 kg/m² categorized as obese cases and BMI < 25 kg/m² as normal weight or lean controls). SNPs were analyzed as single SNPs and as haplogroups (HaploGrep). Fisher's two-sided exact test was used for association testing.

Results: In the discovery step, nominally significant association to obesity was found for the frequent allele of rs28358887 ($p=0.0020$) and haplogroup W ($p=0.0387$). rs28358887 is located in the *ATP6* gene. These findings could not be confirmed in the population-based adults.

Conclusion: Our hypotheses of a contribution of mtDNA to the observed higher BMI correlations between mothers and offspring cannot be substantiated by the findings of the present study.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded by grants of the German Federal Ministry of Education and Research (BMBF and NGFNplus, grant numbers 01KU0903, 01GS0830, and 01GS0820), the European Community's Seventh Framework Program (FP7/2007-2013, grant number 245009) and the IFORES program of the University of Duisburg-Essen.

T1:P.027

Increased sensitivity to food cues in the fasted state and decreased inhibitory control in the satiated state in the overweight

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Background: flexibility of food-reward related brain signaling (FRS) between food and non-food-stimuli may differ between overweight and normal weight subjects and depend on a fasted or satiated state.

Objective: assessing this flexibility in response to visual food vs. non-food cues. Design: 20 normal weight (age=22.4 \pm 0.4, Body Mass index (BMI) =22.7 \pm 0.2) and 20 overweight participants (age=24.0 \pm 0.7, BMI=28.1 \pm 0.3) completed 2 functional magnetic resonance imaging scans. Subjects arrived fasted and consumed breakfast comprising 20% of subject-specific energy requirements between two successive scans.

A block paradigm and a food>non-food contrast was used to determine FRS.

Results: an overall stimulus x condition x subject group effect was observed in the anterior cingulate cortex (ACC) ($p<0.006$, $F_{(1,38)}=9.12$) and right putamen ($p<0.006$, $F_{(1,38)}=9.27$). In all participants, FRS decreased from fasted to satiated state in the cingulate ($p<0.005$, $t_{(39)}=3.15$) and right prefrontal cortex (PFC) ($p<0.006$, $t_{(39)}=3.00$). In fasted state they showed FRS in the PFC ($p<0.004$, $t_{(39)}=3.17$), left ($p<0.009$, $t_{(39)}=2.95$), right insula ($p<0.005$, $t_{(39)}=3.12$), cingulate cortex ($p<0.004$, $t_{(39)}=3.21$) and thalamus ($p<0.006$, $t_{(39)}=2.96$). In satiated state, FRS was limited to the left ($p<0.005$, $t_{(39)}=3.21$), right insula ($p<0.006$, $t_{(39)}=3.04$) and cingulate cortex ($p<0.005$, $t_{(39)}=3.15$). Regarding subject group, in the fasted state FRS in the ACC was more pronounced in overweight vs. normal weight subjects ($p<0.005$, $F_{(1,38)}=9.71$), while in satiated state, FRS was less pronounced in overweight vs. normal weight subjects in the ACC ($p<0.006$, $F_{(1,38)}=9.18$) and PFC ($p<0.006$, $F_{(1,38)}=8.86$), suggesting lower inhibitory control in the overweight.

Conclusion: FRS was higher in the overweight in the satiated state, yet when sufficiently satiated they show decreased inhibitory control, facilitating overeating.

1. Conflict of Interest: None Disclosed

2. Funding: Research related to this abstract was funded by the Top Institute of Food and Nutrition (TIFN).

T1:P.028

Accuracy of predictive equations for estimating resting energy expenditure in overweight adult females

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Introduction: During the last three decades the prevalence of overweight and obesity has rapidly increased in adolescents living in European countries. An accurate assessment of energy needs is required to improve individual clinical and nutritional evaluation in order to plan a more appropriate therapeutic intervention.

Aim: To compare resting energy expenditure (REE), calculated by different predictive equations, with REE measured by indirect calorimetry in overweight adult females.

Methods: One hundred and sixty-nine overweight (BMI= 25-30 kg/m²) females aged 18–50 years were included. Measured REE (MREE) was compared with predicted REE (PREE) estimated by the most common equations applied in clinical practice (Harris-Benedict, FAO/WHO/UNU, Mifflin, and Owen) and equations derived by overweight-obese samples (De Lorenzo, Lazzar, Marra, Ireton, Bernstein, Siervo and Huang). The mean MREE and mean differences between PREE and MREE, as well as the prediction accuracy at 5% were evaluated. Body composition was estimated by bioimpedance.

Results: The differences between PREE and MREE was less than 5% for Harris-Benedict, Marra, Ireton, De Lorenzo and Lazzar. In the clinical setting (i.e. with the single patient) the accuracy (calculated as the percentage of subjects whose REE was predicted within $\pm 5\%$ of MREE) was less than 40% considering all predictive equations.

Conclusions: Equations derived for overweight-obese individuals are more suitable than those for the general population to predict REE, while in clinical practice (single patient) all considered predictive equations are not sufficiently accurate to evaluate REE in overweight female. Measurement of REE with indirect calorimetry is often necessary in overweight adult females to obtain a more accurate assessment in the individual patient.

1. Conflict of Interest: None of the authors had any conflict of interest regarding the abstract

2. Funding: No Funding

T1:P.029

Hyperleptinemia is associated with lower adiponectin concentrations after interdisciplinary therapy in obese adolescents: implications for vascular protection

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Introduction: The low-grade systemic inflammation seen in obesity may affect the actions of some adipose tissue-derived adipokines that are involved in the regulation of vascular function. We sought to verify whether hyperleptinemia may influence the inflammatory and atherogenic responses in obese adolescents undergoing interdisciplinary therapy.

Methods: Thirty-four obese adolescents (17 non-hyperleptinemic [NHL] and 17 hyperleptinemic [HL]), paired by age, gender, and body mass index (BMI) underwent interdisciplinary therapy for one year. Body composition was measured by plethysmography, the carotid intima-media thickness (cIMT) was determined by ultrasound, and glycemia, insulinemia, lipid profiles, and adipokines (leptin, adiponectin, and plasminogen activator inhibitor type-1 [PAI-1]) were analyzed before and after therapy. Insulin resistance was evaluated by HOMA-AD. Subjects were considered hyperleptinemic if they had baseline values of leptin above 20 ng/mL for boys and 24 ng/mL for girls.

Results: Both groups showed an improvement in body composition and a reduction in cIMT. However, adiponectin levels did not improve in the HL group, and these subjects also had higher leptin/adiponectin ratios, higher HOMA-AD levels, and lower levels of adiponectin after therapy. Only subjects in the HL group showed a positive correlation between HOMA-AD and cIMT ($r=0.64$; $p<0.05$). In the NHL group, leptin concentrations were positively correlated with adiponectin ($r = 0.63$; $p<0.05$) and inversely correlated with PAI-1. ($r = -0.51$; $p<0.05$).

Conclusion: hyperleptinemic state impairs the attenuation of inflammation in obese adolescents undergoing interdisciplinary therapy, particularly by impeding the increase in adiponectin concentration, which is directly involved in vascular protection in atherosclerosis.

1. Conflict of Interest: None Disclosed

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T1:P.030

Hyperleptinemia is associated with lower adiponectin concentrations after interdisciplinary therapy in obese adolescents: implications for vascular protection

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Introduction: The low-grade systemic inflammation seen in obesity may affect the actions of some adipose tissue-derived adipokines that are involved in the regulation of vascular function. We sought to verify whether hyperleptinemia may influence the inflammatory and atherogenic responses in obese adolescents undergoing interdisciplinary therapy.

Methods: Thirty-four obese adolescents (17 non-hyperleptinemic [NHL] and 17 hyperleptinemic [HL]), paired by age, gender, and body mass index (BMI) underwent interdisciplinary therapy for one year. Body composition was measured by plethysmography, the carotid intima-media thickness (cIMT) was determined by ultrasound, and glycemia, insulinemia, lipid profiles, and adipokines (leptin, adiponectin, and plasminogen activator inhibitor type-1 [PAI-1]) were analyzed before and after therapy. Insulin resistance was evaluated by HOMA-AD. Subjects were considered hyperleptinemic if they had baseline values of leptin above 20 ng/mL for boys and 24 ng/mL for girls.

Results: Both groups showed an improvement in body composition and a reduction in cIMT. However, adiponectin levels did not improve in the HL group, and these subjects also had higher leptin/adiponectin ratios, higher HOMA-AD levels, and lower levels of adiponectin after therapy. Only subjects in the HL group showed a positive correlation between HOMA-AD and cIMT ($r=0.64$; $p<0.05$). In the NHL group, leptin concentrations were positively correlated with adiponectin ($r = 0.63$; $p<0.05$) and inversely correlated with PAI-1. ($r = -0.51$; $p<0.05$).

Conclusion: These data suggest that a hyperleptinemic state impairs the attenuation of inflammation in obese adolescents undergoing interdisciplinary therapy, particularly by impeding the increase in adiponectin concentration, which is directly involved in vascular protection in atherosclerosis.

1. Conflict of Interest: None Disclosed.

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T1:P.031

Involvement of leptin in the satiety effect of fatty acids

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Introduction: We evaluated the effects of individual fatty acids on satiety and the expression of the main hypothalamic neurotransmitters, as well as the role of gastrointestinal hormones. We were especially interested in the role of leptin in the satiating effects of fatty acids, which still remain unknown.

Methods: Adult male Wistar rats (6 animals per group) were orally treated with an equicaloric load of several fatty acids in saline 1 hour before the beginning of the dark cycle. Food intake was monitored for 2h, starting when lights were turned off. In a second experiment, 6 hour fasted adult male Wistar rats (4–6 animals per group) were treated with palmitic or linoleic acids and were sacrificed after 40 and 100 minutes; serum and hypothalamus were collected. Hypothalamic neurotransmitter mRNA levels were determined by RT-qPCR, and serum gastrointestinal hormone levels by ELISA.

Results: None of the fatty acids tested caused significant differences on food intake after treatment compared to vehicle. However, linoleic acid caused reduced food intake compared to palmitic acid. Gene expression analyses showed that linoleic acid, but not palmitic acid, induced the expression of the anorexigenic neurotransmitter POMC, correlated to an early increase in circulating leptin levels and a decrease in circulating ghrelin levels.

Conclusion: The results suggest a role for leptin in short-term regulation of feeding by fatty acids.

1. Conflict of Interest: None disclosed.

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T1:P.032

The role of leptinemia state as a mediator of inflammation in obese adults

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Introduction: Hyperleptinemia has emerged as a marker of pro-inflammatory status, while the adiponectin/leptin ratio has been used to identify anti-inflammatory state. In this context, the aims of the present study were to investigate the role of leptinemia, adjusted by tertiles, on inflammatory state in obese adults according to obesity degree.

Methods: This is a cross-sectional study comprised of 43 obese adults. The anthropometric variables and body composition were analyzed, as well as markers of inflammation such as leptin, adiponectin and plasminogen Activator Inhibitor (PAI-1). Subjects were grouped using adjusted tertiles of the leptin levels.

Results: The major finding was the negative correlation between leptin concentration with adiponectin/ leptin ratio ($r = -0.622$, $p = 0.000$) and the positive correlation with leptin /adiponectin ratio ($r = 0.622$, $p = 0.000$). Indeed, both ratios were decreased and increased, respectively according to the obesity degree. Furthermore, in the stepwise multiple linear regression analysis, the high degree of obesity showed to be an independent predictor of leptinemia when adjusted for age and BMI ($\beta = 0.588$, $p = 0.000$ and $\beta = 0.778$, $p = 0.005$).

Conclusion: Finally, the strong negatively correlation between the leptinemia with adiponectin/leptin ratio and the positive correlation with leptin/adiponectin ration reinforces the role of this adipokine as a biomarker of inflammation in obese adults, according to obesity degree. Our findings can elucidate that hyperleptinemic status was a major factor in the pro-inflammatory status related to higher obesity degree. All together, these data reinforce the role of leptinemia state as a mediator of inflammation in obese adults.

Conflict of Interest: None disclosed.

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T1:P.033

Minipig: A new animal model for the study of leptin hypothalamic pathway

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Introduction: Leptin, secreted from white adipose tissue, acts in hypothalamus to maintain the homeostasis balance. The leptin hypothalamic pathway signalization involves the activation of signal transducer and activator of transcription 3 (STAT3) in the arcuate nucleus. Whereas the minipig becomes a model for study metabolic diseases, leptin pathway has never been explored on them. The aim of our study is to work out the immunohistochemistry analysis of leptin hypothalamic pathway signalization on minipigs.

Methods: We included 6 male, adult, of normal weight, minipigs. The animals randomly received a sub-cutaneous injection of murine leptin (dose: 0,024 mg/kg) or control saline solution. After 45 minutes, the animals were sacrificed under general anesthesia. Firstly, they underwent an exsanguino-perfusion via the cannulation of aorta and superior vena cava, by perfusing isotonic saline solution and then paraformaldehyde solution. Secondly, the brain was carefully removed, and particu-

larly the median eminence and the hypothalamus. The series of coronal sections were performed thanks to a cryostat and mounted on slides. The immunohistochemistry was performed sequentially with a triple marker pSTAT3 - HuC/D (neuronal marker) – POMC.

Results: We found an increase of pSTAT3 marker in the POMC neurons of the arcuate nucleus after leptin injection, on minipigs.

Conclusion: This is the first study performing the pSTAT3 immunohistochemistry on the minipig hypothalamus; opening up thereby new perspectives in nutrition research.

1. Conflict of Interest: None Disclosed

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T1:P.034

The use of fMRI in food addiction: A systematic review

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Introduction: Emerging evidence suggests that food addiction contributes to obesity development. Imaging techniques, including functional magnetic resonance imaging (fMRI) provide insight into the neurobiology of eating behaviour, identifying several brain regions associated with anticipation and ingestion of food. The aim was to review the practical aspects of using fMRI in association with food addiction.

Methods: A systematic review identified studies published from 1973 to 2012. Human studies were included if subjects aged >18 years, use of visual food cues and included fMRI as an outcome measure. Two independent reviewers evaluated study quality and extracted data using standardised tools.

Results: 31 studies met inclusion criteria with a total of 802 participants (mean 26, range 10–48); 2 studied obese participants, 15 studied healthy-weight participants, and 13 compared healthy weight and obese participants. Studies were predominantly cross sectional (n=17). Only two used a dietary intervention (range 12 weeks – 6 months). Food image cues were predominantly presented in a block design with participants fasted prior to fMRI (range 90 mins–18h). All studies exposed participants to images of food while within the scanner. Images were primarily of high-calorie foods (n=31), low-calorie foods (n= 23) or non-food control images (n=25).

Conclusion: Activation of brain reward-related regions increased in response to high-calorie images compared to low-calorie and control. This was more pronounced in obese individuals. Future research would benefit from high quality intervention studies with long-term follow up to determine if reward-related neural responses can be modified.

1. Conflict of Interest: None Disclosed

2. Funding: No Funding

T1:P.035

Baseline plasma endocannabinoid levels predict rimonabant-induced body weight loss in obesity-prone (DIO) and obesity-resistant (DR) rats

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Introduction: To learn how to identify responders, we studied whether plasma baseline levels of endogenous CB1r ligands (endocannabinoids; eCB) would predict degree of weight loss upon subsequent treatment with a CB1r antagonist.

Methods: Body weight (BW), 24 h food intake (FI) and eCB levels (AEA, OEA and PEA) were sampled in male DIO and DR Levin rats at baseline, and after 14 d treatment with a CB1r antagonist (rimonabant;

10 nmol/kg p.o., qd). Correlations between eCB levels at baseline, either individually or as composite, and weight change as well as eCB levels, before and after treatment, were examined.

Results: BW response was significantly stronger in the DIO vs. the DR animals ($p<0.0001$). Of the eCBs analysed, only AEA clearly correlated to degree of BW response to rimonabant and was therefore the main contributor to predictions of treatment-induced weight response ($p<0.0001$). On average, comparing baseline to end of treatment, AEA, OEA and PEA levels decreased by 0.94 μM ($p<0.0001$), 16.2 μM ($p<0.0001$) and 5.31 μM ($p<0.0001$), respectively.

Conclusion: The current data indicate that baseline eCB, mainly AEA, levels predict degree of BW response to the CB1r antagonist rimonabant in rat. It may also be hypothesized that decreased levels of eCB may impact the likelihood of weight regain. Clinical studies are required to address to what extent this holds true in man.

T1:P.036

Systemic neuropeptide Y levels are elevated in metabolic syndrome and less amenable to reversibility by weight loss

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Background: Approximately ~20% of a Caucasian cohort, despite morbid obesity, remains metabolically healthy (MHO), retaining insulin sensitivity and lower risk of associated pathologies.

Aim: To determine if elevated peripheral neuropeptide Y (NPY) mediates the heterogeneity of obesity pathology and is modified by weight loss.

Methods: Consenting, Caucasian, subjects were studied prior to and following surgical weight loss. The MHO cohort had no T2DM or CVD and fasting insulin <6.5 mIU/ml, the remaining were classified as Metabolic Syndrome (MeS) or diabetic (DM). Adipokines and NPY were determined by ELISA, morphology by histology, insulin resistance by HOMA-IR and vaso-contraction of adipose arterioles by wire myography.

Results: Despite matched BMI, MeS had higher fasting insulin ($p<0.001$), HOMA-IR ($p<0.001$), triglycerides ($p<0.001$), glucose ($p=0.007$) and lower adiponectin ($p=0.016$) than MHO cohort and accompanied by adipocyte hypertrophy ($p<0.001$). Circulating NPY was lowest in MHO {DM 16.1 (8.15–27), MeS 11.2 (4.9–14.8) and MHO [8.6 (3.5–12) pg/ml]. Similar trends were apparent in adipose tissue NPY protein. NPY mediated a less powerful, transient vaso-contraction in MHO arterioles compared to those from the MeS patients.

Successful weight loss led to improved insulin sensitivity only in non-MHO subjects ($p=0.03$). Circulating adiponectin increased significantly and free fatty acids decreased significantly in all groups. The change in NPY levels did not reach significance in any group.

Conclusion: Elevated circulating NPY is a biomarker for deteriorating metabolic status in obesity and mediates differences in endothelial dysfunction. The pathologies mediated by elevated NPY, such as dyslipidaemia and hypertension, appear less reversible by weight loss.

T1:PS3 – Body Composition / Dietary Lipids

T1:P.039

Sarcopenic obesity and risk of cardiovascular disease and mortality: A population-based cohort study of older men

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Introduction: Sarcopenic obesity refers to age-associated loss of muscle mass coupled with high adiposity. Obesity and low muscle mass has been linked to increased mortality and morbidity but their combined effects on the risk of cardiovascular disease (CVD) and mortality remain unclear.

Methods: Prospective cohort study of 4252 men (60–79 years) from the British Regional Heart Study, with 11.3 years mean follow-up. Participants were classified as either normal, sarcopenic, obese, or sarcopenic obese, using baseline measurements of midarm muscle circumference and waist circumference. Cox regression analyses assessed associations between sarcopenic obesity groups and CVD/mortality.

Results: 1314 deaths, 518 cardiovascular deaths, 458 CHD events and 852 CVD events occurred during follow-up. Compared with normal body composition, sarcopenic and obese men both showed significantly increased all-cause mortality risk, adjusting for lifestyle characteristics, with the highest risk in sarcopenic obese men [HR(95% CI): 1.41 (1.22–1.63), 1.21 (1.03–1.42) and 1.72 (1.35–2.18) respectively]. The increased mortality associated with sarcopenia and sarcopenic obesity (but not obesity) remained after adjustment for potential mediators (blood pressure, blood lipids and inflammation). No association was seen between sarcopenia and obesity with CHD/CVD events, but sarcopenic and obese both showed increased CVD mortality risk compared to men with normal body composition, which was largely explained by its associations with CVD risk factors.

Conclusion: Sarcopenia and central adiposity were both associated with increased CVD and all-cause mortality. Sarcopenic obese men showed the highest risk of all-cause mortality but not CVD mortality. Efforts to promote healthy ageing should focus on preventing obesity and maintaining muscle mass.

1. Conflict of Interest: None declared.

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T1:P.040

An alternative definition for sarcopenia in elderly subjects

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Background: Sarcopenia is generally defined as appendicular lean soft tissue index (ALSTI, $\text{ALST}/\text{height}^2$) 2 standard deviations (2SD) lower than a young reference population, but this definition leads to an underestimation of sarcopenia in overweight and obese people due to a simultaneous increase of skeletal muscle (SM) with higher body fat mass (%FM).

Objective: To determine normative, %FM-adjusted values of SM in healthy adults aged 18–40 years, applicable for determination of sarcopenia in elderly adults.

Methods: 242 healthy subjects (149 women, 93 men, 18–40 years, BMI 16.8–46.8 kg/m^2) were examined cross-sectionally. Total SM was assessed by goldstandard whole-body magnetic resonance imaging (MRI). %FM and ALST were measured by Dual-X-ray absorptiometry. Ob-

tained normative values were applied for the determination of sarcopenia in elder adults (23 women, 27 men, 60-78 years, BMI 18.5-33.7 kg/m²).

Results: SM was adjusted for %FM and calculated as skeletal muscle index (SMI; kg SM/height²) to obtain a value independent of height and %FM. Mean values for SMI were: 7.83±0.90 kg/m² (corresponding to ALSTI 7.41±1.31 kg/m²) for women and 10.17±1.32 kg/m² for men (ALSTI 9.08±1.27 kg/m²) aged 18–40 y. Sarcopenia was defined as 2 SD below this value, with prevalences of 21.7% in elderly women and 18.5% in elderly men. By contrast, using the common definition, prevalences were 8.7% in women and 0% in men, only.

Conclusions: These findings suggest that fat mass should be considered for defining sarcopenia in elder people. Further studies should take into account functional aspects of muscle mass.

1. Conflict of Interest: There are no conflicts of interest.

2. Funding: Competence Network Obesity, Reference Center for Body Composition; FKZ 01GII125

T1:P.042

Psoas Muscle Cross Sectional Area: A Novel Marker of Physical Fitness

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Introduction: The psoas muscle of the trunk is recruited during hip joint flexion and functions as a stabilizer of the hip and lumbar region. Due to the importance of the psoas muscle in maintaining balance and stability when performing movement we hypothesized that psoas muscle size will be strongly associated with level of physical fitness.



Figure 1: Examples of psoas muscle at level of umbilicus.

Methods: Thirty Caucasian men (mean ± SD age: 44 ± 6 yr; BMI: 29.4 ± 5.9 kg/m²) underwent MRI at 1.5T following an overnight fast. Whole body T1 weighted axial images of the whole body were obtained and the level of L5 identified. Cross sectional area (CSA) of left and right psoas muscles and total trunk CSA at the level of L5 were calculated by an experienced Radiographer. Physical fitness was measured as maximal oxygen consumption (VO_{2max}) during an incremental cycling test to exhaustion.

Results: Psoas muscle CSA was expressed relative to total trunk CSA and this value correlated significantly with VO_{2max} (r = 0.49, P = 0.005).

Correlation with physical fitness was improved when the size of the psoas muscle was normalised to body weight (r = 0.68, P < 0.001).

Conclusion: Psoas muscle CSA provides an accurate and time-efficient estimate of physical fitness.

T1:P.043

Obesity prevalence and body composition in children with idiopathic scoliosis – association with the scoliotic curve severity

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Introduction: Body composition changes during childhood and adolescence. It is markedly different in children with idiopathic scoliosis (IS). The study objective was to assess the nutritional status of patients with IS based on standard anthropometrical analysis and bioimpedance method (BIA).

Methods: 59 patients (45 girls/ 14 boys) at a mean age of 13.37 ± 2.67 years, with IS were qualified into the study. Scoliotic curves were assessed radiographically by Cobb's angle and angle vertebra rotation (AVR). Height, weight, waist and hip circumferences were measured and body mass index (BMI), BMI Z-score, waist/height ratio (WHtR) and waist/hip ratio (WHR) were also calculated. A bioelectrical impedance analyzer was used to assess body composition in every child.

Results: 64.4% of children have normal weight, 23.7% of them were underweight and 11.9% overweight or obese. Juvenile IS group was more underweight and less overweight than adolescent IS (AIS). Body composition correlated significantly with scoliotic curve severity in the study group. Higher correlation coefficients were in overweight and obese patients, but significance was reached only for predicted muscle mass. WHtR correlated significantly with curve severity in the entire group. Degree of both overweight (positively) and underweight (negatively) (BMI Z-score) correlated significantly with the scoliotic curve severity.

Conclusions: 1. Overweight and obesity have similar prevalence in scoliotic adolescents as in general pediatric population. 2. Scoliotic curve severity appears to be related to body composition parameters especially in overweight and obese patients. 3. Adipose tissue distribution measured by WHtR seems to be significantly related to the clinical grade of IS.

1. Conflict of Interest: None Disclosed

2. Funding: No Funding

T1:P.044

Body fat percentage and body mass index relationship in a sample of adults from Niterói, Rio de Janeiro, Brazil

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Introduction: Despite its universal usage, body mass index (BMI) cut-offs to identify obesity or risks for associated complications have been shown to be population specific. **Objective:** The aim of this study was to examine the relationship between BMI and percentage body fat (%BF) in Brazilian adults.

Methods: Body fat (dual-energy X-ray absorptiometry - Lunar iDXA, GE Health Care) was measured in a convenient sample of 676 adult (≥ 20 years of age) subjects (424 women) from Niterói, Rio de Janeiro with BMI > 18.5 kg/m². %BF prediction equations were developed based on the inverse of BMI (inv_BMI) and waist circumference (WC) according to sex.

Results: The developed equations [%BF=67.648-(717.916 x inv_BMI) and %BF=63.085-(907.419 x inv_BMI), for women and men, respectively] yielded fairly good estimates (R²=0.66 and 0.56 and SEE=3.57 and 4.74, for women and men). The addition of WC in the model improved substantially the estimate for men (R²=0.71 and SEE=3.82) but not for women (R²=0.67 and SEE=3.55). The estimated %BF values for the BMI cut-off values of overweight and obesity (≥ 25 and ≥ 30 kg/m²,

respectively) for women (38.9 and 43.7) and men (26.8 and 32.8) were somewhat greater than what has been suggested for the American population but resembles the values documented in an adult sample of a population-based household survey in Niterói in 2003.

Conclusion: The BMI cut-off values currently suggested for international use may not be appropriate for the Brazilian population living in Niterói.

1. Conflict of Interest: None.

2. Funding: FAPERJ E-26/110.208/2009; CNPq 308489/2009-8.

T1:P.045

Optimal waist circumference measurement site for assessing metabolic and type 2 diabetes risk in middle-aged adults

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Introduction: Body Mass Index (BMI) is traditionally used as a measure of overall obesity. Increasing evidence suggests that central obesity is a more important cardiometabolic risk factor. Despite recommendations that waist circumference (WC) should be a routine measure in clinical practice, there is no international consensus regarding measurement protocol.

Methods: BMI and WC measurements including WC measured between the lowest rib and iliac crest (WC midway), below the lowest rib (WCR), WC/height ratio, WC/hip ratio and WC adjusted for pelvic width were determined in the cross-sectional Cork and Kerry Diabetes and Heart Disease Study of middle-aged adults (N=2047). Logistic regression and area under the receiver operating characteristic curve (AUC) analyses were used to evaluate the ability of each of these measures to predict metabolic risk and type 2 diabetes (T2DM).

Results: WCR, and rib derived indices, displayed the strongest associations for T2DM and metabolic risk phenotypes in non-stratified and gender specific regression models. In particular, WCR/height ratio (AUC) = 0.76 [CI 0.72–0.81] males, (AUC) = 0.78 [CI 0.71–0.85] females, and WCR adjusted for pelvic width (AUC) = 0.77 [CI 0.73–0.82] males, (AUC) = 0.78 [CI 0.71–0.84] females, showed significantly greater discriminatory abilities for T2DM when compared to BMI, WC midway and other measures of adiposity.

Conclusions: The clinical utility of WCR, and rib derived indices, as potentially more accurate predictors of metabolic risk requires further investigation.

1. Conflict of Interest: None disclosed.

2. Funding: This work was supported by a research grant from the Irish Health Research Board (reference HRC/2007/13).

T1:P.046

Current skinfold references of Norwegian children 4–15 years of age

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Introduction: During the last 30 years there has been a prominent increase in skinfold thickness among Norwegian children that exceeds the corresponding increase in weight-for-height. The aim of this study was to establish new reference values for triceps (TSF) and subscapularis (SSF) skinfolds of Norwegian children, 4–15 years of age, and to define cut-off values for overweight and obesity using the IOTF criteria.

Material: A cross-sectional sample of 4606 children 4–15 years of age, part of the Bergen Growth Study, were used to estimate reference curves

with the LMS method; suggested cut-offs were selected using receiver operating characteristic analyses.

Results: Reference values for TSF and SSF are presented as percentiles. Mean skinfold size increased with age. Girls had higher values than boys over the entire age range. There was a strong positive correlation between both skinfolds and BMI. For all ages together a cut-off of 1.0 SDS gave a sensitivity of 76% for SSF, and 70% for TSF to detect overweight, with a corresponding specificity of 92% for both. To detect obesity a cut-off value of 1.3 SDS gave a sensitivity of 91% and specificity of 90% for SSF. Corresponding values for TSF were 86% for the sensitivity, and 91% for the specificity.

Conclusion: This study presents new reference values for triceps and subscapularis skinfolds of Norwegian children 4–15 years of age. Both skinfolds had a high discriminating power to detect overweight and obesity as defined by the IOTF BMI criteria.

1. Conflict of Interest: None

2. Funding: No funding

T1:P.047

Increased trunk-to-appendicular fat ratio is associated with low serum HDL cholesterol levels independently of total adiposity in Japanese children

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Introduction: Central adiposity is associated with adverse lipid levels in childhood. However, it is unclear whether central adiposity is associated with adverse lipid levels independently of total adiposity, given the relationship between central adiposity and total adiposity. The purpose of this study was to examine if the association between central fat distribution and lipid levels is independent of total adiposity in Japanese children.

Methods: We analyzed 408 fifth-grade children (202 boys and 206 girls) who attend public schools in Hamamatsu, Japan. Regional fat was measured by dual-energy X-ray absorptiometry. Trunk-to-appendicular fat ratio (TAR) was calculated as trunk fat mass divided by appendicular (arms and legs) fat mass.

Results: TAR was significantly related to serum HDL cholesterol levels ($r=-0.247$, $P<0.001$) as well as total body fat percentage ($r=0.434$, $P<0.001$). After adjusting for total body fat percentage and sex, the mean value of serum HDL cholesterol in the fifth quintile groups of TAR was significantly lower than that in the third quintile groups (1.78 mmol/L vs. 1.96 mmol/L, $P=0.025$).

Conclusion: Central fat distribution is associated with serum HDL cholesterol levels, independently of total adiposity in Japanese children.

1. Conflict of Interest: None disclosed.

2. Funding: Research relating to this study was funded by Grants-in-Aid for Scientific Research (#21657068 and #22370092) from the Japan Society for the Promotion of Science.

T1:P.048

Increased trunk-to-appendicular fat ratio is associated with decreased adiponectin concentrations independently of whole body fat in a general population of Japanese children

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Introduction: Previous studies reported that adiponectin concentrations are related to visceral fat accumulation in adult and child populations. However, it is unclear whether this relationship is independent of total adiposity, given a high correlation between visceral fat volume and total

body fat volume. Accordingly, the present study focused on fat distribution independent of total adiposity.

Methods: The source population was all fifth-grade children who attended one of the two public schools in Hamamatsu, Japan. Of the source population, 77.2% children (199 boys and 203 girls) were analyzed. Fat distribution was determined by dual-energy X-ray absorptiometry. Trunk-to-appendicular fat ratio (TAR) was calculated as trunk fat mass divided by appendicular (arms and legs) fat mass.

Results: A significant correlation was found between TAR and total body fat percentage ($r=0.444$, $P<0.001$). An increase in TAR was related to a decrease in adiponectin concentration ($r=-0.207$, $P<0.001$). This relationship was statistically significant even after adjustment for confounding factors such as total body fat percentage, sex, and pubertal status ($\beta=-0.171$, $P<0.005$).

Conclusion: An inverse relationship between TAR and adiponectin concentrations was observed independently of total adiposity in a general population of Japanese children.

1. Conflict of Interest: None disclosed

2. Funding: Research relating to this abstract was funded by Grants-in-Aid for Scientific Research (#21657068 and #22370092) from the Japan Society for the Promotion of Science.

T1:P.049

Bone mineral density and quantity are negatively affected by adiponectin levels and positively by protein intake in an obese with metabolic syndrome features sample. The RESMENA project

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Introduction: Adiponectin is an adipose tissue-secreted endogenous insulin sensitizer and exhibits anti-inflammatory and antiatherogenic properties. Moreover, this adipokine and associated receptors have shown to be expressed in osteoblasts, suggesting a relationship with bone metabolism. Furthermore, it exist a growing trend to increase dietary protein intake. We aimed at assessing both adiponectin and bone health-protein intake associations since available results are controversial.

Methods: A total of 105 obese ($BMI=35.80\pm4.71$ kg/m²) presenting metabolic syndrome features were enrolled to a 6-months intervention trial, divided in a 2-month controlled period and a 4-month self-control one. They were allocated in two groups and provided a diet with the same energy restriction (-30% E) but a different protein content (15% E vs 30% E). Anthropometric and biochemical parameters, food intake records as well as bone mineral density (BMD) and quantity (BMQ) by Dual-energy X-ray absorptiometry were assessed at baseline and at the end of each period.

Results: Adiponectin showed a negative association with pelvis ($p=0.026$) and total BMD ($p=0.004$) as well as with total BMQ ($p<0.001$) at month 2 and also at month 6 ($p=0.005$, $B=-0.092$), ($p=0.001$, $B=-0.102$), ($p=0.001$, $B=-0.408$) respectively. Protein intake, showed a positive influence on the three measurements (pelvis, BMD and BMQ) at month 2 ($p<0.001$) respectively, but disappeared at month 6.

Conclusion: Increased adiponectin levels were negatively associated with bone status. A higher protein intake was associated with an improvement of both BMD and BMQ in obese subjects with metabolic syndrome features, at least in the short-term.

1. Conflicts of Interest: None of the authors declare a conflict of interest.

2. Funding: This work was supported by the Health Department of the Government of Navarra (48/2009) and by Linea Especial about Nutrition, Obesity and Health (University of Navarra LE/97). Government of Navarra also provided a research grant to Patricia Lopez-Legarrea (Pre-doctoral n° 233/2009).

T1:P.050

Obesity parameters and total testosterone level and SHBG in morbidly obese males

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Introduction: Abdominal phenotype of obesity in males produces disparate effects on androgen production rates and associated with metabolic and cardiovascular co morbidities.

Methods: We have investigated the relationship between different antropometric and metabolic parameters (eg. BMI, waist circumference, percentage of body fat mass, intra abdominal fat tissue (IAFT), blood glucose, insulin, insulin resistance) and total testosterone and SHBG level in 174 males with no previous diagnosis of diabetes mellitus. The mean years of age were 36.95 ± 10.8 (range from 17 to 60), and mean BMI was 46.64 ± 10.18 kg/m². FSH, LH and blood glucose levels was within reference range.

Results: Spearman's test of correlation has shown negative correlation with significance $p<0.05$ for HOMA IR and testosterone ($p=0.049$) and percentage of fat mass and testosterone ($p=0.02$). Negative correlations with significance $p<0.01$ were in relationship between waist circumference and testosterone ($p=0.001$), BMI and testosterone ($p<0.001$) and blood glucose and testosterone ($p<0.001$). There were no significant correlations between testosterone and insulin, hip circumference and intra abdominal fat tissue (IAFT). Also, there were no correlations between sex hormone binding globulin (SHBG) and any of parameters of obesity ($p>0.05$).

Conclusion: We might be concluded that BMI, waist circumference, insulin resistance, percentage of fat mass and blood glucose are in negative correlation with total testosterone level in morbidly obese males while the level of SHBG and intra abdominal visceral fat have no influence on testosterone level.

T1:P.051

Relationship between waist circumference measurements and body composition in obese women

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Introduction: The waist circumference (WC) measurement was added to the body mass index (BMI) as a predictor of morbidity and mortality. WC measurement can be a problem because obese individuals do not have defined waist, and presenting navel vertical displacement. The aim of this study was to propose other measures in the abdomen and to relate them to body composition in obese women.

Methods: Participants were 30 obese women, BMI 37.3 ± 4.4 kg/m² and 39 ± 6.3 years of age. Anthropometric measurements (WC – in the navel, WC1 – 8cm above the WC, and WC2 – 16 cm above the WC) and body composition (fat mass and fat free mass by total and trunk bioelectrical impedance and dual-energy x-ray absorptiometry – DXA). Statistical analysis was performed with Pearson correlation coefficient (r).

Results: There was positive strong correlation between total ($r=0.7379$) and trunk ($r=0.8126$) fat mass by DXA and WC sum, and between total fat mass by bioelectrical impedance and WC sum ($r=0.7674$). Positive moderate correlation was observed between trunk fat mass by bioelectrical impedance and WC sum ($r=0.5879$), between total ($r=0.5092$) and trunk ($r=0.516$) fat free mass by DXA and WC sum, and between total fat free mass by bioelectrical impedance and WC sum ($r=0.6229$). No correlation between trunk fat free mass by bioelectrical impedance and WC sum.

Conclusion: These results show that proposed WC measurements have a positive strong correlation with trunk and total fat mass in obese women, suggesting that WC1 and WC2 are good measures to evaluate the obesity.

1. Conflict of Interest: None Disclosed.

2. Funding: This research was supported by The State of São Paulo Foundation (FAPESP).

T1:P.052

Femoral fat: A cardiometabolic advantage?

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Both a larger waist and narrow hips are associated with increased risk of cardiovascular (CV) disease, type 2 diabetes and premature mortality. The relationships between body composition (anthropometry and DXA) and CV risk factors were studied in 430 overweight men and women (age: 44±15 years, BMI: 33.6±6.7 kg/m², WHR: 0.89±0.12). Total fat mass (kg and %), fat mass of trunk and legs (kg and %), BMI, Waist, WHR, blood glucose (GI), triglycerides (TG), HDL-cholesterol (HDL-C), fasting Insulin (Ins), Systolic and Diastolic blood pressure (SBP and DBP) and Fibrinogen (Fibr) were studied. The partial correlation coefficients are shown in the table.

	BMI	Waist	WHR	FAT %	FAT TR%	FAT LEG%
GI	0,20	0,25 ⁺	0,27 ⁺	0,10	0,29 ⁺	-0,34 ⁺
HDL-C	-0,32 ⁺	-0,45 ⁺⁺	-0,46 ⁺⁺	0,12	-0,46 ⁺⁺	0,25 ⁺
TG	0,26 ⁺	0,38 ⁺	0,40 ⁺⁺	0,10	0,49 ⁺⁺	-0,44 ⁺⁺
Ins	0,32 ⁺	0,31 ⁺	0,25 ⁺	0,10	0,30 ⁺	-0,37 ⁺
SBP	0,58 ⁺⁺⁺	0,57 ⁺⁺⁺	0,40 ⁺⁺	0,24 ⁺	0,40 ⁺⁺	0,12
DBP	0,52 ⁺⁺⁺	0,54 ⁺⁺⁺	0,41 ⁺⁺	0,16	0,44 ⁺⁺	0,10
Fibr	0,09	0,01	0,01	0,42 ⁺⁺	0,24 ⁺	0,15

⁺ p < 0,05, ⁺⁺ p < 0,01, ⁺⁺⁺ p < 0,001

In conclusion, abdominal fat (FAT TR % evaluated by DXA, Waist and WHR) was positively associated with unfavorable CV risk factors. Femoral fat (FAT LEG %) was associated positively with HDL-C and negatively with GI, TG, Ins. This association was stronger in women and remained significant after adjustment for age and BMI. Without accounting for the protective role of femoral fat, the effect of obesity on morbidity and mortality may be seriously underestimated.

T1:P.053

Current Weight, Height and BMI prevalences of Children and Adolescents in Yucatan-Mexico

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Introduction: Body mass index (BMI) age-based cut-offs values have been widely used to perform screening of childhood obesity. However, they must not be well fitted for all ethnics, so several prevalence data are biased. It was our aim to perform an analysis of prevalence of weight, height and BMI in a specific sample of Yucatán.

Methods: Our analysis of 14,434 (7,057 girls and 7,377 boys, between 3 and 18 years) children and adolescents (4 to 15 years old) was based on the cross-sectional measurements performed on Yucantán region

(México) during 2010–2011 period. Weight and height were measured using classical procedures, and BMI was calculated. This represented a 3.47% of the children population in public schools in the state of Yucatán. The LMS (lambda-mu-sigma) method (Cole, 1990) was used to construct smoothed age-and gender-specific curves, using the software package LMS Chart Maker Pro, version 2.54.

Results: According with WHO criteria these results were found for a) weight: 8.5%(Z≤-2), 18.5%(-2>Z≤-1), 53.2%(-1>Z≤1), 16.1%(1>Z≤2), 3.8%(Z>2); b) height: 22.1%(Z≤-2), 35.4%(-2>Z≤-1), 40.1%(-1>Z≤1), 1.9%(1>Z≤2), 0.4%(Z>2). According with IOTF criteria for BMI at 18y: 1.9%(≤17), 4.7%(≤18), 57.2%(>18.5&≤25), 1.9%(25>Z≤30), 0.4%(Z>30).

Conclusion: When observing the relative importance of both body weight and height, there seems to be a very strong impact of a lower height. Determining to what extent this is caused by local particularities, social behavior, geographic or economic variables will be the scope of future research.

1. Conflict of Interest: None Disclosed

2. Funding: Secretaría de Educación del Gobierno del Estado de Yucatán, México

T1:P.054

Metabolic effects of dietary n-3 fatty acids supplied as phospholipids reflect down-regulation of biosynthetic pathways in the liver of mice fed a high-fat diet

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Introduction: We have shown previously that a combination treatment using dietary n-3 polyunsaturated fatty acids (n-3PUFA) as triglycerides and thiazolidinedione (TZD) antidiabetic drugs could efficiently prevent/reverse obesity in mice fed a high-fat diet, while ameliorating insulin resistance primarily through the effect on skeletal muscle. Recent studies suggested that n-3PUFA as phospholipids might be superior to triglycerides especially with regard to their effect on hepatosteatosis. We investigated the mechanisms how n-3PUFA as phospholipids, alone or in combination with TZD, affect hepatic steatosis and metabolism in obese mice.

Methods: Male C57BL/6N mice were fed for 7 weeks a corn oil-based high-fat diet (cHF) or various cHF-based interventions: (i) cHF with n-3PUFA as phosphatidylcholine-rich concentrate replacing ~10% of dietary lipids (PC); (ii) cHF with 10 mg rosiglitazone/kg diet (R); (iii) PC+R. Glucose tolerance, markers of glucose and lipid homeostasis, hepatic steatosis, and hepatic gene expression were assessed.

Results: Both PC and PC+R prevented weight gain, while all interventions reduced the weight of abdominal fat and plasma triglycerides. Besides improving glucose tolerance, only PC and PC+R also prevented hepatosteatosis. Microarray analysis of hepatic gene expression showed a complex down-regulation of biosynthetic pathways including lipogenesis and cholesterol biosynthesis by the PC, while fatty acid oxidation was stimulated.

Conclusion: Obesity-associated hepatosteatosis was ameliorated by n-3PUFA as phospholipids in association with a complex inhibition of hepatic biosynthetic pathways. Prevention of weight gain and glucose intolerance was potentiated in the PC+R group, suggesting potential use of similar combinations in clinical settings.

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T1:P.055

Expression of the n-3 fatty acid receptor/sensor, GPR120, in mouse adipose tissueSarviaho R, *Stocker CS, Trayhurn P*

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Introduction: Several G-protein coupled receptors (GPCRs) are sensors/receptors for fatty acids, with GPR120 sensing *n*-3 polyunsaturated fatty acids. The expression of GPR120, which is implicated in the anti-inflammatory and insulin-sensitising effects of *n*-3 fatty acids, has been examined in adipose tissues of obese mice. Comparisons have been made with GPR81, the receptor for lactate which mediates the anti-lipolytic action of insulin.

Methods: Tissues were taken from lean and obese (*ob/ob* and dietary-induced) mice. Gene expression was determined by RT-PCR and real-time PCR, using specific primers and probes. **Results:** GPR120 was strongly expressed in white adipose tissue (epididymal, subcutaneous) and the colon; expression in interscapular brown fat was lower, and there was little expression in other tissues. GPR81 was much more strongly expressed in white fat than in other organs, and there was a marked reduction in expression in both *ob/ob* and dietary-obese mice compared with lean controls. GPR120 expression was also lower in white adipose tissue of *ob/ob* mice, and in subcutaneous, though not mesenteric, fat of dietary-obese animals. Administration of the β_3 -adrenoceptor agonist BRL35135 reduced GPR120, and particularly GPR81, expression in white adipose tissue of *ob/ob* mice.

Conclusions: GPR120 and GPR81 are strongly expressed in white fat depots of mice and expression is reduced in the obese. It is suggested that the anti-inflammatory and insulin-sensitising actions of *n*-3 polyunsaturated fatty acids may be compromised in obesity, and this may be a consequence of an inflammation-induced downregulation of GPR120 expression in adipose tissue.

Conflicts of Interest: none.

T1:P.056

Dietary supplementation with Conjugated Linoleic Acid hinders health perturbations caused by high-fat feedingMollica MP¹, Cavaliere G¹, Trinchese G¹, De Filippo C¹, Gaita M¹, Bergamo P²

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Introduction: Dietary conjugated linoleic acids (CLA), have been reported to have different isomer-dependent effects on lipid metabolism although the mechanisms involved remain to be fully understood. The aim of this study was to compare the effect of individual CLA isomers in a rodent model of diet-induced obesity.

Methods: Male Wistar rats were fed for 6 weeks with high-fat diet rich in lard (40% fat) alone (L) or supplemented with *cis*-9,*trans*-11 (L9) or *trans*-10,*cis*-12 CLA (L10)(100mg/kgbw). Animal fed with normal diet (11% fat) were used as control. Mitochondrial efficiency/proton leak and redox status (H₂O₂ yield, aconitase activity), body composition and energetic parameters (energy efficiency/expenditure) were determined. Insulin, glucose, triglycerides, cholesterol concentration and the levels of obesity-related oxidative stress marker (protein carbonyls, PC), pro-inflammatory and hepatocellular injury indicators (TNF- α , Alanine aminotransferase, ALT) were measured in serum.

Results: As expected, L-treated rats exhibited enhanced body weight, lipid gain, H₂O₂ yield but diminished aconitase activity and insulin sensitivity. Moreover, the obesity-related signs (triglycerides, cholesterol, TNF- α , PC, and ALT) in L-treated rats were significantly higher as compared to controls. By contrast, mitochondrial activity/proton leakage and energy expenditure was significant increase in L9 and L10 treated rats and, notably, the lower energy efficiency and body weight found in these animals associated to the marked reduction of all the considered diet-induced patho-physiological markers.

Conclusion: The results demonstrate that CLA isomers efficacy in reducing the adverse health effects caused by high-fat feeding is, at least in part, mediated by increased mitochondrial activity and energy expenditure.

1. Conflict of Interest: None disclosed

2. Funding: No funding

T1:P.057

Conjugated linoleic acid and or phytosterol supplementation reduces lipid droplets the liver and fat acids from the blood of obesity rats

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Introduction: Some food compounds, like conjugated linoleic acid (CLA) and phytosterols, are linked to benefits in health as they modulate oxidative stress, hormones and inflammation.

Methods: Twenty-one-days-old Sprague-Dawleymale rats were divided into five groups (n = 5): Standard group (P), Standard High-Fat group (HF) and three high-fat groups fed diets added CLA (HC), phytosterol (HP) and phytosterols plus CLA (HS). Animals were caged for 65 days. Three animals from each group (n = 15) were selected for analysis of liver tissue in order to quantify the presence of fat globules. The liver was removed, weighed and stored at -80 °C for later analysis of lipids by Bligh & Dyer and histology. Histology was performed according to the kit instructions commercial Embedding® LAICA historesin.

Chromatographic data of serum of animals were analyzed according to Principal Component Analysis Multimode (MPCA) and two-dimensional chromatography (GCxGC-FID).

Analysis of Variance (ANOVA) and Tukey's test (p < 0.05) were used.

Results: The area of fat droplets were significantly reduced lower in the supplemented groups (p < 0.05) compared to non-supplemented. There were significant reduction in palmitic, stearic and arachidic acids in supplemented groups (HC and HS) and increasing in oleic and linoleic acids in the HC group compared to HF group (p < 0.05).

Conclusion: The supplementation of 2% CLA and 2% phytosterol or both reduced the liver lipid droplets and weight, but only CLA and CLA plus phytosterol reduced fat liver. The serum fat acids were modulated by CLA and phytosterol supplementation, reducing the saturated fatty acids that cause inflammation.

1. Conflict of Interest: This work does not present conflicts of interest. All authors participated in protocol development, conception and design of the study, result, evaluation, writing, editing and have approved the final version of the manuscript. None of the authors had any financial or personal interest in any company or organization sponsoring the research.

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T1:P.058

Effect of high fat diet on muscle tissue in aged miceGuelzim N^{1,2}, Chaumontet C^{1,2}, Azzout-Marniche D^{1,2}, Foucault AS³, Fromentin G^{1,2}, Tomé D^{1,2}, Gaudichon C^{1,2}

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Introduction: Because high fat diets have been suggested to alter muscle during aging due to lipid exfiltration into muscle, nutritional obesity has been suggested as a risk factor for sarcopenia. However, the underlying concept of sarcopenic obesity is mainly based on phenotypical data from clinical observation. We aimed to study the effect of different diets on muscle tissues in aged mice.

Methods: 19 month-old (aged) female C57Bl/6J mice were fed for 3 months either a control or a high fat diet with a normal (HFNPD) or a low protein level. Six week-old (young) mice were fed HFNPD to control the age effect. Lean and fat mass evolution was monitored using

MRI and DEXA. Histological analysis was performed on extensor digitorum longus (EDL) and soleus muscles at the end of the study.

Results: Thirty percent of aged mice died during the study. In surviving old mice, HFNPd tended to increase body weight versus control. None of the 3 diets increased fat mass gain by contrast to young mice. The lean body mass was unchanged in aged mice, whatever the diet, and stayed higher than that of young mice. Histological analyses of EDL and soleus revealed neither fibrosis nor fiber morphology alteration or fiber type modification in aged mice. Lipid inclusions were scarce.

Conclusion: In 22-month mice, high fat diets do not alter muscle tissues, even with low protein level. Further investigation in older mice is necessary to characterize the appearance of age-induced muscle alterations under HFD which features sarcopenic obesity.

T1:P.059

Effects of Chronic Intake of Dietary Fatty Acids on Skeletal Muscle Fibre Composition

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Introduction: Long-term consumption of saturated fatty acids (SFAs) is detrimental to health and can induce obesity. Replacement of dietary SFAs with polyunsaturated fatty acids (PUFAs) can improve metabolic profile and muscle function. We hypothesized that this is underpinned by altered muscle morphology, such that PUFAs induce a transition from fast-twitch to slow-twitch (fatigue-resistant) fibres and alter myogenesis.

Methods: For two months, male Wistar rats were fed isoenergetic high-fat diets, providing 40% of energy as fat, either from PUFAs (menhaden fish oil) or SFAs (lard; Research Diets, Inc.; n=8/group). Rats received BrdU tracer in drinking water during the final week. Gastrocnemius and soleus muscles were dissected as examples of anaerobic/glycolytic and aerobic/lipid-utilizing types so alteration of fibre composition would be clearly observable. Muscles were analysed histologically for myosin ATPase and myosin isoforms, to distinguish fibre-types, and for BrdU uptake as a marker of cell proliferation.

Results: Known inverse fibre compositions in the two muscles were maintained, irrespective of diet: more fast than slow fibres in gastrocnemius ($69 \pm 2.2\%$ vs. $31 \pm 1.1\%$, $p < 0.05$) and the opposite in soleus ($12 \pm 0.8\%$ vs. $88 \pm 2.8\%$, $p < 0.05$). No differences between diet were observed in either muscle (both $p > 0.05$). Myogenesis was minimal in both muscles and diet groups ($p > 0.05$).

Conclusions: SFAs in the high-PUFA diet (30% of fish oil FAs, w/w) may override the ability of constituent PUFAs to stimulate muscle remodelling. Therefore, concentration of SFAs in fish oil is an important consideration prior to recommending dietary intervention with PUFAs.

1. **Conflict of Interest:** None

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T1:PS4 – Miscellaneous

T1:P.062

RPI-100 Significantly Affects Body Weight and Variables Associated with Metabolic Syndrome in Obese Zucker Rats

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Introduction: RPI-100 is a proprietary glycolipid formulation composed of rhamnolipids.

Methods: In a pilot study with 5 male obese Zucker rats 7-8 weeks of age (2 randomized to placebo; 3 to RPI-100), the impact of dosing frequency on body weight (BW) was explored and the optimal dose regimen identified as 120 mg/kg given subcutaneously (s.c.) 3x/week

for 28d. In a confirmatory study 15 obese Zucker rats received either placebo (n=8; sterile saline vehicle) or RPI-100 (n=7) s.c. 3x/week for 28d. Differences were assessed using unpaired t-tests.

Results: In the pilot study, a reduction in BW (496 vs 423 g; $p < 0.05$) was observed. In the confirmatory study the RPI-100 group showed a lower mean BW gain (24% lower BW gain; BW 446 vs 402 g; $p < 0.001$), alanine aminotransferase (ALT; 134 vs 79 U/L; $p < 0.05$), and creatinine (0.35 vs 0.3 mg/dL; $P < 0.05$). Mean plasma concentrations of leptin (66145 vs 49729 pg/mL; $p < 0.05$), insulin (18072 vs 13897 pg/mL; n.s.) and TGF- β 1 (14242 vs 8427 pg/mL; $p < 0.05$) were also reduced in the RPI-100 group.

Conclusions: These results support further development of RPI-100 for the treatment of obesity and further research regarding its impact on bioactive TGF- β 1.

T1:P.063

The effects of co-administration of probiotics with herbal medicine on weight, blood lipid metabolism, intestinal permeability and gut microbiota in obese Korean women: A randomized double-blind controlled clinical trial

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Introduction: Probiotics is considered as key potential treatment for obesity as it helps maintain balance in composition of the gut microbiota. Study was conducted to assess the effects of probiotics when combined with herbal medicine in treating obesity. Probiotics was tested to modulate gut microbiota, gut permeability and endotoxin level which may have correlation with factors affecting obesity.

Methods: We conducted a randomized double-blind placebo controlled study. Subjects (n=50) with higher Body mass index (BMI) ($> 25 \text{ kg/m}^2$) and waist circumference ($> 85 \text{ cm}$) were randomly assigned to receive Bofutsushosan with either probiotics or placebo capsule for eight weeks. Body composition parameters, metabolism biomarkers, endotoxin level, gut permeability and gut microbiota in stool were assessed at baseline and at week 8.

Results: Although both groups have shown significant reductions in weight and waist circumference, there was no significant difference in body composition change between two groups after eight weeks. However HDL cholesterol level was increased in probiotics group compared to placebo and *Bifidobacterium breve*, *Lactococcus lactis*, *Lactobacillus rhamnosus* showed significant increase in probiotics group. Combining two groups' results showed that body composition change have positive correlation between endotoxin level and *Lactobacillus plantarum*. Gram negative bacteria also showed positive correlation with body composition change and total cholesterol level.

Conclusion: Some correlations between increase in gut microbiota and body composition change indicate probiotics can influence energy metabolism in obesity. Correlation between endotoxin level and weight reduction proves that probiotics, especially gram negative bacteria and *Lactobacillus plantarum*, prevent endotoxin production that can lead to gut microbiota dysbiosis associated with obesity.

T1:P.064

Obesity phenotypes: A pilot study on the Traditional Chinese Medicine approach

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Objects: Obesity is an emerging health problem in China. This study is a first attempt to assess associations between the Traditional Chinese Medicine (TCM) central concept of ZHENG (also known as Syndrome) and obesity phenotypes as measured in western countries.

Methods: We collected TCM data through face-to-face interview (specific questionnaire). We assessed medical history and habitual physical activity, and we measured body composition (DXA), fasting blood glucose, insulin and lipids. Distribution of syndrome elements (SE) and dysfunctional organs (DO) as defined by TCM were examined. Cluster analysis was used to define types of ZHENG and levels or frequencies of obesity phenotypes were compared among groups.

Results: In 140 consecutive obese patients seen in a specialized university clinic (84% women, 40.3±10.3 y, BMI: 39.9±5.8 kg/m²), SE found were: QiXu (30.4% of total frequency), ReXie (23.0%), YinXu (20.9%) and ShuiShi (12.5%). DO were: Shen (35.6%), Wei (21.1%), Pi (18.4%) and Gan (16.7%). Subjects with three-SE or two-DO showed increased total fat mass (FM) and trunk FM. Four types of ZHENG were identified: A (37.1% of subjects), B (16.5%), C (35.7%) and D (10.7%). Subjects with type D (Shen QiXu ShuiShi) had increased body weight, BMI, total and trunk FM, and decreased physical activity. Biological parameters did not differ across ZHENG types.

Conclusions: Obesity phenotypes based on body composition differ according to ZHENG types in obese patients. This study is a first step to better understand the contribution of TCM to obesity phenotyping and management.

T1:P.065

The effects of polydextrose and betaine on obesity-related changes in the gut microbiota composition in high-fat diet-fed mice

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Introduction: Obesity is associated with low-grade systemic inflammation and changes in the gut microbiota composition. High-fat diet (HFD) feeding is known to change the gut microbiota towards an increased ratio of Gram negative to Gram positive bacteria. Here we assessed the impact of polydextrose (PDX), a soluble fibre, and betaine (BET), an osmolyte and methyl donor, on obesity-related changes in gut microbiota composition in HFD-fed mice.

Methods: C57BL/6J male mice were fed HFD for 4 weeks to induce obesity. The following 4 weeks mice received daily doses (wt/vol) of betaine (1%), PDX (3,33%) or their combination together with HFD. The body and tissue weights were measured and the abundance of *Bifidobacteria*, *Bacteroidetes*, *Enterobacteriaceae* and *E. coli* was analysed with qPCR from feces, ileal and caecal digesta or mucosa.

Results: HFD induced significant weight gain already in 4 weeks; this was not altered by supplementations. PDX-supplemented groups had significantly higher caecal weights than HFD control. HFD decreased the amount of *Bifidobacteria* in all samples, and PDX+BET supplementation reversed this effect in feces. PDX increased also the quantity of *Bacteroidetes* in feces and caecum. No changes in other microbial groups were seen.

Conclusion: PDX increased caecal weight indicating increased digesta bulking and microbial growth. PDX normalized the abundance of beneficial *Bifidobacteria* in HFD-fed animals. Betaine is absorbed early in the GI tract, thus showing only modest effects on microbial growth.

Funding: DuPont/Danisco is the producer of polydextrose (Litesse®) and betaine (Betafin® BP20). This research was funded by DuPont/Danisco and University of Eastern Finland.

T1:P.066

Madelung's disease – case report and literature review

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Introduction: Madelung's disease in literature is known also as a MSL – Multiple Symmetrical Lipomatosis, BSL – Benign Symmetrical Lipomatosis or Launois-Bensaude's Syndrome. It is characterized by non-encapsulated fatty masses developing symmetrically, mainly in the region of the head and neck. In extreme cases it might lead to difficulties in breathing and dysphagia. MSL etiology is not clearly known. It occurs mainly in the population of white males, aged 30 to 60 years, chronically abusing alcohol. Madelung's disease should be differentiated with Cushing syndrome, simple obesity, cysts of the neck, salivary glands disorder, thyroid gland cancers, leukemia and soft tissues sarcoma.

Case Report: A 44-year-old man without extended history of heavy alcohol use presented with soft, painless and slow-growing swellings over his neck, shoulders and head. Magnetic resonance imaging of his head and neck revealed nonencapsulated soft-tissue masses widely distributed over the superficial and deep fascial spaces. Pathologic examination showed lipomatous hypertrophy, confirming our clinical diagnosis of Madelung disease. Due to disfigurement and limitations of movement plastic surgery was scheduled.

Summary: Madelung's disease treatment is based on multi stages surgical debulking of fat masses. Liposuction and ozone therapy are also used, though they are not so fully effective. The recurrence of the disease is often and treatment applies frequent repetitions. Surgical procedures improve live comfort of the patient only for short period of time.

T1:P.067

Prevalence of sarcopenia in middle-aged obese outpatients

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Introduction: Sarcopenic obesity is a condition where fat mass excess and muscle mass depletion coexist and it is mainly described in the elderly. Our study aims to evaluate the prevalence of sarcopenia in obese outpatients, using BIA and two skeletal muscle mass indexes as screening tools.

Methods: Skeletal muscle mass (SM) was estimated by Janssen's BIA equation in 100 (50F, 50M) obese (BMI ≥ 30 kg/m²) adults (45-65yrs). Prevalence of sarcopenia was evaluated by sex-specific cut-off points of SMI = SM/heinght² [1] and SMI% = SM/body mass × 100 [2].

Results: Based on SMI, 2% of men and women were moderately sarcopenic; none resulted severely sarcopenic. Based on SMI%, 100% of men and women met the definition of sarcopenia; prevalence of moderate sarcopenia was 44% in men and 20% in women; whereas prevalence of severe sarcopenia was 56% in men and 80% in women.

Conclusion: Sarcopenia rates vary widely, based on different definitions. Despite SMI is the only predictive index of disability, it could underestimate sarcopenia in obesity, since the muscle mass, though normal, could be inadequate for total body mass. SMI% could better define sarcopenia in obese patients, as it takes total body mass into account. Based on SMI%, 100% of our patients could be considered in a "presarcopenia" stage. The definition of sarcopenia needs to be improved with data on muscle function.

References

- [1] Janssen I, et al. Am J Epidemiol 2004; 159: 413-21.
- [2] Janssen I, et al. J Am Geriatr Soc 2002;50:889-96.

1. Conflict of Interest: None

2. Funding: No Funding

T1:P.068

Body weight trajectories and associated events in obese women identify stress-related obesity development

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Introduction: Aim: to evaluate if trajectories of body weight gain in relation to time obtained by weight history could identify factors potentially linked to the development of obesity and metabolic, hormonal, and psychiatric comorbidities.

Methods: 116 overweight/obese female patients were prospectively enrolled (age 48.3 ± 13.7 years). Anthropometry, metabolic and hormonal parameters, and psychiatric traits were analyzed. Weight trajectories were built by the same Endocrinologist recording the first self-reported weight of adult life (W0), the weight at the time of the visit (Wv), and up to 4 weight changes (± 5 kilograms) between W0 and Wv. BMI and age of each time were also reported. Δ -BMI (each BMI recorded minus BMI of the previous record) / Δ -Time (difference of age corresponding to Δ -BMI) ratio (BTr) and (number of weight changes) / (time between W0 and Wv) ratio (WCTr) were calculated. The maximum BTr (BTr-max) was considered. Causative factors related to BTr-max were identified as chronic distress, menopause onset, quit smoking, major surgery, post-diet rebound, drugs, depression-eating disorders, and unknown-undefined. Patients were clusterized in 2 groups using standardized values of BTr-max and WCTr by K-Means Cluster analysis.

Results: Cluster 1 (fast weight gainers-FWGs; $n=61$) was characterized by higher BTr-max and WCTr values respect to Cluster 2 (slow weight gainers-SWGs; $n=55$). Prevalence of chronic distress as causative factor was higher in FWGs (26.2%) than in SWGs (5.5%) ($P=0.003$). Chronic distress-FWGs ($n=16$) showed higher cortisol values than SWGs ($P=0.027$) and unknown-undefined-SWGs ($n=40$) ($P=0.006$).

Conclusion: Rapid weight gain can help to identify women with stress-related obesity.

1. **Conflict of Interest:** none.

2. **Funding:** none.

T1:P.069

Body weight satisfaction and perceptions of diabetes among multiethnic, low-income women of varying BMI status

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Introduction: This research investigated: a) body satisfaction/dissatisfaction, b) perceptions of diabetes risk, and c) association between depression and body satisfaction among women of various races with varying weight status living in similar low-income environments.

Methods: Low-income women ($n=330$) living in urban Minnesota, USA were provided a gender-specific, eight figure silhouette instrument with figure 1 being the thinnest and figure 8 being the heaviest. Women were categorized by weight normal ($BMI < 25 \text{ m/k}^2$), overweight/obese ($BMI \geq 25 < 30 \text{ m/k}^2$), and obese ($> 30 \text{ m/k}^2$), and by race for data analyses. Means were compared using ANOVA, then with t-tests. Bonferroni correction applied.

Results: Mean age was 36 years. Normal weight (29% of sample) wanted to be a larger size (body dissatisfaction score of $.26 \pm 1.4$), while overweight (21%) and obese women (50%) desired to be significantly smaller (-1.3 ± 1.5 and -2.1 ± 1.3 respectively). Normal weight and overweight selected a similar body shape (3.5) for the healthiest shape; whereas obese women selected a significantly larger shape. All BMI and race categories identified the largest silhouettes as most likely to get diabetes. White and Native Americans were most dissatisfied with their body size (-1.3 ± 1.5 and -1.7 ± 1.5 respectively). Native Americans be-

lieved they looked larger than Black or White Americans. No significant differences in depression scores by race or BMI status.

Conclusion: We found racial differences existed for body image and body dissatisfaction. All identified the shape/size most associated with diabetes, though Black Americans desired larger body sizes.

T1:P.071

Association of plasma levels of inflammatory markers and vaspin with components of metabolic syndrome

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Insulin resistance (IR) is the common factor and precedes the installation of updates metabolic characteristics of metabolic syndrome (MS) as the release of inflammatory mediators. It has been suggested that vaspin, an adipokine secreted by visceral adipose tissue, has an effect on insulin sensitivity. Thus, the objective of this study was to verify whether vaspin is associated with markers of inflammation, IL-1b, IL-6, TNF- α and MS components in a sample of Brazilian adolescents. Cross-sectional study with 487 adolescents (10 a 14). Were obtained from clinical and anthropometric measures and plasma concentrations of certain vaspin, IL-6 and TNF- α , and calculated HOMA-IR (homeostasis assessment index insulin resistance). Test was performed on the Pearson correlation variables in quartiles of HOMA-IR. The vaspin was associated with cholesterol ($r = 0.23$; $p < 0.05$) and LDL-C ($r = 0.21$; $p < 0.05$) in the lowest quartile of HOMA-IR. Quartile 2, vaspin was negatively associated ($r = -0.20$, $p < 0.05$) with blood pressure and in the last quartile of HOMA-IR this association was reversed, becoming positive ($r = 0.20$, $p < 0.05$). In a third quartile vaspin only associated with IL-6 ($r = 0.25$, $p < 0.05$). Our study suggests that vaspin may be related to RI in a modulatory way and that their levels are altered as IR progresses, and is involved in the installation of complications of MS.

Reference

HIDA K.; WADA J.; EGUCHI J., *et al.* Visceral adipose tissue-derived serine protease inhibitor: a unique insulin-sensitizing adipocytokine in obesity. *Proc Natl Acad Sci USA*, v. 102(30), p. 10610-5, 2005.

T1:P.073

New equations for the prediction of resting energy expenditure in overweight adult females

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Introduction: The relationship between Resting Energy Expenditure (REE) and body composition evaluated with bio-impedance analysis (BIA) has not been extensively studied in overweight adult females.

Aim: The purpose of this study was to evaluate whether BIA measurements can be useful for the development of more accurate predictive equations of Resting Energy Expenditure in overweight females.

Methods: Data from 169 overweight (BMI 25-30 kg/m^2) adult females (age 29.1 ± 10.2 y, weight 72.2 ± 6.9 kg, height 161 ± 6 cm, BMI 27.6 ± 1.4 kg/m^2) were considered. REE was measured with indirect calorimetry (Vmax29, Sensor Medics) and body composition was assessed with BIA (DS Medica). The following variables were considered as possible predictors of REE: age, height, weight, BMI, Bioimpedance Index (BI) and phase angle (PA). REE predictive equations were derived by multiple regression analysis.

Results: Measured REE (1554 ± 189 kcal/die) was strongly correlated with: weight ($r=0.683$), height (0.585), BI ($r=0.477$), BMI ($r=0.360$), PA (0.334) but not with age. The model with general characteristics generated the following predictive equations: REE (kcal/d) = $18.9 \times \text{weight} + 192$, SEE 151 kcal/d, $r=0.683$. When BI and PA were included in the model the equation was: REE (kcal/d) = $15.9 \times \text{weight} + 43.1 \times \text{PA} + 4.3 \times \text{BI} - 73$ SEE 133 kcal/d, $r=0.720$.

Conclusion: these data suggest that in overweight adult females, REE can be estimated using body weight and estimation further improves when BIA variables are considered. These preliminary observations warrant further evaluation in larger groups.

1. Conflict of Interest: None of the authors had any conflict of interest regarding the abstract

2. Funding: No Funding

T1:P.074

Acylated and desacyl ghrelin inhibit TNF- α -induced apoptosis and autophagy in human visceral adipocytes

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Introduction: The aim of the present study was to evaluate the association between acylated and desacyl ghrelin and proinflammatory TNF- α in obesity and obesity-associated type 2 diabetes (T2D), as well as the potential role of ghrelin in the control of apoptosis and autophagy in human visceral adipocytes.

Methods: Circulating concentrations of the ghrelin isoforms and TNF- α were measured in 194 volunteers. Ghrelin and ghrelin *O*-acyltransferase (GOAT) levels were analysed by real-time PCR, western-blot and immunohistochemistry in 53 biopsies of human omental adipose tissue. The effect of acylated and desacyl ghrelin on TNF- α -induced apoptosis and autophagy-related molecules in omental adipocytes was also evaluated.

Results: Plasma acylated ghrelin and TNF- α levels were increased, whereas desacyl ghrelin levels were decreased in obesity-associated T2D compared to lean and obese NG subjects. Both ghrelin and GOAT were expressed in omental and subcutaneous fat depots. Omental adipose tissue from obese patients with type T2D showed an up-regulation of transcript levels of GOAT, increased adipocyte apoptosis as well as increased expression of the autophagy-related genes *ATG5*, *BECN1* and *ATG7*. The incubation with either acylated or desacyl ghrelin reduced TNF- α -induced activation of caspase-8 and caspase-3, and cell death in differentiating adipocytes. In addition, acylated ghrelin reduced the basal expression of the autophagy-related genes *ATG5* and *ATG7*, while desacyl ghrelin blunted the TNF- α -induced increase of *ATG5*, *BECN1* and *ATG7* expression.

Conclusion: Apoptosis and autophagy are upregulated in human visceral adipose tissue of obese patients with T2D. The ghrelin *O*-acyltransferase-ghrelin system reduces TNF- α -induced apoptosis and autophagy in human visceral adipocytes.

1. Conflict of Interest: All contributing authors declare that they have no conflicts of interest.

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T1:P.075

Interleukin-1 β mediates macrophage-induced lipolysis and inhibits lipid accumulation in human adipocytes

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Introduction: Obesity is associated with an increase in macrophage infiltration in adipose tissue. Interleukin-1 β (IL-1 β) is a major proinflammatory cytokine produced by macrophages. Evidence suggests that IL-1 β may mediate macrophage-induced adipose tissue remodelling in obesity. This study investigated whether IL-1 β impairs lipid storage function of adipose tissue by influencing lipolysis and lipid accumulation in human adipocytes.

Method: Human THP-1 macrophages were cultured for producing macrophage-conditioned (MC) media. Human preadipocytes were induced to differentiate into mature adipocytes and treated with MC media, IL-1 β neutralizing antibody or IL-1 β . Lipolysis was measured as glycerol release. Adipogenesis was assessed as lipid accumulation by Oil Red-O staining and gene expression of the adipogenic factors using real-time PCR.

Results: The effect of IL-1 β on adipogenesis was examined with the treatment of IL-1 β (5ng/ml) for 12 days since the induction of adipocyte differentiation. IL-1 β led to a significant reduction in lipid levels during adipocytes development (by 30%, $P < 0.001$). There was also a downregulation of mRNA levels of the adipogenic factors, such as aP2 (40%, $P < 0.05$), PPAR γ (40%, $P < 0.01$) and C/EBP α (82%, $P < 0.001$). In contrast, IL-1 β significantly induced gene expression of proinflammatory factors, including IL-6 (273-fold, $P < 0.001$), IL-8 (414-fold, $P < 0.001$), MCP-1 (23-fold, $P < 0.001$) and CCL5 (1469-fold, $P < 0.001$).

Conclusion: IL-1 β impairs lipid storage in human adipocytes, probably by mediating macrophage-induced lipolysis and inhibiting preadipocyte differentiation.

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T1:P.076

Ageing of human adipocytes is associated with increased triglyceride storage and altered secretion profiles of inflammatory adipokines

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Introduction: Dysregulation of adipokine secretion by adipocytes is thought to link chronic inflammation and obesity-related metabolic disorders. Human adipocytes have been shown to have a long life-span but little is known the metabolism and the secretory function with cell ageing. This study investigated whether adipocyte ageing *in vitro* modulates lipid mobilisation and the secretion profiles of major inflammatory adipokines.

Methods: Human primary preadipocytes (derived from subcutaneous fat) in culture for up to 30 days after differentiation were used. Intracellular triglyceride (TG) content and glycerol release were quantified. The secretion profiles of inflammatory adipokines at the basal level and following TNF α and LPS stimulation were determined using ELISAs.

Results: With adipocyte ageing, TG content was significantly elevated up to day 30 and lipolysis peaked at day 15 without changes thereafter. Basal secretion of adiponectin was peaked at day 9 and then progressively declined. The release of leptin, MCP-1 and IL-8 was peaked at day 15 and the levels were maintained afterwards. IL-6 secretion was also peaked at day 15 while moderately decreased thereafter. Both TNF α and LPS enhanced inhibition of adiponectin secretion with adipocyte ageing. TNF α and LPS augmented leptin release at day 20. The release of MCP-1 and IL-6 was markedly increased by TNF α and LPS at day 14 (8 to 20-fold), 20 (3 to 6-fold) and 26 (3 to 6-fold).

Conclusion: These results suggest that increased lipid storage and the differential secretion of pro- and anti-inflammatory adipokines in aged adipocytes may contribute to local and systemic inflammation.

1. Conflict of Interest: None Disclosed

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T1:P.077

Macrophage-derived factors impair insulin signalling and glucose uptake in human primary adipocytes

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Introduction: Adipose tissue expansion in obesity exhibits inflammation and adipocyte malfunction, which is associated with increased infiltration of macrophages. Adipose tissue in addition to muscle is an important site of insulin resistance in obesity but the molecular mechanisms remain to be clarified. This study examined the effects of macrophage-derived factors on insulin signalling and glucose uptake in human adipocytes.

Methods: Human THP-1 monocytes were differentiated to macrophages and macrophage conditioned (MC) media was harvested. Human primary adipocytes differentiated in culture were exposed to MC medium or RPMI (control) for 24 h. Gene expression profile was measured using a qPCR array. Protein abundance of glucose transporter-4 (GLUT 4), insulin receptor substrate-1 (IRS-1), phosphoinositide-3-kinase (PIK3) and phosphorylated protein kinase B (pAKT) was determined by western blotting. Basal and insulin-stimulated 2-deoxyglucose uptake was quantitated.

Results: MC media significantly reduced expression of genes involved in insulin signalling and glucose metabolism, including IRS-1 (-2 fold, $P<0.001$), GSK3B (-2 fold, $P<0.01$) and GLUT4 (-12 fold, $P<0.01$). Consistently, there is also a decrease in protein abundance of GLUT4 (30%, $P<0.01$), IRS-1 (50%, $P<0.001$) and PI3K p85 (35%, $P<0.001$). MC media abolished basal phosphorylation of AKT and markedly reduced insulin-stimulated pAKT (75%, $P<0.01$). In addition, basal glucose uptake by adipocytes was significantly decreased (by 24%, $P<0.05$) and insulin-stimulated glucose uptake was abolished following the treatment with MC media.

Conclusions: These results suggest that macrophage-derived factors directly impair insulin responsiveness in human adipocytes. This is probably by blocking insulin signalling and downregulation of GLUT4.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded by the Medical Research Council (G08-1226)

T1:P.078

The influence of weight loss on HOMA-IR, soluble CD163 and mRNA CD163

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Introduction: Soluble CD163 (sCD163) is a protein cleaved from inflammatory macrophages, and it is found elevated in obesity and insulin resistance. In the present study we investigated changes in HOMA-IR, sCD163 and mRNA CD163 after weight loss induced by very low energy diet (VLED) in an obese population.

Design: 96 obese were enrolled, of whom 62 underwent 8 weeks of VLED followed by 3±1 week of weight stabilization. 36 lean subjects were recruited as a control group. Blood samples, subcutaneous fat biopsies and anthropometric measures were taken at baseline and again after 12 weeks.

Results: Obese subjects have a higher level of circulating sCD163 (lean 1.6 ± 0.4 mg/l vs. obese 2.3 ± 1.0 mg/l) and an elevated expression of mRNA CD163 compared with lean subjects (both $p<0.001$). VLED

resulted in 12 ± 4.5 kg weight loss (mean±SD) and the level of sCD163 was significantly reduced ($p<0.001$), but there was no change in the level of mRNA CD163 ($p=0.2$). In baseline analysis sCD163 correlated with BMI ($r=0.46$), waist circumference ($r=0.40$), HOMA-IR ($r=0.41$, all $p<0.001$). In a multivariate analysis sCD163 was found to be significantly associated with HOMA-IR, independently of waist circumference, sex and age ($\beta=0.25$, $p=0.04$).

Conclusion: The level of sCD163 and mRNA CD163 are closely related to obesity, however “short time” changes in body weight only affect sCD163 but not the level of gene expression. Finally we confirm that sCD163 is significantly associated with HOMA-IR at baseline, independently of sex, age and waist circumference, thus sCD163 is a new marker of low grade inflammation in obesity.

T1:P.079

Resveratrol inhibits hypoxia mediated inflammation in adipose tissue, adipocytes and macrophages

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Introduction: It has been proposed that hypoxia may be the fundamental determinant in the development of adipose tissue inflammation and adipocyte dysfunction in obesity. Resveratrol is a natural polyphenolic compound synthesized in a large number of plant species. It has been shown that resveratrol has powerful anti-inflammatory effects and may have beneficial effects on the metabolic syndrome seen in obesity.

Methods: The effect of hypoxia, induced by incubation at 1% O₂ for 24 h, was examined on the expression of inflammation-related adipokines in whole human adipose tissue cultures, 3T3-L1 murine adipocytes and THP-1 human macrophages - plus/minus resveratrol (50 µM).

Results: Exposure of whole human adipose tissue cultures, adipocytes, and macrophages to hypoxia resulted in increases in mRNA levels of Glucose transporter-1 (GLUT-1) (19-, 12- and 5-fold), Vascular endothelial growth factor (VEGF) (10-, 3- and 9-fold) and Interleukin 8 (IL8) (8, (NS) and 4-fold), respectively. In hypoxia mediated protein secretion we measured an increase in VEGF by (8-, 1.3- and 1.2-fold) respectively. Resveratrol reduced the hypoxic response in mRNA expression of GLUT-1 (100%, 34% and 36%), VEGF (100%, 28% and 68%), IL8 (100%, 49% and 47%) and VEGF protein secretion (91%, NS and 29%) respectively.

Conclusion: Resveratrol was able to partially counteract the effect of hypoxia in both adipocytes and macrophages on inflammation. Thus, resveratrol may have implications in the treatment of some of the complications associated with an enhanced fat mass as in obesity.

T1:P.080

Resistin level in young men with obesity that developed in puberty

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Purpose: To study resistin level in young men with obesity that developed in puberty considering the degree and the type of obesity.

Methods: 69 young men with obesity that manifested itself in puberty (average age is 19.22 ± 0.26) participated in the study. Control group consisted of 17 healthy young men (average age is 22 ± 0.72). All participants' anthropometric measurements were determined; while determining resistin level the degree and the type of obesity were taken into consideration. Statistical processing was performed using the package SPSS 11.5.

Results: All young people with obesity showed a tendency to higher resistin level (9.51 ± 0.54 ng/ml) compared to control group (7.98 ± 0.71 ng/ml, $p>0.05$). Spearman correlation analysis revealed positive correlation between resistin level and waist circumference ($r=0.253$, $p=0.047$), hip circumference ($r=0.286$, $p=0.024$) and body mass index ($r=0.269$, $p=0.035$). A tendency to an increase in resistin with increasing degree of obesity was observed ($p>0.05$). The maximum level of resis-

tin was observed in patients with III degree of obesity ($10,65 \pm 1,14$ ng/ml), although not it was significantly different from the control group ($p > 0.05$). Resistin level in the group of young men with abdominal obesity ($10,84 \pm 0,99$ ng / ml) was not significantly higher than in patients with gluteofemoral obesity ($9,10 \pm 0,57$ ng/ml, $p > 0.05$).

Conclusions: Resistin level tends to increase with increasing degree of obesity; however, it is not related to the type of obesity.

T1:P.081

Agouti signalling protein (ASIP) is circulating in bovine blood and suggests endocrine function

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Introduction: The agouti signalling protein (ASIP), known for its role in melanogenesis, has been previously related to obesity. Auto- and paracrine effects were suggested. However, ASIP circulating in blood as a prerequisite for an endocrine function has not yet been described. The aim of our study was to investigate the abundance of ASIP in adipose tissue and blood of cattle and possible relationships with fat deposition.

Methods: Blood samples were taken at 250 days of age and fat related traits were determined after slaughter of 248, 18 months old Charolais (CH) x Holstein (HS) F₂ crossbred bulls. Additional 19 blood samples were taken from two CH and HS bulls within 6 hours of one day for measurement of leptin and ASIP abundance. A custom made bovine specific antibody was used for detection of ASIP in tissue, plasma and differentiating primary bovine stromal vascular (sv) cells.

Results: Significant, positive relationships could be detected between body fat traits and plasma ASIP abundance. The ASIP plasma level fluctuated over day. This is also known from adipokines like leptin. However, leptin and ASIP levels were not correlated and whether adipocytes are the source of plasma ASIP needs further investigations. In primary sv cell cultures, ASIP was detected only in the cytoplasm of lipid containing cells.

Conclusion: Our results indicate that ASIP is circulating in bovine blood and suggest a potential role of ASIP in body fat deposition. Furthermore, a hitherto unknown endocrine function can be assumed with possible importance for obesity research in human.

T1:P.082

Oleuropein is inhibitor of peroxisome proliferator-activated receptor gamma (PPAR γ)

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Introduction: Oleuropein, which is a major phenolic compound found in olive leaves and oil, exerts numerous beneficial effects on health including antioxidant, anti-inflammatory, anti-atherogenic and anti-cancer activities. Furthermore, oleuropein suppresses the adipocyte differentiation in vitro. We aimed to characterise molecular mechanisms underlying anti-adipogenic effects of oleuropein.

Methods: 3T3-L1 cells and primary cultures of differentiated adipocytes derived from subcutaneous fat of the mice were used. Two days after reaching confluence, cells were cultured in differentiation medium containing: 3T3-L1 cells - 2 μ M dexamethasone, 100 nM BRL for the first 2 days and 5 μ g/ml insulin for all differentiation time; primary culture - 100 nM BRL and 5 μ g/ml insulin. Cell viability/proliferation was analysed using Trypan blue and WST-1 assays, and triglycerides were stained with Oil Red O. Gene expression was analysed by qRT-PCR. Cell based gene reporter assays for PPAR α , PPAR δ/β and PPAR γ (GeneBLAzer, Invitrogen, USA) were used to study direct effects on transcriptional activity of various PPARs.

Results: Oleuropein (>100 μ M) decreased viability of proliferating preadipocytes and didn't exerted any cytotoxic effects in post-confluent

cells after induction of differentiation. Oleuropein dose-dependently (>100 μ M) inhibited adipocyte differentiation and suppressed gene expression of PPAR γ , C/EBP1 α , SREBP-1c and FAS in both experimental models. PPAR α and PPAR δ/β activity were not affected by oleuropein. Contrary, PPAR γ transcription activity was diminished by oleuropein (>100 μ M).

Conclusion: Oleuropein suppresses both preadipocyte proliferation and adipocyte differentiation in vitro. Moreover, our data suggest, that oleuropein exerts anti-adipogenic effect through direct inhibition of PPAR γ transcriptional activity

T1:P.083

The mechanical properties of human adipose tissue and their structural bases

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Introduction: Adipose tissue (AT) expansion in obesity is characterised by cellular growth, and continuous extracellular matrix (ECM) remodeling. It is hypothesised that the matrix could inhibit cellular growth and lipid storage. For this purpose we characterise the biomechanical properties of the ECM and the mechanical properties of subcutaneous and omental tissues which have different physiological and biomechanical environments and functions.

Methods: AT was obtained from 31 subjects undergoing surgery. Force-extension curves and stress-relaxation data were obtained by mounting fresh AT strips in buffer on a purpose-made apparatus; effects of osmotic swelling and cell rupture measured and organisation of ECM determined using nonlinear microscopy.

Results: AT showed non-linear stress-strain characteristics up to 30% strain. Comparing subcutaneous to omental paired samples (n=19) the moduli were lower in subcutaneous: initial 1.6 ± 0.8 KPa (mean \pm SD) and 2.9 ± 1.5 KPa ($p=0.001$), final 11.7 ± 6.4 KPa and 32 ± 15.6 KPa ($p<0.001$) respectively. Hysteresis was lower in subcutaneous AT (n=13): 0.1 ± 0.1 KPa and 0.3 ± 0.2 KPa respectively ($p=0.006$). The time course of stress-relaxation was fitted by a double-exponential function. In both tissues osmotic rupture of adipocytes resulted in a 30% decrease in force at 30% strain, an increase in the transition strain, and significant increases in the initial and final moduli, which are attributed to changes in matrix organisation ($p \leq 0.005$). Nonlinear microscopy revealed collagen and elastin networks in close proximity to adipocytes.

Conclusion: These results show that subcutaneous AT is more distensible than omental and has lower hysteresis loss, implying that as a storage organ it should have greater capacity for lipid storage and recovery from mechanical deformation.

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T1:P.084

Adipose tissue fatty acid desaturation index correlates with BMI in obese patients

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Introduction: Monounsaturated fatty acids (MUFA) are produced in liver and adipose tissue by stearoyl-CoA desaturase 1 (SCD1). Rodent studies suggested a negative role for SCD1 in the development of obesity, insulin resistance, liver steatosis and metabolic syndrome, however in human, evidence is less convincing. 18:1/18:0 desaturation index (DI) reflects the SCD1 activity. Recently a positive correlation has been shown between body mass and adiposity indices and DI in genetically obese rats. The aim of this work was to evaluate the association between DI and BMI and adipose tissue mass in morbidly obese patients.

Methods: Visceral and subcutaneous adipose tissues and serum were obtained from sixteen morbidly obese woman who underwent bariatric surgery. Fatty acid composition in tissue and serum was analyzed with GCMS.

Results: MUFA are the dominant fatty acids in adipose tissue in obese patients. We found positive correlation between DI and BMI in visceral and subcutaneous adipose tissue depots ($R=0.69$, $R=0.59$), as well as between DI and total adipose tissue mass ($R=0.70$, $R=0.62$). In serum we found positive correlations between DI and BMI ($R=0.44$), and between DI and total adipose tissue mass ($R=0.40$), but these correlations did not reach statistical significance.

Conclusion: Our study in obese human confirms the correlation between DI, which reflects the SCD1 activity, and BMI as well as adipose tissue mass reported previously in animal model. Since increased SCD1 activity is associated with several obesity comorbidities our results suggest that DI in adipose tissue of obese human is a biomarker of metabolic diseases risk.

T1:P.085

Altered adipocyte lipolysis, macrophage content and inflammatory markers in white adipose tissue of mice KO for corticosteroid-binding globulin

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Introduction: Corticosteroid-binding globulin (CBG) is a glucocorticoid carrier in blood with the accepted function of modulate corticosterone free fraction. CBG expression has been reported in white adipose tissue (WAT), where its function remains unknown. Glucocorticoids regulate adipocyte differentiation and metabolism and promote differentiation and survival of anti-inflammatory macrophages.

Methods: Epididymal WAT of eighteen weeks old mice C57BL/6 wild type (WT) and knockout for CBG (KO) was digested with collagenase and adipocytes and stromal vascular fraction (SVF) obtained. Adipocyte diameter and number were quantified and lipolysis evaluated from glycerol measurement in medium. Total, M1 and M2 macrophages were quantified by FACS. Gene expression from WAT was determined by RT-PCR.

Results: Adipocytes from KO mice were smaller and showed less lipolytic capacity than adipocytes from WT. KO mice had higher number of adipocytes per gram of tissue (1.26 ± 0.04 millions) than WT (0.82 ± 0.12 millions). The abundance of cells from SVF was lower in KO mice (0.20 ± 0.02 millions) than in WT (0.51 ± 0.08 millions). In SVF the macrophage fraction represented 39.4 ± 2.5 and 32 ± 12 percentage of total cells in WT and KO mice respectively. The percentage of M1 macrophages was 44 ± 4 and 51 ± 3 and of M2 was 55 ± 4 and 49 ± 3 in WT and KO mice respectively. TNF α and PU.1 expression were significantly higher in WAT from KO than from WT.

Conclusion: The lack of CBG promotes a higher expression of inflammatory markers in parallel with a slight predominance of proinflammatory macrophages and a diminished adipocyte lipolytic capacity that suggest an altered response to glucocorticoids in WAT.

T1:P.086

The level of adhesive molecules sICAM in patients with obesity

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Background: Patients with obesity have disturbances of immune status. The realization of immune inflammation is performed with participation of adhesive molecules sICAM, which provides cellular interaction in fat tissue vessels.

Methods: We examined 81 patients with obesity of 19-66 years old (33 males, 48 females). The obesity was diagnosed by body mass index (BMI) and bioimpedance body composition analysis. Twenty seven patients had 1st grade of obesity ($BMI=30-35 \text{ kg/m}^2$), 18 patients – 2nd grade ($BMI=35-40 \text{ kg/m}^2$), and 36 patients – 3rd grade ($BMI>40 \text{ kg/m}^2$). The control group consisted of 23 healthy persons of the same age. The level of adhesive molecules sICAM was measured by immunoenzyme assay using reactive from Biosources Company.

Results: The mean level of adhesive molecules sICAM in the group of patients with 1st grade of obesity was $310.9 \pm 31.8 \text{ ng/ml}$, in patients with 2nd grade - $327 \pm 26.4 \text{ ng/ml}$, in 3rd grade of obesity - $329 \pm 28.4 \text{ ng/ml}$. The level of this molecules in the control group was $230.0 \pm 47.4 \text{ ng/ml}$ ($p<0.05$).

Conclusion: The realization of immune inflammation in patients with obesity is accompanied by increased levels of adhesive molecules sICAM.

1. Conflict of Interest: Non disclosed

2. Funding: No funding

T1:P.087

Resveratrol metabolites reduce triacylglycerol content and inhibit differentiation in 3T3-L1 adipocyte

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Introduction: Resveratrol, a polyphenol present in different fruits and derivative drinks, undergoes rapid and extensive metabolism into enterocytes and liver. Consequently, glucuronide and sulfate metabolites are produced and high concentrations of them reach plasma and tissues. However, very little data exists concerning their biological activity. The aim of the present study was to determine whether resveratrol metabolites contribute to the beneficial anti-obesity effect of resveratrol using 3T3-L1 maturing pre-adipocytes.

Methods: 3T3-L1 pre-adipocytes were cultured in DMEM+FBS media. Two days after confluence, differentiation was induced. On day 0, 2, 4 and 6 of differentiation maturing pre-adipocytes were treated with 1, 10 and 25 μM *trans*-resveratrol or its metabolites (*trans*-resveratrol-3-O-glucuronide, *trans*-resveratrol-4'-O-glucuronide and *trans*-resveratrol-3-O-sulfate). On day 8, medium was removed and cells were harvested. Triacylglycerol content was measured by spectrometry. The expression of genes involved in pre-adipocyte differentiation (CEBP α and β , PPAR γ and LPL) was analyzed at 25 μM by Real Time RT-PCR. The statistical study was performed by using Student's *t* test.

Results: Resveratrol, *trans*-resveratrol-4'-O-glucuronide and *trans*-resveratrol-3-O-sulfate reduced triacylglycerol content at 25 μM (13.0%, 13.8% and 16.8% respectively). The reduction induced by *trans*-resveratrol-3-O-glucuronide (11.3%) did not reach statistical significance. Resveratrol and the three metabolites reduced CEBP β gene expression. *Trans*-resveratrol-3-O-sulfate also reduced CEBP α , PPAR γ and LPL mRNA levels.

Conclusion: The present study shows for the first time that among resveratrol metabolites, *trans*-resveratrol-4'-O-glucuronide and *trans*-resveratrol-3-O-sulfate induce similar delipidating effects to resveratrol in maturing pre-adipocytes. This suggests that both resveratrol and

resveratrol metabolites may be involved in the anti-obesity effect of this polyphenol.

1. Conflict of Interest: None Disclosed.

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T1:P.088

Effect of statins on body fat accumulation

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Introduction: Statins are a family of drugs widely used in hypercholesterolemia treatment. Nevertheless, their effect on body fat accumulation is not known. The aim of this study was to analyse the effect of statins on body fat accumulation in genetically obese Zucker rats.

Methods: Seventy Zucker rats (*fa/fa*) were divided into seven groups. Rats from six statin groups were orally treated with Simvastatin, Pravastatin, Atorvastatin, Rosuvastatin, Fluvastatin and Lovastatin, respectively, at a dose of 0.6 mg/kg body weight/d. After 6 weeks, white adipose tissue from epididymal, perirenal and subcutaneous locations were dissected and weighed. In subcutaneous tissue the activity of *de novo* lipogenic enzymes such as fatty acid synthase (FASN), glucose-6-phosphate dehydrogenase (G6PDH) and malic enzyme (ME) were measured spectrophotometrically. Total lipoprotein lipase (LPL) and heparin-releasable LPL (HR-LPL) were measured fluorimetrically also in this tissue.

Results: No changes were observed in epididymal and perirenal adipose depot sizes. However, rats treated with Rosuvastatin, Atorvastatin, Fluvastatin and Lovastatin showed higher subcutaneous adipose tissue. FASN activity was increased in Fluvastatin and Lovastatin groups, and G6PDH was increased in Atorvastatin and Lovastatin groups. There were no changes in ME activity. Total LPL was increased in Rosuvastatin and Lovastatin groups, whereas HR-LPL was increased in Rosuvastatin, Atorvastatin, Fluvastatin and Lovastatin groups.

Conclusion: The increase in the subcutaneous adipose tissue induced by several statins is due to, at least in part, an activation of the fatty acids synthesis and/or their uptake from circulating triacylglycerols. These results should be taken into account for statin choice in prescription.

1. Conflict of Interest: None Disclosed.

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T1:P.089

Fat mass and obesity associated gene (FTO) deficiency induces expression of UCP-1 in human SGBS adipocytes

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Introduction: The association between gene variants in FTO (fat mass and obesity associated) has been shown in different genome-wide association studies. FTO encodes a 2-oxoglutarate dependent demethylase and is expressed ubiquitously. The phenotype of FTO deficient mouse

models points to a participation of this gene in energy metabolism. However, its precise role in adipocyte metabolism has not been elucidated so far. This study aimed at identifying the role of FTO in human adipocyte metabolism.

Methods: By using lentiviral-mediated expression of shRNA, we generated FTO deficient SGBS pre- and adipocytes. Successful knockdown and expression of marker genes involved in adipogenic differentiation and glucose and lipid metabolism were monitored by qPCR. Relative mitochondrial content was determined by measurement of citrate synthase activity. Cellular oxygen consumption rates were analyzed by cell respirometry.

Results: In human SGBS preadipocytes and adipocytes we reached a transduction efficiency of >90%. This led to an inhibition of FTO mRNA expression by 73% and to a total repression of FTO protein expression. FTO deficiency did not affect differentiation into mature adipocytes. Interestingly, expression of uncoupling protein 1 (UCP-1) was approximately 4-fold increased in mitochondria of FTO deficient adipocytes compared to preadipocytes. This led to an increased basal as well as uncoupled mitochondrial respiration in FTO deficient adipocytes.

Conclusions: We conclude that FTO deficiency leads to the induction of a brown adipocyte phenotype, thereby enhancing energy expenditure. Further understanding of the signaling pathways connecting FTO with UCP-1 expression might lead to new options for obesity treatment.

T1:P.090

Renin-angiotensin system blockade with AT1 receptor blocker versus ACE inhibitors – impact on glucose metabolism in hypertensive patients

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Introduction: Treatment with ACE inhibitors (ACEi) and AT1 receptor blockers (ARBs) has been shown to reduce the number of new-onset DM2, improve insulin sensitivity and reduce adipocyte size^{1,2}. We investigated additional metabolic effect of renin-angiotensin system (RAS) blockade with ARB in comparison with ACEi. Specifically we studied the effect of Candesartan cilexetil therapy on glucose metabolism and parameters of subcutaneous adipose tissue (SAT) in hypertensive subjects.

Methods: Antihypertensive treatment with ACEi was replaced by candesartan for 6 months in 18 subjects with essential hypertension. Experimental procedures involved measurements of anthropometric data, blood pressure, oral glucose tolerance test; RAS and adipokines gene expression in SAT obtained by biopsy. Interstitial fluid from SAT was collected by using microdialysis.

Results: Six months after replacement ACEi by candesartan, the systolic blood pressure decreased by 6.95±4.07 mmHg (p< 0.05), diastolic blood pressure decreased by 5.68±2.35 mmHg (p< 0.05) and mean fasting plasma glucose decreased by 0.84±0.06 mM (p< 0.01). Insulin sensitivity index (Matsuda) tended to increase (p=0.08). Among the adipokines and RAS genes studied in SAT only PPARγ expression tended to increase (p=0.052) after candesartan treatment.

Conclusion: As expected, candesartan had blood pressure lowering effects comparable to those of ACEi. Seeing that candesartan reduced fasting glycemia and strongly tended to increase PPARγ expression in SAT, we speculate that ARBs treatment might have additional positive effect on glucose metabolism compared to ACEi. Analysis of serum and microdialysate by RAS fingerprint method is currently under way.

References

¹Lopez-Jaramillo (2006) Trials.7:28

²Zorad (2006) Eur.J.Pharmacol.552:112

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T1:P.092

Gene Expression Levels of STEAP4 and NGAL are Increased in Visceral Adipose Tissue of Obese Subjects and Related to Inflammation and Iron Status

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Introduction: Iron homeostasis is involved in the development of insulin resistance, being also disturbed in inflammatory diseases. Neutrophil gelatinase-associated lipocalin (NGAL) and six-transmembrane epithelial antigen of prostate (STEAP)-4 are two anti-inflammatory adipokines related to obesity and insulin resistance, involved also in iron metabolism. The aim of this work was to analyse the effect of obesity and iron status on NGAL and STEAP4 expression in visceral adipose tissue (VAT).

Methods: Fifty-three subjects were included in the study. Gene and protein expression levels of STEAP4 and NGAL in VAT were analysed. Gene expression levels of relevant inflammatory markers were further measured. Circulating ferritin and free iron concentrations were also determined.

Results: Obese patients showed increased ($P<0.001$) VAT gene expression of STEAP4 and NGAL. Protein expression levels of NGAL and STEAP4 followed the same trend, although protein levels of STEAP4 did not reach statistical significant differences. After body fat adjustment, STEAP4 gene expression was strongly correlated ($P<0.001$) with mRNA levels of NGAL. Moreover, an association ($P<0.01$) of STEAP4 and NGAL with parameters of inflammation (TNFA, CD68, MMP9, SPP1) was also observed. Obese patients showed increased (150%) circulating levels of ferritin ($P<0.05$). Serum concentrations of free iron in obese subjects were lower, although differences were not statistically significant. A negative correlation ($P<0.05$) between free iron concentrations and gene expression levels of both STEAP4 and NGAL was found, while circulating ferritin concentrations were positively correlated ($P<0.05$) with NGAL mRNA after body fat adjustment.

Conclusions: The increased levels of STEAP4 and NGAL in human obesity may be viewed as a compensatory mechanism to reduce inflammation in obesity, probably involving mechanisms of iron homeostasis.

T1:P.093

Impact of the novel adipokines BMP4 and BMP7 on the white-to-brown shift of primary human adipose stem cells

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Introduction: Promoting the browning of white adipose tissue (AT) and thereby increasing energy expenditure may counteract obesity. Recently, bone morphogenetic protein (BMP) 7 has been shown to promote brown adipocyte differentiation, while BMP4 enhances white adipogenesis. The differential effect of these BMPs remains unknown in human adipocytes. We have demonstrated that BMP4/7 are secreted from human AT. Thus we aimed to investigate the role of BMP4/7 in the white-to-brown shift in human adipose stem cells (hASCs).

Methods: hASCs isolated from human subcutaneous AT were chronically challenged with BMP4 or BMP7 (50ng/ml) during differentiation (14 days) and subsequently characterized by Oil Red O Staining, Western Blot and qRT-PCR.

Results: BMP4 and BMP7 significantly increased lipid accumulation (2.5 and 2.6fold). Both BMP4 and BMP7 upregulated PPAR γ (4.0 and 3.9fold) and C/EBP α (7.7 and 6.1fold). UCP1 expression was also induced by BMP4 and BMP7 (6.2 and 7.7fold). Furthermore, BMP4/7 administration decreased the mRNA levels of the white-specific marker

Tcf21 by 50%. The ability to induce UCP1 in response to BMP4/7 was highly variable between donors and seemed to be associated with the expression of the recently identified “beige” cell marker CD137. Moreover, BMP4/7 treatment upregulated mitochondrial Oxphos proteins in a subset of donors.

Conclusion: We showed for the first time that besides the known browning factor BMP7, BMP4 is able to induce browning in hASCs. Therefore, the adipokines BMP4 and BMP7 arise as potential therapeutic targets to counteract human obesity in an auto-/paracrine manner.

T1:P.094

Effects of cardiotrophin-1 on lipolysis in 3T3-L1 adipocytes

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Introduction: Cardiotrophin-1 (CT-1) is a member of the IL-6 family of cytokines. A recent study of our group has revealed that CT-1 is a key regulator of glucose and lipid metabolism. The aim of this study was to analyze the potential lipolytic actions of CT-1 in adipocytes and the molecular mechanisms involved.

Methods: Fully differentiated 3T3-L1 adipocytes were incubated with different concentrations (1-40 ng/mL) of recombinant protein CT-1 (rCT-1) for 1-24 hours. Lipolysis was evaluated by the determination of the amount glycerol released into the media. Total protein content of perilipin and the main lipases ATGL and HSL, as well as the phosphorylation levels of perilipin and HSL at Ser563, Ser565 and Ser660 were analyzed by Western Blot. The amount of intracellular cAMP was determined by enzyme immunoassay. The effects of the PKA inhibitor H89 on rCT-1 actions on lipolysis were evaluated.

Results: rCT-1 treatment stimulated both basal and isoproterenol-induced glycerol release in a concentration and time-dependent manner. rCT-1 (20 ng/mL) also induced a marked increase in PKA mediated phosphorylation of perilipin and HSL at Ser660 at 24 hours. In parallel rCT-1 induced a rise in cAMP intracellular content. Furthermore, the lipolytic actions of rCT-1 as well as the phosphorylation of HSL at Ser660 were completely reversed by pre-treatment with the PKA inhibitor H89.

Conclusion: The present data demonstrate the ability of rCT-1 to stimulate lipolysis in adipocytes and suggest that these lipolytic actions of rCT-1 are mainly mediated by the HSL phosphorylation through cAMP-mediated activation of protein kinase A.

1. Conflict of Interest: None

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T1:P.095

Role of retinoic acid, rosiglitazone and forskolin in the expression of human and mouse UCP1 reporter constructs in differentiated and undifferentiated HIB1B brown adipocytes

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Introduction: Expression from the promoter of human uncoupling protein 1 (UCP1) is stimulated by isoproterenol and thiazolidinediones but only in the presence of retinoic acid whereas expression of the mouse UCP 1 promoter can be stimulated without retinoic acid.

To establish the molecular mechanism for this species difference we have generated human and mouse UCP1 promoter reporter constructs and examined their activity in the HIB1B mouse cell line.

Methods: Mouse and human enhancer-proximal promoter luciferase pLenti reporter constructs were transiently transfected into undifferentiated HIB-1B cells, or used to produce lentiviral particles which were used to produce stably transduced cells that were differentiated for 7 days using a standard protocol. Cells were then cultured in the presence and absence of retinoic acid, forskolin (to stimulate cAMP) and the thiazolidinedione, rosiglitazone. Luciferase assays were performed up to 48h later.

Results: Transcription from both mouse and human UCP1 promoter luciferase reporter constructs transiently transfected into undifferentiated HIB1B cells was strongly upregulated by the separate addition of forskolin, retinoic acid or rosiglitazone to the media, although combined addition of these drugs synergistically enhanced luciferase activity. In differentiated HIB1B cells stably transduced with the mouse construct, addition of forskolin only weakly stimulated transcription but strongly upregulated luciferase activity, when combined with retinoic acid or rosiglitazone.

Conclusions: Transcription of a human UCP1 enhancer-promoter reporter construct is only fully responsive to cAMP stimulation in the presence of retinoic acid or rosiglitazone.

1. Conflict of Interest: None

2. Funding: Saudi Arabian government and Nottingham University

T1:P.096

TNF system activity and plasma RBP4 and apelin levels in obese and normal weight women

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Introduction: TNF- α is a factor suppressing RBP4 expression in adipose tissue. While a positive correlation between plasma levels of apelin and TNF- α was shown in diabetic patients. The aim of the study was the assessment of associations between TNF system activity and plasma RBP4 and apelin levels in obese and normal weight women.

Methods: 115 women (72 obese and 44 normal weight) were enrolled into study. In addition to the anthropometric parameters, plasma TNF- α , sTNFRs, RBP4 and apelin-36 levels were assessed by ELISA, serum glucose by colorimetric method and insulin by RIA.

Results: Plasma TNF- α , sTNFR1, RBP-4 and apelin-36 levels were significantly higher in obese than normal weight women (Median values 4.4 vs. 2.3 pg/ml, $p < 0.05$; 1908 vs. 1285 pg/ml, $p < 0.001$; 27.6 vs. 14.7 ng/ml, $p < 0.001$ and 1.6 vs. 1.2 ng/ml, $p < 0.05$, respectively). While, plasma sTNFR2 level was significantly lower in obese than normal weight group (2361 vs. 2574 pg/ml, $p < 0.05$). The multivariate regression analysis revealed that plasma RBP4 level was related to age ($\beta = 0.01$; $p < 0.001$), plasma TNF- α ($\beta = 0.26$; $p < 0.001$) and sTNFR1 ($\beta = 0.39$; $p < 0.001$) levels and inversely to sTNFR2 level ($\beta = -0.55$; $p < 0.001$) independently from BMI and waist circumference. While, apelin-36 was related to BMI ($\beta = 0.01$; $p < 0.05$) and inversely to age ($\beta = -0.01$; $p < 0.001$) and insulin level ($\beta = 0.19$; $p < 0.05$) independently from waist circumference and TNF system activity.

Conclusion: TNF system activity is associated with plasma RBP4 but not apelin-36 levels.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded by Medical University of Silesia

T1:P.097

Plasma omentin and adiponectin levels as markers of adipose tissue dysfunction in polycystic ovary syndrome

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Introduction: The aim of the study was to assessment of plasma omentin and adiponectin levels as a markers of adipose tissue disturbances as well as analyze relationships between omentin to adiponectin ratio and insulin resistance or hormonal disturbances in PCOS.

Methods: A cross-sectional study enrolled 87 PCOS (48 obese) and 72 Non-PCOS women (41 obese). Anthropometric parameters and body composition were determined. Serum glucose, androgens, FSH, LH, SHBG and insulin concentration, as well as plasma omentin-1 and adiponectin levels were measured in the fasting state.

Results: The adiponectin level was similar in PCOS and Non-PCOS groups, but significantly lower in obese than normal weight subgroups. While, omentin-1 level was significantly lower in PCOS than non-PCOS group and not related to body mass. Adiponectin to omentin-1 ratio (AOR) was significantly higher in PCOS than non-PCOS group. Moreover, AOR was significantly higher in normal weight than obese subgroups in both PCOS and non-PCOS groups. The multiple regression analysis revealed that both FAI and HOMA-IR values are related to AOR beside to anthropometric parameters.

Conclusion: Our results suggest impaired hormonal function of adipose tissue stroma in PCOS independent of body mass. While the adipocyte hormonal function impairment is primarily dependent on body mass. It seems that the adiponectin to omentin-1 ratio may be useful in the assessment of adipose tissue dysfunction not only in PCOS.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded by Medical University of Silesia

T1:P.098

The hormonal changes during the menstrual cycle and plasma adipokines levels in young, healthy, normal weight women

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Introduction: The aim of the study was to assessment of the influence of the hormonal changes during the menstrual cycle on plasma leptin, adiponectin, resistin, visfatin, omentin-1 and vaspin levels in young, healthy, normal weight women.

Methods: The study involved 52 young, healthy, normal weight women. Anthropometric parameters, body composition and serum hormones concentrations as well as plasma leptin, adiponectin, resistin, visfatin, omentin-1 and vaspin levels were measured morning in the fasting state three times (within 2–4 days, 12–14 days and 24–26 days of menstrual cycle).

Results: Plasma adiponectin, omentin-1, resistin and visfatin concentrations were stable during the menstrual cycle. While, leptin and vaspin

level were significantly higher in midcycle and luteal phase than in follicular phase of menstrual cycle ($p < 0.01$ and $p < 0.01$; $p < 0.05$ and $p < 0.05$, respectively). There was no correlation between plasma vaspin level and serum gonadotrophins, estradiol, 17-OH progesterone and anthropometric parameters in both follicular phase, midcycle and luteal phase of menstrual cycle. While, the positive correlation between plasma leptin level and body fat mass and percentage was found ($R = 0.48$; $p < 0.001$ and $R = 0.41$; $p < 0.01$, $R = 0.35$; $p = 0.02$ and $R = 0.33$; $p = 0.02$, $R = 0.39$; $p < 0.01$ and $R = 0.37$; $p < 0.01$, respectively). Moreover, in midcycle, only leptin level was associated with LH concentration ($R = 0.38$; $p = 0.01$). There were no correlation between leptin level and estradiol or 17-OH progesterone concentrations.

Conclusion: Our results revealed stable plasma adiponectin, omentin-1, resistin and visfatin levels during the physiological menstrual cycle. While plasma leptin and vaspin levels increased in midcycle and luteal phase regardless of estradiol and 17-OH progesterone changes.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded by Medical University of Silesia.

T1:P.099

A novel automated image analysis method for accurate adipocyte quantification

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Introduction: Insulin resistance correlates better with adipocyte size than with adipocyte number. Manual methods for determining adipocyte size are laborious. We have created a novel method to provide accurate measurements of the cross-sectional area of adipocytes in paraffin sections, providing rapid high-throughput quantification of cell size and number.

Methods: Manual measurements were made from photomicrographs of H&E-stained paraffin gonadal fat pad sections, and adipocyte sizes were calculated from the major and minor axes of individual adipocytes. For automated analysis in MATLAB, images were segmented using the saturation channel within HSV colour space. Following fully automated post-processing steps to subtract background, enhance cell boundaries, fill holes and close gaps, individual adipocyte areas were measured and presented within histograms. At least five mice were sampled per group, with at least eight independent fields of view analysed.

Results: Manual and automated adipocyte measurements from images of gonadal fat pads from either chow or high-fat fed mice yielded good concordance in numbers. However, the ellipses generated by manual methods consistently over-estimated cell size, particularly in cells with an area $< 500 \mu\text{m}^2$. As smaller cells typically have a more inconsistent shape, ellipse-based area calculations will over-estimate measurements, whilst pixel counts establish the absolute area within the adipocyte boundary.

Conclusion: We report an accurate method to determine adipocyte size in histological sections that provides a considerable time saving over manual methods. We are currently applying this technique to determine the effect of a high fat diet on adipocyte size in visceral, gonadal and subcutaneous depots.

1. Conflict of Interest: None Disclosed

2. Funding: No Funding

T1:P.100

Oral Treatment with Gallic and Chlorogenic Acids Improves Metabolism Increasing Adipose Expression of SIRT1, SIRT6 and Adiponectin/FoxO1

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Objective: Obesity is described as a major factor in the development of type 2 diabetes and characterized by persistent low-grade inflammation. Sirtuins represent a promising new class of III NAD dependent histone deacetylases that regulate a number of physiological processes including inflammation, diabetes and obesity. The aim of the present study was to evaluate the effect of the association of gallic and chlorogenic acids on the metabolic profile and on adipose tissue sirtuins expression in mice treated with a high-fat diet.

Methods and Results: Male FVB/N mice were divided into 5 groups ($n = 10$ each) and were fed for 60 days with: standard diet (SD), high-fat diet (HFD), high-fat diet combined with gallic acid (HFD+GA), high-fat diet combined with chlorogenic acid (HFD+CA) and high-fat diet combined with gallic and chlorogenic acids (HFD+CA+GA). Body weight, food intake, blood parameters (insulin sensitivity, glucose tolerance, total-cholesterol, HDL-c triglyceride and glucose levels) were evaluated. Real-Time PCR was performed in order to analyze the expression of SIRT1 to 7.

Results: Our main findings showed that the combination of chlorogenic and gallic acids induced reduction in HDL-c; decrease in body weight gain and improvement in glucose tolerance. These results were accompanied by an increase in SIRT1 and SIRT6 mRNA expression. Further, the mechanism is related to SIRT regulation of adiponectin expression in adipose tissue by activation of FoxO1.

Conclusion: Combination of chlorogenic and gallic acids improved metabolism in high-fat diet treated mice probably due to sirtuins regulation on adipose tissue.

Conflict of Interest: There are no conflicts of interest to declare.

T1:P.101

Oral formulation of Angiotensin-(1-7) prevented obesity and hepatic inflammation by inhibition of Resistin/TLR4/NF- κ B pathway in rats treated with high-fat hypercaloric diet

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Objective: Obesity is a serious public-health problem characterized by a pro-inflammatory state and commonly associated to other metabolic disorders. The aim of the present study was to evaluate the effect of oral administration of Ang-(1-7) in liver resistin/TLR4/ NF- κ B pathway of high-fat feed rats.

Methods and Results: Male Sprague Dawley rats were divided into 3 groups ($n = 08$ each) and were fed for 60 days with: standard diet (SD), high-fat diet (HFD) and high-fat diet (HFD) + Ang-(1-7). Body weight, food intake, blood parameters (insulin sensitivity, glucose tolerance, total-cholesterol, HDL-c triglyceride and glucose levels) were evaluated. The main results showed that oral Ang-(1-7) produced a significant decrease in body weight and abdominal fat mass, despite normal food intake. In addition, high-fat diet (HFD) + Ang-(1-7) treated rats presented enhanced glucose tolerance, insulin sensitivity, and decreased plasmatic insulin levels, as well as a significant decrease in circulating cholesterol and triglycerides levels. These alterations were accompanied by a marked decrease expression of resistin, Toll-like receptor 4 (TLR4), angiotensin converting enzyme (ACE) and increased angiotensin converting enzyme 2 (ACE2) expression in liver. Furthermore, Ang-(1-7) decrease phosphory-

lation of mitogen-activated protein kinase (MAPK) and increase nuclear factor- κ B-dependent (NF- κ B) expression. These alterations prevented the increase in the proinflammatory cytokines interleukin-6 and tumor necrosis factor- α (TNF- α) expression. Conclusions: In summary the present study showed that oral Ang-(1-7) treatment in high-fat fed rats prevents obesity metabolic alterations and decreased several liver proinflammatory cytokines by down regulating resistin/TLR4/ NF- κ B pathway.

T1:P.102

Involved mechanisms of the inflammatory response induced by obesity

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Objective: Obesity is a epidemic health problem commonly associated with a pro-inflammatory state which is present in several obesity related diseases. Several inflammatory markers have a key role producing metabolic dysfunction. High-circulating cytokines participates of inflammatory signaling pathways in metabolic tissue-cells. The aim of the present study was to investigate the association between pro-inflammatory protein with Body Mass Index (BMI). Methods and Results: A cross-sectional study was conducted in a population of 32 adults. We analyzed results from 22 patients undergoing bariatric surgery, 5 control patients eutrophic and 5 cachectic patients in a descriptive study. We measured height, weight, waist circumference, BMI, blood pressure, blood glucose, and circulating lipids and blood analysis. We evaluated adipose tissue expression of factor of necrosis tumoral- α (TNF- α), interleukine-6 (IL-6), protein-c reactive (CRP), sirtuin 1, nuclear factor kappa-beta (NF- κ B) and enzyme conversion angiotensin II (ACE2). The main results showed that cachectic patients presented significant increased TNF- α ($P < .01$), IL-6 ($P < .01$), and NF- κ B ($P < .05$) mRNA, while ACE2 was decreased in obese and cachectic groups ($P < .01$). The sirtuin 1 expression was diminished in cachectic group. Conclusions: Cachectic patients have elevated pro- inflammatory expression and decrease expression of ACE 2 and sirtuin 1.

T1:P.103

Cross talk between Angiotensin-(1-7)/Mas axis and Sirtuins in adipose tissue

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Objective: The importance of Angiotensin-(1-7) – Ang-(1-7) and of the sirtuins on metabolic regulation was recently discovered, however still not completely understood in the obesity. Thus the aim of the present study was to evaluate the effect of oral administration of Ang-(1-7) and resveratrol (RSV) on lipid and glucose metabolism as well as in the adipose tissue gene regulation in mice treated with a high-fat diet.

Methods and Results: Male FVB/N mice were divided into five groups (n=10 each) and were fed for 60 days with: standard diet, high-fat diet (HFD), high-fat diet combined with RSV, high-fat diet combined with Ang-(1-7) and high-fat diet combined with RSV and Ang-(1-7). Body weight, food intake, blood parameters (insulin sensitivity, glucose tolerance, glucose, total-cholesterol and triglycerides levels) were evaluated. Real-Time PCR was performed in order to analyze the expression of SIRT1, ACE and ACE2. The main results showed that obese mice treated with angiotensin-(1-7) and resveratrol presented improved glucose tolerance, insulin sensitivity, and plasma glucose levels. In addition, association of treatments decreased triglycerides and cholesterol plasma

levels, as well as produced a significant decrease in abdominal fat mass, despite non altered food intake. Adipose tissue gene expression analysis showed an increase in ACE2 and SIRT1 mRNA in the mice treated with angiotensin-(1-7) and resveratrol.

Conclusion: Take together these results shows that oral administration of angiotensin-(1-7) and resveratrol can produce an important improvement of lipid and glucose metabolism modulating adipose expression of RAS components and sirtuins.

Conflict of Interest: There are no conflicts of interest to declare.

T1:P.104

Adult growth hormone deficiency and metabolic disease are associated with a substantial reduction in adipose tissue expression levels of zinc- α 2-glycoprotein: Effect of GH supplementation

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Introduction: Adult growth hormone deficiency (GHD) is associated with prediabetes and low GH is found in obesity. We hypothesized that zinc- α 2-glycoprotein (ZAG), adipokine reduced in obesity, is regulated by GH and associated with metabolic disease.

Methods: ZAG adipose tissue (AT) mRNA was measured in: lean (n=22), overweight/obese (n=21), prediabetic (n=18) and T2D (n=16) middle-aged men; GHD adults before (n=16) and after 5 years of hGH-replacement therapy (n=18) and healthy controls. Insulin sensitivity (euglycemic hyperinsulinemic clamp), glucose tolerance (oGTT), body composition (MRI) and resting energy expenditure (REE, indirect calorimetry) were assessed. AT samples were taken by biopsy. Adipocyte diameter was measured histomorphometrically. Gene expression was measured by RT-PCR.

Results: Compared to lean, overweight/obese men had almost 60% reduced AT ZAG expression ($p < 0.001$). Reduction of ZAG mRNA was more pronounced in prediabetic (76%) and diabetic individuals (82%). AT and serum of GHD-adults displayed almost 70% decrease in ZAG mRNA and protein ($p < 0.001$). hGH replacement normalized ZAG mRNA to levels found in healthy individuals. In addition, AT ZAG expression was positively associated with REE, AT- (insulin-induced FFA suppression) as well as whole-body insulin sensitivity ($R = 0.47$; $R = -0.33$; $R = 0.67$; $p < 0.01$). Negative relationships with adipocyte diameter, serum triglycerides, subcutaneous and visceral adiposity were observed ($R = -0.66$; $R = -0.35$; $R = -0.73$; $R = -0.47$; $p < 0.01$).

Conclusion: Our results demonstrate reduced circulating and AT ZAG in GHD as well as normalization of AT ZAG expression by hGH therapy, confirming obesity-independent regulatory role of GH. Associations of ZAG with insulin sensitivity, REE and adiposity suggest the role for reduced ZAG in metabolic disease development.

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T1:P.105

Regulation of Adipocytes in Polycystic Ovarian Syndrome Patients

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Introduction: Polycystic ovarian syndrome (PCOS) is defined as a complex genetic condition and endocrine disorder. Prevalence of PCOS is around 7% to 20% of premenopausal female. The prevalence of

obesity between patients with PCOS reaches to 50% and often is central obesity which associated with metabolic syndrome.

Hypothesis: The hypothesis is high free testosterone plasma levels in females are related to fat cell morphology and expression of genes regulating adipocyte differentiation and adipokine secretion.

Method: Human adipocytes cell line (SGBS) were seeded in sex wells plates till 90% confluence then human preadipocytes is treated with induction DMEM for 4 days. The DMEM is changed with differentiation DMEM with different concentrations of steroid hormones for three different course time (Day 7, 15 and 20). The genes expression of target genes was examined by qRT-PCR.

Result: Human cell line treated with sex steroids (0.5, 1, 1.5, 3 and 5 nM) for 7, 15, 20 days and exhibited a non-significant change in adipogenic markers (PPARG, CEBPa and Resistin) but clear change in Adiponectin expression when added Estradiol (3 nM).

Conclusions: Sex steroid exert stimulatory effect on adipocyte differentiation but do not appear to stimulate insulin resistance by changing adiponectin and resistin expression.

Funding: King Saud University (Saudi Arabian government) and Nottingham University (UK).

Future work: Human primary cell line Cells.

T1:P.106

Decreased RB1 expression and activity reflects obesity induced altered adipogenic capacity in human adipose tissue

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Aim: To investigate the possible role and regulation of Retinoblastoma (RB1) in adipose tissue (AT) in obesity using human samples and animal and cell models.

Methods: RB1 expression and activity were analyzed in: AT samples from two independent human cohorts in relation to obesity and related parameters; AT samples of rats after diet-induced weight gain and loss; and during human preadipocyte differentiation. Effects of transient Rb1 knockdown in fully differentiated 3T3-L1 adipocytes were also analyzed.

Results: RB1 (mRNA, protein and activity) in visceral and subcutaneous human AT was negatively associated with BMI and insulin resistance (HOMAIR) and positively associated with the expression of adipogenic genes (PPAR γ and IRS1). BMI increase was the main contributor to adipose RB1 down-regulation. Adipose RB1 expression and activity decreased in parallel to dietary-induced weight gain in rats, and returned to baseline with weight loss. RB1 expression and activity increased significantly during human adipocyte differentiation. Transient knockdown of Rb1 in fully differentiated adipocytes led to loss of the adipogenic phenotype.

Conclusion: Retinoblastoma seems to play a permissive role for human AT function, being down-regulated in obesity and increased during differentiation of human adipocytes. RB1 knockdown findings further implicate RB1 as necessary to maintain adipogenic characteristics in fully differentiated adipocytes.

Reference

Moreno-Navarrete et al, Diabetes, in the press.

1. Conflict of Interest: None Disclosed.

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T1:P.108

Diet Composition Modulate Expression of Sirtuins and Renin-Angiotensin System Components in Adipose Tissue

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Introduction: The renin-angiotensin system (RAS) and sirtuins (SIRT) are involved in metabolic balance, inflammation, and obesity, and may therefore be affected by food intake and adipose tissue formation. The aim of the present study was to evaluate the expression of RAS components and SIRT enzymes in the adipose tissue of mice fed diets with different macronutrient composition.

Methods: The body weight, food intake, and energy intake (kcal) were evaluated. Blood parameters (insulin sensitivity, glucose tolerance, total cholesterol, HDL-C triglyceride, and glucose levels) were also assessed. Real-Time PCR was performed in epididymal adipose tissue samples to analyze the expression of renin, angiotensinogen (AGT), angiotensin-converting enzyme 1 and 2 (ACE and ACE2), and SIRT1 to 7. Male FVB/N mice were divided into 5 groups (N=10 each) that were fed experimental diets for 60 days. Test diets were divided into standard (ST), AIN-93M, high-glucose (HG), high-protein (HP) and high lipid (HL).

Results: The main results showed that HL diet treatment induced reduction in HDL-C and triglyceride plasma levels; increased ACE (Ang II marker) expression and decreased ACE2 [Ang-(1-7) catalyzer] expression in adipose tissue; and also increased SIRT4 expression.

Conclusion: Diets with high lipid content induced a degenerative state associated with deregulation of adipose tissue enzymes expression.

1. Conflict of Interest: The authors declare that they have no competing interests.

2. Funding: Research relating to this abstract was funded by Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES)

T1:P.109

Metabolic health in 12-week-old obese Zucker rats is associated with increase in 14-3-3 β and phosphorylation of AS160 in epididymal adipose tissue

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Introduction: Obesity is associated with impairment of insulin action in peripheral tissues including adipose tissue (AT). Protein 14-3-3 β is involved in translocation of GLUT4 vesicles to plasma membrane and regulation of lipolysis in adipocytes.

Methods: We studied expression of pivotal molecules of the insulin signaling cascade in epididymal AT of 12-week-old (n=8, 388.3 \pm 5.4 g) and 33-week-old obese (*fa/fa*) (n=8, 688.8 \pm 17.9 g) male Zucker rats. Lean (*Fa/Fa* or *Fa/fa*) littermates of same age (12-week-old: n=7, 257.3 \pm 4.9 g; 33-week-old: n=6, 457.3 \pm 8.7 g) were used as controls. Glucose tolerance test (IPGT) was performed after an overnight fasting by intraperitoneal injection of glucose 2 g/kg. Plasma parameters were assessed by radioimmunoassay. Epididymal adipocyte size was determined on histochemical slides. Gene expression was evaluated by RT-PCR and protein amount by immunoblotting.

Results: Obesity in both 12- and 33-week-old Zucker rats was associated with increased adiposity, marked adipocyte hypertrophy, hyperleptinemia and hyperinsulinemia (p<0.01). Impairment of glucose tolerance (2h-glycemia during IPGT; p<0.01), AT inflammation and hypoxia, expressed as up-regulation of CD68 (p<0.05), TNF α (p<0.05) and GLUT1 mRNA (p<0.01), was observed in 33-week-old, but not in 12-week-old obese rats. Interestingly, AT of 12-week-old obese rats displayed a 67% increase in amount of 14-3-3 β protein (p<0.001), notably enhanced phosphorylation of its binding partner AS160 (p<0.01) as well

as up-regulation of GLUT4 protein ($p < 0.05$) in plasma membrane fraction.

Conclusion: Our data confirm a key role of 14-3-3 β protein in GLUT4 translocation *in vivo*. We hypothesize that 14-3-3 β /pAS160 might represent a compensatory mechanism protecting from metabolic comorbidities in early stages of obesity.

Fundings: APVV-0028-10 and SAS-NSC JRP 2010/07.

T1:P.110

Adipocyte Aquaglyceroporin 7 (AQP7) expression in relation to Peroxisome Proliferator-Activated Receptor- γ (PPAR- γ) and c-CBL associated protein (CAP) in obese children: a morbidity signaling cascade

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Introduction: Childhood obesity is a major risk factor for the development of severe insulin resistance during adolescence. PPAR- γ , an insulin sensitizer, up-regulates CAP, which induces insulin-dependent glucose uptake and AQP7, which facilitates glycerol efflux from the adipocytes.

Methods: Primary cultures of adipocytes were developed from routine surgical biopsies of subcutaneous abdominal adipose tissue from 35 obese (BMI > 95thtile) and 54 lean (BMI < 85thtile) children divided into two pre-pubertal groups A (2mos-7yrs) and B (8-12 yrs) and pubertal group C (10-15 yrs). The mRNA expression (ME) of PPAR- γ , CAP and AQP7 was studied with RT-PCR and the protein expression (PE) with Western Immunoblotting.

Results: The adipocytes showed: (1) a significant increase of the ME of PPAR- γ , ($p = 0.007$, $p = 0.019$), and the PE of CAP ($p = 0.039$, $p = 0.010$) and AQP7 ($p = 0.001$, $p = 0.009$) in the lean adolescents vs. the lean pre-pubertal children of groups A and B, (2) a significant decrease of CAP PE in the obese adolescents vs their respective lean ($p = 0.010$) and (3) a significant decrease of the ME ($p = 0.009$) and PE of AQP7 in the obese vs. lean adolescents.

Conclusions: The increased ME of PPAR- γ and PE of CAP and AQP7 in the lean pubertal children's adipocytes possibly reflects an attempt to limit the "physiological insulin resistance" necessary for the increased energy needs of puberty for glycerol. On the contrary, the decreased PE of CAP and ME and PE of AQP7 in the obese adolescents, might put them at a higher risk for the development of severe insulin resistance and impaired adipocyte glycerol efflux.

T1:P.111

Expression of Lipolytic Genes in Adipose Tissue is Differentially Regulated during Weight Loss and Weight Maintenance Phase of Dietary Intervention in Obese Women

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Introduction: Mobilization of fatty acids from adipose tissue plays a key role in providing energy substrate to other tissues and in regulation of re-modelling of adipose tissue. The aim of this study was to investigate the time-course of the expression of key lipolysis-regulating genes in adipose tissue during 6 months' dietary intervention (DI).

Methods: 16 women underwent a 6 months' DI consisting of a 1 month very-low-calorie diet (VLCD), subsequent 2 months' low-calorie diet and 3 months' weight maintenance diet (WM). Samples of subcutaneous abdominal adipose tissue (SCAT) were obtained at each phase of DI and expression of mRNA of lipolysis-regulating genes was determined.

Results: mRNA levels of adrenergic beta₂-receptor (ADRB2) increased and alpha₂-receptor (ADRA2A) decreased at VLCD and both returned back to pre-diet values at WM. Adipose triglyceride lipase mRNA

showed the same pattern as ADRA2A while hormone-sensitive lipase, phosphodiesterase-3B and Gi-protein did not change throughout DI.

Conclusions: Results suggest that the pattern of regulation of lipolysis during a multi-phase dietary intervention differs in respect to the dietary phase, i.e. the status of energy balance. This pattern might be a feature of an energy-preserving mechanism in periods with low energy supply.

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T1:P.112

Lipid metabolism in adipose tissue: A study postprandial

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Background & Objectives: Morbidly obese patients have associated diseases such as diabetes, hypertension, hyperlipidemia and cardiovascular diseases. There is evidence that patients with morbid obesity have postprandial hypertriglyceridemia (HTGpos) and that this HTGpos is related with the degree of insulin resistance. Our aim was to characterize the adipose tissue of morbidly obese patients with mild or severe HTGpos after a fat overload though the expression of a battery of genes involved in lipid metabolism.

Methods: We studied 57 morbidly obese patients who had mild or severe HTGpos after fat overload (patent P201030776). Measurements of anthropometric and biochemical variables and oxidative stress biomarkers were done. Samples of visceral adipose tissue were obtained during bariatric surgery in the morbidly obese patients. The RNA isolation from adipose tissues was done using RNeasy Lipid Tissue Mini Kit and the gene mRNA expression levels were assessed by real-time PCR using an ABI Prism 7000 Sequence Detection System.

Results: No significant differences were observed in biochemical variables except in triglyceride levels between the two groups of morbidly obese patients with postprandial mild or severe HTGpos. The morbidly obese patients with severe HTGpos had a higher oxidative stress levels. Genes involved in the management of triglycerides or lipid metabolism were up-regulated in morbidly obese patients with severe HTGpos.

Conclusion: Morbidly obese patients with severe HTGpos had a more active adipose tissue regarding the expression of genes involved in lipid metabolisms, these data could indicate a greater flow of lipids and a greater insulin resistance in these patients.

T1:P.114

The effect of Roux-en-Y gastric bypass surgery and intensive lifestyle intervention on aortic arterial stiffness. A non-randomised clinical study

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Introduction: Exercise and weight-loss may reduce aortic arterial stiffness (pulse wave velocity; PWV) and CVD. We aimed to compare the 1-year effect of an intensive lifestyle intervention programme (ILI) and Roux-en-Y gastric bypass (RGB) on PWV.

Methods: PWV was assessed by carotid-femoral PWV (Sphygmocor®). A low-calorie-diet (<900 kcal/day) was given 7-weeks before surgery. The ILI-group underwent supervised training sessions 3 days/week (4-8 METs) and calorie restriction (1000 kcal/day) for 12 weeks, and followed monthly thereafter. Statistics; repeated measures ANOVA.

Results: A total of 163 subjects, [ILI-group; 76 (62% women), RGB-group; 87 (66% women)] were included. Mean (SD) BMI was 42.0 (5.0) in the ILI-group and 45.9 (5.9) in the RGB-group, $p < 0.001$. Weight-loss

(95%CI) after 59 weeks in ILI was 13.9 (11.4, 16.4) kg and RGB 41.9 (39.1, 44.7) kg. Mean (95%CI) PWV (m/s) was 8.3 (8.1,8.9) and 8.7 (8.4,8.9) at 7 and 59 weeks, respectively. Statistically significant effects of time were observed on PWV, mainly explained by a larger reduction of PWV in the ILI-group at 7-weeks.

Conclusion: Despite a larger weight-loss in the RGB-group no significant adjusted difference in PWV between groups were seen at 59 weeks follow up.

1. Conflict of Interest: None disclosed

2. Funding: No founding

Table for T1:P.114

	Baseline (SD)			7 weeks		59 weeks			
	ILI	RGB	P-value	Between group difference (95% CI)	P-value	Between group difference (95% CI)	P-value	Repeated measurement ANOVA	P-value
PWV (m/s)	8.7(1.9)	8.7(1.8)	0.903	0.4(0.2,0.6)	<0.001	-0.1(-0.3,0.2)	0.999	F(1.710, 268.524)=4.13	0.022
BP _{systolic} (mmHg)	145(18)	139(21)	0.027	10(7,13)	<0.001	5(1,9)	0.004	F(1.768, 277.562)=5.38	0.007
BP _{diastolic} (mmHg)	81(11)	80(13)	0.529	3(2,5)	<0.001	2(0,4)	0.071	F(1.865, 292.773)=4.70	0.011

T1:P.115

Relationship between body mass index and nocturnal decline of blood pressure in patients with chronic kidney disease stage three and above

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Introduction: Patients with chronic kidney disease (CKD) show loss of nocturnal decline of blood pressure (BP) in line with renal failure. However, how their daily activities and body weight relate to loss of nocturnal BP decline is not fully understood. We evaluated the relation between 24-hour BP, body mass index (BMI) and physical activities in patients with CKD stage 3 and above.

Methods: Patients (aged 20–85 years, urinary protein excretion <0.3 g/g creatinine, systolic/diastolic BP <180/110 mmHg, estimated glomerular filtration rate <60 mL/min/1.73 m²) participated in the study. Twenty-four-hour BP was measured using ambulatory BP monitoring devices equipped with an acceleration pickup sensor (pedometer) to determine physical activity. Multivariate regression was conducted using the sleeping/waking BP ratio as dependent variable and age, sex, BMI, physical activity and 24-hour BP as independent variables.

Results: In 169 patients (60±9 years, men/women: 90/79: eGFR 33±13 mL/min/1.73 m²), BMI correlated significantly ($p < 0.01$) with sleeping/waking systolic BP ratio ($r=0.56$) and diastolic BP ($r=0.49$). Physical activity correlated reversely ($p < 0.05$) with sleeping/waking systolic BP ratio ($r=-0.38$) and diastolic BP ($r=-0.44$). However, age, sex, systolic BP or diastolic BP did not correlate ($p > 0.05$) with sleeping/waking systolic BP ratio ($r=0.04$, 0.13, 0.07 and -0.04, respectively) or sleeping/waking diastolic BP ratio ($r=0.17$, 0.16, 0.10 and 0.09, respectively).

Conclusion: Our findings suggest that reduced daily activities and increased body weight in patients with CKD stage 3 and above are related to loss of nocturnal BP decline, a predictor of cardiovascular organ damage.

T1:P.116

Postprandial blood pressure and hormone responses differ after intake of different proteins

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Introduction: Hypertension is a comorbidity often seen in obesity. It has been shown that consumption of a protein mix compared to maltodextrin lowers blood pressure (BP) (1). Some hormones may have vasoactive properties, like insulin, glucagon like peptide 1 (GLP-1) and glucagon. The aim of this study was to compare postprandial changes in BP and these hormones between three different protein sources.

Methods: Pea, milk and egg protein isolate, were tested in a randomized order by a crossover design with one week washout. Postprandial responses of BP, plasma glucose, insulin, glucagon and GLP-1 were monitored for four hours in men and women (BMI 25–35 kg/m²) with untreated elevated BP.

Results: Postprandial mean arterial pressure was higher after egg protein consumption compared to milk and pea protein from 2–4 hours ($P \leq 0.008$). Glucose responses did not differ between proteins. Compared to the other proteins, egg protein induced lower insulin concentrations from 1 to 2 hours and lower GLP-1 at 2 hours ($P < 0.0001$). Plasma glucagon differed between all three protein sources from 1 to 2 hours with pea>milk>egg ($P \leq 0.003$).

Conclusion: This study shows that different proteins can induce different postprandial responses in BP, insulin, GLP-1 and glucagon. Dietary proteins may modulate BP via differences in hormonal responses. Whether prolonged consumption of these proteins will also lead to long-term differences in BP remains to be determined.

Reference

1. Teunissen-Beekman et al. AJCN, 2012; 95:966–71.

1. Conflicts of Interest: none declared

2. Funding: Research related to this abstract was funded by the Top Institute (TI) Food and Nutrition (project number A-1003), Wageningen, The Netherlands. TI Food and Nutrition is a public private partnership of science, industry and government conducting strategic research in food and nutrition (www.tifn.nl).

T1:P.117

Epicardial adipose tissue thickness as predictor for adiponectin systemic blood concentration

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Introduction: Epicardial adipose tissue (EAT) is a known risk factor for CAD and metabolic syndrome. Adiponectin (ADIPOQ) is responsible for the modulation of metabolic syndrome. Also, ADIPOQ exerts its antiatherogenic effects on the vascular endothelium.

The aim of this study is to predict possible concentrations of ADIPOQ, IL6 and TNF α in the aortic root (AR) and coronary sinus (CS) using EAT thickness.

Methods: In this study 34 subject were included, 16 with CAD and 20 controls all of whom underwent cardiosurgery. Prior to cardiosurgery, EAT thickness was measured by echocardiography and coronarography was performed in all subjects. During cardiosurgery, blood samples were taken from AR and CS. ADIPOQ, IL6 and TNF α concentrations were measured in the AR and CS.

Results: EAT thickness is positively correlated with IL6_{CS} concentration ($r=0.418$, $p=0.024$) and negatively correlated with ADIPOQ_{AR} ($r=-0.625$, $p<0.001$) and ADIPOQ_{CS} ($r=-0.631$, $p<0.001$). EAT thickness did not show correlation with TNF α concentration in AR or CS. MARS analysis showed that ADIPOQ_{AR} ($R^2=0.529$) and ADIPOQ_{CS} ($R^2=0.539$) concentration can be predicted with EAT thickness. Also, MARS analysis showed that IL6_{CS} concentration can be predicted ($R^2=0.159$) but with very low accuracy.

Conclusion: EAT thickness, known CAD risk factor, is positively correlated with IL6_{CS} concentration, which indicates that thicker EAT is producing more proinflammatory cytokines. Also, EAT thickness is negatively correlated with ADIPOQ_{AR} and ADIPOQ_{CS}. EAT thickness can be used, fairly accurately as predictor for adiponectin systemic concentration.

T1:P.118

Risk of cardiovascular death associated with asymmetric dimethylarginine in obese and non-obese patients with stable angina

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Background: Overweight and obese patients with various chronic diseases may have lower morbidity and mortality than their lean counterparts (the obesity paradox). Previous studies in patients with high risk of coronary heart disease have shown an association between BMI and plasma levels of the CVD risk factor asymmetric dimethylarginine (ADMA).

Aim: To investigate if plasma ADMA-levels are associated with increased risk of CV death among obese (BMI ≥ 30 kg/m²) and non-obese patients with stable angina pectoris.

Methods: The cohort included 4153 patients who underwent coronary angiography for stable angina pectoris between 2000 and 2004. CV deaths were registered until end of 2006. Multivariate risk associations with CV deaths were estimated using Cox regression adjusting for established CVD risk factors by comparing the fourth vs. first ADMA quartile and as linear trend across quartiles.

Results: No significant association between BMI and quartiles of ADMA was found. Overall, there was a trend of increased risk of CV death across quartiles of ADMA (p -trend=0.006), with a multivariate adjusted hazard ratio (HR) (95% CI) in the fourth vs. first quartile of

1.74 (1.09, 2.78). The association was strengthened among non-obese patients ($n=3387$ HR 2.07 (1.18, 3.65)), p -trend=0.009, whereas no significant association was observed among obese patients ($n=766$ HR 1.06 (0.42, 2.69)), p -trend=0.463.

Conclusions: In a large cohort of obese and non-obese patients with stable angina, we observed a moderately strong association between plasma ADMA and risk of CV death in non-obese patients while no significant association was observed among obese patients.

1. Conflicts of Interest: None disclosed

2. Funding: No funding

T1:P.119

Early Diagnosis of Cardiovascular Disease in Children with Obesity

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Introduction: The incidence of obesity dramatically increased in pediatric population which led to the increase of cardiovascular pathology. So it is important to develop new criteria for the early diagnostics and due to this the possibility for avoidance of complications in future.

Objective: To check the early clinical manifestation of atherosclerotic aortic lesions and 24hour monitoring of blood pressure (24h-BPM) in children with various rates of obesity.

Material and Methods: There were investigated 477 children aged 9-17 years with normal, excess weight or different degree of obesity. It was carried out 24h-BPM by TM-2421 (A&D, Japan) and the DR-102 (Schiller, Switzerland). And there were investigated 151 children of 8-13 years old with excess weight or different degree of obesity by noninvasive oscillometric arteriography TensioMed (Hungary). The main characteristics of arterial stiffness were checked: pulse wave velocity (PWV) and augmentation index (Aix).

Results: We received a correlation between the increase in body mass index percentile, and an increase in average systolic and diastolic blood pressure, as well as indicators of pressure load (index time and space) for all intervals of follow-up (24-hour period, awake, sleep) among children without and with different degree of excess weight. Determine the validity of the relationship between the degree of obesity and increased vascular wall remodeling.

Conclusions: According to our data we recommend to perform 24h-BPM and arteriography in all children with obesity for detecting the early signs of cardiovascular disorders.

1. Conflict of Interest: Non disclosed

2. Funding: No funding

T1:P.120

Increased levels of the sinoatrial 'pacemaker gene', HCN4 (hyperpolarization-activated cyclic nucleotide-gated potassium channel 4), in the left ventricle of rats fed a diet rich in saturated fats

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Introduction: Obesity is linked to increased rates of ventricular arrhythmias¹. We examined the effect of high-fat feeding on ventricular expression of HCN4, an ion channel linked to ventricular arrhythmias.

Methods: For 8 weeks, male Wistar rats (~250 g) consumed a high-fat or control diet, providing 60% or 10% of energy from saturated fatty acids (source mainly lard) or polyunsaturated fatty acids (source mainly soybean oil), respectively ($n=8$ /group). Weekly body weight and terminal fat pad mass were measured. Samples of left ventricular free wall were dissected and processed. HCN4 mRNA expression (referenced to

housekeeper gene, 18S) was determined by qPCR using the Δ CT method. HCN4 protein expression was assessed by immunohistochemistry signal intensity. A two-sample *t*-test was used to assess differences.

Results:

Diet	Weight gain (g)	Adiposity (%)	HCN4 mRNA	HCN4 protein
Control	232.9±12.4	1.032±0.081	218×10 ⁶ ±239×10 ⁶	12.19±1.95
High-fat	308.6±18.5**	1.449±0.010**	703×10 ⁶ ±439×10 ⁶ *	29.23±3.85**

Means±SEM shown; **p*<0.05; ***p*<0.01 vs control. Weight gain = final – initial body weight. Adiposity = % epididymal fat mass relative to final body weight.

Discussion: Ventricular HCN4 mRNA and protein expression are increased in obese rats. This is expected to be pro-arrhythmic and may represent an area for exploration in human subjects; e.g., using the HCN4 blocking drug, ivabradine.

Reference

Pietrasik G, et al. Obesity as a risk factor for sustained ventricular tachyarrhythmias in MADIT II patients. *J Cardiovasc Electrophysiol*. 2007;18:181–4.

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T1:P.121

Dynamics of types of left ventricular remodeling after weight loss

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Introduction: Obesity causes specific changes in the heart that should regress with weight reduction. The aim of our study was to assess the structural changes of left ventricular in women after weight loss.

Methods and Materials: We investigated geometry of left ventricular (LV) in women before and 12 months after weight loss programme of low-caloric diet and physical exercises. LV mass indexed to body surface area (IMMLV) and relative wall thickness (RWT) were calculated. Four types of myocardial remodeling: (1) normal, (2) concentric remodeling, (3) eccentric hypertrophy, and (4) concentric hypertrophy were determined, and their dynamics were investigated.

Results: 49 women (mean age 45.4±1.4 years, body mass index (BMI) 34.9±0.7 kg/m²) had following LV parameters before the study: mean IMMLV 100.5±2.5 g/m², RWT 0.38±0.01. According to the type of LV remodeling 30 (61.2%) women had normal LV geometry, 5 (10.2%) – concentric remodeling, 8 (16.3%) – eccentric hypertrophy, and 6 (12.2%) – concentric hypertrophy. After 12 months 49 women lost their weight (mean BMI 30.2±0.7 kg/m²). Repeat echocardiography estimated non-significant dynamics of IMMLV (+1.8 g/m², *p*=0.5) and RWT (0.01, *p*=0.69) respectively. Patients with normal geometry had significant decrease of RWT (-0.02, *p*=0.02), and IMMLV (-7.34 *p*=0.04). Women with concentric remodeling had significant increasing of RWT (0.06, *p*=0.014). All other patients had non-significant increased RWT and IMMLV.

Conclusion: Weight loss led to regress of structural changes in the myocardium due to obesity which are more significant in the intact heart.

1. Conflict of Interest: None Disclosed.

2. Funding: No Funding.

T1:P.122

Visceral fat is stronger associated with sympathetic activation than subcutaneous fat in individuals with structurally normal hearts: the NEO study

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Introduction: Adiposity is associated with sympathetic activation, but the role of different fat depots is unclear. Furthermore, subclinical cardiovascular disease (CVD) may have resulted in observed associations. We investigated the association of visceral (VAT) and subcutaneous adipose tissue (SAT) with electrocardiographic measures of sympathetic activation in a population with structurally normal hearts.

Methods: In this cross-sectional analysis of the Netherlands Epidemiology of Obesity (NEO) study, VAT and SAT were measured using MRI. From the electrocardiogram and vector cardiogram, resting heart rate (RHR), ventricular gradient (VG), QRS-T angle and Tpeak-end duration (Tpe) were calculated. We performed linear regression analyses adjusting for age, sex, smoking, ethnicity and physical activity.

Results: Participants with missing data (*n*=54), prevalent CVD (*n*=74), diabetes (*n*=108), cardiac MRI abnormalities (*n*=49), abnormal ECG (*n*=25) and cardiac medication (*n*=175) were excluded. We included 472 participants: 48% men, mean age(SD): 55(6) years. Per SD VAT (0.16 dm³) RHR increased with 2.2 (95% CI: 1.21; 3.23), VG decreased with -5.6 (-7.7; -3.4) and the QRS-T angle increased with 3.3 (0.5; 6.1). Per SD SAT (0.30 cm³) RHR increased non-significantly with 0.99 (-0.07; 2.05), VG decreased with -2.3 (-4.5; 0.0) and the QRS-T did not change 0.0 (-2.9; 3.0). Both VAT and SAT were not associated with Tpe.

Conclusion: Fat measures were associated with RHR, VG and QRS-T angle, but not with Tpe in individuals with structurally normal hearts. Associations were stronger for visceral fat, suggesting that excess visceral fat may alter the sympathetic nervous system before the onset of CVD.

1. Conflict of Interest: None disclosed.

2. Funding: Research relating to this abstract is funded by the Leiden University Medical Center.

T1:P.123

Cardiovascular risk factors and inflammation in obese women: Effects of short term interdisciplinary therapy

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Introduction: Obesity is a major modifiable risk factor for cardiovascular disease (CVD). In fact, the excess of adipose tissue increases the prevalence of CVD and the deregulation of the adipokines expression, as PAI-1, may be one of the mechanisms for this increased prevalence since it is an important factor for vascular homeostasis. However, more than ¼ of CVD mortality can be prevented by changes to lifestyle. The aims were to evaluate the effects of short term therapy on cardiovascular risk factors and inflammatory biomarker in obese women.

Methods: 30 women obese (age 43.3 ± 5.3 years and BMI 34.8 ± 3.0 kg/m²) engaged in a short-term interdisciplinary therapy. The variables were evaluated including anthropometric profile, body composition by bioimpedance, blood pressure, cardiorespiratory capacity (VO_{2 max}) by spirometry and level of serum biomarker PAI-1 by blood collection.

Results: Our results showed a significant reduction of body mass (-4.34 ± 3.52 Kg), waist circumference (-6.45 ± 5.41 cm), hip circumference (-4.51 ± 4.82 cm), neck circumference (-0.72 ± 1.53 cm), body fat (-1.54 ± 1.35 Kg) and fat-free mass (-2.80 ± 2.32 Kg). The blood pressure

(systolic 4.33 ± 0.80 mmHg and diastolic -0.17 ± 4.26 mmHg) and PAI-1 (-0.10 ± 0.22 ng/ml) were not changed significantly. The VO^2_{max} was significant increase (relative 2.08 ± 4.95 L/min and absolute 0.12 ± 0.44 L/min).

Conclusion: Short-term therapy was effective in reducing some variables and improved the cardiorespiratory capacity, but it was not enough to change blood pressure and inflammatory biomarker.

1. Conflict of Interest: None disclosed.

2. Funding: CAPES-REUNI, FAPESP (#11/51723-7), CNPQ (#471108/2011-1) and UNIFESP supported the Research performed in Santos, Brazil by GEO – UNIFESP.

T1:P.125

Weight loss by LCD improves physical performance and cardiovascular risk markers in obese patients with heart failure

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Introduction: Though the risk of heart failure increases with BMI, observational studies have found that after the onset of heart failure weight loss increases the risk of mortality. Unintentional weight loss may be taken as a sign of increased disease severity; but intentional weight loss has not been well investigated. The aim was to investigate the effect of weight loss, induced by low calorie diet on physical performance among obese patients with moderate-to-severe heart failure; furthermore the effect on cardiovascular risk factors.

Methods: A RCT in 33 moderate-to-severe heart failure patients, 26 in intervention and 7 in control, BMI 36.2 kg/m^2 (30-50). A 12 week weight loss program was induced by 8 weeks LCD, 800 kcal/day and following four weeks energy restricted diet, 1200 kcal/day. Data are presented as median (range).

Results: Intervention group lost more than controls -12.4 kg (-35 to -4) vs. -1.8 kg (-4 to 1.5) ($P=0.002$) and they reduced waist and circumference 11 and 10cm more than controls ($P<0.005$). Differences in plasma cholesterol obtained during LCD (total cholesterol -0.5 ($P=0.047$), LDL -0.3 ($P=0.047$), HDL -0.1 ($P=0.48$) were not existing at endpoint. There was no difference between groups on physical performance; but intervention group increased their physical performance by 11 and 16% in six-minute walk test and maximum oxygen uptake ($P=0.002$ and $P=0.008$), respectively.

Conclusion: Patients with moderate-to-severe heart failure achieved a weight loss of 12 % of their body weight following calorie restriction for 12 weeks. Weight loss resulted in improvement in clinical symptoms and cardiovascular risk markers.

1. Conflict of Interests: None disclosed

2. Funding: LCD products were kindly supplied by nupo®, Denmark.

T1:P.128

Impact of metabolic flexibility on changes in body composition during caloric restriction and subsequent re-feeding

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Background: We hypothesized that metabolic flexibility has an impact on partitioning of weight loss and weight regain during a weight cycle.

Methods: In a controlled intervention study 32 healthy men (age 26.0 ± 3.9 y; BMI $23.4 \pm 2.0 \text{ kg/m}^2$) followed 1-wk of overfeeding, 3-wks of caloric restriction (CR) and 2-wks of re-feeding (RF) at $\pm 50\%$ energy requirement. Two groups, differing in macronutrient proportion of the diet were formed (L-CHO, n=16: 50%, 35%, 15%; H-CHO, n=16: 65%, 20%, 15% CHO, fat, protein). Metabolic flexibility was defined as (i) changes in fasting respiratory quotient (ΔRQ) with CR/RF and (ii) capacity to increase carbohydrate oxidation after an oral glucose tolerance test (incremental area under the RQ-curve, iAUC-RQ). Changes in body weight and %fat mass (EchoMRI) were adjusted for predicted values according to Hall et al., (Lancet 2011; 378(9793):826-837).

Results: Participants lost $-2.63 \pm 0.54 \text{ kg}$ fat mass with CR and regained $1.20 \pm 0.63 \text{ kg}$ with RF (all $p<0.001$). ΔRQ was -0.14 ± 0.05 with CR and 0.11 ± 0.05 with RF. iAUC-RQ was 0.18 ± 0.14 during CR and 0.12 ± 0.10 during RF. L-CHO and H-CHO did not differ in fat mass changes, ΔRQ and iAUC-RQ during CR. But iAUC-RQ was higher in L-CHO during RF (0.18 ± 0.09 vs. 0.05 ± 0.06 , $p<0.001$). During CR metabolic flexibility had no impact on changes in body composition. During RF regain in fat mass was associated with ΔRQ in H-CHO ($r=0.72$, $p<0.01$) and with $\Delta\text{iAUC-RQ}$ in L-CHO ($r=0.58$, $p=0.02$).

Conclusion: Inter-individual variability in metabolic flexibility had an impact on the partitioning of weight regain. High metabolic flexibility led to a higher fat mass regain.

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T1:P.129

Impact of glycemic load on the regulation of energy balance during controlled re-feeding

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Background: Metabolic and neuro-endocrine adaptations during weight loss may persist and promote weight regain. Previous studies suggest that diets with lower carbohydrate content and low glycemic index improve weight maintenance.

Methods: In a 6-week controlled intervention trial, 32 healthy young men (age 25.5 ± 3.9 y, BMI $23.5 \pm 2.0 \text{ kg/m}^2$) followed 1-week overfeeding, 3-weeks caloric restriction and 2 weeks refeeding at $\pm 50\%$ energy requirement. During re-feeding four study groups differing in carbohydrate intake (50%=LCHO, 65%=H-CHO) and glycemic index (LGI, HGI) were formed. Glycemic load was 192 for LCHO-LGI, 273 for HCHO-LGI, 378 for LCHO-HGI and 494 for HCHO-HGI. Glycemia was assessed by 7-days continuous interstitial glucose measurement.

Results: During overfeeding, participants gained $1.9 \pm 1.2 \text{ kg}$ body weight, followed by a weight loss of $-6.3 \pm 0.6 \text{ kg}$ and weight regain of $2.8 \pm 1.0 \text{ kg}$. Resting energy expenditure (adjusted for changes in body composition) decreased by $109 \pm 131 \text{ kcal/d}$ (-6%), activity energy expenditure for walking (5 km/h) decreased by 30 kcal/h (-10%) and glucose-induced thermogenesis after oral glucose tolerance test decreased by 10 kcal/3h (-51%) (all $p<0.05$). Simultaneously 24-h-urinary noradrenaline excretion (-33%), leptin- (-44%), and fT3-levels (-6%) decreased, whereas ghrelin level increased ($+46\%$) (all $p<0.05$). Each

parameter normalized after re-feeding ($p > 0.05$ vs. baseline) and no between group differences were observed. iAUC under the interstitial glucose curve differed between the four groups ($p < 0.05$) whereas weight- and fat mass regain (adjusted for predicted values according to Hall; Lancet 378:826,2012) was similar between groups ($p > 0.05$).

Conclusion: Metabolic and neuro-endocrine adaptation is compensated after weight recovery. The glycemic load had no impact on this process.

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T1:P.130

The combination of resveratrol and quercetin increases the effect of both biomolecules on liver triacylglycerol content when administered separately

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Introduction: Additive or synergic effects could be expected when active biomolecules are administered together. The aim of this work was to analyse the effect of a combination of resveratrol and quercetin on liver fat accumulation.

Methods: Fourty male Wistar rats were divided into four groups fed on an obesogenic diet during 6 weeks: control rats (C), and rats treated with resveratrol (RSV; 15 mg/kg/d), quercetin (Q; 30 mg/kg/d), or both molecules (RSV+Q). Hepatic triacylglycerols (TG) and enzymatic activities of carnitine palmitoyltransferase-1 (CPT-1) and fatty acid synthase (FASN) were assessed by spectrophotometry. The results were analyzed by ANOVA I and *post-hoc* Newman Keuls test.

Results:

	C	RSV	Q	RSV+Q
Liver weight (g)	10.1 ± 0.3 ^a	10.1 ± 0.1 ^a	9.7 ± 0.4 ^a	8.8 ± 0.3 ^b
TG (mg/g)	52.3 ± 3.3 ^a	52.0 ± 4.0 ^a	59.0 ± 3.7 ^a	44.4 ± 0.9 ^b
Enzyme activities (nmol/min/mg protein)				
CPT-1	5.1 ± 0.5 ^a	6.5 ± 0.9 ^a	6.5 ± 0.8 ^a	8.0 ± 1.0 ^b
FASN	9.5 ± 1.1	10.9 ± 1.2	12.2 ± 0.6	11.5 ± 0.5

^{a,b}Values in the same row with different superscript letters were significantly different $P < 0.05$

Conclusion: A synergic effect takes place when resveratrol and quercetin are administered in combination because when these molecules are administered separately, at the doses used in the present study, they do not show significant effects on liver weight and hepatic triacylglycerol metabolism. It seems that this effect is caused, at least in part, by increasing fatty acid oxidation.

1. Conflict of Interest: None Disclosed.

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T1:P.132

The effects of long-term valsartan treatment on skeletal muscle fatty acid handling in humans with impaired glucose metabolism

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Introduction: Blockade of the renin-angiotensin system reduces the incidence of type 2 diabetes in humans with impaired glucose metabolism (IGM).

Methods: 26 subjects with IGM were treated with the angiotensin-receptor blocker valsartan (VAL) or placebo for 26 weeks. Before and

after treatment, fasting and postprandial skeletal muscle fatty acid (FA) handling were determined by combining the forearm balance technique with stable isotopes of palmitate ($[^2\text{H}_2]$ -palmitate and $[\text{U-}^{13}\text{C}]$ -palmitate), enabling differentiation between the metabolic fates of dietary versus endogenous FAs. Skeletal muscle biopsies (vastus lateralis muscle) were taken to determine intramuscular triacylglycerol (TAG), diacylglycerol (DAG), free FA (FFA), and phospholipid (PL) content, their fractional synthetic rate and degree of saturation, and mRNA expression of oxidative genes.

Results: VAL decreased circulating $[\text{U-}^{13}\text{C}]$ -palmitate, tended to decrease $[\text{U-}^{13}\text{C}]$ -palmitate in TAG concentrations and decreased the rate of appearance of FFA (Ra_{FFA}). Interestingly, VAL also decreased the saturation of the TAG and DAG fractions in skeletal muscle. Net uptake of $[^2\text{H}_2]$ -palmitate, $[^2\text{H}_2]$ -palmitate in TAG, estimated $\Delta 9$ -desaturase activity in TAG, DAG, PL and FFA and expression of genes encoding for proteins involved in oxidative metabolism in skeletal muscle were not significantly altered by VAL.

Conclusion: The present study demonstrated that 26-wks VAL treatment decreased the saturation of skeletal muscle TAG and DAG stores, suggesting altered intramuscular lipid partitioning of FA. Furthermore, VAL induced a reduction in circulating chylomicron-TAG concentrations, FA spillover from TAG hydrolysis and endogenous lipolysis, and decreased Ra_{FFA} in the postprandial state, pointing towards an improved adipose tissue lipid buffering capacity.

1. Conflict of Interest: None disclosed.

2. Funding: Research relating to this abstract was funded by an Investigator-Initiated Study Grant from Novartis Pharma.

T1:P.133

Leptin is Responsible for Maintaining Blood Glucose Levels and Energy Expenditure in Fasting

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Introduction: Leptin regulates glucose metabolism and energy homeostasis. It is known that this hormone plays an important role in neuroendocrine response to fasting. In this study, we examined the role of leptin in glucose metabolism and energy expenditure in fasting.

Methods: Exp1: C57BL/6 and leptin mutant ob/ob mice were fasted for 48 hours. Body weight, blood glucose and oxygen consumption were evaluated before and after fasting. Exp2: Osmotic pumps filled with leptin (20ng/g/h) were implanted in C57BL/6 and ob/ob mice. The mice were fasted for 48 hours and the same parameters were measured before and after fasting.

Results: Exp1: After fasting, there was lesser decrease in oxygen consumption (C57BL/6: before 5962±192 after 4800±265; ob/ob: before 2962±374 after 2833±453 ml/kg/h, $p < 0.05$) and a larger decrease in body weight (C57BL/6: before 29.2±0.2 after 25.0±0.2; ob/ob: before 66.9±1.7 after 61.2±1.4g, $p < 0.001$) in ob/ob mice than C57BL/6 mice. Exp2: By continuous infusion of leptin, decrease in body weight after fasting was larger (leptin-: -3.6±-0.2, leptin+: -4.0±-0.4g, $p < 0.05$) and decrease in blood glucose was also greater (leptin-: -24±-8, leptin+: -56±-6mg/dl, $p < 0.05$) than with no infusion of leptin in C57BL/6 mice. Decrease in oxygen consumption after fasting was blunted (leptin-: 1162±274, leptin+: 250±294 ml/kg/h) by leptin infusion in C57BL/6 mice. There were no changes in those parameters in ob/ob mice.

Conclusion: Lack or disturbance of fall in leptin in fasting further decreased blood glucose levels, and enhanced the decrease in body weight, obstructing the decrease in energy expenditure. Leptin may be a regulator for glucose metabolism and energy expenditure in fasting.

T1:P.134

Short-term heart rate variability and associated risk factors in asymptomatic overweight senior citizens*Spadari RC, Bianchim MS, Aquino AC, Garcia MC, Dourado VZ, Céspedes IC*

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Introduction: The analysis of the heart rate variability (HRV) is a non-invasive method to determine the balance between sympathetic and vagal tonus to the heart. Overweight, stress and aging are characterized by increased sympathetic activity to the heart and cardiovascular risk. The objective of this work is to investigate if HRV is correlated with those risk factors in asymptomatic senior citizens.

Methods: Third four (19 female; 15 male) 50–70 year-old subjects participated in the study. HRV was measured at rest during ten minutes. Blood cholesterol, triglycerides, and glucose, as well as salivary cortisol levels and perceived stress index (PSI) were determined. Differences were significant when $p \leq 0.05$.

Results: Subjects were 59 ± 5 year-old, overweighted (BMI 28.3 ± 5), and presenting normal levels of glucose, triglycerides, cholesterol, cortisol and perceived stress. Cardiac beating rate was 62 ± 6 beats/min; electrocardiogram R-R interval, 984 ± 6 ms; STDRR, 31 ± 10 ms; rMSSD, 21 ± 7 ms; SD1, 15 ± 5 ms; LF%, 56 (14–30) and LF/HF, 1.3 (0.62–2.55). Negative correlations were significant between glycemia and SD1 ($r = -0.54$); triglyceridemia and LF% ($r = -0.54$); BMI and LF/HF ($r = -0.55$). The levels of cortisol were higher in the morning and lower at evening (11.18 ± 2.36 ; 2.83 ± 0.90 nmol/L, respectively); the area under the curve of cortisol was significantly correlated with HF ($r = -0.82$); LF ($r = +0.80$) and LF/HF ($r = +0.77$).

Conclusion: High levels of glucose, triglycerides, cortisol and overweight are associated with lower HRV and represent risk factors for cardiovascular diseases, even in asymptomatic subjects.

1. Conflict of Interest: None disclosure

2. Funding: Fundação de Apoio à Pesquisa do Estado de Sao Paulo (FAPESP)

T1:P.135

Effect of 3-month L-arginine supplementation on insulin resistance and tumor necrosis factor activity in patients with visceral obesity*Bogdański P¹, Pupek-Musialik D¹, Suliburska J², Musialik K¹, Jablecka A³*

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Background: The role of tumor necrosis factor alpha (TNF- α), one of the adipose tissue product, in the pathogenesis of insulin resistance is well-documented. Many recent studies have shown beneficial influence of L-arginine supplementation on cardiovascular system. However, molecular mechanisms of its positive actions are not fully elucidated.

Aim: The aim of the study was to evaluate the influence of L-arginine supplementation on tumor necrosis factor alpha, insulin resistance and selected anthropometric and biochemical parameters in patients with visceral obesity.

Material and Methods: 60 patients with visceral obesity were randomly assigned to either receive 9 g of L-arginine or placebo for 3 months. 20 healthy lean subjects were used as a control. Selected anthropometrical measurements and blood biochemical analyses were performed at baseline and after 3 months. TNF- α and its soluble receptor 2 (sTNFR2) were assessed in both treated groups. Insulin resistance in the participants was evaluated according to the homeostasis model assessment–insulin resistance (HOMA-IR) protocol.

Results: The concentration of insulin, TNF- α and sTNFR2 and HOMA-IR level in both obese groups significantly exceeded these observed in the control. Basal TNF- α and sTNFR2 concentration were positively correlated with basal body mass index (BMI), waist circumference,

percent of body fat and HOMA-IR. We found that 3-month L-arginine supplementation resulted in significant decrease of HOMA-IR and insulin concentration. Only insignificant tendency to decrease of TNF- α and sTNFR2 was observed.

Conclusions: Our results confirm TNF- α role in the complex pathogenesis of insulin resistance in patients with visceral obesity. 3-month L-arginine supplementation in a dose of 9 grams improves insulin sensitivity in patients with visceral obesity with no impact on tumor necrosis factor alpha concentration.

T1:P.136

Association of fasting and postprandial complement component C3 and BMI in non obese, normolipidemic, non diabetic subjects*Martínez-Valls JF, Artero A, Caro J, Civera M, Martínez-Hervás S, Pedro T, Real JT, Ascaso JF*

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Aims: To study the association of fasting and postprandial complement component C3 with clinical and biological factors in non obese, normolipidemic, non diabetic subjects.

Methods: We have studied 20 non obese, normolipidemic, non diabetic subjects (mean age 38 ± 10.6 years, BMI 24.5 ± 3.03 and waist 86.1 ± 9.5 cm). In all subjects at fasting and every 2 hours (8 hours, end point) after an oral fat load test with unsaturated fat (Supracal^R, 50 g/m²), we measured glucose, insulin, HOMA index, plasma lipids and C3 with standard methods.

Results: Fasting and postprandial C3 plasma values significantly associated with gender, BMI and postprandial TG levels. Comparing overweight subjects (BMI > 25 , $n = 8$) with those with normal weight ($n = 12$) fasting and postprandial C3 values were significantly increase in overweight subjects (fasting C3: 104.2 ± 57.2 vs 96.7 ± 9.2 g/l $p < 0.01$, AUC C3 837.3 ± 54.6 vs 755.1 ± 101.4 g h/l, $p = 0.047$).

Conclusion: BMI is the mayor factor associated to fasting and postprandial C3 value (after an unsaturated fat load test) in normolipidemic non diabetic, non obese subjects.

T1:P.137

Acute exercise increases circulating inflammatory markers in overweight and obese compared with lean subjects*Bruun JM^{1,2}, Christiansen T¹, Paulsen SK¹, Ølholm J¹, Overgaard K³, Pedersen SB¹, Richelsen B¹*

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Introduction: A common trademark of obesity and a sedentary lifestyle is low grade inflammation, which lead to the investigating if overweight and obese compared to lean individuals would display differences in levels of inflammatory markers in circulation, skeletal muscle (SM) and adipose tissue (AT) after acute exercise.

Methods: Fifteen lean (BMI: 22.4 ± 2 kg/m²) and 16 overweight or obese (BMI 31.8 ± 3 kg/m²) individuals were included. They completed 120 min of ergometer bicycling at 55–60% of maximal heart rate. Blood samples were obtained at baseline, after T=60 min and T=120 min of exercise, and analyzed using an ELISA method. SM and AT biopsies were obtained at baseline and T=120, and mRNA expression was assessed using Real-time RT-PCR.

Results: Circulating IL-6, TNF- α , IL-8, and IL-15 all increased at T=120 ($p < 0.01$). Circulating IL-6 and IL-15 increased in all subjects at T=120 ($p < 0.01$) but only the increase of IL-6 was significantly higher in overweight and obese subjects ($p < 0.05$), and positively correlated with body fat percentage ($p < 0.01$). Circulating IL-8 and TNF- α were increased in overweight and obese ($p < 0.05$) but not in lean subjects. Acute

exercise increased IL-6 mRNA expression in SM biopsies ($p < 0.05$). IL-6 as well as adiponectin mRNA expression were increased in AT biopsies ($p < 0.05$), however, no effect of body weight was found.

Conclusion: The findings suggest that the systemic inflammatory response to acute exercise is different in lean compared to overweight and obese subjects, with a more pronounced increase in inflammatory markers [e.g. IL-6, IL-8, and TNF- α] in overweight and obese individuals.

1. Conflict of Interest: None disclosed

2. Funding: No funding

T1:P.138

The relationship between obesity and inflammation in patients with arterial hypertension

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Introduction: The aim of our study was to evaluate activation of anti-inflammatory markers adiponectin and interleukin-1 receptor antagonist (IL-1(ra)) in patients with arterial hypertension and obesity. The explanation of the relationship between adiponectin, IL-1(ra) and obesity in patients with arterial hypertension may help to understand the influence of inflammation on the development of hypertension and metabolic syndrome.

Methods: The study included 161 male patients with 1 and 2 grade hypertension, aged 35 to 56 years. First group – 46 hypertensive patients with low cardiovascular risk; second group – 51 patients with moderate cardiovascular risk; third group – 32 high risk hypertensive patients. Patients were divided into sub groups depending on the presence of obesity (Waist Circumference (WC) > 94 cm, Body Mass Index (BMI) > 29 kg/m²). The control group – 32 relatively healthy men.

Results: The level of IL-1(ra) in all groups with obese patients was significantly increased compared to its level in lean patients. The level of adiponectin was low in all groups with the lowest figures in obese patients. Positive correlation was found between IL-1(ra) and WC, body mass index (BMI) and left ventricular mass index in the second and third groups. Negative correlation between adiponectin and WC, BMI was seen in patients of the second group only.

Conclusions: The presence of obesity in patients with arterial hypertension contributes to the activation of chronic inflammatory process that triggers the need for early non-medical and therapeutic interventions aimed at normalizing fat metabolism and reducing inflammation to prevent development of hypertension and its cardiovascular complications.

1. Conflict of Interest: None Disclosed

2. Funding: No Funding

T1:P.139

Postprandial response of adiponectin, tumour necrosis factor- α and interleukin-6 to a high-carbohydrate meal in liquid versus solid form

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Introduction: Consumption of a high-energy meal is known to provoke an acute postprandial inflammatory response. The current study was designed to examine the postprandial effect of a high-carbohydrate (CHO) meal and changes in the CHO physical form on the anti-inflammatory hormone adiponectin and pro-inflammatory hormones tumour necrosis factor- α (TNF- α) and interleukin-6 (IL-6).

Methods: Eighteen lean, healthy males (BMI 22.9, 2.1 kg/m², age 27, 5.9y (mean, SD)) participated in this randomised, cross-over study. All subjects were normoglycaemic, normolipidaemic and normotensive. Each subject consumed a high-CHO test-meal at breakfast on 2 occasions, one in liquid form, CHO_{liquid}, (2458kJ, 145g total CHO) and one

in solid form, CHO_{solid}, (3006kJ, 151g total CHO) which were matched for available CHO (145g). Blood samples were collected at baseline (0 minutes) and 30, 45, 60, 90, 120, 180 and 360 minutes after the start of ingestion of the test-meals. Samples were analysed for total adiponectin, TNF- α and IL-6 using commercially available ELISA assays.

Results: There was no differential effect of the CHO_{liquid} versus the CHO_{solid} meals on the hormones studied (time*treatment, $P > 0.05$) over the 6 hour postprandial period. When analysed independent of physical form, there was no significant change from baseline in adiponectin (time, $P = 0.38$) or TNF- α (time, $P = 0.40$) whilst IL-6 (time, $P = 0.0037$) increased significantly from baseline in response to the high-CHO meal.

Conclusion: Postprandial inflammation is an adverse metabolic condition and further research is necessary to examine the effect of high-CHO meals and changes in physical form on the circulation of markers of inflammation.

1. Conflict of interest: None disclosed

2. Funding: Research relating to this abstract was funded by Roxdale Foods Ltd New Zealand and University of Auckland New Staff Research Fund.

T1:P.140

Oral formulation of angiotensin-(1-7) improves lipid metabolism and prevents high-fat-diet-induced hepatic steatosis and inflammation in mice

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Objective: Obesity has been described as a systemic and local adipose pro-inflammatory state, and has been implicated in the development of complications. The aim of the present study was to evaluate the effect Angiotensin-(1-7) on hepatic function, steatosis and on liver inflammatory markers expression in mice treated with a high-fat diet.

Methods and Results: Male FVB/N mice were divided into three groups and were fed for 60 days with: standard diet (SD), high-fat diet (HFD) and high-fat diet combined with Ang-(1-7) (HFD + Ang 1-7). Body weight, food intake, and blood parameters (total-cholesterol, triglyceride, aspartate transaminase (AST) and alanine transaminase (ALT)) were evaluated. Immunohistochemical analysis were performed for inflammatory markers tumor necrosis factor- α (TNF- α) and interleukin-6 (IL-6). Real-Time PCR was performed in order to analyze the expression of ACE angiotensin-converting enzyme (ACE2), angiotensin-converting enzyme II (ECA II), interleukin-1 beta (IL-1 β), interleukin-6 (IL-6), factor necrose tumoral- α (TNF- α), Acetyl-CoA carboxylase (ACC), Carbohydrate responsive element-binding protein (ChREBP), Sterol regulatory element-binding protein 1 (SREBP-1). Our main findings showed that oral Ang-(1-7) treated group presented reduction in liver fat mass and weight, decreased plasma total cholesterol, triglyceride and ALT enzyme levels. These results were accompanied by an important reduction in TNF- α and IL-6 mRNA expression in the liver. Analyses of adipogenesis related genes showed that SREBP-1 mRNA expression were clearly suppressed. Further, the mechanism is related to and ACE2 regulation expression in the liver.

Conclusion: Treatment with Ang-(1-7) improved metabolism and decreased pro-inflammatory profile and fat deposition in liver of mice with obesity-induced diets.

Conflict of Interest: There are no conflicts of interest to declare.

T1:P.141

Aristotelia chilensis and Berberis microphylla extracts inhibit adipocytes apoptosis induced by activated macrophages conditioned media treatment

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Introduction: obesity has been characterized to present a chronic inflammatory state in the adipose tissue. This state has been related with adipocyte apoptosis. Anti-inflammatory treatments appear as interesting approaches to counteract this phenomenon. In this regard, Chilean native fruits present high content of antioxidant and anti-inflammatory compounds.

Methods: *Aristotelia chilensis* (Ac), *Berberis microphylla* (Bm), and *Vaccinium Cyanococcus* (Vc) (as control) fruits, were dried, extracted in methanol:water, concentrated, and conserved. Total polyphenols (TP), anthocyanins (ANT) and total antioxidant capacity (TAC) were determined using standardized methods. Murine macrophages (RAW264.7) were pre-treated or not with 100 µM [polyphenols] of each extract and incubated for 24h with and without lipopolysaccharides (LPS). Culture media after the experimental period were conserved and used as conditioned media (CM). Mature 3T3-L1 adipocytes were treated with the different CM obtained for 24h. Finally, caspase-3 and lactate dehydrogenase (LDH) activities were determined from cell lysates and culture media, respectively.

Results: Ac extract presented the highest values of PT, ANT and TAC, followed by Bm. It was observed that the CM from LPS-activated macrophages decreased adipocyte viability. These effects were not prevented by any extract. Moreover, it was observed that cell viability-corrected caspase-3 activity presented no differences between control, CM and LPS treated groups. Although, LPS treatment alone and LPS-Vc induced higher apoptosis than CM treatment, which was not observed in LPS-Ac and -Bm groups.

Conclusion: Chilean native fruits extracts present adipocytes anti-apoptotic features which could be taken into account as a possible characteristic to avoid obesity-related illnesses.

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T1:P.142

Adiponectin is a marker of adiposity and insulin resistance but not of obesity-induced chronic low grade inflammation

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Introduction: Adiponectin exerts anti-inflammatory effects. Obesity lowers adiponectin and causes chronic low grade inflammation (CLGI). Aim of the present study was to assess plasma adiponectin as marker of body fat, insulin resistance and CLGI.

Methods: Adiponectin, CRP, SAA, ESR, insulin and lipids were measured in obese, overweight and normal BMI individuals. Body fat was measured by DEXA.

Results: (a) The levels of the inflammatory markers and insulin resistance were progressively and significantly elevated in each BMI group. (b) In our combined population, adiponectin was significantly and negatively correlated to BMI, lipids and body fat while no correlation was evident with markers of CLGI. (c) After adjusting for BMI, a positive and moderate correlation between adiponectin and body fat was evident only in the obese. (d) The distribution of adiponectin within each BMI group was wide and overlapping the three BMI groups its median value being 10.9 µg/ml. (e) this phenomenon was not due to higher concentrations of adiponectin in the females since it was apparent in the males. (f) Adiponectin levels in each BMI group were separated into quartiles which revealed: a significant reverse association of adi-

ponectin with total and leg fat mass, a weak correlation between adiponectin levels and markers of CLGI, and a significant correlation to insulin resistance.

Conclusion: our data suggest that adiponectin, although widely distributed within each BMI group, is a good marker of adiposity and insulin resistance but not a significant marker of obesity-induced inflammation.

T1:P.143

Ginkgo biloba extract (GbE) restored the increased gastrocnemius TG levels in diet-induced obese (DIO) rats

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Introduction: Obesity is associated with muscle lipid accumulation. Experimental models suggest that inflammatory cytokines favor this alteration. GbE has been pointed as beneficial for obesity-related disorders treatment. In view of these observations, the current study aimed at investigating whether GbE treatment modulates TNF-alpha, triglycerides and Toll-like receptor 4 (TLR4) levels in gastrocnemius muscle of DIO rats.

Methods: Male Wistar rats were fed from 2 to 4-mo-old with standard chow (Control group – C) or lard-enriched high-fat diet (DIO groups). After that, DIO rats were divided in two groups: obese rats daily gavaged with vehicle (DIO-vehicle) or GbE (500 mg/kg/day – DIO-GbE group) during a 14-day period of treatment. After euthanasia, gastrocnemius muscle was dissected and processed for analysis of TNF-alpha (Multiplex[®]), TLR4 (Western Blot) and triglycerides (colorimetry).

Results: High-fat diet increased body weight gain (6.7%, p= 0.02) and adiposity (49%, p< 0.01) in comparison to C rats, characterizing a model of DIO. Gastrocnemius TG levels were increased in DIO-vehicle rats (831.48%, p< 0.001 vs. C) while it significantly decreased in DIO-GbE rats (-71.73%; p< 0.001 vs. DIO-vehicle). Both DIO-vehicle and DIO-GbE groups presented increased TNF-alpha levels (93.27%, p< 0.001; 57.98%, p= 0.014, respectively) in comparison to C. TLR4 expression was significantly higher in DIO-vehicle rats (p= 0.015 vs. C).

Conclusion: GbE treatment restored the increased gastrocnemius TG levels in DIO rats. This effect was not associated with changes in neither TNF-alpha or TLR4 levels in gastrocnemius. Other studies are needed for better understand the beneficial GbE effect herein described.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded by FAPESP and Capes.

T1:P.144

The effect of high fat meal containing phosphorus on postprandial lipid status of healthy subjects

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Introduction: Phosphorus ingestion is known to affect insulin sensitivity (Khattab *et al* 2011) and it is not clear whether such effect can impact postprandial lipid status.

Methods: A randomized cross over study was conducted, in which overnight fasted healthy subjects (8 males) received high fat meal [330kcal; Energy (%): 69 fat, 28 CHO, 3 protein] with or without phosphorus (500mg). Blood samples (Baseline, 1, 2, 3, 4, 5 and 6 hr after meal ingestion) were collected and plasma concentration of total Phosphorus, Insulin, Triglyceride (TG), ApoB48 and non-esterified free fatty acids (NEFFA) were determined. Changes in metabolite's concentration from baseline were analysed using two-way analysis of variance.

Results: Ingestion of high fat meal containing phosphorus was associated with a statistically significant change in total phosphorus. The changes in plasma insulin and TG concentration were similar between the two meals, while that of NEFFA was significantly different according to

time only. However, the changes in plasma ApoB48 was significantly different according to phosphorus content of the meal, in which that of phosphorus containing meal was higher and sustained for longer duration.

Conclusion: The level and duration of postprandial plasma ApoB48 was found to be increased in the phosphorus containing high fat meal.

Reference

M. Khattab, D. dit El-Khoury, S. Azar, M. Mattar and O. Obeid. Effect of phosphorus on the oral glucose tolerance test. *Proceedings of the Nutrition Society* (2011), 70: E60.

1. Conflict of Interest: None

2. Funding: University Research Board, American University of Beirut

T1:P.145

Markers of bone turnover markers and glycemic regulation correlate in severely obese non-diabetic individuals

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Introduction: The association between bone turnover and insulin resistance in obesity is highly controversial. Anti-inflammatory n-3 polyunsaturated fatty acids (PUFA) might have beneficial effects on bone. We investigated the association between serum bone turnover marker (BTM) concentration and markers of insulin resistance (IR) and beta-cell function in obese subjects and tested the effect of a high dose of n-3 PUFA on BTM.

Methods: 55 severely obese (BM>40 kg/m²), non-diabetic patients were randomly treated with either 3.4 g/d n-3 PUFA or an equivalent amount of butterfat as a control for eight weeks. At baseline and at treatment end we determined serum concentration of bone alkaline phosphatase (BAP), procollagen type 1 N-terminal propeptide (PINP), osteocalcin (OC), osteopontin (OPN), cross-linked C-telopeptide (CTX) and indices of IR and beta-cell function assessed by a 2 h oral glucose tolerance test (OGTT).

Results: Generally, baseline BTM concentration was in the age and sex specific normal range. BAP, PINP, CTX and OPN correlated positively with markers of IR (fasting insulin concentration, HOMA-IR) and beta-cell function (HOMA-beta) at baseline (all P<0.05). Baseline HbA1c concentration correlated negatively with serum OC concentration (rho=-0.29, P=0.03). No treatment induced differences were detectable in the serum concentration of BTMs analyzed.

Conclusion: BTM concentrations positively correlate with markers of insulin resistance and beta-cell function. Treatment with n-3 PUFA for eight weeks does not seem to impact bone turnover.

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T1:P.149

Interventions to promote weight loss in women treated for breast cancer: A systematic review

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Introduction: Weight gain after breast cancer diagnosis may adversely affect prognosis of breast cancer through increased risk of disease recurrence, poor quality of life and reduced survival. This review was aimed to assess the evidence for effectiveness of weight loss interventions and to identify the successful intervention components and delivery processes.

Methods: MEDLINE, EMBASE and the Cochrane databases were searched between 1946 to December 2011. We included pre and post

menopausal women who had completed their initial treatment for breast cancer (surgery, radiotherapy and/or chemotherapy). Study interventions targeted diet, physical activity and/or psycho-social components but all interventions had to have a dietary component for inclusion. A narrative review was conducted due to the heterogeneous intervention components and varying time points for primary outcome measurement.

Results: 14 eligible studies were included; of them five achieved significant weight loss. The mean weight loss ranged from 0.05–9.5 kg. Most studies were feasibility or pilot study and conducted in the USA. Interventions primarily focused on dietary modification: two of the eight low fat, a low carbohydrate and two of the three reduced energy diets were associated with significant weight loss. No significant improvement in lean tissue mass was achieved. Data were insufficient to draw conclusions regarding the effect of interventions on exercise capacity, quality of life or mortality.

Conclusion: Given the limited evidence to date further research to understand their attitudes and barriers towards healthy lifestyle and preferences of interventions is needed to develop acceptable interventions for this population.

1. Conflict of Interest: None to declare

2. Funding: Research relating to this abstract was funded by Fraserburgh Moonlight Prowl and Cancer Research Aberdeen and North East Scotland (CRANES)

T1:P.150

Two models of metabolic syndrome in rats and their implication in the study of prostate cancerogenesis

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Objectives: Prostate cancer is a common human malignancy, thought to be related at least in part with a cluster of compounds of the metabolic syndrome (obesity, hyperglycemia, dyslipidemia, arterial hypertension). In order to evaluate possible common underlying mechanisms, a model of prostate cancerogenesis with treatment of rats with testosterone and N-methyl-N-nitrosurea could be used.

Our aim was to test two different models of metabolic syndrome in rats – fructose feeding and high fat diet and to reveal the impact of those two types of diet for prostate cancerogenesis.

Methods: 75 rats were divided in 3 groups - group C (n=25), group L (n=25), and group F (n=25). Group L was fed during the whole experiment with a high fat diet (mixture of nuts), and group F received for the whole period 10% fructose instead of drinking water. Group C received only standard laboratory show. All were treated with testosterone-N-methyl-N-nitrosurea and the incidence of prostate cancer was recorded for approximately 1 year of observation.

Results: The incidence of the prostate cancer observed is as follows: 20 rats - from the group C, 22 rats - from the group L (p=NS) and only 12 – from the group F (p<0.05).

Conclusion: Our results indicate that different models of metabolic syndrome in rats impact differentially prostate cancerogenesis. High fat diet tends to increase prostate cancerogenesis in rats, whereas fructose feeding could have a protective effect. Further evaluations are needed in order to elucidate underline mechanisms.

T1:P.151

Associations between abdominal adiposity and three-dimensional breast density using digital mammography

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Background: Breast density and obesity are independent risk factors of breast cancer, but there are few studies about associations of three-dimensional breast density with abdominal adiposity in Korean women.

In this study, we studied about relationships between abdominal adiposity and three-dimensional breast density using digital mammography in Korean women.

Methods: Cross-sectional study was performed about 64 women who underwent health checkups in a university hospital. A questionnaire was conducted on past history, medication history, social history, menstrual history, fertility, and hormone replacement therapy. We used weight, body mass index, waist circumference, visceral fat area and subcutaneous fat area as indicators of obesity and measured breast density (dense volume, percentage dense volume) using a digital mammography. We examined associations between breast density and obesity.

Results: Multiple linear regressions were used to analyze associations between body mass index, waist circumference, visceral fat area, subcutaneous fat area and outcomes: dense volume and percentage dense volume. In postmenopausal women, waist circumference was statistically significantly associated with dense volume ($b=0.012$, $P<0.001$) and visceral fat area was negatively associated with percentage dense volume ($b=-0.002$, $P<0.001$). In premenopausal women, visceral fat was associated with dense volume ($b=0.003$, $P=0.046$) but nothing was statistically significantly associated with percentage dense volume.

Conclusion: we studied associations between three-dimensional breast density using digital mammography and abdominal adiposity in Korean women. And abdominal adiposity affected breast density in both premenopausal and postmenopausal women.

T1:P.154

Novel, human-specific adaptations drive the obesogenic environment, metabolic syndrome and malnubesity

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Clinical central obesity and its consequent degenerative metabolic syndrome (MetS) is still inadequately explained.

Human encephalisation during evolution required a significant increase in energy for the brain, and human-specific energy-balancing co-adaptations have arisen. It is hypothesised that two mechanisms afford extra energy provision for the brain but can, together, predispose humans to MetS.

Firstly, the mesolimbic/mesocortical neural pathway is greatly expanded to provide dopamine based 1) reward, 2) motivation and 3) motor coordination for repeatedly recognising, planning, acquiring and consuming energy dense food, often as perseverating, addictive behaviour.

Secondly, once humans became nomadic foragers, sophisticated NRF systems evolved newly efficient food oxidation and detoxification amplification mechanisms, by co-opting some of the large variety of plant chemicals, phytonutrients, especially defence chemicals, phytoalexins, consumed as moderators and modulators.

High micronutrient:macronutrient ratio diets allow NRF-based ultracytoprotection, enabling 1) non-renewable cells (cardiomyocytes, neurons) to function well for many decades, 2) cells which undergo frequent replication (endocrine, gut epithelium, skin) to be well controlled, preventing dysplasia, 3) the immune system to mount vigorous and varied responses 4) efficient 'adaptive repair' systems for tissues subject to physical shear, wear and tear, and metabolic stress (endothelium, myocytes).

The mesolimbic/mesocortical system drove the newly technology-able humans to develop processes towards producing and marketing energy dense addictive food, neglecting less palatable, nutrient dense whole foods, culminating in pandemic malnutritive obesity (malubesity) and MetS.

Appropriate controlled residential 'proof of concept' and community studies using whole foods and antiaddiction medication to assess effects on oxidant markers, in addition to mathematical modelling of energy oxidation in the presence of plant micronutrients, will be discussed.

T1:P.155

Serum gamma glutamyl transferase level is positively associated with pre-diabetes and diabetes in Chinese- especially among non-obese subjects

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Introduction: To investigate the associations between serum gamma glutamyl transferase (GGT) levels and prevalence of pre-diabetes and diabetes.

Methods: A total of 6091 adult participants were recruited in a health examination center in Taiwan from 2006 to 2008. Among these, 6073 subjects with serum gamma glutamyl transferase data were selected. Anthropometric index and laboratory data were collected. Serum GGT levels were divided into two groups with cut-off value of 50 mg/dL. Pre-diabetes was defined as fasting plasma glucose between 100-125 mg/dL or glycated hemoglobin (HbA1C) between 5.7%-6.4% without anti-diabetes agents use. Diabetes was defined as fasting plasma glucose ≥ 126 mg/dL or HbA1C $\geq 6.5\%$ or under anti-diabetes agents use. Obesity was defined as body mass index ≥ 27 kg/m². The relationships between GGT and pre-diabetes and diabetes were studied by multiple linear and logistic regression analyses.

Results: After adjustment for potential confounder, serum GGT levels were positively correlated with fasting plasma glucose and HbA1C using linear regression analyses. After adjustment for age, sex, cigarette smoking, alcohol consumption, and physical activity, body mass index, serum glutamic pyruvic transaminase, estimated glomerular filtration rate, hypertension, hyperlipidemia, the adjusted odds ratios (95% confidence interval) of having pre-diabetes and diabetes were 2.01 (1.49–2.71) and 2.09 (1.36–3.19), respectively, among subjects with high serum GGT levels compared to subjects with low serum GGT levels. Stratified by obesity status, the significantly association was only seen among non-obese group.

Conclusion: Elevated serum GGT level was independent associated with pre-diabetes or diabetes. The association, however, was not significant among obese group. It merits further study.

1. Conflict of Interest: None Disclosed

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T1:P.156

The oligofructose supplementation (10%) did not change the inflammatory effect of trans fatty acid ingestion during pregnancy and lactation, on 21 days old offspring

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Background: We evaluated the effect of oligofructose 10% supplementation during pregnancy and lactation, in dams fed or not with diet enriched with hydrogenated vegetable fat on pro-inflammatory status of pups with 21 days.

Methods: On the first day of pregnancy, rats were divided into: control diet (C), control diet supplemented with 10% oligofructose (CF), diet enriched with hydrogenated vegetable fat, trans fatty acids (T) or diet enriched with hydrogenated vegetable fat, trans fatty acids, supplemented with 10% oligofructose (TF). The pups were weighed at 21 days of life, right before decapitation. Serum adiponectin concentration was analyzed. White adipose tissue (WAT) and liver were used for IL-6, IL-10 and TNF- α content determination by ELISA. Results are presented as means \pm standard error of the mean. Statistical significances were assessed using two-way ANOVA, $p < 0.05$.

Results: At 21 days, body weight of CF and TF were significant lower than C and T groups. Serum levels of adiponectin in CF, T and TF were

lower than C group. In the WAT IL-6 content was increased in TF group as compared to the C and CF groups, and the TNF- α content was higher in the T and TF than C group. In liver the IL-10 and the TNF- α content was increased in the CF group as compared to the C and TF groups.

Conclusions: The supplementation with oligofructose 10% probably affects the metabolic programming, harming the development of the offspring and contributing to increase of pro-inflammatory status in pups with 21 days old.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded by FAPESP, CNPq and CAPES

T1:P.157

Maternal body size and offspring's growth and risk of childhood obesity. Effects of major weight loss in women surgically treated for obesity

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Introduction: According to the fetal overnutrition hypothesis, obesity in pregnancy predisposes the offspring to obesity. This study aims to compare the BMI development of siblings born before and after maternal weight loss.

Method: Women with at least one child born before and one child born after bariatric surgery were identified from health registries. Information about BMI in early pregnancy, at time of surgery and during postoperative follow-up was extracted from medical records, as was information about the children's BMI from birth–10y.

Results: For 47 mothers, we had data on maternal BMI as well as BMI data for the two children born closest in time before and after surgery. We used BMI differences in siblings at age 4 as an outcome, with differences in maternal BMI in w10 of the pre- and post-operative pregnancies as predictor. A mixed-effects regression model (adjusting for sex, maternal age and smoking) showed no significant associations ($\beta=0.03$, $p=0.68$). Both the children born before and after surgery had a mean BMI of 17.2 kg/m². Mean pre-pregnancy BMI was 38.1 pre-operatively and 31.5 post-operatively. We also calculated prevalence of overweight/obesity in all children born before and after surgery, without finding any BMI differences in BMI in the two groups.

Discussion: These results are in conflict with the only other similar study known to the authors. It may be that lifestyle factors overpower any intrauterine effects of the maternal weight loss, or that the cohort's interpregnancy weight loss was too small to affect the children.

T1:P.158

Increased maternal gestational weight gain is associated with increased differences in sibling's birth weight in repeated pregnancies within the same women before and after bariatric surgery

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Introduction: Large maternal gestational weight gain (GWG) is associated with increased birth weight and increased risk of obesity in offspring later in life. The aim of this study was to investigate the effects of GWG in all three trimesters on birth weight, and BMI at 4 and 6 years of age within siblings born before and after bariatric surgery.

Method: Women with at least one child born before and one after bariatric surgery between 1980 and 2005 were identified in national

Swedish registers. Series of weight (and height) measurements were collected from antenatal medical records with data on pregnancies nearest before and after bariatric surgery. Fixed effect linear regression analyses were used. Outcome variables were offspring's birth weight BMI in preschool age and GWG in each trimester and totally were used as explanatory variables.

Results: Mean pre- and post-operative GWG of 117 women was 11.3 (SD 7.2) and 8.3 (SD 6.4) kg, respectively. Fixed effect regression showed positive associations of differences in mean total maternal GWG (β 0.035 C.I. 95% 0.0070, 0.067), and mean GWG in the 2th trimester (β 1.10 C.I. 95% 0.22, 1.9) with differences in siblings birth weight, whereas no such associations were found in analyses with BMI as outcome.

Conclusion: This study showed positive associations between total and 2th trimester GWG and children's birth weight, but no association for BMI in preschool age in regression models where maternal genetic and social and behavioral variables fixed from one pregnancy to the next when taken into account by study design.

1. Conflict of Interest: The authors have no conflicts of interest to declare.

2. Funding: The Swedish Council for Working Life and Social Research and Stockholm County Council.

T1:P.159

DPP4 shedding from human adipocytes and smooth muscle cells is mediated by metalloproteinases

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Introduction: DPP4 has recently been identified as a novel adipokine by comprehensive proteomic profiling of the adipocyte-secretome by our group. This protease is upregulated in visceral adipose tissue of obese patients and circulating DPP4 correlates with the metabolic syndrome. The release of DPP4 is increasing during the adipocyte differentiation *in vitro*. Our aim was to understand how DPP4 release is regulated and which factors are responsible for the shedding of DPP4 from the cell membrane.

Methods: Comparing different human cell types for their DPP4 release, adipocytes and hSMC showed the highest release of DPP4 with 2000pg/mL and 300pg/mL, respectively. Both cell types were used to elucidate the shedding mechanism of DPP4. Inhibitors for different classes of proteases were used to identify potential shedding enzymes. DPP4 release to the culture medium was measured by ELISA.

Results: Of the tested protease inhibitors, the general MMP inhibitor Batimastat, the serine protease-inhibitor AEBSE and the cysteine protease-inhibitor E64 showed significant reduction of DPP4 release both in adipocytes and hSMC (remaining DPP4 release: Batimastat 50%, E64 70%, AEBSE 60%). We could observe no additive effects of AEBSE, E64 and Batimastat in combination, which suggests that the effects are not independent. Experiments to identify a specific MMP are ongoing at the moment.

Conclusion: Our results suggest that DPP4 shedding is mediated by metalloproteinases that are dysregulated during obesity and type 2 diabetes mellitus.

T1:P.160

Evidence against a beneficial effect of irisin on human adipocytes

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Introduction: Brown adipose tissue (AT) has drawn the attention as novel therapeutic target to treat obesity and type 2 diabetes. Recently, it has been shown in mice that overexpressing PGC1 α in muscle and exercise induce the expression of FNDC5. This gene encodes for a novel factor called irisin, which causes browning of subcutaneous AT. The aim of this study was to analyze the effects of irisin in a human model.

Methods: Human preadipocytes were isolated from subcutaneous AT. During differentiation cells were treated with 50ng/ml BMP7, 200ng/ml FNDC5 or 60ng/ml irisin. RNA was isolated to assess gene expression by RT-PCR. Murine C2C12 cells and primary human myotubes were electrically pulse stimulated (EPS) to induce contraction.

Results: In human adipocytes, BMP7 treatment increased PPAR γ (3.6fold) and UCP-1 expression (6.4 fold) pointing towards increased adipogenesis and browning. The strongest effects were observed in CD137 high expressing cells. TCF21 mRNA level was significantly reduced by BMP7. FNDC5 and irisin had no significant effect on PPAR γ (1.3fold and 0.98fold, respectively) and UCP-1 expression (0.98fold and 0.95fold respectively). After 24h EPS of C2C12 myotubes, PGC1 α and FNDC5 mRNA levels were significantly increased (1.8fold and 2.1fold, respectively). In human myotubes, PGC1 α expression was enhanced by EPS (1.7fold), while FNDC5 mRNA level was not changed.

Discussion: Targeting irisin might be an interesting strategy to activate the browning of white AT and to combat obesity by increasing energy expenditure. However, our findings raise the question whether the effects of irisin observed in mice are relevant for humans.

T1:P.161

Gut microbiota, microinflammation, metabolic profile and zonulin concentration in obese and normal weight subjects

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Introduction: Gut microbiota alterations and increased intestinal permeability are considered as one of systemic microinflammation causes in obese. The association between gut microbiota and circulating zonulin level, a marker of intestinal permeability has not been studied yet. The aim of the study is an assessment of plasma zonulin and proinflammatory cytokines (TNF- α and IL-6) levels in relation to composition of gut microbiota in obese and normal weight subjects.

Methods: Circulating inflammation markers, such as TNF- α , sTNFR1, sTNFR2, IL-6 and zonulin levels were measured in addition to semi-quantitative analysis of gut microbiota composition in 50 obese and 30 normal weight subjects without concomitant diseases.

Results: A bacterial colony count did not differ between groups. Higher plasma zonulin, TNF- α , sTNFR1, sTNFR2 and IL-6 levels were found in the obese subjects. Plasma zonulin level correlated positively with age ($r=0.43$, $p<0.001$), body mass ($r=0.30$, $p<0.01$), BMI ($r=0.33$, $p<0.01$), fat mass and percentage ($r=0.31$, $p<0.01$ and $r=0.23$, $p<0.05$, respectively). Moreover, positive correlation between plasma zonulin level and total bacterial count ($r=0.26$, $p<0.05$) as well as sTNFR1 ($R=0.34$, $p<0.01$) was shown. Furthermore, plasma zonulin level was proportional to daily energy intake ($r=0.27$, $p<0.05$) and inversely proportional to diet protein percentage ($r=-0.23$, $p<0.05$). Additionally, serum glucose concentration correlated with plasma zonulin level ($r=0.18$, $p<0.05$).

Conclusion: Zonulin is a novel marker of systemic microinflammation associated with obesity that may be a link between gut microbiota, inflammation and metabolic profile.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded by Medical University of Silesia

T1:P.162

Association of diet type with ADIPOR2 expression in hepatic tissue of second generation of rats

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Introduction: Adiponectin signalization is recognized as an important step in lipid metabolism, energy consumption, anti-inflammatory reactions and cell proliferation. Adiponectin secreted by adipocytes, acts through its receptors ADIPOR1 and ADIPOR2, latter can be found in skeletal muscle, liver and placenta. We aim to study the difference of ADIPOR2 expression in hepatic tissue of rat offspring depending on their diet and the diet during pregnancy and lactation.

Materials: Ten Sprague Dawley female rats were at the age of 21 days divided in two groups – one was fed high with fat diet (HFD – 86% lard, 8% minerals, 6% proteins), and the other one with standard laboratory chow (CD). At the age of 12 weeks the rats were mated, and their offspring were by the end of lactation (age of 21 days) randomly divided in two groups (HFD2 and CD2) and thus exposed to different diets. After sacrifice, at 40 weeks of age, liver samples were taken and using immunohistochemistry we determined ADIPOR2 expression.

Results: In rats fed with high fat diet ADIPOR2 expression was increased compared to control group.

Conclusion: Adiponectin, and its signalling and receptors, which have not been fully researched, could have a protective role in obesity related to liver disease.

T1:P.163

The Hp $^{-/-}$ mouse: A novel model to study the effect of chronic and metabolically induced oxidative stress on muscle atrophy

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Introduction: Oxidative stress (OS) is a determinant of muscle atrophy. Haptoglobin (Hp), a carrier of free Hemoglobin, is a marker of inflammation and obesity with relevant anti-oxidant function. Aim of this study is to analyze the skeletal muscle phenotype of Hp deficient mice in normal conditions and upon metabolic challenges.

Methods: Adult Hp $^{-/-}$ and WT mice were analyzed in normal conditions, following 3 hrs of rotarod (RUN) and upon high fat diet (HFD). Cross sectional area (CSA) of skeletal muscle fibers was evaluated. Protein carbonylation state was assessed to evaluate local level of OS.

Results: Hp $^{-/-}$ mice showed a reduction (by 10%) of CSA. Hp $^{-/-}$ mice showed increased mRNA for the antioxidant response orchestrator Nrf2, for the atrophy ubiquitin ligases Atrogin1 and MuRF1, and for the autophagy related genes BNIP3 and Cathepsin L. RUN-Hp $^{-/-}$ but not RUN-WT mice showed a drop in force after the exercise. OS was more pronounced in the muscle of RUN-Hp $^{-/-}$ as compared to RUN-WT. The induction of the PGC1 α , typical of physical exercise, was not observed in RUN-Hp $^{-/-}$. An exacerbation of muscle atrophy was observed in HFD-Hp $^{-/-}$ mice as compared to HFD-WT. HFD-Hp $^{-/-}$ displayed reduced strength in resting conditions and augmented muscle local OS, a more pronounced increase of LC3 lipidation and, as opposed to HFD-WT, no increase of p62 protein.

Conclusions: Hp deficiency induces skeletal muscle atrophy under standard conditions through the activation of both ubiquitin proteasome and autophagy pathways, and worsens muscle response to obesity and acute exercise.

T1:P.164

Adipogenic progenitors are resident in human skeletal muscle

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Introduction: Intramuscular adipose tissue is found in skeletal muscles from obese or muscular dystrophy patients. Its origin and impact are largely unknown. Since the cell population found in muscle is endowed with a myogenic and also an adipogenic potential, we tested the hypothesis that different progenitors are present in human muscle.

Methods: Muscle cells were fractionated by flow cytometry. The cell fractions were differentiated *in vitro* under dual myo-adipogenic culture conditions and *in vivo* in muscles from immuno deficient mice.

Results: Only the CD34+ fraction can differentiate into adipocytes whereas the CD34- fraction differentiates only into myotubes. This was observed *in vitro* and *in vivo*. Clonal analysis indicated that the CD34+ population can be further fractionated into CD15+CD56- adipogenic progenitors, CD15-CD56+ myogenic progenitors, and CD15+CD56+ myo-adipogenic progenitors. We started to investigate factors regulating the fate of CD15+CD56- adipogenic progenitors. *In vitro*, at least dexamethasone, PDGF-AA, TGF-beta1, and TNF-alpha are important factors modulating either the proliferation or the differentiation of the adipogenic progenitors. In addition, muscle-derived adipocytes were found to be very close to adipose tissue-derived adipocytes.

Conclusion: Therefore a genuine adipogenic lineage resides in human muscle besides the myogenic lineage. It can be at the origin of intramuscular adipose tissue seen in obese patients. Its expression seems to be regulated by a complex network of cytokines. The identification of these regulating factors is a prerequisite to understand the physiological impact of intramuscular adipocytes.

1. Conflict of Interest: none

2. Funding: Association Française contre les Myopathies

T1:P.165

Characteristics of Nonalcoholic Fatty Liver Disease induced in Wistar rats following four different diets

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Introduction: The objective of the study is to establish, in sixteen weeks, a model of non-alcoholic steatosis in wistar pathogen-free rats following four types of diet.

Methods: 40 healthy Wistar male rats, a month and a half old, weighing 150 g on average were divided randomly into 4 groups of 10 rats each. Each group was assigned a diet with the same quantity (18 g/day/rat). The control group was fed a standardized diet (18.5% proteins, 31.2% lipids and 50.3% carbohydrates), the fat group was fed a lipid-rich diet (50% lipids) while the third and the fourth group were fed a carbohydrate-rich diet (60%), of which 70% were sucrose and fructose respectively.

Results: Fat rich diet group (>50%) had the highest micro vesicular steatosis and percentage of cells enriched in lipids at the end of the study ($p < 0.05$). This group had also the highest weight and liver weight ($p < 0.05$).

Fructose rich diet induced an elevation in triglycerides, ALAT, adiponectine and TNF alpha as compared to starting time ($p < 0.05$). This group had a higher liver weight/ body weight ratio than the sucrose and control groups at the end of the study ($p < 0.05$).

Conclusion: 18g/day/rat diet as compared to the 30 g/day/rat usually required, composed of 50% of fat or 60% carbohydrates enriched in

fructose are capable of inducing nonalcoholic fatty liver disease characteristics in rats.

1. Conflict of Interest: There was no conflict of interest to disclose.

2. Funding: This study was funded by Saint Joseph University of Beirut, Lebanon.

T1:P.166

Cafeteria-diet feeding increases the amount of red blood cell membrane fatty acids without affecting the proportion of trans fatty acids in female Wistar rats

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Introduction: Cafeteria diet (KD) induces the appearance of metabolic syndrome. Higher availability of amino N increases NO• which isomerizes exposed fatty acids (FA). We analyzed red blood cell (RBC) membrane FA on long-lived cells not subjected to turnover and constantly in contact with circulating lipids.

Methods: Female Wistar rats subjected to KD for 30d and chow-fed controls were killed to obtain blood. Frozen blood packed cells were processed to obtain membranes. Lipids were extracted with trichloromethane/ methanol and were trans-esterified to methyl-esters using BF₃ and methanol. FA methyl-esters were separated by GC-MS and identified by MS fragmentation.

Results: The main membrane FA were oleic, elaidic and palmitic acids. In controls, total FA were 20 nmol/gRBC, (38% saturated, 29% trans-FA). In KD rats, total FA were 47 nmol/gRBC (40 % saturated, 33 % trans-FA). Individual FA distribution was similar between controls and KD, but there were significant differences in absolute concentration in about 1/3 of all.

Conclusions: There is a large amount of trans-FA in RBC membranes, but its proportion was not affected by KD. In spite of RBC size being similar in controls and KD, the latter membranes contained 2.3x more FA. This could not be readily explained, unless the proportion of protein/lipid, and cholesterol esterification were deeply altered, which would also justify the higher rigidity of KD RBCs.

1 Conflict of Interests: None disclosed

2 Funding: Spain's Plan Nacional grants SAF2009-11739 & AGL2011- 23635, and CIBER-OBN, Institute of Health Carlos III.

T1:P.167

Hyperproteic diet induces a more marked decrease in the gradient of activity of adenylate deaminase in the rat intestine

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Introduction: Adenylate deaminase (AMPD), key enzyme of the purine nucleotide cycle, releases ammonium from 2-amino nitrogen. AMPD has a regulatory function, lowering AMP, thus affecting AMP-kinase and glycolysis. Metformin inhibits AMPD; its function in intestine seems linked to both amino acid catabolism and glycemic control.

Methods: Zucker male rats were fed a hyperproteic diet (HPD) or standard chow for 30d. After killing, small intestine was cleaned and divided in three parts (I1, proximal to the stomach, I2 and I3), which were used for adenylate deaminase activity and gene expression (AMPD2) measurement.

Results: Intestinal weight was unaffected by diet. AMPD activity was 123 nkat/g, decreasing (I1 to I3) to 49 nkat/g and 43 nkat/g. Under HPD, enzyme activity decreased in I2 and I3 (down to 9% and 22% of I1), values significantly lower than those of controls. AMPD2 mRNA levels were similar in all three fractions: 2.5–2.7 fmol/g. HPD did not change these values except for a 20% decrease in I2-I3.

Conclusion: AMPD activity was higher in the duodenum-jejunum than in the jejunum and ileum, which suggests a more important function in the control of glucose handling than that of amino acids, preferentially absorbed in I2-I3. The small change in AMPD2 expression could not explain the deep lowering effect of HPD on AMPD activity. This suggests that AMPD activity is post-translationally modulated by diet.

1 Conflict of Interests: None disclosed

2 Funding: Spain's Plan Nacional grants SAF2009-11739 & AGL2011-23635, and CIBER-OBN, Institute of Health Carlos III.

T1:P.168

Plasma adiponectin levels in Czech adolescents: Relation to obesity and metabolic syndrome

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Aims of our study were: (1) to explore a relationship between adiponectin levels and parameters of metabolic syndrome (MS) in a population sample of Czech adolescents, (2) to compare plasma adiponectin levels in cohorts of obese girls and boys with and without MS.

Methods: The whole studied cohort included 1179 girls and 1062 boys aged 13.0–17.9 years. Obese cohort consisted of 388 girls [median (upper; lower quartile): [BMI=29.65(27.50;32.52)] and 312 boys [BMI=29.75(27.65;33.41)]. A representative sample of the Czech adolescent population included 791 girls [BMI=21.25(19.43;23.64)] and 750 boys [BMI=21.53(19.64;24.50)]. MS was defined according to the IDF criteria. The following parameters were analyzed: SDS BMI, waist circumference, percent body fat and trunk fat (bioimpedance), blood pressure, adiponectin, fasting blood glucose, triglyceride, HDL-cholesterol. Statistics: ANOVA, Kruskal-Wallis test, Spearman's correlation (software NCSS 2004).

Results: In a population sample significant negative correlations of adiponectin levels with SDS BMI (girls: $r=-0.126$, $p<0.001$; boys: $r=-0.264$, $p<0.001$), total body fat (girls: $r=-0.073$, $p=0.047$; boys: $r=-0.222$, $p<0.001$), waist circumference (girls: $r=-0.108$, $p=0.043$; boys: $r=-0.199$, $p<0.01$) and serum triglycerides (girls: $r=-0.085$, $p<0.001$; boys: $r=-0.139$, $p<0.001$) were demonstrated, while positive correlation between adiponectin and HDL-cholesterol levels was shown (girls: $r=0.293$, $p<0.001$; boys: $r=0.213$, $p<0.001$). Significant negative correlation with trunk fat was revealed only in adolescent boys ($r=-0.190$, $p<0.001$). Obese boys with MS exhibited lower adiponectin levels compared to obese boys without MS (4.02 mg/l vs. 4.72 mg/l, $p=0.012$). Such difference was not observed in obese girls.

Conclusion: We confirmed that adiponectin levels are related to MS and its components in Czech adolescent population. This finding supports potential use of adiponectin levels as predictors of risks for the development of MS in adolescence.

1. Conflict of Interest: None disclosed.

2. Funding: Research related to this abstract was funded by grants IGA MZCR NT/13792-4 and NT12342-5/2011, grant 7F08077 from MSM/7F and grant CZ0123 from Norway through the Norwegian Financial Mechanisms.

T1:P.169

The relationship between sleep quality and metabolic syndrome

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Introduction: The prevalence of metabolic syndrome (MS) increases with age, and aging results in the deterioration of sleep quality. Previous studies found self-reported global sleep quality is significantly related to the MS in adults. However, there is no study on the association between

sleep quality and MS in elderly. Thus, the aim of this study was to investigate their relationship in Chinese elderly.

Method: A total of 435 elderly (≥ 60 years) subjects were selected from the Prevention Health Center of National Cheng Kung University Hospital. The diagnosis of MS was according to the statement of the American Heart Association/National Heart, Lung, and Blood Institute. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI).

Results: Of the 435 subjects, 205 (47.1%) had MS. Subjects with MS had a significant higher global PSQI score than those without (7.0 ± 3.6 vs. 6.0 ± 2.5 , $p=0.001$). In the individual domains of PSQI, subjects with MS had higher scores of "subjective sleep quality" ($p=0.006$) and "the use of sleep medication" ($p<0.001$) as compared with those without. The multivariate logistic regression analysis showed that female (OR=2.029, 95%CI=1.306–3.152, $p<0.01$), higher global PSQI score (OR=1.095, 95%CI=1.026–1.168, $p<0.01$), snoring (OR=1.916, 95%CI=1.223–3.002, $p<0.01$) were significantly associated with MS. Of the individual domains of PSQI, "sleep latency" (OR=0.75, 95%CI=0.568–0.991, $p<0.05$) and "use of sleep medication" (OR=1.751, 95%CI=1.233–2.487, $p<0.01$) were independently related to MS.

Conclusion: Higher sleep quality score have a higher risk to MS in the elderly. In clinical practice, the elder subjects with sleep disturbance should be evaluated for MS.

T1:P.170

Association between metabolic syndrome and types of obesity in men and women

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Aim: To determinate the prevalence of metabolic syndrome (MS) and its individual components in groups of obese men and women with different types of fat distribution.

Methods: The study involved 142 men and 185 women with obesity. Participants were divided into 2 groups depending on waist-to-hip ratio (WHR) value. Women with WHR value <0.85 and men <0.95 were relegated to the group with the lower type of fat distribution (LTFD), women with the WHR value ≥ 0.85 and men ≥ 0.95 to the group with the upper type of fat distribution (UTFD).

Results: The frequency of LTFD was 19.7% in men and 45.4% in women ($p<0.000$). Men with LTFD as compared to UTFD were characterized by a lower prevalence of abdominal obesity (1.9 times), hypertriglyceridemia (1.4 times), low HDL-C (1.6 times), and hypertension (2 times). The frequency of MS in men with LTFD was lower in 2.7 times than that in men with UTFD. Women with LTFD as compared to UTFD had a lower prevalence of abdominal obesity (1.2 times), hypertriglyceridemia (1.8 times), low HDL-C (1.2-fold), and hypertension (in 1.5 times). The frequency of MS in women with LTFD was lower in 1.9 times than that in women with UTFD. Both men and women in the groups with LTFD were missing such component of MS as hyperglycemia i.e. they had the minimal risk of type 2 diabetes mellitus.

Conclusion: These results is due to the fact, that different types of fat distribution involve different pathogenetic mechanisms of obesity.

T1:P.171

The association between areca nut chewing and metabolic syndrome in Taiwanese young male workers

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Introduction: The workers use areca nuts to build focus and attention because of its effects of heightened alertness. We aimed to study the association between areca nut chewing and metabolic syndrome in young male workers.

Methods: Total 5655 male workers, aged 18-49 years, underwent annual health check-up in 2011. The blood lipids, fasting glucose, BMI, waist circumference and blood pressure were measured. All participants were divided into non-chewers, ex-chewers and current chewers.

Results: There were 167 (2.95%) ex-chewers and 471 (8.32%) current chewers among all male workers. The prevalence of areca nut use decreased with age group significantly (13.3% in aged 18-29 years, 11.1% in 30-39 years and 9.6% in 40-49 years, P for trend=0.0011). Compared with non-chewers, chewers (ex-chewers and current chewers) had lower fasting glucose (88 ± 16.9 mg/dL vs. 90 ± 21.4 mg/dL, $P=0.0417$) and triglycerides (124 ± 102.4 mg/dL vs. 150 ± 131.9 mg/dL, $P<0.0001$) significantly. Meanwhile, chewers had more diabetes mellitus ($P=0.0009$), hypertension ($P=0.0313$) and obesity ($BMI \geq 27$, $P=0.0429$) significantly than non-chewers. After adjusting for age, smoking, alcohol and BMI, the chewers were at higher risk for metabolic syndrome (odds ratio [OR]=2.09, 95% confidence interval [CI]= 1.59-2.76) than non-chewers. Furthermore, the smokers were also at higher risk for metabolic syndrome (OR=1.13, 95% CI=1.03-1.25). No interaction effect existed between smoking and alcohol.

Conclusions: The habit of chewing areca nut was an independent factor to the risk of metabolic syndrome. Because metabolic syndrome leads cardiovascular disease in future, it is important to establish areca nuts chewing free policy in workplace.

T1:P.172

Impact of mother's nutrition during pregnancy and lactation, and nutrition of offspring on the development of PCOS in Sprague Dawley rats

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Introduction: Polycystic ovary syndrome (PCOS) is a complex endocrine and metabolic disorder associated with abdominal obesity and ovulatory dysfunction with displayed metabolic changes. Small number of key genes together with environmental factors seems to be responsible for PCOS development.

The aim of the study was to detect association between the type of mother's nutrition during pregnancy and lactation, and nutrition of offspring on the development of PCOS.

Methods: 10 female Sprague Dawley rats were randomly divided in 2 groups. One group was fed with standard laboratory chow (CD), and the other one with high content of saturated fatty acids (HFD). After period of coupling and lactation offspring of the both groups were randomly divided in 2 groups – CD and HFD group. We got 4 groups of offspring genetically similar, but exposed to different intrauterine and postnatal nutrition environments. The weight of offspring was measured once a week. They were sacrificed with 36–40 weeks, after which ovarian morphology and biochemical serum samples were studied.

Results: We have found that the offspring of mother fed with HFD which were also fed with HFD, had the most frequent changes in ovarian morphology, they had PCOS. They also had metabolic abnormalities, including higher body weight and changes in lipid status.

Conclusion: The type of nutrition will significantly increase incidence and intensity of the development of PCOS in offspring of mothers fed with high content of saturated fatty acid.

T1:P.173

Oxidative stress level in obese children and its association with overweight degree and metabolic complications

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Introduction: Obesity in childhood can increase the risk of cardiovascular morbidity and mortality in adulthood. Oxidative stress seems to be involved in the pathophysiology of atherosclerosis, diabetes and cardiovascular complications in obesity. The aim of our study was to evaluate the level of oxidative stress markers in obese children comparing to the lean control group in respect of overweight degree and metabolic complications.

Methods: Oxidative stress markers (TOS – total oxidative status, TAC – total antioxidative capacity, glutathione peroxidase, oxy-LDL), leptin (L) and adiponectin (A) were determined in 80 obese children and 82 healthy controls. Nutritional status by BMI and waist/height ratio calculation and body composition analysis (TANITA BC-418 MA) was assessed in all children. In obese children parameters of metabolic complications were assessed (OGTT, insulin, lipid profile, BP).

Results: TAC, glutathione peroxidase and A/L ratio were significantly lower (0.01; 0.001; 0.01), but oxy-LDL and leptin were significantly higher (0.05; 0.0001) in obese than in healthy children. TOC and leptin significantly correlated with body composition parameters assessed by bioimpedance analysis. There were no significant correlation between oxidative stress markers and metabolic status parameters, just as children who met the metabolic syndrome criteria had no significantly different level of oxidative stress.

Conclusions: In obese children exists the significant imbalance in oxidative/antioxidative status which is associated with the fat tissue percentage and its hormonal activity. Metabolic syndrome criteria probably do not describe the early changes leading to cardiovascular complication in obese children.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded by Medical University of Silesia grant No KNW-1-183/09

T1:P.174

Metabolic shifts and endothelium status after BMI change

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Introduction: The purpose of the given study was to determine the status of carbohydrate and lipid metabolism, as well as endothelial function in women with different body mass index.

Methods: The control group consisted of 30 women with normal BMI. The core group according to BMI was divided into 3 subgroups (52 women with BMI 25-29.9 kg/m; 35 women with the BMI 30-34, 9 kg/m²; 28 women with the BMI ≥ 35 kg/m²). We investigated the status of carbohydrate metabolism and lipid spectrum. Determination as an indicator of endothelial damage was performed by the method of J. Hladorec. Von Willebrand factor (vWF) in the blood plasma was investigated by indirect ELISA using domestic samples of monoclonal antibodies to vWF.

Results: We found evident changes of endothelial. None of the groups showed the number of desquamated endothelial cells (DE) was within normal limits. Despite the fact that in the group of women with a normal BMI increase of DE was small, it was detected in 63% of women. With increasing BMI number DE grew, reaching a significant amount in the second (8.75 ± 2.16) and third (9.81 ± 1.89) groups ($p < 0.01$). With these shifts from DE values of vWF and platelet counts in all groups remained within normal limits.

Conclusion: Thus, our study revealed that endothelial dysfunction is exacerbated with the rise in BMI. The endothelial dysfunction associated with the absence of the metabolic syndrome suggests the primacy of endotheliopathy in complex of metabolic disorders.

1. Conflict of Interest: None

2. Funding: No Funding

T1:P.175

Impaired insulin-mediated ser1176 phosphorylation of eNOS in skeletal muscle arterioles of obese Zucker rats

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Introduction: The ability of insulin to activate eNOS and dilate arterioles is known to control the delivery of glucose and insulin to skeletal muscle. The aim of this study was to identify the molecular mechanism that leads to a reduced muscle glucose uptake in obese Zucker rats (OZR).

Methods: The *m. tibialis anterior* was dissected from 14 week old lean Zucker rats (LZR) and OZR in the fasted state (n=7) and 2 h after the start of a hyperinsulinaemic-euglycemic clamp (HEC; n=7). Content and ser¹¹⁷⁶ phosphorylation of eNOS were measured in the endothelial layer of skeletal muscle terminal arterioles and capillaries using immunofluorescence microscopy.

Results: Total eNOS content and eNOS ser¹¹⁷⁶ phosphorylation in the fasted state was not significantly different between LZR and OZR in terminal arterioles and capillaries. Insulin stimulation elevated terminal arteriole eNOS ser¹¹⁷⁶ phosphorylation in LZR (14%; $P < 0.05$), while causing a reduction in OZR (-28%; $P < 0.05$). Insulin did not significantly change capillary eNOS ser¹¹⁷⁶ phosphorylation in LZR (-7%), while causing a reduction in OZR (-31%, $P < 0.05$). Capillary density and number of capillaries per muscle fibre were lower in OZR ($P < 0.05$). The impairments in OZR coincided with a reduced glucose infusion rate (LZR 95.8 ± 14.1 , OZR 39.7 ± 17.9 mg/min/kg bw) during the first 21 min of the HEC and a 5-fold reduction in insulin sensitivity index (both $P < 0.05$).

Conclusion: The data suggest that a reduction in eNOS ser¹¹⁷⁶ phosphorylation in skeletal muscle arterioles of OZR during a HEC is instrumental to skeletal muscle insulin resistance.

1. Conflict of Interest: None disclosed

2. Funding: Research relating to this abstract was partially funded by Astra Zeneca

T1:P.176

Metabolically healthy obese phenotype: Can the concept be verified in child population of the IDEFICS study?

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Introduction: The IDEFICS (Identification and prevention of Dietary and lifestyle-induced health Effects In Children and infantS) is a five-year multicentre study targeting comprehensively obesity in the 2-10 years age group. Increasing body of evidence suggests the importance of metabolically healthy (MH) obese phenotype. Our aim was to identify MHO in this young age group.

Methods: From the baseline survey we analysed the data of normal weight and obese children according IOTF categorization as contrasting

groups (N 8453-890, boys 51,7-51,2%, age $6,0 \pm 1,80$ - $6,7 \pm 1,51$ years, respectively). MH was defined as having no risk factor from glucose, triglyceride and HDL-cholesterol data (cut-offs 100, 100 and 50 md/dl according Cook and Ferranti).

Results: The prevalence of normal weight MH, normal weight non-MH, obese MH and obese non-MH children were 67,6, 22,9, 5,4, 4,2, respectively. Between obese MH and non-MH children there was significant but minimal (by ANOVA, Scheffé post-hoc test) difference in waist-to-height ratio, but not in waist z-score or body fat (Slaughter equation). Pulse rate, insulin, LDL-cholesterol and CRP level of MH children was significantly lower.

Conclusion: The difference between MH and non-MH obese children wasn't detectable by anthropometric measures, though clearly detectable by further laboratory values.

1. Conflict of Interest: None

2. Funding: Research relating to this abstract was funded by: EC / FP6 Contract no.: 016181-2 (FOOD)

T1:P.177

Bovine serum albumin reduces body fat mass and increases metabolic activity in high fat fed C57/BL6 mice

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Introduction: Increasing evidence suggests that intake of whey protein isolate (WPI) reduces high fat diet (HFD)-induced development of obesity. This study investigated whether lactoferrin and bovine serum albumin (BSA) have bioactivity related to WPI.

Methods: C57/BL6 mice were fed for 13 weeks with 10% kcal low fat diet with 20% casein (LFD) or a 45% kcal HFD supplemented with 20% casein (HFD-C), lactoferrin (HFD-Lac), or BSA (HFD-BSA) (n=8). Body composition and metabolic activity were measured.

Results: Feeding mice with HFD-C and HFD-Lac increased weight gain compared to LFD fed mice (HFD: 13.65125 ± 1.48146 , HFD-Lac: 12.76938 ± 1.267865 vs LFD: 5.74625 ± 1.000781 $P < 0.01$). HFD-BSA (8.06625 ± 1.760374) and LFD groups had similar weight gain. Intake of HFD-C and HFD-Lac increased total (%) body fat compared to LFD (HFD-C: 37.80544 ± 1.65569 , HFD-Lac: 34.8845 ± 1.711267 vs LFD: 20.69163 ± 1.598678 ; $P < 0.01$). There was no significant difference in total (%) body fat between HFD-BSA (27.95875 ± 3.987891) and LFD groups. Mice on the four diets consumed similar energy content and had similar locomotor activity. However, the metabolic activity, as measured by VO₂ consumption, was reduced in the HFD-C and HFD-lac groups compared to LFD group (HFD-C: 3096.705 ± 76.94854 , HFD-Lac: 2983.466 ± 76.45815 vs LFD: 3475.315 ± 41.67143 $P < 0.05$). In contrast, there was no significant difference in the VO₂ levels between HFD-BSA (3405.744 ± 142.9849) and LFD groups.

Conclusions: In contrast to lactoferrin, BSA attenuates HFD-induced body fat gain in part by increasing metabolic activity in mice.

1. Conflict of Interest: None

2. Funding: Research was funded by Teagasc.

T5:PS1 – Bariatric Surgery – Surgical Outcomes

T5:P.001

Preparation for bariatric surgery: Two studies of UK patients

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Introduction: In 2012 a UK enquiry report (NCEPOD) reviewed the care of bariatric surgery patients – 'Too Lean a Service.' Amongst the principal recommendations was a greater emphasis on psychological assessment and support. As this enquiry drew only on clinician and case

reports, the present study took a patient perspective on what preparation patients had received and what, in retrospect, they felt unprepared for.

Methods: In study 1, 148 post-bariatric patients (130 female, mean age 47), recruited from the British Obesity Patient Association (BOSPA) and Weight Loss Surgery Information and Support (WLSinfo), completed a detailed online survey. In study 2, interviews with 7 patients from a NHS bariatric support group were analysed using Interpretative Phenomenological Analysis.

Results: Before surgery 94% had met with a surgeon, 85% with a dietitian, but only 22% with a psychologist. Most had received information on the surgical process, risks and recovery, and changes in diet and eating behaviour. They found this pre-operative information useful. However, only 23% received preparatory information on psychological issues and participants wanted more on the impact of weight loss on self-image, identity, confidence, and relationships. Note that all had consulted the internet. Those interviewed wanted preparatory information to help tolerate the consequences of surgery rather than to inform decision making.

Conclusion: These results reinforce the importance for psychological preparation for bariatric surgery and describe, for some, the need for continued post-surgical support. While preparation requires professional involvement, patients particularly valued hearing the experiences of other patients e.g. via support groups.

1. Conflict of Interest: None.

2. Funding: None.

T5:P.002

Remission of diabetes to prediabetes after bariatric surgery in diabetic patients with no remission after medical therapy induced weight loss

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Introduction: Some type 2 diabetic patients remain diabetic even after medical therapy induced substantial weight loss. We have evaluated the remission of diabetes after bariatric surgery in these patients.

Methods: The influence of bariatric procedures on diabetes control and diabetes remission was evaluated in 37 diabetic patients, who underwent bariatric surgery (gastric banding, gastric bypass, gastric placcation and BPD). The remission of diabetes was evaluated using Hb A1c cut point 47 mmol/mol. Prediabetic Hb A1c was classified as 39 mmol/mol to 46 mmol/mol.

Results: Preoperative weight loss during the period of medical treatment in obesity centre (6 months to 16 months) was 143.9 kg. 127.4. Patients remained diabetic mean Hb A1c was 68.4 mmol/mol before operation. Postoperative mean weight change was in 6 months to 107.1 kg and in 12 months 103.3 kg, HB A1c in 6 months was 41.6 mmol/mol and in 12 months 42.2 mmol/mol. In 6 months 36% patients have prediabetic and 10 % diabetic value of HbA1c, in 12 months 51% prediabetic and 17% diabetic. There was a small nonsignificant difference between the 4 surgical procedures.

Conclusion: The medical therapy induced weight loss is ineffective in diabetes remission in some diabetic patients. Bariatric procedures have significant effect on remission of diabetes to normal or prediabetic Hb A1c in these patients but one half of patients remains prediabetic. Special attention should be given to these patients including dietetic, behavioural and pharmacologic prevention of diabetes.

1. Potential Conflict of Interest: No.

2. Funding: No

T5:P.003

Uncovering the proteomic response of human adipose tissue to bariatric surgery-induced weight loss

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Introduction: Bariatric surgery (BS) is an effective alternative for reducing calorie absorption and altering satiety signals. The beneficial effects of BS include weight loss and reduction in the incidence of diabetes. However, the long-term adaptive changes occurring in adipose tissue (AT) after BS have not been fully established. To identify candidate markers associated with the loss of fat mass and the improvement of insulin sensitivity, we characterized the proteome of subcutaneous adipose tissue of morbidly obese subjects before and after BS.

Methods: AT samples from 8 morbidly obese women (BMI=50.5±2.9 kg/m²) [4 normoglycemic/Insulin sensitive (NIR) and 4 insulin resistant (IR) individuals] were obtained before and after (13.3±0.37 months) BS. Comparative proteomic analysis of pre- and post-BS paired AT samples was carried out by 2D-DIGE/MALDI-TOF/TOF.

Results: In NIR patients, BS evoked changes in proteins related to the cytoskeleton, mitochondria, protein folding, and lipid and glucose metabolism. Along with changes in acute-phase proteins, after BS IR subjects exhibited up-regulated levels of the protein biosynthesis enzyme, TrpRS, which has been suggested to regulate angiogenesis. In both NIR and IR patients BS modified the protein content of ALDH1A1, which has been related to adaptive thermogenesis in AT. Finally, differences in the expression of molecular chaperones were observed after BS between IR and NIR patients.

Conclusions: NIR and IR patients differed in their AT proteomic profiles before BS and, although to a lesser extent, also after BS. Body fat mass reduction differentially affected the AT proteome in relation to the metabolic status of the patients.

1. Conflict of Interest: None Disclosed

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T5:P.004

Does Type 2 Diabetes Influence Long-Term Outcome after Roux-en-Y Gastric Bypass?

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Introduction: Achieving sustained weight loss is difficult for many severely obese individuals and even more difficult for those with type 2 diabetes mellitus (T2DM). Bariatric surgery is a widely accepted and successful treatment option for the severely obese. The goal of this study was to examine, whether weight loss in severely obese individuals with T2DM is comparable to the achieved weight loss of non-diabetic individuals five years after bariatric surgery.

Methods: We conducted a retrospective cohort study with 26 morbidly obese individuals with T2DM (23 female, 3 male, BMI 48.9 ± 8.8 kg/m², age 47.6 ± 10.3y) and 26 preoperative-age, BMI and sex matched obese controls without T2DM (BMI 48.1 ± 7.0 kg/m², age 48.1 ± 9.5y). Both groups underwent Roux-en-Y gastric bypass between 2004 and 2007 and were controlled five years after surgery.

Results: Achieved Weight loss after gastric bypass was comparable in both groups (-31.6% vs. -28.3%, T2DM vs. controls, p=0.27). After

five years, 73% experienced a complete remission of T2DM. In individuals with remission, preoperative HbA1c was significantly lower compared to those without remission (6.8 ± 0.8 vs. $7.7 \pm 0.75\%$, $p=0.016$). Preoperative BMI and postoperative weight loss were comparable.

Conclusion: Weight loss after gastric bypass surgery is independent of the presence of T2DM. Surgery is associated with remission of T2DM in many but not all severely obese diabetic individuals. A better preoperative glycaemic is associated with achievement of remission. Further research is needed to obtain the optimal time for gastric bypass surgery with respect to durable diabetes remission.

1. Conflict of Interest: None Disclosed

2. Funding: No Funding

T5:P.005

Predictive psychological successful factors in bariatric surgery

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Introduction: Weight loss (WL) is largely inconstant following bariatric surgery, depending on surgical procedures, lifestyle and psychological factors.

Our study evaluated the predictive value of depression and eating behavior on WL following bariatric surgery.

Methods: We followed during 5 years, 454 subjects, who underwent gastric banding (GB) (60.4%) or gastric bypass (GBP) (39.6%) from 1996 to 2006. WL, eating behavior via the DEBQ (Dutch Eating Behavior Questionnaire) and depression via the Beck questionnaire were assessed before and 1, 2 and 5 years after surgery.

Results: At 1 year after GB, subjects of the most WL quartile were younger (38 vs 42 years, $p=0.008$), had initial emotionality (2.2 vs 2.8 , $p<0.0001$), externality (2.5 vs 2.7 , $p=0.038$) and depression (12.0 vs 16.0 , $p=0.039$) scores lower than in the other quartiles. No difference was observed at 2 and 5 years after GB, and after GBP. The multiple linear regression, with step by step method, explained 66% of 1 year-BMI by the combination of initial BMI (partial $r=0.795$), surgical procedure (partial $r=0.430$) and emotionality (partial $r=0.314$); only 39.3% of the 2 years-BMI by the combination of initial BMI (partial $r=0.604$), surgical procedure (partial $r=0.289$) and restriction (partial $r=0.204$); and only 40% of the 5 years-BMI by initial BMI alone (partial $r=0.64$).

Conclusion: Eating behavior and depression had a predictive value on short term WL only after gastric banding. To explain long term WL after bariatric surgery, we need a more complex regression model including others environmental factors (probably such as physical activity, diet).

1. Conflict of Interest: None Disclosed

2. Funding: No Funding

T5:P.006

GLP-1 secretory response after test meal in morbidly obese patients before and after gastric bypass

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Introduction: Gastric bypass procedure in obese patients improves insulin sensitivity and changes gastrointestinal hormones and insulin secretion.

Methods: In morbidly obese patients, we determined GLP-1 response after test meal (Fresubin drink a 200 ml; 200 kcal, 15 % protein, 30% fat and 55% carbohydrate) before (day 0) and 5 and 90 days after gastric bypass surgery. Glycaemia (mmol/l; glucose oxidase) and GLP-1 (Active 7-36) (pM/l; ELISA, ALPCO diagnostics) were determined in 16

obese patients (age: 32.3 ± 14.4 ; BMI: 43.2 ± 7.3 kg/m²) in three separate days in 0, 15, 30, 45, 60, 90 and 120 min.

Results: There were no significant difference between area under the glucose curve ($X \pm SD$) (662.64 ± 57.18 vs 584.90 ± 72.86 vs 582.52 ± 98.34 mmol/l x min⁻¹; $p > 0.05$) in respective day intervals, while there was significant increase in area under the GLP-1 curve (pmol/l x min⁻¹) in days 5 (866.74 ± 261.72) and 90 (669.62 ± 134.35) in comparison with day 0 (166.03 ± 74.63) ($p < 0.05$). There were no significant differences between basal glucose and GLP-1 levels (0.57 ± 0.65 ; 0.96 ± 0.19 ; 0.37 ± 0.16 ; $p > 0.05$) while there was significant increase in peak GLP-1 levels in day 5 (21.31 ± 3.33) and day 90 (26.32 ± 4.46) in comparison with day 0 (1.99 ± 0.32) ($p < 0.05$).

Conclusion: We conclude that GLP-1 response after test meal is significantly increased after gastric bypass surgery early (after 5 days) and lately (after 90 days). The improvement in GLP-1 response after test meal after gastric bypass surgery may be responsible for the metabolic effects of bariatric surgery.

T5:P.007

Early effect of laparoscopic gastric plication on anthropometric parameters and on postprandial triglyceride and hormonal response in obese women with type 2 diabetes

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Introduction: Laparoscopic gastric plication (LGP) represents a restrictive bariatric surgery which is less invasive than sleeve gastrectomy as gastric tissue and secretory mucosa are preserved.

The aim of our study was to determine an early impact of LGP conducted in obese type 2 diabetic women on anthropometric parameters as well as on the metabolic and hormonal response to standardized meal ingestion.

Methods: Subjects (women): $n=8$, age: 54.4 ± 6.9 years, BMI: 40.1 ± 4.8 kg/m². Anthropometry and meal test with protein drink (375 kcal; protein 30%, carbohydrate 45%, fat 25%) were performed before and one month after the surgery. Blood sampling during the meal test began with fasting values and then the blood was withdrawn in 30-minute intervals over 3-hr period.

Anthropometry: height, weight, waist and hip circumferences, percent body fat (BIA Tanita).

Metabolic and hormonal parameters: glucose, HbA1c, insulin, C-peptide, cholesterol (total, HDL, LDL), triglycerides, PAI-1, glucagon, ghrelin, GLP-1, GIP, adiponectin, leptin, adiponectin, resistin, visfatin.

Statistics: ANOVA with repeated measurements.

Results: One month after LGP significant reductions of body weight ($p<0.0001$), BMI ($p<0.0001$), waist circumference ($p<0.0001$), hip circumference ($p<0.002$) and percent body fat ($p<0.02$) were observed. LGP resulted in significantly reduced postprandial levels of insulin ($p<0.0001$), glucagon ($p<0.03$), triglycerides ($p<0.01$), leptin ($p<0.0001$), resistin ($p<0.007$), ghrelin ($p<0.0001$) and PAI-1 ($p<0.0001$) whereas elevated postprandial levels of adiponectin ($p<0.005$) were recorded a month after the surgery.

Conclusion: Already one month after GLP not only anthropometric parameters but also postprandial triglyceride and PAI-1 concentrations and several hormone levels were positively affected.

1. Conflict of Interest: None Disclosed.

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T5:P.008

Early effects of laparoscopic sleeve gastrectomy on IGF-I status in severely obese patients

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Severe obesity is associated with low adiponectin and IGF-I levels, both conditions related with increased cardio-metabolic risk

The aim of our study was to evaluate early effects (6 months) of laparoscopic sleeve gastrectomy (LSG) regarding IGF-I levels and the relation with adiponectin and other clinical and metabolic parameters.

Patients and Methods: 124 (37 M, 87 F) severely obese patients were extensively evaluated before and 6 months after LSG. Serum samples of IGF-I were assayed using chemiluminescent immunometric methods, while adiponectin was measured using ELISA method. Since IGF-I levels are age-dependent, standard deviation score of IGF-I levels according to age (z score) was calculated. Adiponectin and IGF-I variation was expressed as percentages.

Results: At baseline, patients mean age was 42.32±10.58 and mean BMI: 46.93±8.56 kg/m². Mean IGF-I levels increased 6 months after LSG, both in women (141.79±67.6 versus 126.92±51.05 ng/ml, p<0.05) and in men (153.42±51.33 versus 121.19±50.27 ng/ml, p<0.001). The prevalence of IGF-I deficiency (IGF-I z score <-2 SD) decreased from 30.25% to 14.15%. In women, IGF-I variation negatively correlated with age (r=-0.219, p<0.05), basal (preoperative) IGF-I level (r=-0.373, p<0.001), basal adiponectin level (r=-0.237, p<0.05) and positively correlated with adiponectin variation (r=0.243, p<0.05). We found no correlation between IGF-I variation and anthropometrics or other metabolic parameters.

Conclusions: As early as 6 months after LSG, IGF-I levels tended to normalise and the prevalence of IGF-I deficiency significantly decreased. In women, IGF-I and adiponectin variation positively correlated; the significance of this relation deserves further investigations

T5:P.009

Indications for the surgical treatment of obesity: Beyond BMI

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Bariatric Surgery (BS) is the only therapeutic approach able to induce a significant and durable weight loss in subjects with severe and/or complicated obesity. Current guidelines for indication of BS are based on body mass index (BMI) as single criterion in subjects with BMI>40 kg/m², or in combination with comorbidities in subjects with BMI>35 kg/m². The weight loss achieved by the various surgical procedures ranges from 56.7% of Excess Body Weight Loss (EBWL) for gastric banding, to 95.1% for biliopancreatic diversion (Buchwald Am J Med 2009). The aim of this study was to evaluate and to identify predictors of weight loss in a group of subject who underwent BS. To this purpose, 65 patients (49F/16M), mean age 40.0 y (17-69), mean BMI 47.73±0.97, underwent BS: 42 sleeve gastrectomy, 14 gastric bypass, 9 gastric banding. Patients were characterized before surgery, and after surgery, weight loss was evaluated in the short to medium term (median 45 days, range 30-120) and correlated with metabolic and anthropometric pre-surgery parameters. The mean EBWL% is 25.68±1.37 (range 6.4-69.6), and it does not correlate with weight, BMI or EBW or with preoperative comorbidities or inflammatory parameters (HS-CRP, TNF-α). The %EBWL is inversely correlated with leptin (r=-0.4674, p=0.0024) and directly correlated with insulin and HOMA-IR (r=0.4279, respectively, p=0.0059, r=0.4789, p=0.0017). These data are a first attempt to profile the patient that can benefit most from BS, or alternatively to identify the surgical procedure that can ensure the best results in terms of weight loss and management of comorbidities.

T5:P.010

Acyl-ghrelin does Correlate to Appetitive Behaviour after Bariatric Surgery

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An individual's personality is thought to play a part in their predisposition to hyperphagia and obesity. The behavioural approach system (BAS), regulating response to appetitive stimuli, and the behavioural inhibition system (BIS), regulating response to aversive stimuli can be assayed by the BIS/ BAS questionnaire. Reward sensitivity is significantly correlated to BMI, food craving, and binge-eating. Acyl-ghrelin acts upon brain reward circuits and levels are altered following bariatric surgery. We therefore undertook a study to examine the relationship between changes in acyl-ghrelin and BIS/BAS scores 12 weeks post-surgery.

We conducted a prospective parallel group study in 17 patients with a BMI of 45.9±1.1 to examine changes in BIS/ BAS scores, and plasma acyl-ghrelin concentrations at 12 weeks following bariatric surgery. There was no correlation between baseline total BAS/ BAS fun scores and baseline acyl-ghrelin AUC. At 12 weeks post-surgery subjects had lost 18.8±0.9 kg, and the acyl-ghrelin AUC had declined by 665±474 (pmol/L). Further, there was no correlation between BAS total/ BAS fun and weight loss at 12 weeks. However, change in meal-stimulated acyl-ghrelin was positive correlated with change in appetitive behaviour after surgery (p=0.042, r=0.13- Total BAS score; p=0.001, r=0.29- BAS fun score). Our findings suggest that change in acyl-ghrelin post-surgery contribute to altered appetitive responses.

1. Conflict of Interest: No conflict of interest

2. Funding: Julian J Emmanuel was a MRC clinical research fellow

T5:P.011

Two years results after laparoscopic adjustable gastric banding "LAGB" in adolescents: The French Experience

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Objectives and Study: Since 2008 bariatric surgery (LAGB) is considered for adolescents with severe obesity enrolled in multidisciplinary program after failed one year lifestyle intervention at least.

Methods: All adolescents were included in prospective longitudinal data collection.

Patients undergo an initial screening process for medical, social and psychiatric history then these evaluations were repeated at 6, 12 and 24 months.

Results: 27 patients have undergone LAGB, the mean age was 16.6 ± 0.9 years. Pre operative body mass index (BMI) was 45.8±5.7.

The group had 21 months of follow up (range 1-51 months) and an average of 14 visits in the first year for behavioural and nutritional assessment. 13 patients had more than two years follow up.

At two years mean weight loss was 43 ± 14.4 kg corresponding to mean excess weight loss (EWL) of 74.8± 14.3 %.

An improvement in metabolic status was demonstrated (HOMA-IR decreasing from 5.55±3.5 to 1.94±0.92, p< 0.005).

The gastric band was removed in one patient due to a band slippage (after 1 year), and 2 patients had failure of weight loss (36 and 37 % of EWL after 24 and 48 months respectively).

Conclusion: At two years, 77% of patients have successful bariatric results (EWL>50%).

LAGB is a restrictive procedure, who requires a high degree of patient cooperation and professional support. However this technique appears to be a primary choice for bariatric surgical procedure in adolescents on the basis of its good weight loss, with low complication rate, and potential reversibility.

T5:PS2 - Bariatric Surgery – Complications

T5:P.012

Postprandial hypoglycaemia one year after gastric bypass surgery

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Introduction: Postprandial hypoglycaemia is increasingly recognised as a side effect of gastric bypass. We aimed to identify predictors of post challenge blood glucose levels after surgery.

Methods: Oral glucose tolerance tests were performed before and one year after gastric bypass in 64 morbidly obese subjects without known type-2 diabetes (Hofsø et al. *EJE* 2011). Mean (SD) age was 41 (10) years, 70% were female and 27% had a family history of type 2 diabetes, 53% had normal glucose tolerance (NGT, fasting glucose <6.1 mmol/l and 2-hour glucose <7.8 mmol/l) and 47% had abnormal glucose tolerance (AGT). Stimulated insulin-to-glucose ratio at 30 minutes was used as measure of beta cell function.

Results: BMI was reduced from 47.3 (5.6) to 33.1 (5.2) kg/m². Two-hour glucose dropped from 5.6 (1.0) to 3.2 (0.6) mmol/l in the NGT-group and from 9.7 (3.9) to 3.6 (1.0) mmol/l in the AGT-group, between group difference at one year $p=0.058$. Two-hour glucose levels after surgery were significantly correlated with age ($r=0.317$, $p=0.011$), baseline HbA1c ($r=0.409$, $p=0.001$) and baseline 30 minutes insulin-to-glucose ratio ($r=-0.370$, $p=0.003$). Regression analysis including age, gender, baseline BMI, family history of type-2 diabetes, glucose tolerance group and baseline 30 minutes insulin-to-glucose ratio as independent variables revealed that baseline 30 minutes insulin-to-glucose ratio was the only variable independently associated with 2-hour glucose levels after surgery ($\beta=-0.274$, $p=0.048$).

Conclusion: Morbidly obese subjects at a younger age with normal glucose tolerance and preserved beta cell function may be at increased risk of developing postprandial hypoglycaemia after gastric bypass.

1. **Conflict of Interest:** None Disclosed.

2. **Funding:** No Funding.

T5:P.013

Hypoglycaemia after bariatric surgery: Frequency and management

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Hypoglycaemia is well recognized complication of bariatric surgery. To determine its frequency and management we reviewed all 1088 bariatric surgery patients operated on in our hospital over a 3-year (August 08 – July 11) period.

Method: We defined suspected hypoglycaemia as the presence of typical symptoms with a reported blood sugar of <3.5 mmolar and confirmed hypoglycaemia as a blood sugar of <2.8 mmolar with confirmation by a third party.

Results: Out of 1088 bariatric surgery patients 46 patients had suspected hypoglycaemia (incidence 4%) and 21 patients had confirmed hypoglycaemia (2%). Amongst those with hypoglycaemia, male sex and previous diabetes mellitus were more common than those without hypoglycaemia, but age, ethnicity and rate of weight loss were similar. LRYGB was associated with hypoglycaemia ($p<0.05$) but LSG; LAGB and DS were not. The time of onset of hypoglycaemia is 15.91 ± 10.04 months after surgery. 43 patients required only dietetic education, 1 patient required acarbose and 2 patients required octreotide. Some of the patients presenting with hypoglycaemia were subsequently shown to have factitious hypoglycaemia, dissociated psychiatric states and primary cardiac arrhythmia.

Conclusion: 2–4% of patients have hypoglycaemia after bariatric surgery. Hypoglycaemia is associated with pre-existing diabetes, male sex and LRYGB. Almost all cases can be managed successfully by dietary education.

T5:P.014

Vitamin status 5 years after gastric bypass: A retrospective study

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Background: Few studies have addressed long-term nutritional effects of bariatric surgery. We examined vitamin status up to five years after Roux-en-Y gastric bypass.

Methods: Serum and blood vitamin concentrations were retrospectively collected from electronic hospital records of patients, operated at our institution 2004–2007 ($n=449$), and followed up until Dec 2011 ($n=188$). Data were available preoperatively ($n=31$ patients) and post-operatively at ½ ($n=385$), 1 ($n=395$), 2 ($n=317$), 3–4 ($n=254$) and 5 ($n=161$) years. All patients were recommended daily oral multivitamin, Ca/vitamin D and iron supplements, and three-monthly intramuscular B-12 post-operatively. Vitamin deficiency was defined as a concentration below the reference range. For each vitamin the medical records of the 10 patients with the lowest concentrations were reviewed for clinical signs of deficiency.

Results: Multivitamin supplement intake was reported by 89% of patients at 1 year post-operatively and by 71% at 5 years. Vitamin A deficiency was seen in 3.1% before surgery, 12% at 2 years, and 6.9% at 5 years. For vitamin B-6 the corresponding figures were 22%, 8.0% and 18%. Vitamin D, B-1 and B-12 deficiency rates were mostly stable, and seen in 18%, 3.0% and 2.0% at 5 years. Vitamin E, C and folate deficiency rates decreased during follow-up. Medical records revealed no clinical signs of vitamin deficiency.

Conclusions: Vitamin B-6 and D deficiency was common throughout follow-up, while vitamin A deficiency appeared to be more common in the intermediate term. Levels of other vitamins were stable or improved after surgery.

1. **Conflict of Interest:** None Declared

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T5:P.015

Determinants of weight regain after laparoscopic gastric bypass

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Introduction: Most subjects who underwent gastric bypass (GBP) obtain stable weight loss (WL), but some regain weight significantly over time. Our aim was to identify factors associated with weight regain (WR) after GBP.

Methods: 114 subjects (107 women, age 44 ± 11 years; BMI 46.5 ± 8.1 kg/m²) followed ≥ 3 years after GBP in our institution were studied. Several preoperative and postoperative factors were recorded, including clinical and biological parameters, lifestyle and adherence to medical care. Subjects were divided into 2 groups, the “regainer” subjects (RS, $n=42$) with a WR ≥ 3 kg between 1 year (1yr) and last visit (LV) and the “non regainer” ones (NRS, $n=72$).

Results: WL was 39.2 ± 11.2 kg at 1yr, 46.1 ± 13.7 kg at nadir (median [IQR] time from surgery = 25[19] months) and 42.3 ± 14.0 kg at LV

(median [IQR] = 48[24] months). WL at LV was lower in RS than in NRS (36.1±14.8 vs 45.5±2.6 kg, $p=0.0005$). Age, initial BMI, physical activity, smoking, total caloric intake, gastrointestinal symptoms and HOMA index were not associated with WR. RS were more likely to snack than NRS at LV (50 vs 28%, $p=0.0041$) and to be noncompliant to medical care (38 vs 22%, $p=0.047$). WR at LV was positively correlated with WL at 1yr ($R=0.237$, $p=0.014$) and negatively correlated with the time of occurrence of weight nadir ($R=0.552$, $p<0.0001$).

Conclusion: Long-term evolution of weight after GBP is influenced by compliance to medical care and dietary habits. A rapid weight loss after surgery seems to promote weight regain, as observed after hypocaloric diets.

1. **Conflict of Interest:** None Disclosed

2. **Funding:** No Funding

T5:P.016

Relationship between 25OH vitamin D (25OHD) deficiency, metabolic parameters and body composition assessed by Dual Energy x Ray Absorptiometry (DXA) in severely obese women before and after laparoscopic adjustable gastric banding (LAGB)

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Introduction: Obesity is associated with 25OHD deficiency. Several mechanisms have been described that partially explain 25OHD deficiency: insufficient dietary intake, sunlight underexposure, reduced hepatic 25OHD synthesis or reduced 25OHD bioavailability due to enhanced uptake by adipose tissue.

Methods: Sixty four women, aged: 44.8±11.4 yrs (mean±SD), body mass index (BMI): 42.5±5.0 Kg/m², were enrolled and assessed for various metabolic parameters and body composition by DXA. A selected subset of subjects (40/64) underwent a bariatric surgery and were evaluated before and after weight loss obtained by LAGB.

Results: Before surgery a negative correlation was found between serum 25OHD and weight ($p<0.007$), BMI ($p<0.001$) and triglycerides ($p<0.03$). Serum 25OHD was negatively correlated with total fat mass ($p<0.04$) and fat trunk ($p<0.02$). A positive correlation was found between serum 25OHD and HDL-Cholesterol ($p<0.04$). After multiparametric analysis, BMI remained the only independent predictor of serum 25OHD levels ($p=0.004$; $R^2=16.1\%$). Forty patients were treated with LAGB, chosen because it produces a sustained weight loss without major alterations of the anatomy and physiology of the gastrointestinal tract.

All correlations found before surgery were lost except a positive correlation between 25OHD and HDL-Cholesterol. Interestingly after weight loss 25OHD levels were significantly lower (22.4±10.7 versus 18.7±8.4, $p<0.02$).

Conclusion: 25OHD is negatively related to obesity and visceral fat. However, weight loss achieved by gastric banding does not normalize 25OHD deficiency and multiple mechanisms like dietary intake could play a role in regulating its serum levels, after bariatric surgery.

T5:P.017

Elevated fasting Glucagon-Like Peptide-1 following surgical weight loss: Association with persistent nausea and vomiting and adipokines

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Background: Gastric bypass surgery is the most effective treatment for obesity as it achieves substantial and sustained weight loss and improved insulin sensitivity. The benefits of bypass surgery on insulin sensitivity appears to be mediated, at least in part, by changes in gut peptides, such as, Glucagon-Like Peptide-1 (GLP-1), independent of weight loss. Following Roux-en-Y bypass surgery (RYGB) some patients develop severe, debilitating and sustained nausea and vomiting (N&V) that persists beyond 3 months.

Aims: The aim of this study was to determine if this N&V is related to elevated GLP-1 levels and whether GLP-1 directly mediates adipose tissue adipokine secretion.

Methods: 42 female non-diabetic subjects were studied in the fasting and post-prandial state. Plasma concentrations of insulin, GLP-1 and adipokines were determined by ELISA.

Results: Subjects with N&V post RYGB surgery had significantly elevated fasting GLP-1 levels compared to those without N&V ($p=0.035$) and compared to morbidly obese (MO), obese and lean subjects. Weight loss and glucose, insulin and GLP-1 response to an 180kCal meal challenge were similar in subjects with and without N&V. Fasting plasma leptin was significantly lower in subjects with N&V compared to those without N&V ($p=0.04$).

Conclusion: In conclusion subjects with persistent N&V post RYGB surgery have elevated fasting GLP-1 levels and lower fasting leptin levels, through mechanisms as yet unclear. GLP-1 antagonists (eg Exendin 9-39) may be a potential therapeutic option in these subjects to alleviate these symptoms. However, potential detrimental effects on weight maintenance and insulin sensitivity would need to be considered.

T5:P.018

Expectations of Bariatric Surgery: Myths and Reality

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Introduction: Weight loss surgery procedures have increased by 70% in three years from 2008-11. Bariatric surgery is a NICE recommended, cost-effective treatment but to obtain these benefits, obesity can't be seen in isolation from the complex behavioural, social and metabolic problems patient's experience. In this context, patients need to have realistic expectations of surgery and, clinicians and commissioners should target interventions appropriately.

This study seeks to highlight the myths and realities of patient experience to inform clinical and commissioning professionals and future surgical pathways. This paper presents findings from the first stage of a longitudinal study.

Methods: In-depth semi-structured interviews, Photovoice and framework analysis techniques. 15 patients interviewed pre surgery, will be followed up at three and nine months post surgery.

Results: Themes focus on the negative impacts weight has on the quality of life for the participant and close family. Participants explained how eating and activity behaviours, life events and lack of self-control influenced their weight gain and had a dramatic impact on their emotional well-being. These experiences helped shape their expectations following surgery. Anticipated health benefits were the main motivation for undergoing bariatric surgery and included: improvements to mobility and breathing; reduced pain; and, reliance on medications. Levels of knowledge and expectation varied between participants. The photographs generated by the Photovoice methodology help to illustrate the impact obesity has on quality of life.

Conclusion: Findings will help inform the implementation of the NCEPOD report and NICE Guidance recommendations to improve the patient journey and outcomes for bariatric surgery.

1. Conflict of Interest: None

2. Funding: Research relating to this abstract was funded by Collaboration and Leadership for Applied Health Research and Care – South Yorkshire.

T5:P.019

Substance use in pregnancy: A comparison between women with a bariatric procedure in history and a matched control group according to BMI

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Introduction: An increasing amount of obese women and those with a bariatric surgery are getting pregnant. Substance use is reported frequently in the pregnant population although it is considered to be harmful for both mother and child. The aim of this study is to compare substance use in pregnant women after bariatric surgery with a control pregnant group matched for BMI.

Methods: A multicenter prospective cohort study including 53 pregnant women (BMI 28.3±5.5 kg/m²) with a history of bariatric surgery was conducted. From a control group of 124 pregnant women, 70 remained after matching for BMI. Nicotine use was questioned at baseline. Food diaries were analyzed for alcohol (g/day) in the first and second trimester.

Results: The proportion of women consuming alcohol was comparable between groups (bariatric surgery group 9.4% vs control group 15.7%; p=0.631) and trimesters (p=0.586). Of the women who do not abstain from alcohol, the alcohol amount consumed was 3.63 g/day and 2.31 g/day respectively in the first and second trimester (p=0.452). Nicotine use occurred significantly more in pregnant women with bariatric surgery than in the control group (24.5% vs 5.7%; p=0.003).

Conclusion: No differences in alcohol consumption were found. A higher prevalence of nicotine use among pregnant women with bariatric surgery should make us pay extra attention to this. However further research should be dedicated to confirm substance use among this pregnant population at risk.

1. Conflict of Interest: None disclosed

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T5:P.020

Metabolic Surgery: Surgical Profile and Complications of 737 Cases at Waterfall City Hospital

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Objective: Surgical profiling, morbidity and mortality data of metabolic surgery should be presented within the South African context in a comprehensive manner.

Methods: Prospective data was collected between 2007 and 2012 on 737 consecutive cases by a single principal surgeon and entered on a custom designed database. Information was also collected on the true incidence of gallstones and *H pylori*. Data is reported on GBP, SG, BPD-DS and revision surgery.

Results: Of the total cohort LGBP 80.6%; BPD-DS 8.5%; OGBP 4.2% LGS 2.0% and Revision surgery 6.3%. The true incidence of gallstones is 5.6%; stomal ulceration 15% and pre-operative *H Pylori* 27.5%. During 2007–2009 major complications were 5.4%; 2010–2012: major complications 1.5%, this in the presence of a 7 index increase in BMI and a tripling in the rate of BPD-DS performed. Co-morbid disease profile increased from 4 to 7 major diseases compared to 2007. Overall

operative time decreased significantly despite a larger number of BPD-DS. Minor complication rate is 6.1% overall. Surgical mortality: 0%

Conclusion: A more difficult patient profile is a natural evolution of an experienced centre. Higher morbidity can be counteracted by a more stringent medical and psychological selection process, intensifying the level of pre- and post-operative medical care, careful and correct selection of surgical procedure and decreasing the operative time.

1. Conflict of Interest: The authors declare that they have no conflict of interest with the research performed and the data presented.

2. Funding: No funding was received relating to this abstract.

T5:P.021

Efficacy of a Liquid Low Calorie Formula Diet in Achieving Preoperative Target Weight Loss before Bariatric Surgery

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Background: A preoperative weight loss of 8% is a prerequisite to undergo bariatric surgery (BS) in Denmark as it may reduce the risk of perioperative complications, reflects motivation and accustoms patients to a lifestyle of food restriction after surgery.

Objective: To evaluate the efficacy of a 7-week low calorie diet (LCD) for achieving preoperative target weight before BS.

Methods: 28 obese patients (45.8 ± 4.4 kg/m²) were supervised by a dietician to follow a liquid LCD (Cambridge Weight Plan, 1000 kcal/day) for 7 weeks as preparation for BS. The study included a baseline visit (week 0) and a visit in week 7 where blood pressure, blood parameters as well as anthropometric measurements and body composition (DXA) were assessed.

Results: At week 7, 82% of the patients had reached their target weight, and this was achieved at week 5.4±1.2. Mean weight loss was 10±2% (43% fat free mass and 57% fat mass). The weight loss was accompanied with a 5% decrease in systolic blood pressure (p<0.05), an 8% decrease in diastolic blood pressure (p<0.001) and an improved metabolic profile (10% decrease in fasting glucose p<0.001, 28% decrease in LDL p<0.001, 25% decrease in HDL p<0.001, 18% decrease in triglyceride p<0.05).

Conclusion: For the majority of patients preoperative target weight can be achieved with a liquid LCD within 7 weeks, and this weight loss is associated with an improved metabolic profile. Though in agreement with current literature, the loss of fat free mass in highly obese subjects on LDC needs further attention.

T5:P.022

Recurrence of diabetes following bariatric surgery due to Latent Autoimmune Diabetes in Adults (LADA)

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Introduction: So-called ‘remission of diabetes’ (normoglycaemia without glucose-lowering medication) occurs in only 50–80% of people with type 2 diabetes (T2D) after bariatric surgery. We report a patient presenting with uncontrolled hyperglycemia one year after gastric bypass surgery due to previously undiagnosed LADA.

Case Presentation: SS developed Type 2 diabetes age 38, weight 114 kg, treated firstly with metformin alone, then after 4 years with insulin glargine due to suboptimal glycaemic control. At referral for bariatric surgery in October 2010, she weighed 106 kg, body mass index (BMI) 35 kg/m², HbA1c 97 mmol/mol. She had hypothyroidism, vitiligo and vitamin D insufficiency. Intensification of her glucose-lowering regimen with the GLP-1 receptor agonist liraglutide, improved HbA1c (57 mmol/mol) with no weight change. Following gastric bypass at 6

months on metformin alone, BMI was 24.8 kg/m², HbA1c 63 mmol/mol. At one-year routine follow-up, despite further weight reduction (BMI 21 kg/m²), HbA1c was found to be 136 mmol/mol. A diagnosis of LADA was suspected, and confirmed by subnormal insulin levels (4.9 mIU/L; concurrent plasma glucose 16.7 mmol/l), strongly positive anti-glutamic acid decarboxylase antibodies (>2000 IU/ml); islet cell antibodies were not detected. Insulin treatment was reinstituted.

Conclusions: Since LADA may account for >5% of adult type 2 diabetes it is likely to be prevalent in patients seeking bariatric surgery who will not derive the same benefits of weight loss surgery and may be at risk of acute uncontrolled diabetes if it is assumed that they are in remission following surgery. LADA may be an important cause for 'failure' of diabetes remission after bariatric surgery.

T5:P.024

Should bariatric surgery be considered for all obese patients with type 2 diabetes?

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Introduction: There is strong evidence that bariatric surgery results in improvement or resolution of type 2 diabetes in the great majority of patients. Several studies have shown that bariatric surgery was not only cost-effective but that the cost of surgery would be fully recouped through the prevention of future health care costs to treat type 2 diabetes.¹ We assessed the effect of bariatric surgery on glycaemic control and the number of hypoglycaemic medications at one year post-surgery.

Methods: 35 patients (22 males and 13 females) who underwent bariatric surgery were selected. 29 patients had Roux-en-Y gastric bypass and 6 had sleeve gastrectomy.

Results: The mean BMI before surgery was 48.5±10.2 kg/m² (32.5–81.5) and 33.4±7.0 kg/m² (23.8–55.5) at one year post-surgery (p<0.0001). The mean HbA1c before surgery was 7.5±1.2 % and 5.9±0.6 % after surgery (p<0.0001). Of the 35 patients, 33 were on hypoglycaemic medications before surgery [mean=1.8±1.0] compared to only 9 patients after surgery [mean=0.3±0.5] (p<0.0001). 29 of the 35 patients (83%) had HbA1c <6.5% at 1 year post-surgery.

Conclusion: Our audit showed that type 2 diabetes has resolved in the great majority of patients at one year after bariatric surgery and that 73% no longer needed hypoglycaemic medications. We conclude that bariatric surgery is cost-effective in treating type 2 diabetes and should be considered for all obese patients with type 2 diabetes.

Reference

1. Buchwald H, Estok R, Fahrenbach, et al. Weight and type 2 diabetes after bariatric surgery: systematic review and meta-analysis. *Am J Med* 2009;122(3):248–256.

T5:P.025

Assessment of micronutrient status pre-bariatric surgery

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Aims: With an increasing prevalence of worldwide obesity, bariatric surgery is being more commonly used as a treatment option. Studies show high rates of micronutrient deficiencies in patient's post-bariatric surgery; however the prevalence of micronutrient deficiencies pre-bariatric surgery has not been studied. The aim of this study was to assess micronutrient status of obese patients awaiting bariatric surgery.

Methods: This retrospective study included 100 obese patients who underwent bariatric surgery at a local hospital. Pre-operative nutritional parameters were analysed including 25-hydroxy-vitamin D (25-OH vitamin D) status, calcium and parathyroid hormone levels. A normal 25-OH vitamin D status was defined as ≥60 nmol l⁻¹, deficiency as 31–59 nmol l⁻¹ and severe deficiency as ≤30 nmol l⁻¹. In addition, haematological parameters including haemoglobin, iron, ferritin, folate and vitamin B12 were analysed.

Results: Ninety-six percent (n=60/68) of patients were vitamin D deficient and 81% of patients severely vitamin D deficient. Twenty-two percent of patients showed folate deficiency (≤2.5ug l⁻¹), and 8% vitamin B12 deficiency (≤145ng l⁻¹). Twenty percent of patients had low haemoglobin levels (men <13g dl⁻¹, women <12g dl⁻¹), 43% low iron levels (men <14μmol l⁻¹, women <11μmol l⁻¹) and 9% low ferritin levels (men <24ug l⁻¹, women <11ug l⁻¹).

Conclusion: Results show that the majority of patients undergoing bariatric surgery have severe vitamin D deficiency prior to surgery. In addition, a significant proportion is found to be deficient in folate, vitamin B12 and iron. As these patients are likely to become more micro-nutritionally deplete post-surgery, it is essential to assess and normalise micronutrient status prior to bariatric surgery.

T5:P.026

The Dudley Bariatric Surgery Comorbidity Score (DUBASCO SCORE) before and at one year post-bariatric surgery

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Introduction: The DUBASCO score has been used to identify patients who are likely to benefit most from bariatric surgery.¹ The score takes into account age, BMI and four comorbidities (type 2 Diabetes, hypertension, dyslipidaemia and OSA). A score of ≥10 has been used for referral for bariatric surgery. We assessed the DUBASCO score before and at one year post-bariatric surgery.

Methods: 53 patients (32 females and 21 males) who underwent bariatric surgery were randomly selected. 39 patients had Roux-en-Y gastric bypass, 9 had gastric banding and 5 had sleeve gastrectomy.

Results: The mean age was 44.2±9.0 years (27–62). The mean BMI pre-surgery was 51.3±8.9 kg/m² (36.1–81.5) and was 35.8±7.4 kg/m² (24.1–55.5) post-surgery (p<0.0001). 35 of 40 patients (88%) who underwent gastric bypass lost ≥50% at one year post-surgery. 8 of 13 patients who lost <50% EBW had gastric banding or sleeve gastrectomy. The mean DUBASCO score pre-surgery was 12.2±3.2 (6–23) and 6.2±2.4 (2–13) post-surgery (p<0.0001).

Conclusion: Our audit showed that gastric bypass is more effective in achieving more weight loss than either gastric banding or sleeve gastrectomy. It also showed that the DUBASCO score is reliable in assessing improvement in comorbidities. We recommend gastric bypass as the main bariatric procedure in achieving maximal weight loss and the DUBASCO score as the main tool in assessing improvement in comorbidities.

Reference

1. Labib M, Haddon AL, Head A and Nightingale P. The DUBASCO SCORE: A scoring system for selecting patients for consideration of bariatric surgery. *Br J Diabetes Vasc Dis* 2011;11:17–20.

T5:P.027

An out-patient protocol to screen for post-gastric bypass hypoglycaemia syndrome

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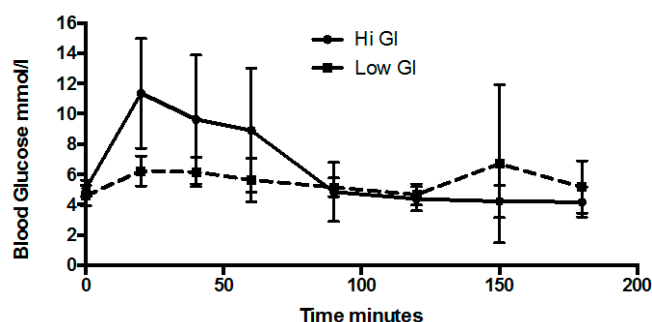
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Introduction: Postprandial hyperinsulinaemic hypoglycaemia is an increasingly recognised complication of gastric bypass surgery. Identification of the phenomenon in, and demonstration to, patients may help drive appropriate nutritional and medical management strategies to reduce symptoms.

Methods: We developed a home screening protocol using two test meals that were nutritionally similar apart from their Glycaemic Load (GL) (High GL meal 35, Low GL 8.6) taken for breakfast after an over-

night fast. Patients recorded frequent capillary blood glucose measurements.

Results: 6 patients presenting with symptoms of hypoglycaemia after gastric bypass (range 6-24months) underwent the test meal protocol. Fasting hypoglycaemia was ruled out prior to the test meal. Four of the 6 patients recorded 1 or more capillary blood glucose readings (CBG) of less than 3.5mmol/l after the high GL meal. 3 patients recorded CBG readings greater than 11. The glycaemic excursions and hypoglycaemia were markedly attenuated in all of the 5 patients who undertook the low GL test meal (ANOVA: $F(1, 72) = 4.036$; $P = 0.0483$).



The 2 patients who subsequently required medical therapy (somatostatin analogue, acarbose), based on severity of symptoms, had higher early glycaemic excursions but not lower CBGs during the test meal.

Conclusion: High glycaemic excursions during a high GL test meal patients with post-bypass hypoglycaemia syndrome may help to predict requirement for early institution of medical therapy and inform patients about the impact of their dietary choices on blood glucose levels.

T5:P.028

A Case Series of Three Patients in Their Early Fifties Suffering from Wernicke's Encephalopathy after Bariatric Surgery

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Methods: Case note review of patients identified as having Wernicke's encephalopathy after undergoing bariatric surgery.

Results: The first patient underwent a gastric bypass operation and, later, a further procedure to increase the bypass loop length after regaining weight. Four years later she developed steatorrhea and diarrhoea. She then developed significant muscle weakness with altered gait and cognitive function. The patient did not adequately respond to thiamine supplementation and eventually underwent a reversal, making a partial recovery. The second patient had a Roux-en-Y gastric bypass. After the operation her eating became erratic, consuming large, irregular meals. Seven months post-operatively, she was admitted to hospital with fine vertical nystagmus and reduced tone and power in the lower limbs. She was treated with supplementation of thiamine and vitamin B12 injections. She made a slow recovery but regained independence after neurological rehabilitation. The final patient underwent a gastric bypass procedure. Two years post operatively she had significantly increased her alcohol intake and was admitted to hospital with symptoms of thiamine deficiency. She received thiamine supplementation and recovered satisfactorily.

Conclusions: All patients were left with some level of permanent morbidity. In each case the gastric bypass surgery combined with patient factors lead to the serious complication of thiamine deficiency. These cases highlight a serious complication of the gastric bypass procedure indicating a need for careful screening pre-operatively as well as close monitoring post-operatively from all clinicians involved.

T5:P.029

Metabolic surgery: Baseline patient profile; 3 year outcome data

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Introduction: Baseline profiling, biochemical, morbidity, mortality outcome after bariatric surgery.

Methods: 50 baseline variables expressed % of total patient; dietary; social history; major; minor comorbidities; Biochemical; Clinical; disease resolution.

Conclusion: Metabolic surgery, obesity solution with high disease resolution, low mortality in Centres of Excellence.

	Baseline (n=730)	3 mo. (n=702)	1 yr. (n=418)	2 yr. (n=279)	3 yr. (n=193)
Weight(kg)	127±1.4	101±1.2**	93±1.1**	88.2±2.0**	93.1±3.4**
BMI	44.6±0.4	36±0.4**	32±1.1**	30.7±0.6**	32±0.6**
Waist(cm)	123±1.0	103±1.0**	94±0.9**	93±1.7**	97±3.0**
Hip(cm)	133±0.8	118±1.0**	111±1.0**	106±1.2**	113±2.2**
Neck(cm)	43.5±0.3	39±0.5*	37±0.3*	36±0.5**	37±0.6**
BP(S)	147±1.0	133±0.8*	132±1.0*	133±1.5*	132±2.3*
BP(D)	89±2.0	80±0.6*	79±0.8*	81±0.9	80±1.7*
Comorbid	6±0.1	1±0.04**	0.4±0.7**	0.5±0.08**	0.6±0.1**
F-Glucose	6.8±0.1	5.3±0.1*	4.9±0.05*	4.8±0.1**	4.9±0.2**
F-TG	1.8±0.05	1.4±0.4	1.2±0.04	1.1±0.05*	1.2±0.1*
F-HDL	1.0±0.02	1.1±0.04*	1.7±0.14	1.6±0.05*	1.6±0.08
F-LDL	3.3±0.05	2.2±0.04	2.5±0.14*	2.5±0.08**	2.5±0.1*
ALT(U/l)	31±0.9	28±0.9*	25±0.9*	24±1.2*	22±1.4*
AST(U/l)	25±0.5	24±0.5	23±0.6	23±0.8	21±1.4
GGT(U/l)	38±2.1	32±1.1	24±2.0**	19±1.6**	21±2.0*
U/A	0.44±0.06	0.5±0.05	0.48±0.02	0.29±0.02**	0.28±0.03*
CRP	16±0.6	6±0.2*	5±0.2*	5±0.2*	5±0.5*

(Mean±SEM) $p < 0.05$; $p^{**} < 0.01$ (unpaired *t*-test).

Mortality: Surgical 0%; Medical: 0.1%.

Morbidity: Surgical (Major) 2.9%; Minor 6.1%; Medical (Major) 3.1%; Minor 1.9%.

1. Conflict of Interest: The authors declare that they have no conflict of interest with the research performed and the data presented.

2. Funding: No funding was received relating to this abstract

T5:P.030

Type 2 diabetes mellitus in the long-term follow-up of Roux-en-Y gastric bypass: remission and relapses – a longitudinal prospective study

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Introduction: Type 2 diabetes mellitus (DM) is highly prevalent in morbidly obese patients. Bariatric surgery is an effective treatment for DM control in these patients. We aimed to assess the course of DM and factors associated with remission in the long-term follow-up of Roux-en-Y gastric bypass (RYGB) in patients of the Brazilian Public Health System operated between 2000 and 2005.

Methods: DM was defined as fasting blood glucose (FBG) ≥ 126 mg/dL, and/or HbA1c $\geq 6.5\%$, and/or any treatment for DM; remission, as normalization of FBG and HbA1c (total remission) or glucose intolerance (partial remission); and prolonged remission, as total remission in five consecutive reassessments. The association between preoperative (age at operation, sex, BMI, medication use and HbA1C) and postoperative characteristics (BMI, % weight loss and regain) was investigated.

Results: 58 patients with DM (77.6% women, mean age [SD] 43.1 years [10.3]) were followed for a median time of 8.0 years. Mean (SD) pre-

operative BMI, FG and HbA1C, were respectively, 53.4 kg/m² (9.5), 130.5 mg/dL (53.2), and 7.3% (1.6). Preoperatively, 37 (63.7%) patients used oral agents, and five (8.6%), insulin plus oral agents. DM remission between one and 10 years of follow-up varied from 75 to 92.3%. Prolonged remission and relapses after prior remission were observed in 11 (26.8%) and 5 (8.6%) patients, respectively. None of the factors studied were significantly related to remission.

Conclusion: RYGB provided significant remission of DM in morbidly obese patients in the long-term. Relapses point out to the need of prolonged postoperative monitoring.

T5:P.031

Effect of weight loss associated with gastric banding surgery on inflammation, iron metabolism, lipidic profile and erythropoiesis

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Accumulating evidence indicates that a state of chronic inflammation has a crucial role in the pathogenesis of obesity-related metabolic dysfunction. This study aims to evaluate changes in inflammatory process, iron metabolism, erythropoiesis and lipid profile associated with weight loss after gastric banding surgery.

Forty six patients were evaluated before and 3 months after gastric banding surgery. A survey was conducted with recording of demographics, body mass index (BMI) and records the presence of co morbidities. Moreover, complete blood cell counts and serum levels of iron, ferritin, transferrin, high sensitivity C-reactive protein (hsCRP), total cholesterol, LDL-cholesterol (LDL-c), HDL-cholesterol (HDL-c) and triglycerides (TG) were performed.

Three months after surgery our patients presented a significant decreased in weight and BMI, associated with a decreased in inflammatory process (decreased hsPCR, transferrin, neutrophil counts and neutrophil/lymphocyte ratio), increased iron availability (increase in transferrin saturation and a trend to higher iron serum levels), decreased erythropoiesis (decreased in reticulocytes counts and reticulocyte production index) and significant decreased in TG and in Tg/HDL-cholesterol ratio. Our results showed a significant decrease in the inflammation process, 3 months after gastric banding surgery, which might be associated with adipose tissue loss. This decreased in the inflammatory process results in more efficient iron absorption and increasing iron availability for erythropoiesis. Moreover, we also found a decreased TG serum levels. These changes suggest benefits from gastric band surgery, including decreased risk of cardiovascular disease.

T5:P.032

Weight loss and metabolic effects of Laparoscopic Sleeve Gastrectomy

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Introduction: Laparoscopic sleeve gastrectomy (LSG) has gained wide acceptance in the treatment of morbid obesity, but there are few data on short-term and long-term effects.

Methods: We performed a retrospective clinical audit of 52 consecutive patients (37 women), with a mean (\pm SE) age of 47.5 (\pm 1.4) years, who underwent LSG at least 6 months prior to data sampling between July 2009 and December 2011. Results were analysed with Student's t-test.

Results: Twenty-nine patients reached a follow-up of 12 months. A decrease in mean (\pm SE) body mass index (BMI) from 52.7 (\pm 1.2) to 37 (\pm 1.4) kg/m² was observed a year following surgery ($P<0.001$). Weight

regain of more than 10 kg from nadir was observed in two (20%) of the ten patients who completed 24 months follow-up. A total of 14 patients (27%) who had diabetes pre-operatively showed improvement in diabetes control 12 months following surgery, with five patients no longer requiring medication. Lower baseline HbA1c levels were independently associated with remission in those patients. A year after surgery, mean (\pm SE) systolic and diastolic blood pressure decreased by 15% and 13% respectively ($p<0.001$). Of the twenty-four patients were receiving anti-hypertensive drugs pre-operatively, only thirteen required antihypertensives 12 months after surgery. Analysis of lipid profile showed no difference between baseline and post-operative values ($p>0.05$).

Conclusion: LSG offers significant amelioration in cardiovascular risk factors, such as hypertension and diabetes 12 months postoperatively. Further studies are required of longer-term effects on cardiovascular and metabolic parameters, specifically dyslipidemia and weight regain.

1. Conflict of Interest: LKM Summers has received educational grants and speaker fees from various pharmaceutical companies and attended meetings funded by Allergan Ltd.

2. Funding: No Funding

T5:P.033

Contrast swallow post laparoscopic sleeve gastrectomy: Should this be a routine procedure to detect leaks?

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Introduction: A leak or perforation following laparoscopic sleeve gastrectomy can result in severe morbidity for the patient. The aim in this study was to evaluate the efficacy of water soluble contrast swallow as a routine procedure post laparoscopic sleeve gastrectomy in detecting leaks.

Methods: Retrospective analysis of data collected from operation notes and oral contrast swallow reports of 48 patients who had laparoscopic sleeve gastrectomies at Manor Hospital, Walsall Healthcare NHS from April 2011 to March 2012. All subjects had a body mass index of >50 and least one co-morbidity that could be improved by weight loss as a result of bariatric surgery.

Procedure: The greater curvature of the stomach is mobilised with the help of a Ligasure™. Over a size 40 Fr bougie, the stomach is transected 5cm from the pylorus to the gastroesophageal junction using Endo-GIA™ transecting/stapling device to form the gastric sleeve. The staple line is oversewn with interrupted polydioxanone sutures. A leak test is done at the end of the procedure using methylene blue dye. If the blue dye test shows no leak, this is followed by a water soluble oral contrast swallow the following day.

Results: Forty seven of the forty-eight oral contrast swallows showed no leak. Two of these patients who showed no leak, re-presented seven and ten days later respectively were confirmed to have a leak on CT scan.

Conclusion: Two false negative results. The oral contrast swallow study is not completely reliable for assessing for leaks post laparoscopic sleeve gastrectomy.

T5:P.034

Physical fitness outcome measurements 2-year post bariatric surgery in adolescents

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Introduction: Obesity in adolescents is a major health problem. Bariatric surgery is shown to successfully induce weight loss but weight regain is a concern. Weight loss involves both lean body mass and fat mass. The aims of this study were to describe relations between physical fitness and weight regain and weight loss.

Methods: Thirty-nine adolescents (29 girls, age 14–18 yrs, body mass index 35–69 kg/m²) underwent gastric bypass surgery. They performed a sub maximal bicycle test, a six minutes walk test (6MWT) and a DXA-scan. Tests were carried out at baseline, one and two year post surgery.

Results: 41% of the participants regained weight between year one and two follow-up. There was a significant loss of lean body mass from baseline 60,29±8,41 (mean±sd) to year one 53,65±10,56 (P<0,001) at year two 54,31±11,17 (P<0,001). There were no significant changes in absolute VO₂max, at baseline 2,91±0,57 at year one 2,97±0,79, at year two 2,99±0,84. Relative VO₂max value at baseline 23,84±6,36, at year one 33,48±10,16 (P<0,001), at year two 34,02±9,79 (P<0,001). Relative lean body mass VO₂max at baseline 48,66±10,89, at year one 57,71±16,68 (P<0,001), at year two 54,97±15,91 (non significant). 6MWT results at baseline were 543±71, at year one 617±68 (P<0,001), at year two 599±57 (P<0,001).

Conclusion: Bariatric surgery improved relative VO₂max and walking distance with results lasting for two years. Despite reduction in lean body mass, absolute VO₂max did not decrease. Relative VO₂max and walking distance were not affected by weight regain.

1. Conflict of Interest: None

2. Funding: None

T5:P.035

A delayed gastric leak four years post-Laparoscopic Sleeve Gastrectomy

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Introduction: Laparoscopic sleeve gastrectomy (LSG) is a recognised bariatric surgical procedure. Gastric leaks are a serious post-operative complication with very few cases reported later than two weeks postoperatively.

Methods: A 48 year old man, who had undergone LSG four years previously, presented to the emergency department with a one week history of abdominal pain and fevers. He admitted to having similar symptoms two weeks post-LSG, which resolved with antibiotics. He was maximally tender in the left hypochondrium and had a raised C-Reactive Protein (CRP) level of 297. Within 24 hours, he developed tachycardia, his CRP rose to 510 and his haemoglobin dropped greater than four units. Computer-assisted Tomography scan of the abdomen revealed a large left subdiaphragmatic abscess displacing the spleen as well as a large soft tissue abnormality in the left anterior abdomen.

Results: At laparotomy, the subdiaphragmatic abscess was in the vicinity of the remnant stomach, eroding inferiorly into the spleen causing rupture. He underwent drainage of the collection and haematoma, and a splenectomy.

Conclusion: Given similar symptoms in the early post-operative period, it seems most likely that his presentation is secondary to a gastric leak that gradually formed an abscess. This represents, by far, the most delayed presentation of an intra-abdominal abscess following LSG that has been reported in the literature to date. It is hence vital that doctors continue to consider this complication when assessing patients, even years following LSG.

T5:P.036

Nutritional needs are far from being covered during the first year following a sleeve gastrectomy

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Introduction: Conversely to gastric bypass, micronutrient deficiencies are considered infrequent after sleeve gastrectomy, but few studies document this assertion.

Methods: Retrospective analysis performed on 51 consecutive obese patients before (M0) and quarterly (M3, M6, M9, M12) one year after sleeve gastrectomy.

Results: The percentage of patients lost to follow-up was 29% at M3, 43% at M6 and 49% at M9 and M12. Mean percent of excess BMI lost was 48% at M3, 63% at M6, 76% at M9 and 83% at M12. Mean (±SD) daily energy intakes were 610±190 kcal at M3, 870±380 kcal at M6, 780±210 kcal at M9 and 880±80 kcal at M12; mean daily protein intakes were 30±9 g at M3, 41±13 g at M6, 34±10 g at M9 and 45±10 g at M12. Several micronutrients deficiencies have emerged during follow-up, especially for vitamin A (8% at M0, 46% at M3, 45% at M6, 20% at M9, 27% at M12), folic acid (15% at M0, 36% at M3, 27% at M6, 38% at M9, 17% at M12), vitamin B12 (4% at M0, 9% at M3, 10% at M6, 16% at M9, 22% at M12) and selenium (24% at M0, 65% at M3, 48% at M6, 30% at M9, 48% at M12).

Conclusion: In addition to an important loss to follow-up, we found insufficient energy and protein intakes during the year after sleeve gastrectomy, which may partly explain micronutrient deficiencies. Multidisciplinary management and reinforcement of therapeutic education are essential to ensure prevention and treatment of these deficiencies.

1. Conflict of Interest: None

2. Funding: No Funding

T5:P.037

Pre-operative dietary restriction for patients undergoing bariatric surgery in the UK: Review of current practice and investigation of dietary effects

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Introduction: Bariatric surgery is the most effective means of achieving weight loss in the severely obese, with most procedures performed laparoscopically. A pre-operative energy restrictive diet has been widely adopted, and is considered to enable surgery through improving liver flexibility and reducing liver volume. However, the nature of the pre-operative diet is not standardised.

Methods: A review of current practice was completed, supported by the British Obesity and Metabolic Surgery Society. Data was collected in the form of patient information material and comments from clinical staff.

A clinical trial was initiated in May 2012 comparing two types of pre-operative energy restrictive diets, recruiting participants from the Bariatric Service at Derby Hospitals NHS Foundation Trust.

Results: The review of 28 services revealed a total of 49 diets in current use. Types of diet include low energy, low carbohydrate and liquid, with

59% offering low energy/low carbohydrate food-based, 21% milk/yoghurt, 19% meal replacement and 2% clear liquid. The diet duration varies between 7 to 42 days, with 41% being for 14 days. Limited anecdotal evidence was provided by services evaluating the pre-operative diet, with dietary choice primarily physician-led.

With 15 patients completed to date, preliminary trial data indicate equivalent weight loss between dietary approaches, but with some differences in patient evaluation.

Conclusion: The review has highlighted variability and lack of consensus in the form of pre-bariatric surgery diet used across different centres. Further research comparing outcomes for alternative diets would support best practice in the future, including results from the current trial.

1. Conflict of Interest: None.

2. Funding: Research relating to this abstract was funded by the University of Nottingham and the BBSRC. Support was provided by the FRAME Alternatives Laboratory, and the National Institute for Health Research, through the Comprehensive Clinical Research Network. Meal replacement products used in the research were provided by LighterLife®.

T5:P.038

Serum Uric acid: An overlooked co-morbidity in obese patients undergoing bariatric surgery

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Introduction: Hyperuricaemia is associated with the metabolic syndrome, hypertension and cardiovascular disease. There is also a strong correlation between obesity and hyperuricaemia, and weight loss has been associated with a reduction in serum urate levels¹. However, hyperuricaemia is not often considered as an important comorbidity in obese patients undergoing bariatric surgery. We assessed serum uric acid levels before and after bariatric surgery.

Methods: 24 patients (13 females and 11 males) who underwent bariatric surgery were randomly selected. 15 patients had gastric banding and 9 patients had Roux-en-Y gastric bypass. Serum urate was analysed before and 4-12 months post-surgery. Patients with worsening renal function, worsening diabetic control or surgical complications were excluded.

Results: The mean weight pre-surgery was 150.0±34.0 kg and 119.0±28.0 kg post-surgery ($p<0.001$). The mean serum urate pre-surgery was 398±81 µmol/L and 328±69 µmol/L post-surgery ($p<0.001$). Pre-surgery, 25% of patients had serum urate levels above the gender-related reference ranges compared to only 4% post-surgery.

Conclusion: Our results show that obesity is associated with significant hyperuricaemia and that weight loss post bariatric surgery results in resolution or improvement of hyperuricaemia. We recommend that serum urate is included as one of the significant reversible comorbidities of obesity and should be routinely included in the assessment of patients being considered for bariatric surgery.

Reference

1. Amin-ul-Haq, Rashid Mahmood, Safi AJ, et al. Association of serum uric acid and obesity. *J Postgrad Med Inst* 2009;23:227-30.

T5:P.038A

Body composition in morbidly obese adolescents five years after laparoscopic gastric bypass (AMOS: Adolescent Morbidity Obesity Surgery study)

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Introduction: Gastric bypass surgery is introduced as treatment of morbid obesity in adolescents.

Methods: Twenty-eight adolescents (10 boys/ 18 girls), underwent laparoscopic gastric bypass and were followed with DXA: at baseline, 1, 2 and 5 yrs postoperatively. At 5 y we also assessed a prospectively identified matched control group (n=20) (6 boys/14 girls) receiving conventional care.

Results: Mean age at five years assessment was 21.8/21.2 years for intervention/controls, respectively. In the intervention group BMI changed from 45.2 to 31.6 to 30.5 to 31.7. Total Fat mass decreased by 42% over the first year and remained so at 5 years (65.3, 37.9, 35.7 and 37.6 kg), lean tissue decreased by 16% but had increased by 3% at 5 years (60.6, 50.8, 51.1 and 52.7 kg). Bone mineral content (BMC) changed over time: (2.84, 3.21, 3.15 and 2.84 kg) and bone mineral density (BMD) z-score (1.8, 0.7, 0.06, -0.02).

Corresponding figures for controls at 5 years: BMI 42.1 (between groups $p<0.001$), fat 59.2 kg ($p<0.001$), lean tissue 58.4 kg (ns) BMC 3.2 kg ($p<0.05$) and BMD z-score 0.6 (ns).

Body composition proportions after 5 yrs for surgery group/controls: fat 40/49%, lean 57/48% respectively and bone 3/3% for each.

Conclusion: Laparoscopic gastric bypass due to morbid obesity in the adolescents leads to dramatic weight loss characterized by predominant loss of body fat while lean tissue was relatively well preserved and was not significantly different from conventional treated controls after five years. The decrease in BMD until 2 yrs after surgery had leveled out until 5 yrs.

T5:PS3 – Co-Morbidities, Including Diabetes

T5:P.039

Comparing effects of meal replacements with isocaloric diet plan on voiding and storage lower urinary tract symptoms, insulin resistance and nutrient intake in obese men

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Introduction: In obese men, diet-induced weight loss improves lower urinary tract symptoms (LUTS). Meal replacements (MR) are useful strategies for weight loss. This study aims to compare effects of MR with isocaloric weight loss diet on LUTS.

Methods: Obese (mean BMI 32.5 kg/m², range 30.5–42.3) men (mean age 43.7 years, range 30–61) with LUTS were randomized to follow conventional diet (CD) (n= 22) or a MR-based plan (n= 22), to reduce intake by 500 kilocalories/day. International Prostate Symptom Scale (IPSS) was used to assess voiding (incomplete emptying, intermittency, weak stream, straining) and storage (urinary frequency, urgency, nocturia) symptoms, with higher scores representing more severe LUTS. Weight, waist circumference, fasting plasma glucose, insulin, and macronutrient composition were measured at baseline and 12 weeks. Insulin resistance was calculated from glucose and insulin using homeostasis model assessment (HOMA).

Results: CD and MR groups had similar reductions in weight (-3.5 ± 1.8 vs. -4.2 ± 2.7 kg), HOMA (-1.3 ± 3.2 vs -1.9 ± 2.1), and voiding scores

(-0.8 ± 0.5 vs. -0.9 ± 0.7 points). Decrease in voiding score was significantly associated with weight ($r = 0.36$, $p = 0.01$) and HOMA ($r = 0.42$, $p < 0.01$). In the MR group, reduction in storage symptom score was greater than the CD group (-1.6 ± 1.3 vs -1.0 ± 0.8 points), and correlated ($r = 0.50$, $p = 0.02$) with greater reduction in saturated fat intake.

Conclusion: Meal replacement-based diets are effective for improving voiding and storage LUTS by reducing insulin resistance and fat intake.

T5:P.040

Increased levels of fasting visfatin in obese women with impaired glucose tolerance

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Introduction: There are reports showed that visfatin levels increase with obesity, diabetes mellitus (DM) and gestational diabetes (GDM). This evidence suggests that visfatin can be stimulated under a hyperglycemic environment. It seems that elevated visfatin concentration in T2DM may be a physiologic protective response to a hyperglycemic environment. The aim of the study was to compare levels of visfatin, adiponectin, glucose tolerance parameters and anthropometric measurements between obese women with normal and impaired glucose tolerance.

Methods: Twenty four obese women with newly diagnosed impaired glucose tolerance (IGT group) and fifty obese normoglycemic women (control group) were recruited in our study (IGT group mean age: 40.1 ± 9.9 yr, mean BMI = 35.6 ± 4.8 kg/m² vs. control group: mean age 37.3 ± 10.5 yr, mean BMI = 36.0 ± 5.0 kg/m²). We measured fasting insulin, plasma glucose, HOMA-IR, AUC insulin (2h OGTT), fasting adiponectin and fasting visfatin level and anthropometric parameters (BMI and waist).

Results: Fasting visfatin (ng/ml) levels were statistically significantly higher in IGT group compared to control group (58.42 ± 8.23 vs. 25.45 ± 2.21 , $p < 0.05$). A significant difference in HOMA-IR (6.45 ± 0.93 vs. 4.57 ± 0.36 , $p < 0.05$) between IGT and control group was detected. Statistically significant difference in fasting adiponectin, AUC insulin, BMI and waist were not detected. Adiponectin was negatively correlated with HOMA-IR in control group ($p < 0.001$), but not in IGT group. There was no statistically significant correlation between fasting visfatin levels and HOMA-IR in both of these two groups.

Conclusion: Fasting plasma visfatin is elevated in women with impaired glucose tolerance, but physiological mechanism on how visfatin affects insulin resistance still remains unclear.

T5:P.041

An Intensive Weight Management Programme for Medically Complex Patients with Obesity

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Introduction: Weight management is challenging in medically complex patients with obesity.

Methods: We retrospectively analysed medically complex obese patients entering 16 week intensive weight management programme (IWMP) at our Hospital between January 2012 and July 2012. The programme consists of 8 weeks of a low energy liquid diet (1000–1200 Kcal/d) followed by meal replacement. A close medical supervision, complex dietary and behaviour support were provided. Participants' comorbid state was staged from 0 to 4 according to the Edmonton Obesity Scoring System¹ (EOSS) reflecting complex nature of the cases.

Results: Eighteen of 23 patients completed the programme. Baseline characteristics were body weight 131.9 ± 23.6 kg (mean \pm SD) (range 99–178.6 Kg), BMI 43.7 ± 8.2 kg/m² (range 37.2–67.8), 13 females, age

(49.6 ± 13.3 (range 18–75), number of comorbidities 4.1 ± 1.8 (1 to 7), EOSS score 1.94 ± 0.64 , median 2 (1 to 3). Patients include Diabetes (57%) of those 6 (26%) were on insulin, Chronic kidney disease stage 3 or above (13%), heart failure (17%), sleep apnoea (30%), hypertension (65%) and of those 4 (17%) were on 3 or more antihypertensive, hypopituitarism (13%), osteoarthritis (17%). Mean weight change at week 16 was -11.8 kg (9.0% [-27.2 kg to -2.1 kg]). Insulin requirements dropped on average by 27.3% ($n=5$, no data on 1 drop out) and antihypertensive requirements reduced from a median of 1 to 0 ($n=9$).

Conclusion: Patients with complex medical comorbidities were able to lose weight effectively and safely under close supervision, furthermore weight loss is associated with advantageous changes in the use of anti-diabetic and antihypertensive medications.

Reference

1. Sharma AF & Kushner RF. A proposed clinical staging system for obesity. *International Journal of Obesity* 2009;33(3): 289–295.

1. **Conflict of interest:** None

2. **Funding:** None

T5:P.042

Screening for Cushing's Syndrome in obese patients

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Introduction: Obesity can coexist with several endocrine disorders, including Cushing's syndrome (CS). Their exclusion is essential before obesity surgical treatment. Although CS is characterized by a broad spectrum of clinical manifestations, a significant number of patients present only with simple obesity.

Objectives: To determine the frequency of CS in an obese population.

Methods: Cross-sectional study of a population of 398 obese adults evaluated at the first attendance of Multidisciplinary Assessment of Surgical Treatment of Obesity. A first CS screening step was performed with 24h-urinary free cortisol (UFC). A second confirmatory step involved 1mg overnight dexametasone suppression test (1 mg-DST). CS diagnosis was confirmed by 48-h, 2 mg/d low-dose DST (LDDST) and differential diagnosis by high-dose DST (HDDST), ACTH and imaging studies.

Results: 336 (84.4%) were female and 62 (15.6%) were male, with a mean age of 41.3 ± 10.9 years and a median BMI of 42 kg/m² (IQR 40.7–47.6). UFC was increased in 16 (4%). UFC was positively correlated with BMI ($r = 0.194$, $p < 0.01$). 49 patients with clinical signs of CS or increased UFC performed 1mg-DXM: 8 patients had last cortisol > 1.8 ug / dL; two tests were simultaneously positive in 3 patients, in whom CS was confirmed. CS was diagnosed in another patient with an UFC of 31.5 ug / dL, but last cortisol of 9.8 ug / dL after LDDST.

Conclusions: CS was confirmed in 4 patients, which gives a prevalence of 1%. There was a statistically significant positive correlation between BMI and UFC.

T5:P.043

The effect of weight loss on nonalcoholic fatty liver disease in an overweight and obese population

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Introduction: Nonalcoholic fatty liver disease (NAFLD) is frequently associated with obesity and insulin resistance. Weight loss is recommended for obese patients with NAFLD. We aimed at studying the effect of weight loss on metabolic and histological parameters of NAFLD in an obese population.

Methods: Obese patients underwent a metabolic and liver assessment. If NAFLD was suspected, liver biopsy was proposed. Patients were invited to participate in a weight reducing program (hypocaloric diet combined with physical activity or bariatric surgery). Patients were re-evaluated after 12 months of treatment, including liver biopsy.

Results: 120 patients (70.8% female) were included (mean age 46.4±1.08years); 49.2% were treated with lifestyle intervention, 50.8% underwent bariatric surgery. In 56 patients a second liver biopsy was performed (58.9% treated with lifestyle intervention). After 12 months mean BMI fell from 39.0±0.51 kg/m² to 31.5±0.43 kg/m² (P<0.001). Significant reduction was observed in lipid profile and insulin resistance. Serum alanine aminotransferase (P<0.001), aspartate aminotransferase (P<0.001), gamma glutamyltransferase (P<0.001), and alkaline phosphatase (P=0.037) decreased. Histological improvement was noted in NASH Activity Score (from 3.96±0.30 to 1.48±0.29, P<0.001) and its individual components; steatosis (from 1.55±0.14 to 0.52±0.11, P<0.001), lobular inflammation (from 1.21±0.12 to 0.45±0.10, P<0.001) and ballooning (from 1.20±0.10 to 0.52±0.11, P<0.001). This was also significant in both intervention groups separately. However, mean decreases were higher in the surgery group. Fibrosis stage showed improvement in the surgery group (from 1.09±0.24 to 0.52±0.25, P=0.046).

Conclusion: Weight loss by lifestyle intervention can achieve a significant, histologically documented, improvement of NAFLD in obese patients. Bariatric surgery results in even more pronounced improvement, including fibrosis regression.

1. Conflict of Interest: None disclosed

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T5:P.044

Bone mineral density in morbidly obese patients and in patients after biliopancreatic diversion: A cross-sectional study

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Introduction: Morbid obesity (MO) is associated with vitamin D deficiency, secondary hyperparathyroidism and loss of bone mineral density (BMD). Loss of BMD as a result of calcium and vitamin D deficiency after bariatric surgery also has been reported. The aim of the study was to compare BMD in morbidly obese patients and in patients who underwent biliopancreatic diversion (BPD) more than 2 years ago.

Methods: 2 groups of patients were included in the cross-sectional study. 1st group (n=22, 6 males, 16 females) - morbidly obese patients, BMI 50.2 [48.0; 56.0], age 44.5 [40; 50]. The 2nd group (n=23, 6 males, 17 females) - patients who underwent BPD with follow up period 4.7 years [2.3; 7.2]. BMI before the operation in this group was 50.8 [46.5;

60.8], BMI at the moment of evaluation 32.8 [25.7; 38.7], age 44.0 [40; 51]. BMD has been assessed by dual-energy X-ray absorptiometry in proximal femur bone (total hip) and in lumbar spine (L2-L4).

Results: In morbidly obese group 4 patients had osteopenia, no cases of osteoporosis were revealed (T-score L2-L4 0.25 [-0.6; 1.5], T-score total hip 0.85 [0.3; 1.8]). In the BPD group 7 patients had osteopenia and 3 patients had osteoporosis (T-score L2-L4 -0.7 [-1.7; 0.5], T-score total hip -0.2 [-0.9; 0.5]).

Conclusion: BMD was lower in patients who underwent BPD in comparison with morbidly obese patients of the same age and sex.

T5:P.045

Women with Polycystic Ovary Syndrome (PCOS) achieve the same weight loss as women without PCOS after 12 weeks of a very low calorie diet (VLCD)

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Introduction: Evidence from standard dietary interventions suggests that obese women with PCOS face additional barriers in achieving weight loss, as compared to women without this condition. The use of VLCDs, however, has not been adequately investigated.

Methods: Data for women with PCOS (n=137) completing a 12 week VLCD with group-based behaviour therapy (LighterLife Total) were obtained from the LighterLife UK Limited database and were compared to an equal sized group of age and BMI matched women without PCOS (nonPCOS). Comparisons were performed using SPSS (version 17.0) (SPSS Inc., Chicago, IL, USA).

Results: After 12 weeks of VLCD, there was a significant weight reduction for both groups when compared to baseline (mean ± standard deviation) (PCOS: 108.3 ± 8.1 vs 89.8 ± 16.7, p < 0.001 and nonPCOS: 107.4 ± 19.8 vs 88.0 ± 17.6, p < 0.001). The total weight change observed for the PCOS group did not differ significantly from the one observed in the nonPCOS group (-18.5 ± 6.6 kg versus -19.4 ± 5.7 kg, p = 0.190).

Conclusion: Contrary to previous studies, we demonstrate that women with PCOS can achieve similar weight reduction to their non PCOS matched individuals, after 12 weeks of VLCD with group-based behaviour therapy.

1. Conflict of Interest: IB, CJ, SL and LD are employed by LighterLife UK Ltd.

2. Funding: Research relating to this abstract was funded by LighterLife UK Limited

T5:P.046

Weight loss in Young and Middle Aged Obese Subjects Improves Lipids and Adipokines Levels and Reduces Arterial Stiffness

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Background: The cardiovascular disease is the main cause of mortality and morbidity in obese patients. While many studies have focused on obese patients who have already developed cardiovascular pathology, few tried to address the prevention of atherosclerosis in healthy young adults.

Aim: Assessing the effect of weight loss on atherosclerosis risk factors and on vascular stiffness.

Subjects and Methods: 159 obese patients with no cardiovascular pathology were assigned, for 6 months, to either weight loss program or a weight maintenance recommendation. In the intensive care group subjects participated to weekly visits consisting of counseling on hypocaloric diet, and physical exercise programs.

We have measured BMI, body composition, lipid profile, adipokines levels as well as markers of arterial stiffness (CAVI, BP, ABI).

Results: At the study endpoint, we found a clinically and statistically significant ($p < 0.001$) difference between the lipid and the adipokine profiles, and, in univariate analysis, weight loss correlates with: total cholesterol decrease $r = 0.63$, LDL decrease $r = 0.65$, HDL increase $r = -0.48$, adiponectin increase $r = -0.59$, leptin decrease $r = 0.6$ and also with abdominal circumference decrease. We also found correlation between vascular stiffness parameters (CAVI, diastolic blood pressure) and the adipose tissue loss ($r = 0.71$; $p < 0.001$ for CAVI and $r = 0.4$; $p = 0.001$ for DBP).

Conclusions: Using a moderate hypocaloric diet and encouraging physical exercise, even after a short period of time, subjects can lose weight, mainly by losing fat mass. The weight loss improved the lipid and adipokines levels and increased vascular compliance.

T5:P.047

Diabetic peripheral neuropathy presenting after bariatric surgery-induced resolution of type 2 diabetes

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Introduction: We present the case of a 45 year old female who developed diabetic peripheral neuropathy following resolution of type 2 diabetes secondary to Roux-en-Y gastric bypass.

Case History: March 2011: Patient referred for bariatric surgery, weight 115 kg, BMI 40 kg/m². Type 2 diabetes diagnosed 1998. Poor glycaemic control since diagnosis (HbA1c > 58 mmol/mol). Co-morbidities: Hypertension. Pre-op medication: metformin 850 mg tds, Lantus 140 units/day, Novorapid 30 units with meals, ramipril 2.5 mg. Retinal screening - minimal background retinopathy. No neuropathy symptomatically or on examination. HbA1c = 64 mmol/mol.

September 2011: Laparoscopic Roux-en-y Gastric bypass. Insulin discontinued on discharge. Commenced multivitamin/mineral supplementation plus Adcal-D3 (2 tablets daily).

January 2012: Weight 98 kg BMI 30.3 kg/m². No dysphagia, excellent glycaemic control (home blood glucose monitoring, fasting glucoses < 5.5 mmol/L, post-prandial glucoses < 7.5 mmol/L). Metformin, ramipril discontinued

March 2012: weight 84 kg, BMI 26.8 kg/m². Bilateral paraesthesia (foot to mid-calf). Diminished sensation, reflexes intact. Monitoring blood tests normal including micronutrients (Vitamin B12, folate, Vitamin D, thiamin and copper). HbA1c = 44 mmol/L.

June 2012: Weight 81 kg, BMI 24.6 kg/m². Loss of sensation to both feet, diminished proprioception, abnormal gait. Referred to Consultant Neurologist: Nerve conduction studies and examination consistent with diabetes peripheral neuropathy. Blood tests normal. Retinal screening: No significant change in retinopathy.

Conclusion: Diabetic complications can present despite resolution of type 2 diabetes by bariatric surgery. We recommend continuance of routine diabetic review for at least 2 years post bariatric surgery.

1. **Conflict of Interest:** None

2. **Funding:** None

T5:P.048

The effects of dark chocolate on glycemic control and blood pressure in hypertensive diabetic patients: A double blind randomized clinical trial

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Introduction: Chocolates and other cocoa products, as a non-pharmacologic treatment get attentions due to their lowering blood pressure activity. The purpose of this study was to determine the effects of 8 weeks consumption of 25 gr dark chocolate (450 mg/day polyphenols) on glycemic control and blood pressure in hypertensive diabetic patients.

Methods: This clinical trial was conducted on 69 hypertensive diabetic patients who were randomly assigned in two (intervention and control) groups. Groups (n=25) received 25 gr dark chocolate (450 mg/day polyphenols) or similar amounts of White chocolate. Blood samples of patients were collected to measure fasting blood glucose (FBS), fasting insulin and HbA1c level. Physical activity and nutrients intake were evaluated before and after intervention and were compared between groups.

Results: FBS, HbA1c, systolic and diastolic blood pressure were declined significantly, in intervention group during the trial. At the end of the study, intervention group had significantly lower systolic ($P < 0.001$) and diastolic ($P < 0.001$) blood pressure than control group.

Conclusion: These data suggest that polyphenols rich in dark chocolate may improve blood pressure in hypertensive diabetic patients, however the effects on glycemic control need to be investigated further in future.

T5:P.049

Intervention vs Motivation in the obesity control and pro-inflammatory cytokine in adolescents

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Objective: We compare body composition and serum levels of cytokine of the two models of interdisciplinary long-term clinical therapy on obese adolescents.

Methods: This study comprised 39 boys obese and 52 girls obese aged 12-18 years, from a São Paulo, Brazil. The first program named "intervention" was based on a calorie-restricted diet, increased physical activity (at least 60 min/day 3 days a week), psychological therapy and nutritional education for one year. And the second program named "motivation" was based on physical activity (at least 60 min/day 1 day a week) and guidance to increase physical activity, psychological therapy, nutritional education and nutritional orientation individual for one year. Anthropometric and body composition measurements were measured before and after intervention. Serum level of TNF- α was also assessed before and after intervention of both analyzed groups.

Results: In the first model "intervention" a significantly decrease in body mass index (BMI), body fat and fat free mass values were observed after the intervention program (all $p < 0.05$). But, in the second model "motivation" the same results were not observed in body composition. However, in both models were observed a significant decrease in the TNF- α after one year.

Conclusions: These preliminary results evidence that the both models of longitudinal clinical intervention of interdisciplinary therapy start modulates an improvement of the inflammatory response of obese adolescents. But in the model "intervention" we observed change body composition quickly than model "motivation".

T5:P.050

Weight loss for individuals with type 2 diabetes following a very low calorie diet in a community based setting with trained facilitators for 12 weeks

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Introduction: Previous observations in individuals with T2DM demonstrated that weight loss achieved at 1 year was approximately 50% less than in non-T2DM patients, when the best diet and lifestyle advice and support is given.

Methods: Participants were eligible if they had T2DM, were recruited onto LL Total VLCD in 2007–2010, and for whom weight at baseline and 12 week weight change information were available. Participants with T2DM were then matched for age, BMI and gender to participants without T2DM. The intervention combines a nutritionally complete VLCD with group-based behavioural-modification (BM). Data were analysed with appropriate parametric or non-parametric tests using SPSS (version 17.0) (SPSS Inc., Chicago, IL, USA).

Results: After 12 weeks of VLCD, there was significant weight loss in both groups (T2DM 115.0 (24.4) vs 96.7 (21.4), $p < 0.0001$, non-T2DM group 117.2 (25.8) vs 97.3 (22.2), $p < 0.0001$) and a significant difference in weight change (-18.3(7.3) vs -19.9 (7.0), $p = 0.012$) and BMI change (-6.7 (2.9) vs -7.1 (2.1), $p = 0.011$) at 12 weeks between the two groups.

Conclusion: Despite a significant difference, weight loss in the T2DM group was more than 90% of that in the non-T2DM group. Our results suggest that within a community based setting with trained facilitators, individuals with T2DM can obtain an improved weight loss response using a VLCD than previously observed using standard weight loss approaches. However, the full impact of weight loss achieved in this population remains to be identified by assessing changes in glycaemia, liver function and medication.

1. Conflict of Interest: IB, SL, LD, CH are employed by LighterLife UK Ltd.

2. Funding: Research relating to this abstract was funded by LighterLife UK Limited

T5:P.051

Vitamin D and metabolic risk factors in obese children living in Sweden

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Introduction: There is increasing evidence that obese children living in Scandinavia are at high risk developing a poor vitamin D-status. Decreased sun exposure and lifestyles factors in combination with reduced bioavailability of 25-hydroxyvitamin D (25-OH-D), related to a sequestration of 25-OH-D into the fat tissue are the main reasons.

Vitamin D insufficiency (25-OH-D < 75 nmol/L) or deficiency (25-OH-D < 25 nmol/L) in obese children, may contribute to increase metabolic risk factors.

The aim was to evaluate the association between 25-OH-D, glucose, insulin and insulin resistance in obese children.

Method: 125 obese children (75 boys/50 girls, aged 5–16 years) were consecutively included at their first visit at the center from 2011-01–2012-11.

BMI SDS, fasting blood glucose, insulin and 25-OH-D were measured using standard protocol and technique. Insulin resistance was calculated using homeostasis model assessment (HOMA).

Results: All obese children had a vitamin D insufficiency. 25% of the children were vitamin D deficient with no difference between genders. No seasonal variation was observed.

A significant inverse correlation ($r = -0.3$, $p < 0.05$) was observed between 25-OH-D and children's age. When comparing vitamin D insufficiency ($n = 95$) with vitamin D deficiency ($n = 30$), we found significant higher glucose and insulin levels ($p = 0.01$ and 0.02 respectively) in children with vitamin D deficiency.

HOMA > 5 was more frequent among children with vitamin D deficiency (68% vs 32% $p < 0.01$).

Conclusion: All obese children were vitamin D insufficient. Vitamin D deficiency was associated with an increased insulin resistance. The causality is unknown and needs further studies.

1. Conflict of Interest: None disclosed

2. Funding: --

T5:P.053

Study on peri-operative and post-operative management of type 2 diabetes following bariatric surgery

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Aims: Increasingly patients with type 2 diabetes are undergoing bariatric surgery. The glycaemic response is variable and this study aimed to determine glycaemic control and insulin management post-operatively.

Methods: This retrospective study included all patients with type 2 diabetes ($n = 27$) who underwent bariatric surgery from January 2011 to July 2012 in one bariatric centre. Follow up was at 0 and 3 months.

Results: Mean age 54 years ± 7.8 , HbA1c 8.2% ± 1.7 , weight 143 kg ± 22 , BMI 51 ± 7 . Bariatric procedures: 13 gastric bands, 10 sleeve gastrectomies, 4 gastric bypasses. Pre-operatively, 14 patients were on oral hypoglycaemics alone, 12 on basal insulin +/- oral hypoglycaemics and 1 diet treated. Mean total daily dose of insulin pre-operatively was 120.4 ± 96 units reduced to 51.5 ± 25 units 24 hrs post-operatively ($p < 0.1$) and 19 ± 30 units 48 hrs post-operatively ($p < 0.05$) respectively. 15/25 patients continued metformin on discharge. At 3 months, HbA1c fell from 8.2% ± 1.7 to 7.4% ± 0.9 and insulin dose fell from 0.8 ± 0.7 units/kg body weight to 0.3 ± 0.2 units/kg body weight. 5/12 patients stopped insulin on discharge and 1 stopped at 3/12. Insulin requirements fell by approximately 2/3 immediately post operatively.

Conclusions: Considerable insulin titration and monitoring is required peri-operatively. For patients with persistent hyperglycaemia post surgery, we recommend starting on 1/3 rd of pre-op total daily dose of insulin with close follow-up.

1. Conflict of Interest: None Disclosed

2. Funding: No funding

T5:P.054

The Epworth sleepiness scale and the severity of obstructive sleep apnea in morbidly obese patients

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Introduction: The Epworth sleepiness scale (ESS) is a simple method to measure daytime sleepiness, a major symptom of obstructive sleep apnea (OSA). We aimed to evaluate whether ESS-scores were associated with the occurrence and severity of OSA in morbidly obese subjects.

Methods: A total of 104 consecutive morbidly obese adults (67 females), mean (SD) age 44.2 (11.5) years and BMI 43.2 (5.7) kg/m², were recruited from the Morbid Obesity Centre, a tertiary care centre in the southern part of Norway. The patients underwent sleep registrations at home with a portable monitor (EmblettaTM). ESS was used to evaluate daytime sleepiness. Statistical methods: Pearson's correlation, independent samples t-test and ANOVA.

Results: Mean (SD) apnea-hypopnea index (AHI) was 18 (24) events/hour and ESS-score 10.5 (4.8). A total of 62 (60%) patients had

OSA (AHI \geq 5), 45% (n=33) of females and 78% (n=29) of males. Of patients with OSA, 45% had mild (AHI 5-15), 21% moderate (AHI 15-30) and 34% severe (AHI \geq 30) OSA. There was no significant correlation between ESS-score and AHI, $r=0.12$, $p=0.215$, and the ESS-score did not differ significantly between patients with or without OSA [9.8 (4.8) vs 10.9 (4.8), $p=0.246$]. Finally, the ESS-scores did not differ significantly between patients with either no OSA, mild OSA, moderate OSA or severe OSA, $p=0.349$.

Conclusions: Our results indicate that the ESS does not reflect the occurrence or severity of OSA in treatment-seeking morbidly obese patients.

1. Conflict of Interest: None Disclosed

2. Funding: Jan Magnus Fredheim is a PhD fellow on educational grant from the South Eastern health region in Norway.

T5:P.055

Assessment of the normalisation of the metabolic state post-bariatric surgery

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Background: Prevalence of obesity worldwide is increasing alongside the global epidemic of type 2 diabetes. Obesity-related co-morbidities have been shown to improve following bariatric surgery, however poorly defined parameters have been used to assess metabolic improvement. Recently, the International Diabetes Federation (IDF) has released new clear targets defining normalisation and substantial improvement of the metabolic state.

Aims: The aim of this study was to assess the normalisation or substantial improvement of the metabolic state in our cohort of patients with type 2 diabetes following bariatric surgery using the new IDF guidelines.

Methods: This retrospective study included all patients with type 2 diabetes who underwent bariatric surgery between January 2010 and March 2012 at a local hospital.

IDF targets for full normalisation of the metabolic state are: HbA1c \leq 6%, no hypoglycaemia, BP $<$ 135/85mmHg, weight loss of $>$ 15%, total cholesterol $<$ 4mmol l⁻¹, LDL $<$ 2mmol l⁻¹, triglycerides $<$ 2.2mmol l⁻¹ and a reduction in number or dose of pre-operative medications.

Results: Twenty-six patients were analysed. Only 8% patients reached all target guidelines and 19% reached partial normalisation of the metabolic state at 2 years post-operatively. There were significant improvements in BMI, HbA1c and BP ($p<0.001$). Eighty-one percent of patients reached IDF target for weight loss, 80% reached IDF BP targets at 12 months, and 9% reached IDF HbA1c targets.

Conclusions: Although only a small percentage of patients reached all IDF targets at 2 years, most patients achieved weight and blood pressure targets. A longer time frame may allow further improvement in metabolic parameters.

T5:P.056

Prevalence of Obesity, Diabetes and Prediabetes in Tirana, the capital of Albania 2010–2011

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Introduction: Obesity and diabetes are strongly associated as causes of morbi-mortality in developing countries. The aim of our study was to evaluate the prevalence of overweight, obesity and undiagnosed diabetes in Tirana district, where 1/4 of the total population lives.

Method: Anthropometric and capillary glucose measures for healthy people unknown of diabetes. Diabetes familiar anamnesis, HTA treatment and smoking were included in the questionnaire.

Results: 3316 persons included in the study. M/F 1755/1561 (52.9%), mean age 53.4 \pm 12.02 yrs, mean BMI 28.3 \pm 1.9 kg/m². Prevalence of Obesity was

23.2% equally present M/F 23.4/23.1%, overweight 46.5%, more present in men 49.4/41.2% ($p<0.05$). Obesity was more frequent in group 40–60 years old- 27.25%, but 15.9% for the group 30–40 years old. Central obesity was present in 67.7% of cases, more frequent in women 79.9 vs 50.1% ($p<0.01$). Prevalence of undiagnosed Diabetes was 3.5%, IFG 14.5%, IGT 10.6%. Diabetes was more frequent in the groups 20–30 yrs (5.41%) and 50–60 yrs 4.32%. The patient diagnosed with Diabetes had the tendency to be more overweight 53.3 vs 44.2%, to have more familiar anamnesis for diabetes ($p<0.01$) and suffer from HTA ($p<0.05$), but not obese 20 vs 21.5%. IFG and IGT were more frequent in the group 50–60 years old.

Conclusions: Prevalence of Obesity, Diabetes, and Prediabetes is very high in Albania, especially in younger age group. It is important to raise the awareness and counseling of younger population about healthy living habits and weight control, as well as the frequency of controlling blood glucose level.

T5:P.057

Diabetes and Obesity: A model from a local diabetes clinic

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A 30 year old lady presented to the diabetes clinic – Erne Hospital – Enniskillen with metabolic syndrome (morbid obesity with base line weight 155 kg – height 1.6 m – BMI 60, type 2 diabetes with HbA1c of 10.3% reflecting poor control , uncontrolled hypertension with BP 190/120 & dyslipidemia with total cholesterol 5.4 & LDL 3.35)

She was already on metformin, gliclazide & simvastatin that needed doses maximised. Amlodipine was added to her bendrofluazide. Orlistat and liraglutide were also started. Patient was reviewed by the dietician and started on low calorie, low fat, no added salt diet and was reviewed by the diabetes nurses for initiation of liraglutide and follow up. She made good progress with weight reduction to 143 kg in 6 months, HbA1c improvement to 6.2%, ideal BP at 115/75 and target lipid profile.

Patient was then referred for bariatric surgery and had laparoscopic gastric bypass a year later with very good outcome with further weight loss to 135 kg two weeks post-operatively and further down to 116 kg three months post operatively (BMI 42). She was able to stop all her medications maintaining HbA1c of 5.4%, BP of 130/80 and normal lipid profile.

We present that case as an example of good outcome following a multidisciplinary care at our local diabetes clinic involving consultant physician, diabetes specialist nurses, dietician with link to bariatric surgery service.

Further development now includes clinical psychologist, GP with interest in diabetes and future plans are to include a local bariatric surgical service.

T5:P.058

Audit of glycaemic outcomes in patients with diabetes participating in a structured NHS weight management programme. (Glasgow and Clyde Weight Management Service, GCWMS)

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Background: The outcomes of patients on insulin attending a structured weight management service, independent of their secondary care diabetes team, were audited for possible Ketogenic impact of carbohydrate restriction and to ensure no disadvantage of being managed by an autonomous specialist team.

Subjects: 23 patients data was analysed, four with T1D and 19 T2D.

Insulin therapy was used in 17 patients, 8 on basal bolus insulin, 8 on BD mix regime and one on basal insulin only. 11 patients were on Metformin One patient each was on sulphonylurea, thiazolidinedione

and diphenylpeptidase-4 inhibitor. Two patients were on GLP-1 agonists (maximal dose Exenatide and Liraglutide respectively)

Methods: Patients were followed up for an average duration of 54.6 ± 5.5 weeks in the GCWMS programme (n = 23). Measurements of glycosylated haemoglobin were collected.

Results: The audit concluded that these patients had significant reductions in body mass (-6.9 ± 1.6 kg ($p = 0.00019$)) without incidence of diabetic ketoacidosis or deterioration in glycaemic control, ($-0.6 \pm 0.4\%$, $p = 0.12$)

Conclusion: The audit suggests that the intervention provided by the GCWMS programme is an effective weight loss measure and does not appear to significantly compromise glycaemic control. In the four patients with T1D, no episodes of ketoacidosis were recorded. Despite the limitations of the audit, it would appear that diabetic patients who are enrolled in the GCWMS programme do achieve significant weight loss without deterioration in glycaemic control and without obvious increased risk of ketoacidosis in those patients with Type 1 Diabetes.

T5:P.059

Hypogonadotropic hypogonadism in obese men

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Introduction: Obesity can be associated with hypogonadotropic hypogonadism (HH) in men, although its prevalence, causes and consequences are not exactly known. Proposed mechanisms are: adipocytary aromatase stimulation leading to oestradiol elevation and gonadotropin inhibition; decreased kisspeptin production; hyperleptinemia. Our aim was to access the prevalence of HH in obese men and its correlation with metabolic comorbidities.

Methods: Prospective study on obese men ($\text{BMI} \geq 30 \text{ kg/m}^2$) consecutively attended at our Department's Obesity Consult. Excluded those with: liver or kidney disease, transferrin saturation $>60\%$, iatrogenic effects, pituitary disease and hypergonadotropic hypogonadism. Clinical and biochemical parameters and testicular ultrasound were analyzed using SPSS 21.0®

Results: Sample of 58 patients, 33 with HH (56.9%) and 25 with normal free testosterone (FT) (48.1%). Men with HH, comparing to those with normal FT, had superior mean age (48.1 ± 11.3 Vs 41.2 ± 11.9 years; $p=0.029$) and increased body fat% (44.9 ± 10.7 Vs 32.6 ± 8.2 ; $p=0.036$). The group with HH had higher A1c (6.3 ± 1.8 Vs $5.7 \pm 1.7\%$; $p=0.061$), LDL cholesterol (141.8 ± 36.1 Vs 130.9 ± 34.7 mg/dL; $p=0.485$), triglycerides (166.2 ± 124.7 Vs 147.5 ± 76 mg/dL; $p=0.513$), peptide C (4.1 ± 1.3 Vs 3.2 ± 1.6 ng/mL; $p=0.089$) and significantly superior levels of estradiol (40.69 ± 22.2 Vs 31.35 ± 18.1 pg/mL; $p=0.035$) and leptin (21.5 ± 10.1 Vs 16.3 ± 8.3 pg/mL; $p=0.012$). Metabolic syndrome (NCEP-ATPIII criteria) was significantly higher in the HH group (71.0% Vs 40.0%; $p=0.041$). Patients with HH had more complaints of erectile dysfunction (85.7% Vs 22.2%; $p=0.002$) and decreased libido (78.6% Vs 22.2%; $p=0.003$). There was a negative correlation between FT and body fat% ($\rho=-0.430$; $p=0.012$), A1c ($\rho=-0.324$; $p=0.042$), peptide C ($\rho=-0.259$; $p=0.034$), estradiol ($\rho=-0.419$; $p=0.018$) and leptin ($\rho=-0.519$; $p=0.009$).

Conclusion: In our sample, there was a high prevalence of HH ($n=58$; 56.9%). FT was negatively correlated with A1c, peptide C, leptin, estradiol and body fat%. Patients with HH had significantly higher levels of leptin, estradiol and body fat% and a superior prevalence of metabolic syndrome.

T5:P.060

Type 2 diabetes and mobility problems do not negatively impact on the success of multidisciplinary specialist medical weight management clinics, but depression might

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Introduction: In 2009, we established a multi-disciplinary medical weight management clinic in Walsall, UK, to deliver a 6-month level 3 weight management programme in line with UK Department of Health directives. We examined a cohort of 96 patients who completed this program to determine if specific co-morbidities predict outcome in terms of weight loss.

Methods: We audited the 96 most recent completers of this programme (audit end October 2012) and compared weight loss outcomes against co-morbidities.

Results: 95 patients (73 female, 23 male). Mean age 50.0 years, Initial mean weight 134.4 kg, BMI 50.1 kg/m². Overall mean weight loss = 6.4% initial body weight. (57.9% patients lost >55 initial body weight: 27.4% lost $>10\%$.)

43 patients (45%) had type 2 diabetes: mean weight loss = 7.2% (not statistically significant compared to overall population).

52 patients (55%) presented with osteoarthritis and/or significant mobility limiting conditions: mean weight loss = 7.4% (NS).

25 patients (26%) presented with both type 2 diabetes and osteoarthritis/significant mobility problems: mean weight loss = 8.3% ($p=0.1$)

24 patients (25%) presented with a history of depression: mean weight loss = 5.3% (NS).

Conclusion: Neither type 2 diabetes nor osteoarthritis/significant mobility problems impact negatively on the outcome of a multi-disciplinary specialist medical weight management programme, but our data suggests that a history of depression might impact negatively on weight loss at the end of 6 months.

1. **Conflict of Interest:** None

2. **Funding:** No Funding for this abstract

T5:PS4 - Diet, Behaviour & Physical Activity Treatments in Adults. Economics & Cost-Effectiveness of Treatment. Long Term Weight Maintenance

T5:P.061

Weight2go: A Peripatetic Level 1 Weight Management Service in Cambridge City and South Cambridgeshire

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Introduction: Weight2go is Level 1 weight management service, commissioned in early 2009 for a three year pilot.

Methods: Twenty-three out of 33 GP practices (70%) participated during the period of February 2009 to November 2011. Three Weight Management Assistant Practitioners (WMAps) are employed, trained and supervised by the Dietetic Business Unit. Clinical outcomes, including weight, height, BMI, BP & achievement of goals, were recorded on ProHealthClinical, (KasTech Ltd). Outcome data was analysed for all patients ($n=1625$). This outcome analysis includes those attending at least 4 of the 6 scheduled appointments within 3 months of commencing Weight2go.

Results: Of the 1152 who started the programme by November 2011, 70.4% attended 4 or more visits ($n=812$). Patient inclusion criteria required ≥ 18 years old and had a BMI ≥ 28 with co-morbidities or BMI

≥ 30. The mean BMI was 37.4 with 24.8% of participants having a BMI ≥40. The mean weight change for patients attending 5 or more appointments was -4.5kg with 35.9% achieving a 5% initial weight loss by 3 months. More males (28.6%) participated in this programme than typically register (≤10%) for commercial weight loss programmes. Patients with a BMI ≥40 demonstrated a mean weight loss of 5.2kg (4.0%). Follow up reviews of patients completing their initial 3 month programme demonstrates continued weight loss with -7.4% at 6 months and -7.2% at 12 months.

Conclusion: This Level 1 Obesity Intervention achieves and maintains clinically valuable weight loss in the Primary Care setting.

T5:P.062

The effect of oolong tea polymerized polyphenols-enriched beverage on body fat mass in obese human

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Introduction: Oolong tea polymerized polyphenols (OTPP) has strong inhibitory activity against pancreatic lipase. We have demonstrated that the OTTP-enriched beverage suppressed fat absorption and the elevation of postprandial triglyceride level in human.

Objective: In this study, we investigated the effect of the long-term OTTP-enriched beverage intake on the body fat mass in obese humans.

Methods: We performed a randomized double-blind, placebo-controlled trial. The 281 subjects with $25.0 \leq$ body mass index (BMI) < 30.0 kg/m² were randomly divided into two groups; OTTP-enriched beverage (OTTP 70 mg/350 ml) group and placebo beverage group. Each subject consumed one bottle with a meal twice a day for 16 weeks. Body Fat was measured by computed tomography (CT) scan.

Results: The changes of both total fat area (TFA) and visceral fat area (VFA) from 0 week to 16 weeks were -11.32 cm² and -7.01 cm² in OTTP-enriched beverage group, respectively. They were significantly different compared with those in placebo beverage group. In addition, body weight, body mass index, body fat ratio, waist size, hip size and skinfold thickness were significantly reduced by the intake of OTTP-enriched beverage. No adverse effects were observed in both groups.

Conclusions: The long-term intake of OTTP-enriched beverage with a meal resulted in the reduction of body fat by means of the suppression of fat absorption, suggesting that OTTP-enriched beverage could be effective for prevention or amelioration of metabolic syndrome.

T5:P.063

The influence of low caloric diet and n-3 PUFA on inflammatory markers in obese patients

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Introduction: Obesity promotes the development of chronic inflammatory state. Intervention studies revealed, that weight reduction exerts anti-inflammatory effect.

Methods: One hundred and three subjects (63 obese and 14 controls) aged 25-65 yrs from Out-patient Clinic of Obesity and Lipid Disorders and Department of Clinic of Metabolic Disorders CMUJ completed the Oral Glucose Tolerance Test (OGTT) and Oral Lipids Tolerance Test (OLT). Subjects were randomized to isocaloric or low caloric diet groups (1200-1500 kcal/day) with placebo (corn oil) or 3x 600 mg capsules n-3 PUFA, with DHA:EPA ratio 5:1 supplementation (EPAX 1050 TG) for three months. Blood concentrations of hs CRP, IL-6,

sPECAM, adiponectin, leptin, resistin and visfatin were measured before and after intervention.

Results: Obese patients on low calorie diet and placebo diminished their BMI status from 34.6 to 32.0 kg/m² and on n-3 PUFA from 34.1 to 32.3 kg/m². Significant decrease of hsCRP levels (from 2.1 to 1.6 mg/l on placebo and from 3.4 to 2.1 mg/l on n-3 PUFA), and mild decrease of IL-6 levels were observed after weight reduction, what was more pronounced in patients on n-3 PUFA supplementation. The postprandial studies (during OGTT and OLT) showed significant reduction in sPECAM levels after low calorie diet, but any further effect of n-3 PUFA was observed. Any effect of n-3 PUFA supplementation on adipokines concentrations were noted.

Conclusion: Weight loss and n-3 PUFA supplementation reduce the inflammatory state associating obesity, what may contribute to prevention of cardiovascular complications.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded by EU FW7 BIOCLAIMS, Grant agreement no. 244995 and grant K/ZDS/002442

T5:P.064

Year-on-year comparison of male and female patients following 12 weeks of the LighterLife Total VLCD weight-loss programme

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Introduction: LighterLife Total is a commercial weight-management programme for patients with BMI ≥30. It utilises the LighterLife Way, a tripartite approach comprising a very-low-calorie diet (VLCD), behavioural-modification using transactional analysis/cognitive-behavioural therapy techniques (TCBT[®]), and group support in single-sexed group sessions. Post-weight loss, an ongoing weight-maintenance programme helps patients sustain healthy lifestyle changes.

Method: Mean weight loss, BMI change and %body-weight lost (%BWL) were determined in a sample of 31,316 male and female patients completing 12wks of the LighterLife Total VLCD in 2008-2012. The data for both male and female participants were combined and analysed together for simplification. Data were analysed by One-way ANOVA and Scheffe's (post-hoc) tests using SPSS version 17.0 (SPSS Inc., Chicago, IL, USA).

Results:

Year	Start weight (kg) (mean±SD)	Start BMI (mean±SD)	Weight after 12wks (kg) (mean±SD)	BMI after 12wks (mean±SD)	Weight-loss (kg) (mean±SD)	%BWL (mean±SD)
2008	102.4±19.4	37.5±6.0	82.7±16.2	30.4±5.2	19.7±6.4	19.2±4.3
2009	103.5±19.7	37.8±6.1	83.9±16.4	30.7±5.2	19.6±5.9	18.9±4.0
2010	103.9±19.4	38.0±6.1	84.5±16.1	30.9±5.2	19.4±6.1	18.7±4.0
2011	105.3±20.6	38.2±6.3	85.8±17.3	31.2±5.4	19.4±6.3	18.4±4.4
2012	105.8±19.6	38.7±6.2	86.9±16.7	31.8±5.5	18.8±6.2	17.8±4.6
p-value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Conclusion: The reason for the reduction in %BWL year-on-year is unclear but may be due to the introduction of new VLCD products which increased total daily intake by approx 50kcal. The effect of this

over 12wks may impact on the total amount of weight lost. However, the mean amount of weight loss observed was still a clinically significant at 17.8% (18.8kg) in 12wks.

T5:P.065

Analysis of a primary care based Obstructive Sleep Apnoea (OSA) screening programme within the Rotherham Institute for Obesity

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Introduction: The Rotherham Institute for Obesity (RIO) provides a multi-disciplinary specialist weight management intervention, primarily for the morbidly obese and the obese patients with co-morbidities. As part of its services it offers screening for OSA.

Methods: All patients attending RIO complete an Epworth questionnaire and have their neck circumference measured as part of their initial consultation. Those who are symptomatic of sleep problems, or obese and diabetic, are offered overnight oximetry using Resmed Apnoea Link equipment. Those with an Apnoea Hypoxic Index (AHI) of >5 were referred to the local sleep centre.

Results: From June 2011 to November 2012, 233 patients proceeded to home oximetry screening for OSA.

167 (72%) had an AHI of >5 .

Of 153 referrals sent to the local sleep centre, 111 had been seen.

88% of these seen were considered to have OSA.

71 were now on CPAP, and a further 27 had mild/moderate OSA.

53% of RIO obese diabetic that were screened, whether symptomatic or not, had a high AHI and referred, which resulted in 83% considered to have OSA, and 61% are now on CPAP.

Conclusion: Our results suggest that OSA is very prevalent in the patient population attending RIO. This screening programme appears to be effective at identifying patients with OSA and with a good correlation to subsequent secondary care testing. Patients are now being treated for a potentially life threatening condition that may otherwise have been missed.

Funding: The Resmed oximetry equipment was kindly donated to RIO.

T5:P.066

Effect of dietary glycemic index and glycemic load on body weight and cardiovascular risk factors: The GLYNDIET Study

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Introduction: Glycemic index (GI) has been explored as an alternative for the prevention and/or management of obesity, cardiovascular disease and T2DM. The objective of the study was to analyze the effectiveness of GI and glycemic load (GL) in the weight loss and the improvement of cardiometabolic risk profile.

Methods: A 6-months randomized, parallel, controlled clinical trial was conducted on 122 community-dwelling subjects aged 30–60 years, with a body mass index of 27–35 Kg/m². Subjects were randomly assigned to three dietary intervention groups; low-GI group (40% fat, 42% low-GI carbohydrates and 18% protein), high-GI group (40% fat, 42% high-GI carbohydrates and 18% protein), or low-fat group (30% fat, 52% high-GI carbohydrates and 18% protein). Blood samples were collected at baseline, at the end of the study and two hours after the ingestion of a study-test breakfast according to the intervention group

Results: In a postprandial state, significant differences in changes of glucose, insulin and HOMA-IR were observed between groups. At the end of the study, weight loss was significantly greater in subjects allo-

cated in the low- and high-GI groups than those in the Low-fat diet group (-7.18 ± 3.74 , -7.05 ± 5.16 and -4.32 ± 4.31 kg; $p=0.016$, respectively). However, no significant differences between groups were observed in the rest of biochemical variables analysed.

Conclusion: The results of our study suggest a beneficial effect of low-carbohydrate diets in weight-loss in comparison to low-fat diets independently of glycemic index.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded by Institut d'Investigació Sanitària Pere Virgili (PV11059S) and Instituto de Salud Carlos III (PI12/01533).

T5:P.067

Drop-out in obesity treatment: predictable and preventable?

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Introduction: Attrition is an important yet understudied issue in the failure of obesity treatment. To date the majority of studies reporting attrition rates and/or its predictors simply examine pre-treatment data routinely collected for other purposes (describing sample characteristics or evaluating weight loss outcomes). The aim of our study was to identify predictors of drop-out focusing on theoretically (e.g. psychopathological symptoms and dieting behavior) or empirically (e.g. poor early weight loss) grounded features.

Methods: Pre-treatment (socio-demographic, nutritional, psychopathological) and treatment-related (weight loss at 1 month) variables were retrospectively selected and/or calculated from clinical chart of 98 obese (BMI ≥ 30 kg/m²) adult (36 males, 62 females) subjects who underwent a 6-months dietetic-behavioral weight loss treatment at the Human Nutrition Research Centre – University of Pavia, Italy; those variables were tested as potential predictors of dropout.

Results: Drop-out rate was 21% at 1-month and 57% at 6-months. Subjects who abandoned treatment before its completion significantly differed from completers for: age at first dieting attempt, diastolic blood pressure, body fat percentage, referral, SCL90-Anger-Hostility subscale and early weight loss. Univariate regression analysis confirmed those variables as predictors of drop-out. Multivariate regression analysis found that age at first dieting attempt and SCL90-Anger-Hostility were significantly related to increased odds of attrition ($p \leq 0.05$) in the “baseline” model; in the “baseline + treatment” model only the early weight loss was significantly related ($p \leq 0.05$).

Conclusion: Our data confirm psychopathological traits and early dieting attempts, as well as a poor initial treatment response, as significant predictors of drop-out.

1. Conflict of Interest: None Disclosed

2. Funding: No Funding

T5:P.068

Assessing the appropriateness of the level of care for morbidly obese subjects

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Introduction: L'obesità è una malattia cronica che si associa ad aumentato rischio di morbidità e mortalità, nonché a disabilità di grado variabile che peggiora la qualità della vita e comporta ingenti costi sanitari per la sua gestione. Due to an increased risk of morbidity, mortality, and disability, obesity management requires significant health care costs. Questi costi possono essere sicuramente ridotti se si interviene sulla malattia precocemente in una logica riabilitativa. The C'è pertanto la necessità di utilizzare al meglio le risorse a disposizione della sanità indirizzando il singolo paziente al setting di cura più adeguato al suo caso clinico, anche secondo il principio dell'appropriatezza di cu-

ra richiesta dal Sistema Sanitario Nazionale. best use of available resources is needed to address the patient to the most appropriate health care setting, according to the principle of appropriateness by all National Health Systems.

A scale of appropriateness for access to different settings of care (SSA-RMNP-O) was drawn up, according to scientific literature, by an expert panel working in different Italian public and private hospitals.

The Scopo dello studio è stato pertanto quello di validare la scheda di appropriatezza e definire aim of this study was to validate the scale and to determine i cut-off che diano indicazione ai setting di cura. the cut-off score, to verify the validity of the SSA-RMNP-O compared to the workload, the incidence of ACEs and the committed resources.

Materials and Methods: 16 diversi centri italiani specializzati nel trattamento dell'obesità sono stati coinvolti nello studio. Italian centres, specialized in obesity treatment, Ogni Centro ha reclutato complessivamente 30 soggetti obesi suddivisi secondo i diversi setting attivi nel centro (ambulatorio specialistico, day-hospital o day service, ricovero riabilitativo). including different settings of care (specialist outpatient service, day-hospital rehabilitation, intensive inpatient rehabilitation) participated in the study.

Non sono stati posti vincoli di età o di genere. Due mesi dopo l'inizio del trattamento è stata compilata una scheda riassuntiva del carico di lavoro (interventi del personale sanitario, numero delle consulenze specialistiche e delle procedure diagnostiche, modifiche della terapia farmacologica, eventi clinici avversi). After a two month- treatment, a summary sheet of the workload (medical and nursing interventions, number of expert advices and diagnostic procedures) and adverse clinical events (ACEs) was filled.

Results: Sono stati arruolati nello studio 449 soggetti obesi, di cui 30,5% maschi e 69,5% femmine. 449 obese subjects were enrolled (30.5% males and 69.5% females): La loro distribuzione nei tre setting di cura è la seguente: 38,3% soggetti in ambulatorio, 20,7% in Day-Hospital e 40,9% in reparto di riabilitazione intensiva. 38.3% from outpatient services, 20.7% from day-hospital rehabilitation units and 40.9% from intensive inpatient rehabilitation units.

A E' stata rilevata una correlazione statisticamente significativa, a prescindere dal setting di cura, tra lo score SSA-RMNP-O e le seguenti variabili esplicative scelte [età, interventi dei medici di reparto e degli infermieri, farmaci iniziali e finali, procedure di laboratorio, diagnostica strumentale, consulenze, carico di lavoro globale (interventi + procedure), eventi clinici avversi]. statistically significant correlation was found between the SSA-RMNP-O, workload and ACEs.

Infine la scala di appropriatezza SSA-RMNP-O ha dimostrato un'ottima validità interna ed un eccellente test-retest nell'intero campione. The SSA-RMNP-O demonstrated an excellent performance to internal validity and test-retest analysis.

Conclusion: La scala SSA-RMNP-O ha dimostrato di essere un valido strumento di valutazione dell'appropriatezza della scelta del livello di cura (ambulatorio – DH – ricovero ordinario di riabilitazione intensiva) consentendo di verificare la corretta allocazione di circa l'80% dei pazienti in quanto ben correlato con le misure del carico di lavoro e con l'incidenza di eventi clinici avversi. The scale SSA-RMNP-O was demonstrated to be a valid tool for assessing the appropriateness of the choice of the level of care and of the proper allocation of patients.

1. Conflict of Interest: None Disclosed

2. Funding: No Funding

T5:P.069

Motivate: A structured behavioural weight management program for obese adults with long term condition (LTC) is a cost-effective treatment

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Introduction: Resent figures estimate the annual cost of overweight and obesity in Northern Ireland to be €510 million. More than a third of this cost can be directly related to healthcare; hospital services, GP visits and drugs. The evidence however, tends to lack details on robust cost-

effective data for weight management services offered to patients with a weight related LTC.

Method: Motivate, a combination of 1:1 and bi-weekly group sessions ran for 6 months. The sessions were facilitated by specifically trained staff; key components included eating, activity habits, application of behavioural tools, relapse and maintenance strategies. Obese adults with a LTC were invited to participate. Use of healthcare resources were compared; 6 months before and during the program. Attendance at Primary, Community and Hospital services were recorded from Trust and GP records. Current prescriptions were used to assess drug usage and dosage before and after completion of the program.

Results: The program (cost per referral £86) delivered meaningful degrees of weight loss, 6% $p < 0.001$ at 6 months; 5% $p < 0.001$ at 12 months. The use of healthcare resources decreased considerably; cost to Primary Care reduced by 75%, Community Care by 80% and Secondary Care by 100% (actual cost per completer ($n = 180$) £79 to £13; £24 to £3; £459 to £7 respectively). Prescribing cost decreased from £732 to £522 (28%) per completed. To deliver the program

Conclusion: There are clear outcomes to demonstrate that cost savings can be achieved when an effect weight management service is applied in practice.

T5:P.070

Effects of face-to-face dietary lecture frequency and intervention periods on weight loss and estimated staffing costs

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Introduction: To examine the effects of face-to-face dietary lecture frequency and intervention periods on weight loss, and to determine the relationship between cost and benefits.

Methods: Ninety-eight obese or overweight women with increased waist circumference, hypertension, dyslipidemia, or hyperglycemia participated in the weight loss program. The participants were divided into three groups with different face-to-face dietary lecture frequency and intervention periods; 6-week, twice-weekly lectures ($n=32$); 12-week, twice-weekly lectures ($n=30$); and 12-week, weekly lectures ($n=36$). All three groups engaged in an equal amount of lecture hours (24hours in total) and were instructed to reduce their dietary energy intakes to 1200kcal per day. Lecture content was identical between all three groups. Costs were evaluated using the wages paid to a staff worker (estimated from working hours and average basic wage in Japan) per 1kg of weight loss for each group.

Results: There were no significant differences in weight loss (6-week, twice-weekly lectures, -4.6 ± 2.3 kg; 12-week, twice-weekly lectures, -5.9 ± 3.0 kg; 12-week, weekly lectures, -4.9 ± 2.5 kg; $P=0.12$). However, weight loss per week in the 6-week, twice-weekly lectures (-0.7 ± 0.4 kg/week) was significantly higher than the other two groups (-0.5 ± 0.2 kg/week, -0.4 ± 0.2 kg/week, $P < 0.05$). Costs for the 6-week, twice-weekly lectures (€70.9/kg) was lower than the other two groups (€81.6/kg, €72.1/kg).

Conclusion: Short intervention periods may be as effective as longer intervention periods when educational exposures are similar. Since frequent participant visits and extended intervention periods are both likely to increase the cost, then short and intensive weight loss interventions might be a time- and cost-effective approach to reduce obesity.

T5:P.071

Weight maintenance in obese patients with knee osteoarthritis: The LIGHT Study – a Randomized Clinical Trial

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Introduction: Weight loss and maintenance is difficult in obese patients with knee osteoarthritis due to reduced mobility. Formula low-energy-diets can be an effective treatment, but the optimum way of delivering weight maintenance diets remains unclear.

Methods: We studied changes in body weight and waist circumference at one year, after a weight loss intervention, between two groups randomized to use formula low-energy-diet products with different strategies for weight maintenance. One-hundred-and-fifty-three patients (BMI 33.3 SD: 4.6 kg/m², mean age 63.8 SD: 6.3 years, 83% women) were randomized. The interventions were either three intensive weight loss 5-weeks periods/year (the third ending 12 weeks before the test-day), where the participants received an all-provided low-energy-diet (3400 kJ/day), or an offer to use 1-2 formula diet products/day, thereby reducing the daily energy intake. Attention and freely provided formula products were similar in both groups (Cambridge Weight Plan).

Results: Baseline average body weight was 91.9 kg (SD: 14.3), 68 weeks after weight reduction from an original average weight of 103.2 kg, and waist circumference was 102.3 cm (SD: 10.9). Retention was similar in both groups (88%). Mean changes in weight after one year in the intensive group and the group substituting meals regularly were -0.96 and 1.59 kg, respectively, with a mean difference of -2.55 kg (95% CI: -4.24 to -0.86; P=0.003). Mean changes in waist circumference in the intensive group and the group substituting meals were 0.33 and 2.68 cm, respectively, with a mean difference of -2.35cm (95% CI: -4.46 to -0.25; P=0.03).

Conclusion: Our results show that weight loss is maintained better with an intensive intermittent formula low-energy-diet approach than by continuous substitution of meals.

ClinicalTrials.gov Identifier: NCT00938808

1. Conflicts of Interest: ARL is Medical Director of Cambridge Weight Plan.

2. Funding: The Oak Foundation, The Cambridge Weight Plan, UK.

T5:P.072

18 month weight maintenance outcomes of patients who have successfully lost > 5kg weight during an NHS multicomponent weight management programme, use of learned strategies and effect of attendance at maintenance programme were evaluated

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Background: Maintenance of weight loss ≥ 1 year confers health benefits. The strategies employed to achieve this are of significant interest.

Subjects: 54 obese subjects were recruited from a multicomponent NHS weight management service. Subjects were included if they achieved ≥ 5 kg loss at end of weight loss intervention.

Methods: Subjects were contacted 18 months after completion of the weight loss phase of the programme. A questionnaire was administered and they attended a follow up clinic. Qualitative and quantitative results were analysed

Results: 54% of subjects successfully maintained their weight loss within 5 kg range at 18 month follow up. The mean weight loss on completion of the programme was -9.7 kg (S.D 5.4) and mean overall

weight change after 18 months was -5.5 kg (S.D.8.2), 77% of patients were of lower weight at follow up than initial weight with 48% achieving a clinically significant weight loss ≥ 5 kg.

The following lifestyle behaviours included in the programme were associated with an ability to maintain weight loss: A low fat, low kcal diet ($p<0.001$), regular weight monitoring ($p=0.04$), exercising portion control ($p=0.03$), meeting the physical activity guidelines of 225-300 minutes moderate activity a week ($p=0.002$), and attending a maintenance intervention for 10 months ($p=0.007$).

Conclusion: Initial weight loss success during an NHS obesity treatment programme can be maintained in the long-term. Post treatment maintenance support and continued use of a low fat, low kcal diet, regular self-monitoring, portion control and meeting PA guidelines were important strategies for success.

T5:P.073

Water-Induced Thermogenesis: Beyond H2O

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Drinking large amounts of water is often recommended for weight control – a notion which is supported by reports that drinking 500 ml of water increases resting energy expenditure (REE) by 30% during 30–90 min post-ingestion. These findings are, however, inconsistent with other human studies reporting no significant thermogenic response to similar (or even greater) water load. One explanation for these conflicting results may reside in the fact that studies reporting ‘water-induced thermogenesis’ utilize tap water or bottled mineral water, both of which contain ingredients (minerals, salts, pollutants, etc) which may be contributing to the thermogenic effects of ‘water’.

In experiments reported here in overnight fasted young men in whom REE was measured by ventilated hood indirect calorimetry before and for 2 h after water drinks (21 °C), we found that drinking 500 ml of purified (distilled) water did not result in a significant increase in REE (1.3%; $n=16$). By contrast, drinking 500 ml of bottled mineral water (rich in calcium, magnesium, sodium, sulphate, bicarbonate) resulted in significant but still modest increase in REE (5.8%, $p<0.001$; $n=8$). No significant differences were found in REE after drinking 500 ml of distilled water together with the ingestion of capsules of sodium bicarbonate in amounts equivalent to (or double) that present in the bottled mineral water.

Our results suggest that drinking 500 ml of purified water has little or no effect on REE. Whether the presence of minerals/salts (other than bicarbonates) and/or sensorial effects may explain differential thermogenic responses to water remains to be investigated.

1. Conflict of Interest: None disclosed.

2. Funding: This study received no specific funding.

T5:P.074

Year-on-year comparison of male and female patients following 8 weeks of the LighterLife Lite LCD weight-loss programme

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Introduction: LighterLife Lite is a commercial weight-management programme for patients with BMI ≥ 25 -29.9. It utilises the LighterLife Way, a tripartite approach comprising fortified-food replacements and a calorie/carbohydrate-restricted meal in a low-calorie diet (LCD, 800-1200 kcal), behavioural modification using transactional analysis/cognitive-behavioural therapy techniques (TCBT[®]), and group support in single-sexed group sessions. Post-weight loss, an ongoing weight-maintenance programme helps patients sustain healthy lifestyle changes.

Method: Mean weight loss, BMI change and %body-weight lost (%BWL) were determined in a sample of 6,741 male and female patients completing 8 weeks of the LighterLife Lite LCD in 2009-2012. The data for both male and female participants were combined and analysed together for simplification. Data were analysed by One-way ANOVA and Scheffe's (post-hoc) tests using SPSS version 17.0 (SPSS Inc., Chicago, IL, USA).

Results:

Year	Start weight (kg) (Mean±SD)	Start BMI (Mean±SD)	Weight after 8wks (kg) (Mean±SD)	BMI after 8wks (Mean±SD)	Weight loss (kg) (Mean±SD)	%BWL (Mean±SD)
2009	75.7±7.0	27.7±1.4	67.7±6.5	24.8±1.4	8.0±2.7	10.5±3.3
2010	76.3±7.6	28.0±1.5	68.3±7.1	25.1±1.4	8.0±3.0	10.5±3.6
2011	76.7±7.7	28.0±1.5	68.9±7.1	25.2±1.5	7.8±2.6	10.1±3.1
2012	76.9±8.9	28.1±1.8	69.1±7.7	25.3±1.5	7.8±4.0	10.1±3.5
p-value	<0.001	<0.001	<0.001	<0.001	0.054	<0.001

The results show an increase in weight and BMI at baseline. Mean weight loss after 8 weeks remained at ~8kg, resulting in a non-significant difference between these years.

Conclusion: Start weight and BMI are increasing year on year, while the amount of weight loss remains consistent. Clinically significant 10.1% (7.8kg) weight loss is achieved consistently during the 8 week LCD programme.

T5:P.075

Does physical activity has benefits beyond weight loss in people with severe obesity? A systematic review

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Introduction: Physical activity (PA) is strongly recommended by experts in the medical and surgical management of obesity. However, all benefits of PA are not clearly identified in people with moderate to severe obesity. The objective of this systematic review was to appraise the impacts of PA practice and physical fitness (PF) on health outcomes in subjects with moderate to severe obesity.

Methods: Studies were identified from Medline, Scopus, Cinahl and Sportdiscuss from 1946 to October 2012. Two independent investigators selected original studies evaluating the impacts of PA practice or PF in adults with BMI ≥ 35 kg/m², extracted characteristics and results of the interventions, and evaluated the quality of the trials. A third investigator solved disagreements.

Results: From 3167 articles identified, 255 were selected for full text review and 135 were included in our review. From these, 52 were observational and 83 interventional studies, among which 54% were carried out in the United States. In the interventional studies, only 32% were randomized controlled trials, 11% studied long-term interventions (≥12 months) and 22% proposed PA management before and/or after bariatric surgery. Very few studies were of high methodological quality. Weight was the most studied outcome, followed by PF, body composition, psychological parameters, comorbidities and quality of life. All studies reported significant improvements in at least one of these outcomes.

Conclusion: Although there is some evidence of benefits of PA in subjects with severe obesity, higher quality trials and more data are required to describe the impact of PA beyond weight loss.

1. Conflict of Interest: None Disclosed

2. Funding: Canadian Institutes of Health Research

T5:P.076

Slimming World on Referral: Weight-management outcomes from a new enhanced service

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Introduction: The Slimming World (SW) on Referral partnership service, established in 2001, involves a health professional providing a referral to a patient giving immediate access to a local Slimming World group for one or more blocks of 12 weeks.

Through continuing service development SW launched an enhanced service in August 2011 whereby the health professional issues information about SW to the patient, who is then required to phone the SW referral hub. The patients' eligibility (based on the commissioner's criteria) and readiness to change is assessed, the programme is explained to the patient and, if appropriate, they are enrolled in the service. A follow-up call is made after 2 weeks on the programme to assess satisfaction/progress.

Methods: This study compares the outcomes of the standard service¹ with audit data from the new enhanced service (collected between August 2011 and November 2012).

Results:

Mean outcomes (SD)		
	New enhanced service	Audit of standard service
Number	629	34,271
Start BMI (kg/m ²)	38.2 (6.8)	36.8 (6.5)
Attendance (weeks)	9.4 (3.2)	8.9 (3.6)
BMI change (kg/m ²)	-1.9 (1.5)	-1.5 (1.3)
Weight change (kg)	-5.3 (4.1)	-4.0 (3.7)
Percentage weight change	-5.1 (3.7)	-4.0 (3.6)
Number achieving 5% weight loss	45.2%	35.8%

Patients accessing the service through the new enhanced route showed better outcomes in terms of weight and attendance (p<0.003 for all comparisons).

Conclusion: Referral to SW is a practical option for NHS weight management strategies and this alternative enhanced service provides improved outcomes.

Reference

1. Stubbs et al. (2011). *Obesity Facts* 4:113-120.

1. Conflict of Interest: All authors work for Slimming World.

2. Funding: Patient referral was funded by the NHS trusts and data analysis related to this abstract was funded by Slimming World.

T5:P.077

Does a Combined Dietetics and Physiotherapy Led Group Approach Promote Weight Loss in Pre and Post Renal Transplant Recipients and Donors?

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Increased Body Mass Index (BMI) in renal transplant recipients has been linked with shorter graft longevity. To proceed to healthy live donation, considered the most cost effective and successful form of renal replacement therapy donors are advised to have a BMI<30. Levels of obesity in pre and post surgery recipients and donors are increasing in our Nephrology and Transplant Directorate.

The NICE Guidelines 2006 state that weight management intervention should be multi-component comprising of dietary advice, physical activity and behaviour change.

An 8 week combined dietetics and physiotherapy programme was established with participants being screened and referred by the transplant team. Pre and post transplant recipients and donors were accepted.

Weekly sessions involved an individual energy prescription and a tailored exercise circuit class with motivational interviewing to promote healthy lifestyle change.

Four groups enabled 34 participants to complete the programme. The average weight loss in 8 weeks was 3.8 kgs (0–8.3 kgs) and in 12 weeks was 4.7 kgs (0–12.4kgs). This shows weight loss of 4.7% over 12 weeks. Incidentally exercise tolerance improved with Sit to Stand 60 improving by 26%. Improvements shown in BMI and waist circumference. Anecdotally participants reported improved mobility, breathing and self esteem.

This programme demonstrates an innovative approach to weight management in this population. The programme provides the skills and information to empower the participants to manage their own weight and health.

We aim to embed this lifestyle programme into our core service and demonstrate cost effectiveness.

T5:P.078

Observational improvements in cardiovascular fitness with primary care initiated physical activity within the Rotherham Institute for Obesity (RIO)

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Introduction: The Rotherham Institute for Obesity (RIO) provides a multi-disciplinary team approach to weight management in the primary care setting. Exercise therapy is provided in on-site gym facilities, and includes a minimum of 6 sessions with exercise therapists, whose aim is to educate and motivate patients.

Methods: A trial was designed to assess whether quantitative improvements in fitness levels were being achieved within RIO. This included 3 tests (step test, wall press-up and stand-up/sit down “squat” test) performed at the beginning, and at the end, of a fixed 6 sessions with the exercise therapists. Male and female data was analysed separately in initial and final test scores for each procedure, whilst the difference of initial and final test scores was analysed between gender groups.

Results: Between April 2011 and April 2012, 381 patients completed the trial.

Test results showed significant improvement from initial to final testing ($P<0.05$), whereas between gender testing showed that males on average had improved their test score significantly more than females ($P=0.003$, male mean difference = 6.56, female mean difference= 4.84) and non-significantly improved their press-up score ($P=0.07$, male mean difference = 7.95, female mean difference = 6.79).

Contrary to this females showed a non-significant increase in the squat test ($P=0.61$, male mean difference = 6.90, female mean difference = 7.25)

Conclusion: These results further support the benefits of a moderate and achievable amount of physical activity in the obese patient and continues to support its use within the RIO MDT weight management programme.

T5:P.079

Comparison of Prediction Equations for Resting Energy Metabolic Rate in Obese Adults and the Implementation of the Mifflin St Jeor, as part of a NHS Weight Management Programme

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Background: Predictive equations used to calculate resting energy requirements (REE) often over predict for the obese population and capping of extreme results is currently used in practice. The aim of this study was to elucidate which equation is the best fit for an obese population and pilot it within an NHS Weight Management Programme.

Subjects: 56 obese, subjects from a multicomponent NHS weight management service with BMI ≥ 35 or ≥ 30 with co-morbidities. A matched group of 70 patients receiving usual care was used as a comparison.

Methods: Following a literature review 4 predictive energy equations were highlighted and modelled against the current energy equation (WHO) using a range of weights, ages and gender, an average height was used. The Mifflin St. Jeor equation was identified as best fit and used to estimate REE for each patient. Weight change results were then compared with the matched cohort of patients. Frequency of capping of extreme REEs was also compared.

Results: 19 of the 56 trial patients met the target weight loss goal of ≥ 5 kg (34%). In the comparison group 18 out of the 70 patients met the target (26%). One calculation was capped in the experimental group whereas 10 were capped in the comparison group

Conclusion: The Mifflin St Jeor equation predicted more accurately the energy requirements for this obese patient group and patients whose requirements were calculated using it were more successful in losing ≥ 5 kg.

1. Conflict of Interest: None

2. Funding: No funding.

T5:P.080

Pilot of a Low Calorie Diet in a liquid form as a treatment option within a specialist, multi-disciplinary weight management programme

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Background: This pilot aimed to achieve a 10kg minimum weight loss over a 12 week period using a low calorie liquid diet (LCLD).

Methods: Patients were recruited from an NHS multi-component weight management programme having completed a 16 week lifestyle intervention. Patients with a BMI <30 kg/m² and those with diabetes on oral or injectable medications other than Metformin, were excluded. Patient's energy requirements were calculated and they were advised to follow a calorie deficit liquid diet of either 1000, 1200 or 1500 calories per day for 12 weeks and then a 16 week food reintroduction programme.

Results: 24 patients (79% female). Baseline characteristics (mean): weight 124.8 kg, BMI 45 kg/m², age 46 years. 33% had comorbidities (diabetes, heart disease and hypertension). Mean weight loss prior to commencing LCLD was 3.24 kg (SD 5.4). 12/24 (50%) completed 12 week LCLD phase, 8/12 (66.6%) met ≥ 10 kg target, mean weight loss 12kg (SD 6.4). Mean total weight loss including 16 week lifestyle intervention and 12 week LCLD was 17.1 kg (SD 9.9). Food reintroduction programme is currently ongoing.

Conclusion: Using a Low Calorie Diet in a liquid form as part of a specialist NHS weight management programme can induce weight loss ≥ 10 kg which is recognised to improve health outcomes (SIGN, 2010).

Reference

Scottish Intercollegiate Guidelines Network (2010) Management of Obesity 115: A national clinical guideline.

1. Conflict of Interest: None

2. Funding: No funding.

T5:P.081

Improving nutrition and the care of the overweight patient: Knowledge and current practice among Scottish dietitians

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Introduction: Dietitians are considered leading practitioners in the treatment and management of overweight/obesity, and provide a training and educational resource for other health professionals. Continuous professional development is essential to maintain clinical competency and ensure clarity and consistency when advising patients and other health professionals. This survey aimed to determine the knowledge and current dietetic practice of Scottish Dietitians on nutrition and weight management in the context of evidence based clinical guidelines on obesity.

Methods: E-mail invitation to complete an online (SurveyMonkey) questionnaire, circulated to all 665 Scottish dietitians with membership of the British Dietetic Association, followed by 2 reminder emails.

Results: Response rate was 30%. Most respondents reported having read the current SIGN & NICE guidelines on obesity, and were confident in offering appropriate advice for weight management. However deficits in knowledge were evident: a quarter of respondents reported that a daily energy intake of 800–1200kcal would not lead to weight loss; few reported 5–10% weight loss as the optimum weight management outcome and there was uncertainty regarding the role of fats and sugars in the development of obesity. Only 48% reported confidence in measuring waist circumference. Eighty-percent would value specialised training in obesity and weight management.

Conclusion: Results suggest that guideline recommendations are not being implemented in practice by all dietitians. Deficits in nutritional knowledge among respondents highlights the need for continuing professional training and education, which most respondents felt would be valued. Given the low response rate, these problems could be more widespread.

1. **Conflict of Interest:** None Disclosed.

2. **Funding:** University of Glasgow.

T5:P.082

The comparison between the effect of two herbal slimming products and a low calorie diet on weight and body composition in overweight/obese individuals. A single-blind randomized controlled study

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Aims: To evaluate the effectiveness of two herbal weight loss products marketed in Lebanon on the weight and body composition of overweight/obese subjects, compared with a low calorie diet and placebo. The study will also examine their side effects and identify some pharmaceutical molecules they might contain.

Methods: We conducted two parallel studies. An initial clinical study and a second laboratory study. We designed a single-blind, randomized controlled trial versus placebo conducted on 103 participants. The clinical trial was divided into three stages: treatment, weight maintenance and monitoring. Subjects were divided into four groups: A (Amana Care), B (Zein Al-Atat), C (placebo) and D (diet). The laboratory study was conducted using GC/MS to analyze the products used.

Results: After 6 weeks of treatment, participants in groups B and D had significantly ($p = .01$) greater reduction in body weight compared to groups A and C. Body fat percentage was significantly ($p = .013$) decreased in groups A, B, and D compared with placebo. Subject's body weight was maintained throughout the 3 weeks of weight maintenance stage. Laboratory analysis showed the presence of sibutramine (37.97 mg) and caffeine in Amana Care, and sibutramine (18.59 mg) in Zein Al-Atat.

Conclusion: One of the herbal products used in this study led to a loss of weight similar to the diet, but accompanied with several side effects most probably due to the presence of high doses of a number of undeclared drugs.

1. **Conflict of Interest:** None Disclosed

2. **Funding:** No Funding

T5:P.083

Obesity treatment: While GPs give up, nutritionist persist

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Introduction: The persistence of high rates of obesity raise some questions about the role of health professionals in the treatment of this disease. Recent studies indicate that general practitioners and specialty groups of health professionals have inconsistent practices and negative beliefs and attitudes toward obese, compromising the success of obesity treatment. However, data is not conclusive and quantitative research is not being able to clarify how health physicians' practices and roles are affected by the way they perceive obesity and obese people.

Methods: Semi-structured interviews about beliefs, attitudes and practices about obesity were done to Portuguese general practitioners and nutritionists. Data was analyzed according to Grounded Analysis' procedures.

Results: The main domains indicate that both groups are concerned about the obesity pandemic and have similar negative beliefs and attitudes toward obese, who are described as being unmotivated, noncompliant and demonstrating a passive coping. General practitioners, due to the lack of compliance and success, feel frustrated, have lower expectations of efficacy and outcomes, are negative about their role in the treatment, giving up in most of the cases. Nutritionists demonstrate an active role, are persistent, describe the difficulties as a challenge and believe in the success of the treatment, featured as a constant struggle between them and the patients.

Conclusion: Since general practitioners and nutritionists are the first port of call for many obese people looking for treatment, it is important to improve motivational strategies as well as the communication between these different groups of health professionals in order to achieve success.

1. **Conflict of Interest:** None disclosed

2. **Funding:** No funding

T5:P.084

Service Evaluation of the Rotherham Institute for Obesity and comparison of 2010 and 2011 data

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Introduction: The Rotherham Institute for Obesity (RIO) is the most comprehensive NHS-funded specialist intervention for weight management, based in the primary care setting, in the UK. It forms part of the award-winning NHS Rotherham Healthy Weights Framework, and provides a multi-disciplinary team approach, primarily for the morbidly obese and the obese patients with co-morbidities, in both adult and child care pathways.

Methods: An analysis was performed on all adult RIO data, from prior the official launch of RIO on 6/11/09, to 30/6/12, and a comparison made of 2010 and 2011 data.

Results: In total, on 4/5/11, 2 years after launch there had been 4428 referrals, and the mode average BMI category was 40–45kg/m². During the dates examined, the cumulative weight loss had been 14.7 tons.

During the 2 year (2010 to 2011) period, 3325 adults were referred to RIO, and 1633 (49%) completed the 6m programme.

Of these 1520 (93%) lost weight, and 1087 (66%) met or did better than NHS Rotherham weight loss targets.

Of these successes, 786 (72%) lost more than 5% of initial weight, and 203 (18.6%) lost more than 10%.

Of all completers, weight loss varied from 0–28.8% (and excess weight loss from 0–109.6%)

2011 data suggests that numbers of referrals, average weight loss, and percentage reaching weight loss targets has improved compared to 2010 data.

Conclusion: RIO is successful in its MDT approach to reduce weight, and 2011 results appear to have improved in key areas compared with 2010.

T5:P.085

Absence of breakfast is associated with a higher risk of overweight and obesity

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Objective: Breakfast is one of the main daily meals and its role on health maintains has been described. Some studies showed that absence or skipping breakfast constitutes an important alteration food habits and lifestyle. The aim of the present study was to evaluate the prevalence and association between obesity, metabolic syndrome and absence of breakfast in patients older than 18 years included in a program of changing habits and lifestyle.

Methods: We conducted a cross-sectional study among 198 participants (female 83.3% and male 16.7%). Overweight, eating behavior, sedentary activity were collected through nutritional assessment, 24 hours recall and biochemical tests were performed for the identification of metabolic syndrome. The overweight and obesity were defined according to the body mass index (BMI) cut-off points of the International Obesity Taskforce. Multivariate analysis (logistic regression) was used to identify independent factors associated with obesity and metabolic syndrome. Statistical significance was considered at $P < 0.05$.

Results: We observed a significant difference when comparing BMI in group with breakfast (WB) - 38.4% and no breakfast (NB) - 61.6% ($P = 0.04$). Analysis of waist circumference ($P = 0.01$) and sedentary lifestyle showed an independent positive association in the group that presented absence of breakfast. On the other hand, biochemical alterations associated with metabolic syndrome as hyperglycemia and dyslipidemia showed no association.

Conclusion: Although limited by a small sample size, this study pointed out for an important role of breakfast absence in the augment of waist circumference being associated with a higher risk overweight induction.

T5:P.086

Motivate: A structured behavioural weight management program for obese adults with Learning Disabilities

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Introduction: Individuals with learning disabilities have higher levels of ill health and obesity than the general population; these needs often go unrecognised and unmet. Research into effective weight management programs in this field is very limited.

Method: Adults with a learning disability and Body Mass Index (BMI) of $\geq 30 \text{ kg/m}^2$ were invited to participate in the Motivate Program ($n = 74$). The program was a combination of 1:1 and bi-weekly group sessions which ran for 6 months. Participants attended with their main carer. Some lived at home, others lived in supported accommodation. The sessions were facilitated by specifically trained staff; key components included eating, activity habits, application of behavioural tools, relapse and maintenance strategies. Anthropometric measurements were taken at baseline ($n = 25$) and on completion of the program ($n = 13$).

Results: The program delivered meaningful degrees of weight loss; 4% ($p < 0.001$) at 6 months, 50% of patients lost $\geq 5\%$. Mean BMI decreased

from 37.83 kg/m^2 to 36.1 kg/m^2 . Weight loss was maintained at 3% 6 months post program.

Conclusion: Obesity in adults with learning disabilities is a significant public health concern. This study demonstrates a role for a well designed, expert led weight management program to reduce the burden of obesity within this group of patients.

T5:P.087

Assessing 12 week weight loss in men following a very-low calorie diet (VLCD)

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Introduction: Few studies have examined the weight loss response in men following a VLCD.

Methods: Data for men completing a 12 week VLCD (LighterLife Total) were obtained from the LighterLife UK Limited company database and were compared to a group of age and BMI-matched women. Comparisons were performed with independent t-test using SPSS for Windows (version 17.0) (SPSS Inc., Chicago, IL, USA).

Results: Data were available for 119 men who followed the diet for 12 weeks. Although men and women were matched for age and BMI, men were significantly taller (means (standard deviation)) (1.78 (0.1) m vs 1.64 (0.1) m, $p < 0.0001$) and heavier (122.6 (18.6) kg vs 104.2 (15.7) kg, $p < 0.0001$) than women at baseline. At 12 weeks, percent weight loss was significantly greater in men than women (21.2 (4.1) % vs 18.3 (4.3) %, $p < 0.0001$). The greatest amount of weight lost in a single week was achieved after the first week of weight loss where the men lost on average 4.4 (1.9) kg and women lost 3.7 (1.7) kg.

Conclusion: Both men and women responded well to the weight loss. In accordance with the literature, men lost more weight than women. It could be argued that this was due to men being heavier at baseline; however, this was still significant when baseline weight was corrected for.

1. Conflict of Interest: IB, SL, LD, CH are employed by LighterLife UK Ltd.

2. Funding: Research relating to this abstract was funded by LighterLife UK Limited

T5:P.088

Does regular breakfast cereal consumption help children and adolescents stay slimmer? A systematic review and meta-analysis

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Introduction: Our aim was to review systematically the evidence on breakfast cereal consumption in children and adolescents and assess whether the regular consumption of breakfast cereals could help to prevent excessive weight gain.

Methods: A systematic review and meta-analysis of studies relating breakfast cereal consumption to BMI, BMI z-scores and prevalence of obesity as the outcomes.

Results: Fourteen papers met the inclusion criteria. The computed effect size for mean BMI between high consumers and low/non-consumers over all 25 study subgroups was -1.13 kg/m^2 (95% CI $-0.81, -1.46$, $P < 0.0001$) in the random effects model, equivalent to a standardised mean difference of 0.24. Adjustment for age and publication bias attenuated the effect sizes somewhat but they remained statistically significant. The prevalence and risk of overweight was lower in children and adolescents who consume breakfast cereals regularly compared to those who consume them infrequently. Energy intakes tended to be higher in regular breakfast cereal consumers.

Conclusion: Overall, the evidence reviewed is suggestive that regular consumption of breakfast cereals results in a lower BMI and a reduced likelihood of being overweight in children and adolescents. However

more evidence from long term trials and investigations into mechanisms is needed to eliminate possible confounding factors and determine causality.

1. Conflict of interest: none

2. Funding: Funding was provided by The Kellogg Company(UK) but the authors are entirely responsible for the content of the review and followed established guidelines on financial conflicts and scientific integrity.

T5:P.089

Weigh Ahead: Morbid obesity management in the community setting

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Introduction: Morbid obesity is defined as a BMI ≥ 40 kg/m² (NICE, 2006). The Health Survey for England (2011) showed increases in Obesity II and III categories since 2008 with 2% of the population being morbidly obese (Health Survey for England, 2010). There is little evidence from primary care of the most effective way to treat morbid obesity in the UK population.

Methods: Anthropometric data, self-esteem, fruit and vegetable intake and physical activity measurements were collected from all patients attending the service at initial assessment (0 months; n=707), and a cohort was analysed at interim (3 months; n=289) and final assessment (6 months; n=116). Data was analysed using SPSS (Version 19.0).

Results: At initial assessment the majority (66%) were female, aged 35-75 years (68%). Patients in the least deprived quintiles were significantly ($p<0.001$) more likely to attend the service. Attrition rates were 41.9% at interim assessment, and 50.6% by final assessment.

Weight change was the primary outcome measured. Patients who attended and completed the service lost a mean average (SD) of 4.1(4.95) kg (3.53 (9.92)%) at interim assessment, and 6.3 (8.36) kg (4.88 (6.22)%) at final assessment, which was statistically significant ($p<0.001$). Statistically significant ($p<0.05$) improvements in waist circumference, BMI, fruit and vegetable intake, physical activity levels and self-esteem scores were also achieved.

Conclusion: This research provides some evidence of morbid obesity management. For those patients who attend their agreed 12 week programme; Weigh Ahead is valuable in aiding weight loss. A 5-10% weight loss in 3-6 months may be unrealistic for morbidly obese patients.

T5:P.090

Biochemical changes associated with weight loss in obese subjects

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Introduction: Obesity is associated with significant biochemical changes, in particular raised glucose levels, hyperlipidaemia, elevated liver enzymes and raised inflammatory markers. Obesity is also associated with many chronic conditions including diabetes and cardiovascular disease.

Method: 180 obese adults with a weight related chronic condition completed Motivate, a 6 month weight management program based on the principles of behaviour change. The Motivate Program focuses on participant's eating and activity habits and uses behavioural tools and strategies to facilitate change. The program is delivered by specifically trained professionals. All participants had failed to lose weight or sustain weight loss using conventional dietetic or other self-directed lifestyle approaches. Participants were screened clinically and biochemically for secondary causes of obesity at entry and those with 'simple' obesity progressed into the program. Biochemical screening consisted of renal, thyroid and liver function tests, fasting blood glucose and lipids profile, HbA1c and C-reactive protein (CRP).

Results: Participants lost, on average 6% body weight ($p<0.001$). Liver enzymes ALT & GGT decreased significantly (-34% $p<0.01$; - 40

$p<0.01$ respectively). LDL—C TC : HDL and TG all decreased (-10% ($p<0.05$); -7% ($p<0.01$); -15% ($p<0.01$)). HDL-C increased 10% ($p<0.01$). HbA1c decreased 22 mmol/mol ($p<0.001$), CRP 63 mg/L ($p<0.05$).

Conclusion: A small degree of weight loss in this group of patients significantly alters biochemical markers associated with cardiovascular risk.

T5:P.091

Patients' experiences of participating in a pilot of a Low Calorie Diet in a liquid form within a specialist, multi-disciplinary weight management programme

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Introduction: This study aimed to investigate patient experiences of undertaking a low calorie liquid diet and subsequently reintroducing food over a period of six months.

Methods: One to one face to face interviews were conducted pre, mid and post intervention with a random selection of patients undergoing the low calorie liquid diet pilot. Thematic analysis techniques were employed to identify recurring themes in participant responses.

Results: Of the 7 participants who were initially interviewed, 6 participants were interviewed after the Liquid Diet phase and 4 of these participants were interviewed following the food reintroduction phase. Overall, the main themes indicated that the liquid phase was easier than anticipated as it removed food choices and did not result in excessive hunger. The challenges were that it could be boring and lead to exclusion from social eating occasions. The food reintroduction was viewed as harder than the liquid phase as food choices were introduced again but participants felt that they had a clearer understanding of the importance of controlling food choices and portions to maintain weight loss in the long term. Other themes indicated general increases in positivity, body image, mobility and physical activity.

Conclusion: Integration of a liquid low calorie diet intervention into a weight management service ultimately can be effective in supporting long term lifestyle changes. This method of weight loss was experienced as generally acceptable and worthwhile to participants.

1. Conflict of Interest: None

2. Funding: No funding.

T5:P.092

The effect of dietary and exercise interventions on body weight in men diagnosed with prostate cancer: A systematic review

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Prostate cancer prognosis may be improved by maintaining healthy weight through healthy behaviours, particularly diet and physical activities. We carried out a systematic review to identify the successful components and mode of delivery of weight management interventions in this group.

MEDLINE, EMBASE, CINAHL and the Cochrane Library databases were searched from the earliest record to August 2012. Randomised controlled trials with dietary and exercise intervention components which involved prostate cancer patients were included. A total of 20 studies were included.

Interventions were categorized as dietary ($n=6$), exercise ($n=8$) or combination of both dietary and exercise ($n=6$) interventions. All studies were published within the last ten years with the majority of the studies were conducted in North America. The sample size ranged from 8-155 and the period of intervention varied from three weeks to four years. Only four dietary intervention studies, two exercise intervention studies and two combination intervention studies achieved significant weight loss or body composition improvement.

We conclude that there is no clear evidence of the best intervention components and delivery to be recommended but low fat diet seems to be the important component of healthy weight maintaining programme. Future RCTs should use larger samples with more specific focus on weight or anthropometric changes to avoid recurrence and improve overall survival in long term.

T5:P.093

Trial protocol for the efficacy of water preloading before main meals as a strategy for weight loss in obese primary care patients: RCT

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Introduction: There is a need to investigate the effectiveness of pragmatic weight loss interventions for delivery in primary care. Daily water consumption is widely advocated as an aid to weight loss, with little supporting evidence. One strategy to facilitate weight loss is to modify perceptions of fullness before meals with a 'preload' such as water. Two test meal studies and a small trial have shown that preprandial water consumption reduces food intake during meals. These results are encouraging, but the question of whether water preloading is an effective weight loss strategy needs to be tested in a more robust way.

Methods: 88 obese adults will be recruited from primary care, and randomised to 500mls of water preloading before meals or comparator (asked to imagine stomach is full prior to meals) for 12 weeks. The primary outcome is weight change and the trial is powered to detect a 1.5kg difference at 12 weeks. Several measures of adherence will be used, including 24hr urine collections. The difference in weight change between groups will be estimated using linear regression and analyses will be conducted using the intention to treat principle.

Results: The trial will show whether it is possible to get participants to adhere to water preloading in primary care and whether this simple instruction can affect weight loss in patients motivated to lose weight.

Conclusion: If effective, water preloading is a simple message that could easily be disseminated, e.g. by GPs and in public health campaigns to raise health consciousness.

1. Conflict of Interest: None disclosed

2. Funding: University of Birmingham, UK

T5:P.094

A cost analysis of medication for patients with type 2 diabetes mellitus – how this varies with Body Mass Index (BMI)

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Introduction: The rising prevalence of obesity has led to an increase in related metabolic disorders; most notably type 2 diabetes mellitus. We sought to determine how the cost of medication for this condition varies within a cohort of type 2 diabetes patients attending Galway University Hospital, according to BMI status, controlling for age gender and comorbidity.

Methods: The specific co-morbidities examined were obesity, hypertension and dyslipidaemia. The analysis compared the lifetime cost of medication of those patients who are obese relative to those who are overweight and of those with fewer to those with more co-morbidities.

Results: We found that obesity is associated with a higher cost of medication relative to being overweight. Those with a BMI range of 35-39.9 had the highest mean cost of medication. The associations of the cost of medication between BMI and co morbidity statuses were statistically significant.

Conclusion: These results suggest that the health economic costs associated with the rising prevalence of type 2 diabetes are differential with respect to the BMI status of affected individuals. These findings are of use in understanding the drug related burden of illness associated with obesity and type 2 diabetes mellitus and more specifically the burden associated with being obese when one has type 2 diabetes mellitus compared to not being obese and having it. These findings will contribute in projecting future health care costs associated with population change. This study generated some interesting data which will need to be replicated in larger prospective multicentre cohort studies.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded by the Irish Research Council for Humanities and Social Science (IRCHSS) and the Hardiman Research Board.

T5:P.096

Assessing long-term weight loss in men following a very-low calorie diet (VLCD)

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Introduction: Few studies have examined the weight loss response in men following a VLCD.

Methods: Data for men who underwent VLCD (LighterLife Total) were obtained from the LighterLife UK Limited company database. Comparisons were performed with independent t-test using SPSS for Windows (version 17.0) (SPSS Inc., Chicago, IL, USA).

Results: Complete 3-year data were available for 82 men who followed the VLCD. Men presented with a baseline height (means (standard deviation)) 177 (8.3) cm, age 44.6 (9.4) y, weight 119.3 (19.6) kg, BMI 37.9 (5.7) kg/m². On average, men underwent a weight loss phase for 19.3 (12.2) weeks and lost on average 30.1 (16.0) kg, where only 2 men did not achieve a 5% weight loss. Men lost on average 23.3 (16.4), 18.7 (16.9), 16.6 (18.0) at years 1,2 and 3 respectively. At 1 year following the weight loss phase, 11, 28, 37 men maintained at least 5%, 10%, 20% weight loss from baseline respectively. At 3 years, 9, 31, 23 men maintained at least 5%, 10%, 20% weight loss from baseline respectively. Hence at 1 and 3 years, 6 and 19 did not maintain a 5% weight loss from baseline respectively. Weight change was not associated with age, but associated with baseline BMI for each time point. Patients in the higher BMI groups lost significantly greater weight at each time point.

Conclusion: The results demonstrate that VLCDs are effective treatments for weight loss in men where BMI is associated with initial and long-term weight loss.

1. Conflict of Interest: IB, SL, LD, CH are employed by LighterLife UK Ltd.

2. Funding: Research relating to this abstract was funded by LighterLife UK Limited

T5:P.097

1 and 2 year weight-maintenance outcomes in 1052 subjects after a mean weight loss of 10.5 kg (1st 9lb) using an LCD and behaviour-change programme

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Introduction: In an intervention for patients with BMI ≥ 25-29.5kg/m², a tripartite approach is employed, comprising a low-calorie diet (LCD, 800-1200kcal), behavioural modification using transactional analysis/cognitive-behavioural therapy techniques (TCBT[®]), and group support. Post-weight loss, an ongoing weight-maintenance programme helps individuals sustain healthy lifestyle changes.

Method: 1052 subjects initially lost (mean±standard deviation) 10.5±4.3kg (13.8%) from their initial mean weight 75.4±7.6kg and BMI 27.8±1.7kg/m² on an LCD+TCBT[®] and enrolled in a weight-maintenance programme for up to 2yrs in 2009–2012. Weight records

were analysed for the intervention period, thereafter weight records at 1 and 2 years post intervention were analysed. Data were analysed by One-way ANOVA using SPSS version 17.0 (SPSS Inc., Chicago, IL, USA).

Results: Mean weight regain in yr1 was 3.5±3.9 kg with lower weight gain in yr2 (2.1±4.7 kg), with the weight-gain highly significant ($p<0.001$). In terms of maintaining clinically-significant weight loss, 76% and 47% achieved >5% and >10% at 1yr, and 64% and 36% achieved >5 and >10% at 2yrs.

Conclusion: Continued contact with obese subjects has been shown to be an effective strategy in reducing weight-regain following weight-loss treatment (Turk *et al.*, 2009). In this cohort of patients remaining engaged with a weight-maintenance programme after LCD-associated weight loss for up to 2 yrs, weight management is clearly achievable. While historical data (Wing *et al.*, 2005) demonstrate weight regain is common after any weight-loss method, these data suggest ongoing interaction can result in sustainable weight maintenance.

References

1. Turk, et al. J. cardiovascular nursing, 2009;24(1):58.
2. Wing, et al. Am. J. Clin. Nut. 2005;82(1):222S–225S.

T5:P.098

1, 2, 3 and 4 year weight-maintenance outcomes in 6920 subjects after a mean weight loss of 25.7 kg (4st 11lb) using a VLCD and behaviour-change programme

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Introduction: In an intervention for patients with BMI≥30 kg/m², a tripartite approach is employed, comprising a very-low-calorie diet (VLCD), behavioural modification using transactional analysis/cognitive-behavioural therapy techniques (TCBT®), and group support. Post-weight loss, an ongoing weight-maintenance programme helps individuals sustain healthy lifestyle changes.

Method: 6920 subjects lost 25.7±11.7 kg (25.3%) from their initial mean weight of 99.2±16.9 kg/BMI 36.4±5.2 kg/m² on a VLCD+TCBT® and enrolled onto a weight-maintenance programme in 2006–2012. Weight records were analysed for the intervention period, thereafter weight records at 1, 2, 3 and 4 yrs post intervention were analysed. Data were analysed by One-way ANOVA with Scheffe's post-hoc analysis using SPSS Version 17.0 (SPSS Inc., Chicago, IL, USA).

Results: Mean weight-regain at yr1 was 7.1±9.0 kg with lower absolute weight-gain in the subsequent 3 yrs, 4.6±7.5 kg, 2.6±7.7 kg and 1.8±8.1 kg at 2, 3 and 4 yrs, respectively ($p<0.001$). In terms of maintaining clinically-significant weight-loss, 92%, 82% and 41% achieved >5, >10 and >20% at 1yr, 84%, 68%, 28% at 2yrs, 76%, 60%, 23% at 3yrs and 72%, 53%, 18% at 4yrs respectively.

Conclusion: Continued contact with obese subjects has shown to be an effective strategy in reducing weight-regain following weight-loss treatment (Turk *et al.*, 2009). In this cohort of patients remaining engaged with a weight-maintenance programme after VLCD-associated weight-loss for up to 4yrs, weight-management is clearly achievable. While historical data (Wing *et al.*, 2005) demonstrate weight regain is common after any weight-loss method, this data suggest ongoing interaction can result in sustainable weight-maintenance.

References

1. Turk, et al. J. cardiovascular nursing, 2009;24(1):58.
2. Wing, et al. Am. J. Clin. Nut. 2005;82(1):222S–225S.

T5:P.099

Weight outcomes in longer-term participants of the Slimming World programme

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Introduction: This study examined weight trajectories in 609 participants of Slimming World who attended for at least 12-months as a commercial weight management cohort studied in the Diogenes programme (<http://www.diogenes-eu.org/>).

Methods: Weight was recorded on joining, 6 months prior to measurement 1 (measurement 0), at measurement 1 and 6 months after measurement 1 (measurement 2). At measurement 1 and 2 a battery of psychological measures were also made (reported elsewhere).

Results: Mean (SD) joining age was 47.5 (11.6) years, height 1.65 (0.07) m, BMI 36.1 (7.6) kg/m²

Body weights, and weight change at the four measurement points.

		Length of time with Slimming World by measurement 1	
		6–12 months	> 12 months
Number		238	371
Weight (kg)	Starting (kg)	98.9	98.0
	Measurement 0	90.9	82.7
	Measurement 1	84.0	81.9
	Measurement 2	82.7	81.8
Change in weight (kg)	Measurement 0	-8.0	-15.3
	Measurement 1	-15.0	-16.1
	Measurement 2	-16.2	-16.2
Change in weight (% of start weight)	Measurement 0	-7.9	-14.9
	Measurement 1	-14.5	-15.6
	Measurement 2	-15.4	-15.7

Weight changes at measurements 0, 1 and 2 were all significantly different from zero ($p<0.004$).

Conclusion: Longer-term membership of SW led to weight-loss exceeding 15%.

1. Conflict of Interest: All authors (except SW) work for Slimming World. SW was supported by Slimming World for this work.

2. Funding: EC contract No. FP6-513946 Diogenes and Slimming World.

T5:PS5 – New Techniques & Devices. Pharmacological Interventions

T5:P.100

Spatz intragastric adjustable balloon vs Bioenterics balloon consecutive balloon positioning: Case-control study

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Introduction: The BioEnterics® IntraGastric Balloon (BIB®) is a well established device for temporary treatment in morbidly obese patients. The Spatz Adjustable Balloon System (ABS) is a dynamic bariatric therapy with a marked prolongation of the implantation time (12 months) and a system for inflation and deflation of the balloon.

Aim: comparison of the Spatz with the BIB in terms of tolerance, safety and weight loss parameters. To achieve the same therapy period (12 months) a single Spatz positioning was compared with a BIB followed by another BIB.

Methods: 40 patients treated with Spatz balloon (BMI 40.9 +/- 4.8 Kg/m²) were compared to 85 patients 2 BIBs treatment (BMI 41.6 +/- 6.5).

Results: endoscopic procedures resulted faster in the BIB group: 12 min vs 26.4 and 15 min vs 27.3 (p<0.02). In Spatz group 9/35 (26.5%) patients increased balloon volume for unsatisfactory weight loss. At 1 year follow up no significant differences in weight loss between the two groups (Spatz: BMI 31.0 +/- 11.8, EWL% 56.7+/-14.2; BIB: BMI 31.3+/-12.3 EWL% 55.6+/-14.6). In the Spatz group 7 complications were registered (17.5%): 4 migrations, 1 breakage of pigtail, 1 balloon deflation, 1 gastric ulcer. In the BIB group 2 complications were described (2.3%): 1 gastrectomy and 1 intolerance. Complication incidence between the 2 groups was statistical significant (p<0.01).

Conclusion: one year balloon treatment for obesity is a useful tool in weight reduction. Complications in Spatz group suggest that BIB is safer and that technical improvements are needed for the Spatz balloon

T5:P.101

New, non-invasive, device for weight loss in overweight and light obese patients. Results of early Italian experiences

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Background: Use of intragastric balloons for surgical and anaesthesiological risks reduction, as co-adjuvant in dietetic regimens, to prevent obesity complications was largely described. Aim of this study is to evaluate the safety and efficacy of a new, non-invasive, intragastric balloon.

Methods: A new intragastric balloon, Obalon® Gastric Balloons (OGB) (ObalonTherapeutics, Inc., San Diego, Ca.) was positioned from August 2012, in 30 patients (23 ♀ e 7 ♂), mean age:41,6±9,5, mean initial BMI 32,6±3,4 Kg/m², mean initial excess weight-EW:22,0±10,7 kg, in three Italian bariatric centers. The OGB was swallowed and then remotely inflated with azoth 250cc, without endoscopy or anesthesia. Additional OGB were added according to weight loss and patients compliance. After the three-month treatment period, all balloons were retrieved during an upper endoscopy, under no or conscious sedation. Patient data

were analyzed for adverse events and standard weight loss parameters. Data are expressed as mean±SD.

Results: Mortality and complications were absent. Mean positioning and removal time were<5 minutes and <10 minutes respectively. 21(70%) and 4(13,3%) patients received a second and a third balloon at 3 and 6 weeks respectively from the initial placement. At OGB removal mean Weight Loss was 10.7±7.7 Kg, mean BMI was 29.9±3.0 Kg/m², mean EWL was 41.3±22.3%, mean BMI lost was 2.7±1.2 kg/m². Mild nausea/vomiting were reported in a few cases, and resolved within 24 hours with no additional clinical visits.

Conclusions: The study with OGB demonstrated favorable safety, tolerability and weight loss from progressively utilization up to three devices during the 3-month treatment period.

T5:P.102

Use of miRNAs in PBMC as new weight loss biomarkers

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Introduction: MicroRNAs (miRNAs), endogenous, single-stranded and noncoding RNAs, have been related to metabolism and body composition homeostasis. Moreover, circulating miRNAs profile has been recently proposed as a non-invasive biomarker for diagnosis of multiple diseases or treatment evolution. The aim of this study was the search for miRNA/s candidate/s to be used as prognostic biomarker/s of weight loss in peripheral blood mononuclear blood cells (PBMC).

Methods: Ten Caucasian obese women were selected among the participants in a weight-loss trial that consisted in following an energy-restricted treatment (8-week low-calorie diet providing 800-880 kcal/day). Weight loss was considered unsuccessful when it was <5% of initial body weight (non-responders) and successful when it was >5% (responders). At baseline, total miRNA isolated from PBMC was sequenced with SOLiD v4. The miRNA sequencing data for mir-223, mir-224, mir-935 and mir-4772-3p were validated by real time RT-PCR.

Results: Different baseline expression of several miRNAs was found between responders and non-responders. Two miRNAs were up-regulated in the non-responder group (mir-935 and mir-4772-3p) and three others were down-regulated (mir-223, mir-224 and mir-376b). Both mir-935 and mir-4772-3p showed relevant associations with the magnitude of weight loss. In the case of mir-223 and mir-224, they showed a trend towards significance in their correlation with the magnitude of weight loss (P-values 0.069 and 0.067, respectively).

Conclusions: According to the miRNA transcriptome of PBMC, basal expression of different miRNAs, particularly mir-935 and mir-4772-3p, could be prognostic biomarkers and may forecast the response to a hypocaloric diet.

1. Conflict of Interest: None Disclosed.

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T5:P.103

Weight maintenance in Caucasian adults: Safety and efficacy of IQP-G-002AS over 24 weeks

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Introduction: The efficacy and safety of IQP-G-002AS in body weight reduction were previously proven in a 12-week trial. ¹ Research showed that the success rate of long-term weight loss was only 20%. ² We con-

ducted a randomised, double-blind, placebo-controlled study on the effects of IQP-G-002AS in body weight maintenance.

Methods: 50 subjects with documented weight loss (at least 3% of initial weight) in the past 3 to 6 months were recruited. The dosage of the investigational product was 2 tablets tds. Subjects were encouraged to adhere to a nutritionally balanced diet but there were no formal dietary restrictions.

Results: The final analysis included 49 subjects (intent-to-treat). Baseline characteristics were similar in the 2 groups. After 24 weeks, 68.0% in the IQP-G-002AS group maintained or further reduced their body weight compared to 12.5% of subjects on placebo (mean weight decrease of 0.62kg vs increase of 1.62kg respectively, $p<0.001$). The IQP-G-002AS group also responded more favourably than the placebo group in mean body fat mass change (decrease of 0.99kg vs increase of 0.45kg, $p=0.014$) and body mass index change (decrease of 0.21kg/m² vs increase of 0.57 kg/m², $p<0.001$). There were no serious adverse events or adverse reactions reported.

Conclusion: IQP-G-002-AS helps to maintain body weight after weight loss, with a positive safety profile.

References

1. Grube *et al.* *Obesity* 2012 June 25 [Epub ahead of print; doi: 10.1038/oby.2012.165]
2. Wing and Phelan. *Am J Clin Nutr* 2005; 82(1 suppl): 222S–225S

1. Conflict of Interest: None.

2. Funding: The trial was funded by InQpharm Europe.

T5:P.104

Weight, waist circumference and all other metabolic syndrome components improve after long-term testosterone treatment in 334 hypogonadal men

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Objective: This study investigated effects of TRT on the metabolic syndrome.

Methods: In this cumulative, prospective registry study, 334 hypogonadal men (147 with primary hypogonadism, 100 with secondary hypogonadism and 87 with “late-onset hypogonadism” (mean 42±15 years, range: 15 to 72 years) received intramuscular injections of 1000 mg of testosterone undecanoate at day 1, after 6 weeks and thereafter every 10 to 14 weeks during a maximal treatment duration of 15 years, overall corresponding to 1403 treatment years. Hypogonadism was defined as total testosterone below 12 nmol/L and occurrence of symptoms.

Results: Testosterone increased from 5.8 to 16.1 nmol/L within the first year of treatment and remained stable thereafter. Body weight decreased by 23.9 kg from 103.0 at baseline to 79.1 kg at the end of the observation period. The proportion of weight loss was 23.2%. Body mass index declined from 31.8 to 24.4 kg/m². Waist circumference declined by 19.9 cm from 114.0 to 94.1 cm.

Systolic blood pressure decreased by 20 mmHg from 148.0 to 128.0 mmHg, diastolic blood pressure by 17 mmHg from 98.0 to 81.0 mmHg. Total cholesterol decreased from 232.0 to 171.0, LDL from 157.0 to 110.0, triglycerides from 198.0 to 145.0 mg/dl and HDL increased from 38.4 to 53.6 mg/dl. Glucose decreased from 108.1 to 91.2 mg/dl.

Conclusion: Injections of testosterone undecanoate lead to improvements in body composition and other features of the metabolic syndrome. These changes are maintained over a long-term follow-up period.

T5:P.105

Effects of low calorie diets based on crisp bread or liquid meal replacements on metabolic syndrome in morbidly obese women with polycystic ovarian syndrome (PCOS). A randomised controlled trial

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Introduction: Morbid obesity and PCOS are associated with metabolic syndrome (MS). Low calorie diets (LCD) may reduce the severity of PCOS and MS. Possible effects of various LCDs on MS are unknown. We compared the effects of a fructose-rich liquid meal replacement-LCD (LMR) and a crispbread-LCD (CB) on MS-components.

Methods: Randomised controlled trial including 61 morbidly obese women with PCOS who were assigned to LMR or CB for 8 weeks (both 900 kcal/day).

Paired and unpaired t-tests were used to analyse within- and between-group differences.

Results: Fifty-two women completed the intervention period; 25 in the LMR- and 27 in the CB-group. Mean (SD) age, weight, BMI and waist circumference at baseline were 29(6) years, 123(17) kg, 44(6) kg/m² and 125(11) cm, respectively. After intervention, weight was reduced by 8% in both groups. Fasting cardiometabolic variables at baseline and at 8 weeks are presented in Table 1:

	<i>Liquid meal replacement (n=25)</i>		<i>Crispbread (n=27)</i>		
	Baseline	8 weeks	Baseline	8 weeks	P***
Tot-chol. ¹	4.9(0.8)	4.4(0.9)*	5.1(0.9)	4.7(0.9)**	0.201
HDL-chol. ¹	1.1(0.2)	1.0(0.2)*	1.1(0.3)	1.0(0.2)**	0.704
LDL-chol. ¹	3.1(0.7)	2.7(0.7)**	3.3(0.7)	3.1(0.7)	0.055
TG ¹	1.7(0.8)	1.5(0.6)**	1.6(1.0)	1.4(1.0)	0.925
Glucose ¹	5.3(0.9)	5.0(0.6)**	5.3(1.0)	5.0(0.5)	0.735
Insulin ²	144(69)	87(51)*	129(76)	90(66)**	0.854
BP sys. ³	129(14)	116(26)	127(16)	119(12)**	0.471
BP diast. ³	80(12)	75(9)**	81(13)	76(13)**	0.334

¹mmol/l, ²pmol/l, ³mmHg

* Within-group differences, $P<0.001$

** Within-group differences, $P<0.05$

*** Between-group differences at 8 weeks

Conclusion: Morbidly obese women with PCOS allocated to a LMR- or CB-based LCD had similar weight loss and reduction in components of MS.

1. Conflict of Interest: None Disclosed.

2. Funding: Line Kristin Johnson has received unrestricted educational grants from Norwegian Resource Centre for Women's Health, Oslo University Hospital, Norway.

T5:P.106

Does a history of depression and/or antidepressant use affect the weight loss efficacy of phentermine and topiramate extended-release (PHEN/TPM ER)?

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Background: Obesity is associated with an increased risk of depression, which can be reduced with weight loss (WL). PHEN/TPM ER produced enhanced WL vs placebo in obese and overweight subjects with weight-related comorbidities, but the impact of depression or antidepressants (including SSRIs and SNRIs) on WL is unknown.

Methods: This post-hoc analysis of CONQUER/EQUIP (N=3678) assessed WL in obese and overweight subjects (BMI ≥ 27 kg/m²) with a history of depression and/or receiving antidepressant medications (including SSRIs and SNRIs) at baseline, and in those with no history of depression or antidepressant medication use. Subjects were randomized to placebo, PHEN 3.75 mg/TPM ER 23 mg (3.75/23), PHEN 7.5 mg/TPM ER 46 mg (7.5/46), or PHEN 15 mg/TPM ER 92 mg (15/92).

Results: At baseline, 560 (15.2%) subjects were taking antidepressants (including SSRIs and SNRIs), 221 (6.0%) had a history of depression but no antidepressant use, and 2897 (78.8%) had no history of depression/no antidepressant use. At week 56, least-squares mean percent WL among the 781 subjects with either a history of depression or antidepressant use at baseline was -1.1%, -5.6%, -7.6%, and -9.5% for placebo, 3.75/23, 7.5/46, and 15/92, respectively ($P < .0001$ vs placebo, all comparisons; ITT-LOCF). Those with no history of depression/not taking antidepressants had WL of -1.9%, -4.9%, -8.7%, and -10.9%, respectively ($P < .0001$ vs placebo, all comparisons; ITT-LOCF). Subjects taking antidepressants at baseline and those with a history of depression but no antidepressant use had similar WL.

Conclusions: Regardless of subjects' history of depression and/or antidepressant use, WL in subjects receiving PHEN/TPM ER was significant vs placebo.

1. Conflict of Interest: PO has participated on advisory board(s) for Orexigen; has taken part in clinical trials for Orexigen, NovoNordisk, Shire, and Weight Watchers International; and is a speaker for VIVUS, Inc. TC has participated on advisory board(s) for Jenny Craig; is a consultant for Catapult Health, Lockton-Dunning, and VIVUS, Inc.; and has taken part in clinical trials for Coca-Cola, the NIH, and Sanofi-Aventis.

2. Funding: Funding for research and editorial assistance was provided by VIVUS, Inc.

T5:P.107

Changes in Prescribing Practices of Obesity in Medicine Specialists in the United States 2008–2012

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Introduction: Given the growing obesity epidemic and the changing landscape of obesity drugs, we wondered if Obesity Medicine Specialists (OMS) had changed their prescribing habits in recent years.

Methods: Anonymous online surveys were given to OMS who are members of the American Society of Bariatric Physicians (ASBP) in 2008 and in 2012 before any new drugs became available.

Results: In 2008 (n=266), 97% of respondents prescribed medications to promote weight loss, whereas, in 2012 (n=352), 89% did. Phentermine was the most frequently prescribed drug in 2008 (97%) and 2012 (99%), with use of diethylpropion and phendimetrazine increasing by 10% each in 2012. Sibutramine was taken off the market by 2012; in 2008, 49% of respondents prescribed it, although for <4% of patients. The longest duration that physicians prescribed phentermine was shorter in 2012 vs. 2008 (27±36 vs 38±55 months, $p=0.02$); however, the highest average dose prescribed did not change for any medication from 2008 to 2012 ($p>0.05$). Phentermine + metformin and phentermine + topiramate were the most popular drug combinations in 2012 (38% and 28% prescribing,

respectively), but not specifically reported in 2008. The combination of phentermine + 5HTP/Carbidopa was prescribed by 19.7% of respondents in 2008, and only 6.5% in 2012.

Conclusion: OMS may be more conservative with the length of time that they and their patients feel comfortable using medications to promote weight loss. The prescribing practices of OMS have undergone changes in recent years and represent a more conservative approach to prescribing medications to promote weight loss.

T5:P.108

The change of fatty acids' metabolism in case of alimentary obesity in children and adolescents as a predictor of germination of obesity

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One of the most topical issues of modern pediatrics is obesity in children and adolescents, which has a tendency to doubling every three decades in almost all countries.

The aim of our research was to investigate the fatty acid composition of the blood in children with obesity.

Patients and Methods: We investigated 50 children aged from 7 to 15 years, divided into 2 groups: Group I - 25 children (64% boys and 36% girls) who are overweight or obese (BMI 29.68 ± 1.21 kg/m²), group II - 25 persons (85% boys and 15% girls) with normal body weight (BMI 19.45 ± 0.05 kg/m²). Research methods: Quantitation of omega-3 and omega-6 polyunsaturated fatty acids, determination of the total amount of fatty acids, the total content of eicosapentaenoic and docosahexaenoic acids by gas chromatography with mass selective detection and determination of the omega-3 index (the ratio of the sum of eicosapentaenoic and docosahexaenoic acids to total content of fatty acids in %).

Results: There was a direct correlation between the value of BMI and the increasing of omega-3 index and the omega-6 PUFAs in children with obesity, while for the children with normal body weight the connection of BMI with the change of the fatty acid composition of blood was not obtained.

Thus changes of the quantitative and qualitative fatty acid composition of blood in children and adolescents with different body weight have multidirectional nature and require further dynamic study.

T5:P.110

Age and sex related to the treatment of obesity using the intragastric balloon (IGB); in Granada, Spain

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Introduction: As many means of communication have been discussing this method, it is of great importance to mention the incipient increase of obesity that the population is suffering all around the world. If we add the impact that it entails on the rest of chronic diseases, the repercussions on the quality of life of the patients and the health cost, the amount of research carried out on this subject is understandable.

Methods: For this reason, a retrospective, longitudinal and descriptive study is done. Thirty four individuals treated at a private clinic are taken as a sample: and to carry out the study the age is used as quantitative variables and the sex is used as qualitative variables. In order to get the results, the data is analyzed using the SPSS statistic program, which are shown in percentages.

Results: as the sex variable, a higher percentage is obtained in women who decide to use the IGB as treatment for their obesity. As the age variable, a higher percentage is obtained in ages between 20 and 30, followed by ages between 30 and 40.

Conclusion: to summarize, we would like to emphasize the high rate of prevalence in young women using this method, probably caused by the

society which we live in today and also the fact that women have more tendency to gain weight than men.

T5:P.111

Efficiency in treatment of obesity using the intragastric balloon (IGB); in Granada, Spain

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As many means of communication have been discussing this method, it is of great importance to mention the incipient increase of obesity that the population is suffering all around the world.

If we add the impact that it entails on the rest of chronic diseases, the repercussions on the quality of life of the patients and the health cost, the amount of research carried out on this subject is understandable.

Given that there are numerous treatments for this health problem, we believe that it is of special interest to learn the efficiency of one of the most popular methods over the last twenty years, which is known as the IGB.

For this reason, a retrospective, longitudinal and descriptive study is done. Thirty four individuals treated at a private clinic are taken as a sample: and to carry out the study the BMI is used as quantitative variables and the residential location is used as qualitative variables.

In order to get the results, the data is analyzed using the SPSS statistic program, which are shown in percentages.

T5:P.113

Efficacy of metformin on serum levels of adiponectin, leptin and C-reactive protein in obese patients

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Introduction: There is a chronic low intense inflammatory process in obesity. The pro-inflammatory profile includes low serum concentrations of adiponectin, and increase of leptin and C-reactive protein.

Methods: A clinical trial was conducted with completed and balanced crossover design. There were included non-diabetic obese adults. All participants were randomized to: placebo, metformin 500 mg and 850mg, bid, for one week, then there was washout for one week between each treatment. All volunteers received the 3 treatments. At the end of each week of treatment, serum was collected for measurement for high molecular weight adiponectin, leptin and C-reactive protein concentrations. It an ANOVA, Bonferroni test post hoc and size effect calculation were performed.

Results: There were included 28 women and 8 men, out of them 17 were obese class 1 and 19 class 2. The serum concentrations of adiponectin at week end of placebo, metformin 500 mg and metformin 850 mg treatment were: 1.582±0.982, 1.950±1.086, 2.499±1.173µg/ml, respectively. In the same order, the concentrations of leptin were: 57.13±21.72, 49.86±20.29, 42.02±19 ng/ml, respectively. The concentrations of C-reactive protein were: 7.29±4.52, 5.54±2.87, 4.73±2.53 mg/l, respectively. All values showed p-value <.05. The sizes effects of the metformin 850 mg treatment were: for adiponectin 84.75%, 74.04% for leptin and 69.89% for C-reactive protein. The sizes effects for metformin 500 mg were minors than metformin 850 mg, but were highest than placebo.

Conclusions: The size of effect was clinically relevant for the two doses of metformin. They were more effective than placebo to improve the pro-inflammatory profile, and it was doses-dependent.

1. Conflicts of Interest: None disclosed

2. Funding: Research relating to this abstract was funded by Research Department of Hospital General of Mexico.

T5:P.114

Long-term Phentermine Pharmacotherapy: An Investigation for Amphetamine-like Abuse Potential

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Introduction: A commonly held presumption is that phentermine therapy can induce abuse or dependence, at a lower incidence rate, with similar symptoms, but of lesser severity than amphetamine and methamphetamine-induced dependence. No human data supporting these presumptions has ever been published. Intense cravings for amphetamine are a hallmark symptom of amphetamine abuse and dependence. If phentermine-induced abuse occurs, phentermine cravings could be expected to occur during long-term use.

Methods: 117 patients phentermine-treated for 8.4 (5.2) years with 53.4 (19.5) mg/day (Long-Term Patients, LTP) and 152 patients phentermine-treated for 9.3 (3.4) days with 34.5 (9.5) mg/day (Acute-Term Patients, ATP) were examined. LTP were interviewed using Module K (Non-alcohol psychoactive substance use disorders) of the Mini International Neuropsychiatric Interview (MINI) modified for phentermine, then examined using the Severity of Dependence Scale (SDS) modified for phentermine, and Tiffany's 45-question cocaine craving questionnaire modified for phentermine (PCQ). ATP were examined with SDS and PCQ. SDS and PCQ scores were analyzed using Mann-Whitney U tests.

Results: Based on the MINI, no LTP had phentermine abuse or dependence. SDS mean total scores were not significantly different: LTP 0.42 (0.75); ATP 0.50 (0.91), $P = 0.528$. (Typically SDS scores for amphetamine-dependent subjects are >4.) PCQ total mean scores: LTP 1.93 (0.64); ATP 2.25

(0.71), $P < 0.001$, but ATP > LTP, reverse the ratio expected if phentermine induced cravings.

Conclusions: Patients treated with phentermine for averages of 8.4 years and 53.4 mg/day had no sign of amphetamine-like abuse, or dependence. Long-term phentermine treatment did not induce phentermine cravings.

1. Conflict of Interest: Dr. Hendricks has received honoraria from Akramax, Eurodrug Laboratories, Citius, and Vivus. Dr. Greenway has received honoraria from Baronova, Basic Research, Citius, Diabetic Living, Eisai, GNC, Jenny Craig, Lithera, Merck, Naturalpha, Nume Health, Orexigen, Plensat, Takeda, Thetis, Unigene, and Zafgen. Dr. Srisurapanont, Mr. De Marco, Ms. Hendricks, and Ms. Istratyi state no conflicts of interest.

2. Funding: The American Society of Bariatric Physicians provided funding for this study.

T5:P.115

Profound weight loss in 159 obese hypogonadal men treated with injectable testosterone undecanoate for up to five years

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Objective: In this study, we analysed the effects of testosterone replacement therapy (TRT) in obese hypogonadal men presenting to a urologist with erectile dysfunction.

Methods: Cumulative, prospective, registry study of 159 men (mean age: approximately 58 years) with testosterone levels below 12.0 nmol/L and a body mass index (BMI) of ≥ 30 kg/m². All men received parenter-

all testosterone undecanoate 1000 mg/12 weeks following an initial 6-week interval for up to five years.

Results: At the end of the observation period, mean weight (kg) decreased from 107.92±11.15 (minimum 86.0, maximum 141.00) to 96.06±9.55 (min 74.5; max 124.0). This decrease was statistically significant vs baseline ($p<0.0001$) and each year compared to previous year. Mean change from baseline was $-10.13\pm0.38\%$. After five years, 95% had lost any weight, 84% had lost $\geq 5\%$, 65% $\geq 10\%$, 43% $\geq 15\%$, and 22% $\geq 20\%$.

Waist circumference (cm) as a measure of abdominal fat decreased from 111.74±9.74 (min 96.00; max 148.00) to 100.59±9.28 (min 85.00; max 137.00). The mean reduction of waist circumference was 10.51 ± 0.32 with 98% of patients having any decrease.

Fasting glucose decreased from 118.12±38.63 to 100.87±18.78 mg/dl, HbA1c from 6.87±1.31 to 5.68±0.69%. Total cholesterol dropped from 267.53±49.83 to 215.09±39.75, LDL from 162.85±25.68 to 125.46±32.4, triglycerides from 266.03±82.11 to 207.01±41.3 mg/dl. HDL increased from 40.33±13.2 to 56.41±15.73 mg/dl. Systolic blood pressure decreased from 142.04±13.08 to 123.75±5.46, diastolic from 83.06±10.33 to 78.4±3.91 mmHg ($p<0.0001$ for all).

Conclusions: Long-term TRT in obese hypogonadal men resulted in progressive improvements in weight, waist circumference and other components of the metabolic syndrome.

T5:P.119

Assessing the 1-Year Long Effectiveness of Psychotherapeutic Approaches to Weight Loss in Russia

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Introduction: Obesity remains one of the most urgent and widespread health problems in Russia and currently affects approximately 23% of the population. Our weight loss programme has been in place for 11 years and has been taken to over 80 cities and towns across Russia.

Methods: The programme consists of complex group psychotherapy using CBT, low-calorie diets, elements of trance and transpersonal techniques. Research was conducted with an experimental group of 288, who actively participated in the programme from September 2010 to October 2012 in Tomsk, Siberia.

Results: Initial average weight was 95,44±18,34 kg. Participants achieved significant body mass dynamics (Table1).

Period	Weight loss dynamic in % from initial body mass	Number of participants (%) who lost given percentages from their initial body mass (N=288=100%)				
		0% or weight regain	0–5%	5–10%	10–15%	>15%
1 month	5,86±2,28	1,38	32,53	64,36	1,38	0
3 months	10,09±4,90	6,25	6,94	33,68	38,19	14,93
6 months	11,23±7,62	11,81	8,33	21,18	28,47	30,21
12 months	10,75±8,76	18,47	13,94	19,16	20,21	28,22

In addition, among 53 persons with zero body mass dynamic or weight regain after 1 year 8 women became pregnant and had natural weight regain process.

Conclusion: The use of this short-term psychotherapeutic programme provides good weight loss results. At the present time, further studies are being done to assess the effectiveness of the given approach over a longer period (more than 1 year).

1. Conflict of Interest: None Disclosed

2. Funding: No Funding

T5:P.120

Amount of weight lost by consuming calories between meals less often

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Introduction: It is been proposed that adding more calories to a stomach that is still quite full from the previous meal does not keep hunger suppressed as well as calories taken in during or just before a meal (Booth, 1988). We tested this theory by asking participants to eat “snackfoods and energy-containing drinks” less often either between or within “meals.” The hypothesis was that more weight would be lost by cutting down on perceived energy intake between meals than within meals.

Methods: Student volunteers (43 women, 2 men; ages 20 ± 1 y) agreed to change their frequency of up to two habits during weekly tracking of weight read from scales and recalled timings of the last two occasions of each of 19 eating or exercise habits. The number of times per week that each habit was currently carried out was estimated from the time between the two occasions. Those individuals who sustained a decrease in frequency were included in the estimation of weight change.

Results: A decrease in frequency of consuming snackfoods and calorific drinks of once per week between meals was associated with weight loss of about 11 g, whereas within meals gave a weight gain of 7 g. The *Ns* were very small but the difference approached statistical significance ($p < 0.08$). The findings for other tested habits were also in the expected direction.

Conclusion: The innovative method gave findings in line with the claim that “zero calories between meals” are a first defence against weight gain.

1. Conflict of Interest: None.

2. Funding: Mexican National Council for Science and Technology and the University of Birmingham, U.K.

T5:P.121

The impact of the consumption of fatty acids and inflammation in obese adults

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Introduction: Obesity and dietary habits are cardiovascular disease risk markers. C-reactive protein is an inflammation marker, and is been associated with cardiovascular disease risk increased, since a chronic inflammatory process is involved in atherosclerosis. The aim was to evaluate the association between fatty acids consumption and inflammation in obese adults.

Methods: For this study 32 obese adults (34.65 ± 3.04 BMI) were involved. The variables included were age, body mass index (BMI), fatty acids consumption and C-reactive protein serum concentration. Dietary recall was applied during 3 days, including two periods of one weekend day. The dietary were calculated using the Avanutri software by the mean consumption of 3 days. The benchmark for group evaluating (EAR) was calculated as the mean \pm standard deviation of men and women aged from 31 to 50 years.

Results: C-reactive protein were negatively correlated with percentage of monounsaturated fatty acid in relation to the total caloric value content of the diet ($r=-0.4355$, $p=0.023$) and total of monounsaturated fatty acid diet ($r=-0.3898$, $p<0.05$).

Table 1. Descriptive analysis of anthropometric variables, dietary intake and C-reactive protein

Variables	Mean \pm SD
Age (years)	41,63 \pm 6,04
BMI (Kg/m ²)	34,65 \pm 3,04
Total Caloric Value (Kcal)	1881,25 \pm 499,29
Monounsaturated fatty acid (%)	6,63 \pm 2,17
Monounsaturated fatty acid (g)	14,16 \pm 6,32
C-reactive protein (ng/mL)	8,68 \pm 2,66

Conclusion: Nutritional intervention in obesity control is important to change dietary choices, since the modification of food consumption, especially in relation to fatty acid intake helps to decrease inflammation.

1. Conflict of Interest: None Disclose.

2. Funding: FAPESP 11/51723-7; CNPq 471108/2011-1; CAPES and UNIFESP supported the Research performed in Santos- Brazil by GEO – UNIFESP.

T5:P.122

Effects of short term interdisciplinary therapy in quality of sleep, VO₂max and body mass index (BMI) in obese adult women

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Introduction: Obesity is considered a global epidemic with over 1.5 billion overweight adults, where at least 500 million of them are clinically obese. It is deleterious for vital functions as the sleep. Sedentary lifestyle with inappropriate food habits are considered the main factors for those modifications by promoting adipose tissue accumulation, causing imbalance in cytokine concentrations and therefore sleep disturbances. Recent studies show that the interdisciplinary therapy promotes more benefits if compared to physical exercises alone. The aims of this study were to analyze the effects of a short term interdisciplinary therapy on the sleep quality, VO₂max and body mass on obese adults.

Methods: A total of twenty-nine (n=29) adult women (age 43.27 \pm 5.4 years), were enrolled at short term interdisciplinary therapy (20 weeks) who consisted of physical exercise sessions three times a week and nutritional and psychological intervention once a week at the Federal University of São Paulo – UNIFESP - GEO, Santos- Brazil.

Results: Our results demonstrated an increase in the sleep quality (p < 0,001), VO₂max (p < 0,001) and decrease in drowsiness (p = 0,001) and non-significant decrease in sleep latency (20%) was observed after short term interdisciplinary therapy.

Conclusion: In conclusion, the short term interdisciplinary therapy promoted an important improvement in sleep quality, VO₂Max and body mass index (BMI) in obese adult women.

1. Conflicts of Interest: No disclosure.

2. Funding: FAPESP 11/51723-7; CNPq 471108/2011-1; CAPES Reuni and UNIFESP supported the Research performed in Santos- Brazil by GEO – UNIFESP.

Hot Topic Posters

HTP.001

A restricted capacity of primary cultures of ear mesenchymal stem cells to differentiate to adipocytes

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One major goal of current research in brown adipose tissue (BAT) research is to determine the molecular basis for its variable induction in white fat depots. The expression of BAT in white fat depends on developmental age, genotype and specific white fat depot. We have been testing the conditions for culturing the stromal vascular (SV) fraction from inguinal fat (ingWAT), interscapular brown fat (iBAT) and ear mesenchymal stem cells (EMSC) to ascertain conditions for maximal expression of biomarkers for the brown and white differentiation programs. Although morphological differentiation of these primary cell cultures appears indistinguishable, major differences exist in their capacity to activate either the brown fat or white fat differentiation programs. Identical culture conditions with the SV fraction from ingWAT and iBAT led to robust and virtually indistinguishable induction of the genes of brown fat phenotype, which was characterized by high expression of *Ucp1*, *Ppara*, and *Pgc1a*, low expression of *Mest* and the absence of *Sfrp5* expression. On the other hand, these same conditions led to high expression of the white fat program in EMSC cultures, that is, high expression of *Mest*, *Bmp3*, *Cav1* and *Sfrp5*, and virtually no expression of *Ucp1*. Also EMSC cultures are unique in being able to express *Sfrp5*, whereas cultures of ingWAT and iBAT are incapable of expressing this gene. EMSC cultured in adipogenic media have a unique restricted capacity for adipogenesis that is different from the plasticity observed in SV fraction cultures from adipose tissue.

1. Conflict of Interest: None

2. Funding: Foundation for Polish Science Welcome /20 10-43 and REFRESH project (FP7-REGPOT-2010-1-264103)

HTP.002

Impact of reduced ambient temperature during early post-natal development on diet-induced obesity in adult mice

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Dietary conditions that vary energy intake during early postnatal development will impact body composition phenotypes in adult life. We predicted that changes in energy balance by modulating energy expenditure during the early post-natal period will also affect adiposity phenotypes. To test this idea, we investigated the effects of different ambient temperatures during early development on high fat diet-induced obesity in adult mice. AXB8 and C57BL/6J male mice, representing mice with variable brown fat induction in white fat, were maintained from birth to weaning at either 17 °C or 29 °C and fed a standard chow diet (22 kcal% fat). At weaning animals were maintained at 23 °C until the end of the protocol and from the 8th to 16th week of life they were fed a high fat diet (58 kcal% fat). We assessed body weight, body composition by NMR, food intake, glucose tolerance and adipose tissue morphology. Fat mass of AXB8 mice raised at 17 °C was reduced by 40% in suckling mice compared to those raised at 29 °C. No difference in fat mass or lean mass was present at 56 days of age, but following 8 weeks on a high fat diet fat mass was 21% lower in mice raised at 17 °C. At the lower temperature the higher energy expenditure required to maintain body temperature stimulated food intake by the lactating mother. These data suggest that a mild cold environment during early post-natal development is a potential method for suppressing development of diet-induced obesity and associated diseases.

1. Conflict of Interest: None

2. Funding: Foundation for Polish Science Welcome /20 10-43 and REFRESH project (FP7-REGPOT-2010-1-264103)

HTP.003

Prediabetes in Danish overweight and obese children and youths included in a paediatric chronic care tertiary center

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Objective: To investigate the prevalence of prediabetes and describe the metabolic profile in Danish overweight and obese children and youths at the time of inclusion in a childhood obesity chronic care treatment.

Methods: This retrospective study included 763 children and youths (344 boys) from The Children's Obesity Clinic. Data were measured at the time for inclusion and included values of body mass index (BMI) standard deviation score (SDS), blood pressure, gender, and biochemical measures, including the fasting concentrations of blood glucose, serum insulin, HbA1c, and serum lipids. The BMI SDS was median 2.64 (range 1.33–5.10) and the age was median 11.6 (range 2.4–24.7) years. Prediabetes was classified as a fasting blood glucose ≥ 5.6 and < 6.9 mmol/L. The Mann-Whitney-Wilcoxon test was used for the analyses.

Results: Prediabetes was present in 97(47 boys) patients. These patients were older, age median 12.29 vs. 11.50 years ($p=0.015$), had a higher BMI SDS median 2.74 vs. 2.61 ($p=0.005$), an increased fasting HbA1c median 36 vs. 34 mmol/mol ($p<0.0001$), an increased fasting serum insulin median 110.5 vs. 64 pmol/L ($p<0.0001$), and an increased median HOMA-IR 5.01 vs 2.34 ($p<0.0001$), respectively, compared to the patients with a fasting plasma glucose < 5.6 mmol/L. No differences were found in any of their fasting serum lipid levels or blood pressure ($p>0.05$).

Conclusion: In this large group of overweight and obese children prediabetes is prevalent. Thus it seems important to identify obese subjects with prediabetes early in the childhood obesity treatment in order to prevent the development of diabetes.

HTP.004

Satiety differences between a meal based on palaeolithic-inspired nutrition compared with a calorie matched modern-day reference meal

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Introduction: We investigated whether Paleolithic-type meals rich in fruit and vegetables provide improved glucose metabolism and satiety over a modern-day reference meal.

Method: Three meals were given to healthy volunteers in a three-way random crossover exploratory study. A reference meal (REF) was broadly based on WHO recommendations (15% protein, 60% carbohydrate 25% fat, 383 KCal). Two Palaeolithic-inspired meals, PAL1 and PAL2, were rich in fruit and vegetables (selected for high fibre and polyphenol content); PAL2 was matched to REF for protein, fat and calorie-content while PAL1 was a larger meal with 41% carbohydrate and 29% protein, (553 Kcal). All meals were matched for available carbohydrate. Outputs measured included visual analogue scales (VAS) for subjective feelings of hunger, and gut hormone PYY.

Results: Satiety Quotients (175 min) based on VAS scores for "How hungry are you?" and energy were 0.049 for PAL1, 0.073 for PAL2 and 0.019 for REF ($p=0.0137$ PAL1, $p<0.0001$ PAL2 compared to REF). Postprandial serum concentrations of PYY were also significantly higher for both PAL meals compared to REF. Mean iAUCs for 185 mins for PYY were 414.5 ± 114.9 min.pmol/l for PAL 1, 328.4 ± 111.1 min.pmol/l for PAL 2 and -54.2 ± 111.2 min.pmol/l for REF (PAL1 v REF $p<0.0001$, PAL2 v REF $p<0.0002$).

Conclusions: Improved satiety in high fruit and vegetable based meals designed using principles of Palaeolithic-type diet is reflected by PYY response and Satiety quotient; most surprisingly this seems to be independent of the caloric value of the meal.

HTP.005

Tea-seed saponin E1 as an effective ingredient for Anti-Cancer and Anti-Obesity Based on Anti-Angiogenesis

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Introduction: Natural products are growing interest in the field of nutrition and complementary medicine to prevent chronic illness or as treatment. We investigated the anti-cancer and anti-obesity properties of Green Tea seed saponin E1 (GTSSE₁) on cancer cells and high fat diet induced obese mice, focusing the functional importance of GTSSE₁.

Methods: The anti-angiogenesis effect of GTSSE₁ in HUVECs was examined to elucidate the effect on anti-cancer and anti-obesity process that develops through a mechanism of angiogenesis. Cytotoxicity in HUVECs and cancer cell proliferation were measured by MTT assay. Anti-cancer and anti-obesity effect was investigated by using in-vitro and in-vivo system. Western blot analysis was also performed to evaluate the effect of GTSSE₁ in angiogenic protein expression.

Results: GTSSE₁ has least toxic effect on Human umbilical vein endothelial cells (HUVECs) in comparison to other saponins and significantly inhibited the proliferation of cancer cell lines. It inhibited the HUVECs cell tube formation through inhibition of VEGF-induced angiogenesis. The differentiating 3T3-L1 cells treated with various concentration of GTSSE₁ had a visible decrease in lipid droplets formation measured by Oil Red O staining. Experiments in mice showed that GTSSE₁ inhibits pancreatic lipase activity without hemolysis of erythrocytes, when administered orally. Also, it reduces the size of tumor in nude mice.

Conclusion: Green Tea Seed Saponin E1 (GTSSE₁) is a natural effective ingredient for anti-angiogenesis and anti-obesity effect. From our investigation, we found GTSSE₁ has anti-cancer and anti-obesity properties. At dose-dependent concentration, it exerts pharmacological properties.

HTP.006

How mothers cook in Chile: An experimental exercise to use food labels to control portion sizes

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Portion size of food and drink products is an important consideration when providing nutrition information for food labeling purposes. The present study was conducted in order to understand more about consumer attitudes and understanding of portion size information on food and drink products. An experimental trial was performed on mothers and one of their relative. The participants were asked to prepare two meals (one meant for a child, one for an adult), with ingredients measured only with kitchen tools. Participants were stratified by portion size information in two groups, one with labels bearing the "100 gr" and one with "per portion". Subsequently, every participant was interviewed on the basis of a questionnaire assessing nutritional and portioning knowledge. When measured the total Kcal of prepared meals after the simulation, an increase of calories was recorded in the group of subjects who prepared foods bearing the 100 g label, although not statistically significant ($p=0.842$). Portion size use seemed to be a more intuitive and therefore

sharable means to properly share nutritional information, especially when considering common traditional recipes. Meals responsible appeared to be much more at ease when using per portion labeling, when preparing both children's meals and adult ones.

HTP.007

Developing prediction equations and a mobile phone application to identify infants at risk of obesity

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Background: Advancements in phone technology have created the opportunity to develop an electronic tool to predict an infant's risk for childhood obesity. The study aims were to develop and validate equations for the prediction of childhood obesity and integrate them into an App.

Methods: Anthropometry and childhood obesity risk data were obtained for 1868 UK-born White or South Asian infants. Logistic regression was used to develop prediction equations (at 6±1.5, 9±1.5 and 12±1.5 months) for risk of childhood obesity (BMI at 2 years >91st centile and weight gain 0-2 years >1 centile band) incorporating sex, birth weight, and weight gain as predictors. The discrimination accuracy of the equations was assessed by the area under the curves (AUC); internal validity by comparing AUCs to those obtained in bootstrapped samples; and external validity by testing in an external sample. The App incorporates six final equations (two at each age, one of which included maternal BMI).

Results: The equations had good discrimination (AUCs 86–91%), with the addition of maternal BMI marginally improving prediction. The AUCs in bootstrapped samples were identical to those obtained in the actual sample and performance in the external sample was similarly high. The App is user-friendly and provides a risk assessment of low, medium, or high accompanied by advice and website links to government recommendations.

Conclusions: Robust prediction equations for risk of childhood obesity have been developed and incorporated into an App, providing proof of concept that childhood obesity prediction research could be integrated with advancements in technology.

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HTP.008

Should vitamin B12 supplements be given routinely to all post-gastric bypass surgery patients?

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Introduction: B12 deficiency can occur after Roux-en-Y Gastric Bypass (RYGB). In one study, 30% of RYGB patients who were receiving a multivitamin supplement, developed B12 deficiency after 1 year. In other studies, the incidence of B12 deficiency after RYGB was 8–37% at year 2–4. In view of this, it has been recommended that vitamin B12 supplements should be initiated within 6 months postoperatively, despite the absence of controlled studies.

Methods: We assessed serum B12 in 22 patients (13 women, 9 men) who underwent RYGB and who were not taking B12 supplements. The reference range for serum B12 was 180–650 ng/L.

Results: The mean age was 46.7±9.1 years (range: 24–60) and the mean time from RYGB to B12 measurement was 17±8 months (range: 6–38). The mean serum B12 was 323±161 ng/L (range: 166–743). Only 2 of the 22 patients (9%) showed a serum B12 below the reference range.

Conclusion: Our audit showed that the majority of patients post-RYGB were not B12 deficient at 6–38 months postoperatively. Studies have shown that about a third of patients develop B12 deficiency by year 2–4 post-RYGB and most centres recommend routine B12 supplementation. On the other hand, it has been recommended that all patients who had bariatric surgery should have regular blood tests for various parameters, including vitamins and trace elements. Given that two-thirds of RYGB patients do not develop B12 deficiency, we recommend that initiation of B12 supplementation should be guided by these measurements rather than be given routinely to all patients after RYGB.

1. Conflict of Interest: None

2. Funding: None

HTP.009

Metabolically healthy obesity and risk of mortality: Does the definition of metabolic health matter?

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Objective: To assess the association of 'metabolically healthy obese' phenotype with mortality using five definitions of metabolic health.

Research design and methods: 5269 adults (71.7% men) aged 39–62 years in 1991/93 provided data on Body Mass Index (BMI) and metabolic health, defined using Adult Treatment Panel-III (ATP-III), Wildman, Karelis, Matsuda and HOMA index. Cross-classification of BMI categories and metabolic status (healthy/unhealthy) created six groups. Cox proportional hazards regression models were used to analyze associations with all-cause and cardiovascular disease (CVD) mortality during a median follow-up of 17.7 years.

Results: A total of 638 individuals (12.1% of the cohort) were obese, of whom 9–41% were metabolically healthy, depending on the definition. Regardless of the definition, compared to metabolically healthy-normal weight individuals, both the metabolically healthy obese (Hazard Ratio (HR) range from 1.81 (95% CI: 1.16, 2.84) for ATP-III to 2.30 (95% CI: 1.13, 4.70) for Matsuda index) and the metabolically abnormal-obese (HR range from 1.57 (95% CI: 1.08, 2.28) for Matsuda index to 2.05 (95% CI: 1.44, 2.92) for Karelis) had an increased risk of mortality. The only exception was the lack of excess risk using the HOMA-criterion in the metabolically healthy obese (HR= 1.08; 95% CI: 0.67, 1.74). Among the obese, the risk of mortality did not vary as a function of metabolic health apart from when using the HOMA-criterion (HR=1.93; 95% CI: 1.15, 3.22). Similar results were obtained for cardiovascular mortality.

Conclusions: For most definitions of metabolic health, both metabolically-healthy and unhealthy obese carry an elevated risk of mortality.

Disclosures: None

HTP.010

Obesity in Portugal: Does height matter?

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Introduction: Body mass index (BMI) is measured as weight in kilograms divided by height in meters squared, and this parameter reflects genetic, environmental and behavioral factors. Different indexes of weight-for-height are commonly used to classify underweight-*UW*, normal weight-*NW*, overweight-*OW* and obesity-*Ob*. in adults. The

objective of this study is to compare height attainment according different BMI categories.

Methods: The sample included all subjects in the fourth Portuguese National Health Survey older than 19 years (15463 men and 17181 women). Participants were selected from households distributed in seven regions of Portugal (*NUTS-II/sub-division*). Subjects were categorized according to their BMI as: *UW* ($<18.5 \text{ kg/m}^2$); *NW* ($18.5 \text{ kg/m}^2 \leq \text{BMI} < 25.0 \text{ kg/m}^2$); *OW* ($25.0 \text{ kg/m}^2 \leq \text{BMI} < 30.0 \text{ kg/m}^2$) and *Ob*. ($\geq 30.0 \text{ kg/m}^2$). *ANOVA* was used to evaluate the relationship between the height and the BMI categories. *Bonferroni test* was chosen to examine each other significance. Multinomial logistic regression models were fitted to estimate the association between the height and categories of BMI, adjusting for potential confounders (*proxy-reporting-information/gender/age/education/income/height*). *NW* category was defined like reference.

Results: When the categories of BMI were analyzed was found that the average height gradually decreased (assuming from underweight to obesity). After being adjusted confounders it was observed that individuals who had height less than 1.58 m were 2.67 times more likely to be *Ob*. (95% CI: 2.65–2.69). While individuals with a height between 1.65 to 1.699 m were more likely to have low *UW* (OR: 1.1895% CI: 1.17 to 1.20).

Conclusion: This study of the general population in Portugal showed that there was a relationship between height and BMI categories, with emphasis among individuals with short stature and obesity.

1. Conflict of Interest: None Disclosed

2. Funding: No Funding.

HTP.011

Relationship between obesity, diabetes and proinsulin in adult population

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Introduction: The aim of this study was to examine the relationship between obesity, diabetes and fasting proinsulin (FP) in adult population.

Methods: A random population-based sample (n=656) of Romanians (26–80 years) was studied. All participants underwent anthropometric measurements and blood tests (fasting plasma glucose, HbA1c, lipids, aminotransferases, insulin, proinsulin and C-peptide). Homeostasis model assessment of insulin resistance (HOMA-IR), HOMA-B were also calculated. The diagnosis for metabolic syndrome (MetS) was made according to International Diabetes Federation.

Results: In person without diabetes, fasting proinsulin levels significantly increased with body mass index (BMI) category from lean (n=83, 3.2 pmol/L) to overweight (n=119, 5.5 pmol/L) to obese (n=112, 7.4 pmol/L) ($p < 0.0001$). The ratio of the fasting levels of proinsulin to insulin did not differ significantly between the three groups ($p=0.64$). Subjects with insulin resistance (HOMA-IR >2 , n=208) had higher fasting PI and C peptide levels than those without ($p<0.001$), with no significant difference in fasting PI/I ratio ($p=0.84$). The group with the highest FP quartiles showed higher prevalence of overweight/obesity and MetS ($p < 0.0001$). HOMA-IR over 2 was present in 42.2% (n=35) normoponderal person, in 65.5% (n=78) in overweight, and 84.8% (n=95) in persons with obesity.

Conclusions: Our study has demonstrated a close association between obesity and elevated proinsulin but not with proinsulin/insulin ratio. These results suggest that IR, insulin secretion, proinsulin are affected early in patients with overweight and obesity and diabetes prevention measures must be applied at this stage.

1. Conflict of Interest: None Disclosed

2. Funding: Research-relating to this abstract was funded by Medas Clinic.

HTP.012

Should the dosage of phentermine is adjusted for lower BMI patients?

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Introduction: Phentermine is recommended for subjects whose BMI are 30 kg/m^2 or greater and 27 kg/m^2 or greater having weight-related comorbidity. But in Korea, the cut off point of BMI for obesity is lower than that in Western countries, so in many cases, phentermine is being prescribed for the patients who have lower BMI than the recommendation. The aim of this study is to know whether to adjust the dosage of phentermine considering the lower BMI state.

Methods: The patients who participated in the treatment were divided into the two groups, BMI 25 kg/m^2 or greater (high BMI group: n=37) and less than 25 kg/m^2 (low BMI group: n=39). They all received phentermine-HCl 37.5 mg per day with life style modification for 4 weeks. They were checked BMI, body weight, body fat weight before and at the end of the treatment. And to check the adverse reactions, at every visit, twice a week, they were asked about the discomfort with the medication.

Result: The mean of weight loss was $3.79 \pm 1.72 \text{ kg}$ ($5.0 \pm 2.0\%$ of initial weight) in high BMI group and $3.36 \pm 1.85 \text{ kg}$ ($5.37 \pm 2.9\%$ of initial weight) in low BMI group. There were no significant differences in the change of body weight, BMI, body fat and the incidence of adverse reactions between both groups.

Conclusion: Phentermine was well tolerated and made the favorable results in weight control for lower BMI patients like for obese patients. It is considered that it doesn't need to adjust the dosage of the agent even for the lower BMI patients.

1. Conflict of Interest: None disclosed

2. Funding: No funding

HTP.013

Mitochondrial dysfunction causes an excessive inflammation in adipose tissue

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Mitochondrial dysfunction and inflammation have been reported to occur in the adipose tissue of obese individuals. However, consequences for primary mitochondrial dysfunction for adipose tissue are not known. We utilized the knowledge that some mitochondrial genetic defects in humans are associated with obesity, and some with thinness. This raised the question whether mitochondrial dysfunction can regulate fat storage or utilization, depending of the dysfunction type. We have previously shown that the thinness in mitochondrial disorders is associated with skeletal muscle symptoms, which elicit muscle secretion of a fasting-associated lipolytic cytokine FGF21. Here we studied the molecular pathways associated with mitochondrial disease-associated obesity, and their relevance for common obesity.

We analyzed the molecular characteristics of the adipose tissue of patients with different mitochondrial disorders: MELAS (mtDNA mutation) associated with thinness, and MIRAS (POLG1 mutations) associated with obesity. We found that all mitochondrial disease patients, regardless of their BMI, showed mitochondrial dysfunction in their adipose tissue, with a substantial decline in mtDNA copy number, decreased level of mtRNA transcripts and protein subunits of respiratory chain complexes. Pathway analyses of MIRAS adipose tissue indicated excessive activation of inflammation pathways and dysregulation of adipokine secretion, significant even if compared to BMI-matched

controls. However, in overweight MIRAS patients, inflammation was much more pronounced than in lean MELAS patients. Our results show that primary mitochondrial dysfunction associates with inflammation of the adipose tissue, the more pronounced the higher BMI. These results strongly support the causal link between mitochondrial dysfunction and inflammation in the adipose tissue.

HTP.014

Obesity in Croatia – prevalence, observed trends and risk factors

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Introduction: Obesity is considered a leading public health problem and is listed among the ten major risk factors for a number of chronic diseases (WHO, 2012).

Aim and Methods: Our aim was to estimate the prevalence of obesity in Croatia, describe the changes in prevalence over a 5-year period and detect the predictors and risk factors of obesity, on both national and regional level. The study has been conducted in two phases: in 2003 on a representative sample of 9070 adults from six Croatian regions and in 2008 on a subset of 3222 adults, based on questionnaires measuring socioeconomic and health status, dietary habits, alcohol consumption, level of physical activity, smoking habits, blood pressure and waist circumference.

Results: Our study showed that 20.37% of Croatian adults are obese on a national level; on the regional level, significant differences have been observed between Continental and Mediterranean part of the country. Obtained results indicate that 22.51% of the examinees in the Continental part are obese, unlike only 15.80% in the Mediterranean part. Also, we have ascertained a significant increasing trend (>10%) in the obesity prevalence during a 5-year period (2003–2008) and determined following major obesity risk factors: age, frequent consumption of “hidden fats” of animal origin, level of formal education, living in a rural surrounding and alcohol consumption.

Conclusion: We can conclude that the level of obesity prevalence in Croatia is significant, socially conditioned and with an increasing trend, which calls for immediate intervention and implementation of preventive public health programs.

HTP.015

Obstructive sleep apnoea is associated with increased arterial stiffness in severe obesity

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Introduction: Obstructive sleep apnoea (OSA) is associated with obesity, hypertension and cardiovascular disease. Arterial stiffness has been proposed as a marker of cardiovascular disease risk. We determined whether severely obese patients with newly diagnosed OSA without previous cardiovascular disease have increased arterial stiffness compared with BMI-matched controls.

Methods: 72 patients (35 females), age 47.8±9.8 years, mean BMI 40.9±7.2 kg/m² underwent a night respiratory polysomnographic study to assess for OSA. Pulse wave analysis used applanation tonometry at the radial artery. Augmentation index at HR75 (Aix), Augmentation pressure (AP) and subendocardial viability ratio (SEVR) were derived from waveforms. OSA patients were studied prior to CPAP.

Results: Groups [OSA 47, controls 25], [Apnoea-hypopnoea Index (AHI) 23.8±10.6 vs 2.6±1.0] were matched for age [OSA 46.7±9.4 years vs control 49.6±10 years(ns)] and BMI [42.0±7.8 kg/m² vs 40.0±5.8

kg/m² (ns)]. Obese OSA patients demonstrated increased arterial stiffness, augmentation pressure and SEVR compared with controls (OSA Aix 23.2±5.2% vs control 11.3±5.2%; OSA AP 12.8±6.3 mmHg vs control 6.5±4.1 mmHg; OSA SEVR 149±14% vs control 171±12%) all P<0.001. Aix was associated with mean arterial blood pressure (MAP) (r=0.31, P=0.003) and AHI (r=0.436, P<0.001). On multivariate analysis with Aix designated as dependent variable and including age, BMI, systolic BP, diastolic BP, MAP, total cholesterol and AHI as independent variables, AHI emerged as an independent predictor of arterial stiffness [β=0.42±0.05, P<0.001].

Conclusions: Severely obese patients without cardiovascular disease or hypertension but who have OSA have increased arterial stiffness. The observed association between the Aix and MAP may relate to underlying arterial stiffness augmenting central pressures, potentially increasing cardiovascular risk.

1. Conflict of Interest: None

2. Funding: This research was supported by the University of Liverpool, St Helens and Knowsley Hospital and University Hospital Aintree.

HTP.016

Genome-wide gene expression in human muscle and fat tissue induced by weight reduction

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Introduction: Weight reduction improves many parameters of obesity related diseases, which include glucose and lipid metabolism. The individual response to standardized weight loss interventions is characterized by considerable variation. As adipose tissue (AT) and skeletal muscle (SKM) contribute to the regulation of energy balance, the interplay of these tissues may be crucial for long-term weight reduction. We here aimed to identify molecular mechanisms in SKM and AT involved in body weight regulation.

Methods: We performed a weight loss study in 143 obese subjects. A set of parameters assessing glucose and lipid metabolism, insulin sensitivity, body composition and cardiovascular risk were analysed before and after weight reduction and during follow up (currently 18 month). SKM and AT biopsies were analysed concerning differentially expressed genes and pathways using deep sequencing technique.

Results: We observed an expected improvement of several metabolic and anthropometric parameters. Furthermore we identified a set of genes, which were regulated by weight reduction. Clearly distinct responses were seen in AT and SKM, with expression changes being more prominent in AT. Pathway analysis reveals altered metabolic pathways in AT, whereas predominantly structural genes have been affected in SKM.

Conclusions: Weight reduction alters gene expression patterns in both SKM and AT.

HTP.017

COX2 regulation during adipogenesis of 3T3-F442A cells

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Introduction: Obesity is an abnormal and excessive accumulation of fat that cause weight gain, and it is considered a risk factor for several common diseases. During adipogenesis preadipose progenitors undergo biochemical, morphological and metabolic changes related to gene

expression, and it has three major steps: commitment, clonal expansion of committed cells, and phenotype expression. Our group has developed an in vitro model to study commitment where 3T3-F442A cells are induced to differentiate by a combination of staurosporine and dexamethasone (St/Dex) in non-adipogenic serum. St/Dex induces two well-defined stages of commitment; induction and stabilization. It has been reported that Cn downregulate adipose differentiation through the anti-adipogenic pathway that includes NFATc1 participation as a nuclear effector, and CaM as a molecule needed for Cn activity, and RCAN as an endogenous inhibitor of Cn activity. It was reported that promoter of *ptgs2* (COX2) has activation sites by NFATc1.

Methods: We analyzed, by qRT-PCR, the relation of Cn and COX2 pathway during adipose commitment induced by St/Dex.

Results: We found the expression of *nfatc1*, and *ptgs2* mRNAs was transiently increased during induction phase, whereas during stabilization of commitment *ppp3ca* and *cam1* decreased. The mRNA expression of *ptgs1* and *rcan1* did not change during commitment. Adipose commitment induced by St/Dex blocked Cn activity. In addition, Cn activity increases *ptgs2*, *nfatc1* and *rcan1* expression.

Conclusion: Expression of *ptgs2* is regulated by a mechanism not yet described that does not include participation of Cn during adipogenic commitment.

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HTP.018

Supplementation of probiotics in diet-induced obese mice is correlated with gut microbial change and reduction in obesity

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Introduction: Diet-induced obesity is reported to be associated with alterations in mouse gut microbiota. Hence gut microbiota represents a therapeutic target with potential to reverse existing obesity. The aim of this study was three fold: First to assess the functional effects of probiotic treatment on diet-induced obesity; Second to establish the effects on the gut microbiota of diet-induced obese mice; and third to assess the effects on liver and adipose gene expression.

Methods: C57BL/6J male were fed a high-fat diet (HFD) for 8 weeks to induce obesity, then randomized to receive HFD+probiotic (*Lactobacillus curvatus* HY7601 and *Lactobacillus plantarum* KY1032) or HFD+placebo for further 10 weeks. Normal diet (ND) fed mice served as non-obese controls.

Results: Diet-induced obese mice treated with probiotics showed reduced body weight gain and fat accumulation, as well as lowered plasma insulin, leptin, total-cholesterol and liver toxicity biomarkers. A total of 151061 pyrosequencing reads for the fecal microbiota were analysed. Gut microbiota diversity and composition were significantly altered in diet-induced obese mice and following probiotic treatment. We observed transcriptional changes in adipose tissue and liver. In adipose tissue, pro-inflammatory genes (TNF- α , IL6, IL1 β and MCP1) were down-regulated. In liver, fatty acid oxidation-related genes (PGC1 α , CPT1, CPT2 and ACOX1) were up-regulated.

Conclusion: Gut microbiota of diet-induced obese mice appears to be modulated in mice receiving probiotic treatment. Probiotic treatment might reduce diet-induced obesity and modulate genes associated with metabolism and inflammation in liver and adipose tissue. Therefore, probiotics appear to represent a promising natural therapeutic to combat obesity.

HTP.019

Application of the transtheoretical model of behavior change for obesity patients in Turkey

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Aim: The aim of this study was to assess stages of change in patients with obesity patients and to analyze their correlations with clinical characteristics and treatment processes using Prochaska's transtheoretical model of change.

Methods: Consecutive sample (N=60) applied to education (n:30), control group (n:30) was recruited from an endocrinology clinic Ege University Hospital in Izmir. The patients' readiness to change their eating behavior was assessed by a self-rating scale (URICA), scale processes of change in exercise and diet. A score for each participant on each subscale (Precontemplation, Contemplation, Action, Maintenance) was derived from the scale. Data were gathered at baseline and at the end of 6 months. The data was analyzed with software SPSS. Ethic permission was obtained for the conduct of research.

Results: The mean age of the intervention group (32.21 \pm 5.7), control group (34.82 \pm 4.1). At the end of 6 months body weight (BW), Body Mass Index (BMI), waist circumference (WC), triglycerides (TG), total cholesterol (TC), HbA1C, and systolic blood pressure (SBP) of the intervention group had declined significantly. Triglycerides, fasting blood glucose, HbA1C, and SBP had worsened in the control group. URICA, scale processes of change in exercise and diet scores had increased significantly in the intervention group ($p < 0.05$).

Conclusion: After six months, interventions patients has increased of undergoing stages of behavior change to the control group. Education applying transtheoretical model were found to be effective in changing behavior.

HTP.020

Melanocortin-4 Receptor mutations do not affect eating behaviours in adult obese: A case-control study

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Introduction: Melanocortin-4 Receptor (MC4R) gene mutations, the most frequent known cause of monogenic obesity, are involved in the leptin-melanocortin pathways that control food intake. The effect of these mutations on eating behaviours is still debated. The objective of our study is to determine the impact of functional MC4R mutations on eating behaviour in obese adults.

Methods: A total of 21 adult carriers of functional MC4R mutations, referred in a clinical Nutrition Department (Paris, France) were included. Each case was matched with two randomly paired controls without mutation. Matching factors were age, sex and body mass index. The 63 patients were interviewed on their food intake, potential eating disorders (binge eating, hyperphagia, night eating, snacking, emotional eating, cognitive restraint, uncontrolled eating) and physical activity level. Conditional logistic regression analysis was performed to assess the association between MC4R functional mutations and the risk of eating disorders.

Results: Binge-eating episodes were not different between carriers and non-carriers of MC4R mutations. Qualitative and quantitative compo-

nents of eating behaviour, dietary intakes or physical activity did not differ either between groups.

Conclusion: In this large case-control study on functional *MC4R* mutations carriers, we have shown that *MC4R* mutations do not affect dietary intakes or eating behaviours.

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HTP.021

Psychological Benefits of Weight Loss: A Systematic Research Review

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Introduction: It is generally accepted that weight loss has significant physiological benefits, such as reduced risk of diabetes, lowered blood pressure and blood lipid levels. However, few behavioural and dietary interventions have investigated psychological benefit as the primary outcome.

Method: Systematic review methodology was adopted to evaluate the psychological outcomes of weight loss following participation in a behavioural and/or dietary weight loss intervention in overweight/obese populations. 35 studies were selected for inclusion and were reviewed.

Results: Changes in self-esteem, depressive symptoms, body image and health related quality of life (HRQoL) were evaluated and discussed. The results demonstrated consistent improvements in psychological outcomes concurrent with and sometimes without weight loss. Improvements in body image and HRQoL (especially vitality) were closely related to changes in weight.

Conclusion: Although the quality of the studies reviewed was generally acceptable, only 8 out of 35 studies included a suitable control/comparison group and the content, duration of intervention and measures used to assess psychological outcomes varied considerably. Further research is required to improve the quality of studies assessing the benefits of weight loss to fully elucidate the relationship between weight loss and psychological outcomes.

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HTP.022

Adipose tissue and liver fibrosis in morbid obesity: Link with BMI variation and tissue stiffness

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Introduction: Gastric bypass (GBP) is associated with long-term weight loss (WL). However, there is an important interindividual variability of WL after GBP with some subjects being less responsive than others. Previous studies identified predictive factors of WL but none explored tissue specific parameters such as adipose tissue remodelling. We aimed to determine presurgical predictors of WL after GBP by exploring these parameters.

Methods: The study enrolled 404 obese candidates for bariatric surgery. Liver biopsies, subcutaneous (scWAT) and omental adipose tissue were collected. 243 patients were clinically characterized before, 3, 6, and 12 months after surgery. Liver and scWAT stiffness were assessed non-invasively using Vibration-Controlled-Transient-Elastography (Fibroscan® and a novel prototype named AdipoScan™) in 72 patients.

Results: The exploration of BMI trajectories revealed that 28.8% of the participants were less responsive (LR) than others. LR group was older, had higher frequency of diabetes and increased circulating concentrations of IL6. LR group also showed increased amount of scWAT fibrosis and a higher frequency of liver fibrosis. We built two predictive models for the less response to WL. Model1 combines scWAT fibrosis, HBA1C, IL6, age and BMI. Model2 combines histological parameters of liver, IL6 and age. Liver and scWAT stiffness were positively correlated with liver and scWAT fibrosis.

Conclusion: Altered BMI response to GBP can be predicted by a series of biochemical variables, which include not only metabolic and inflammatory parameters but also scWAT and liver fibrosis. Therefore the non-invasive evaluation of liver and scWAT seems to have an interest in clinical practice.

HTP.023

Benefits of levemir insulin therapy at obese diabetic patients

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Aims: We studied in this study the effect of the Levemir insulin therapy over the weight curve and the advantages of the using of basal insulin analogues.

Method: We included 120 obese patients with type 2 diabetes, to who we initiated the basal insulinic therapy.

We created 2 plots: one of 60 patients who were treated with basal human insulin, and the second one of 60 patients who were treated with basal insulinic analogues- Levemir. During an interval of 6 months, the patients were monitored the metabolic control, body weight, BMI, HOMA index, waist and hip circumferences.

Results: At initializing of the study, the patients had an average Hb A1c of 9.8%, while after 6 months of therapy the patients out of the first plot ranged a Hb A1c value of 8.2% vs. the second plot with a range of 7.3%. The frequency rate of nonsevere hypoglycemic episodes was 39% and of the severe episodes was with 12% for first plot vs 21 % and 5% for second plot. The patient's weight increase was smaller in the second batch. They presented an average increase of 3,8 kg within 6 months for first plot vs 1.2 kg for second plot.

Conclusions: The use of basal insulin analogues in the therapy of obese diabetic patients ensures a great benefit, as it allows a good metabolic control with the price of a lower hypoglycemic risk and a reduced weight increase in comparison to the basal human insulin.

HTP.024

The use of alternative key performance indicators to measure success in a tier 3 weight management programme

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Introduction: Programmes around the UK use various methods to trigger weight change. This work refers to a Tier 3 multidisciplinary (MDT) programme for patients with BMI >35 kgm² (+ co-morbidities) or BMI >40 kgm² (- co-morbidities). The MDT includes registered dietitians, anthropometrists, clinical psychologists and a bariatric physi-

cian delivering 12 or 24 week programmes focussing on the individual journey of each patient.

Methods: Innovative NHS commissioners authorized a focus on non-traditional key performance indicators (KPIs). These emphasize anthropometry, examining health status using obesity phenotype and somatotype (shape/proportion/genetics). This bespoke information tailors dietary and physical activity interventions, and develops positive strategies to overcome personal barriers. In addition to traditional KPIs (weight maintenance, and % weight loss), the programme measures positive dietary behaviour change, increased physical activity, progression to healthier obesity phenotypes and improved clinical condition at 12 or 24 weeks.

Results: Since June 2011, 533 individuals have begun treatment. To date (January 2013), 280 patients have completed the programme at 12 or 24 weeks (Drop outs = 28% before key milestones). Data analysis (n=280) reveals evidence of improved health status: 46% lost between 1 and 5% at 12 weeks and 19% lost more than 10 % of weight at 24 weeks. 25% show improving obesity phenotypes, 92% show improved dietary behaviour, 78% show increased physical activity and 62% show improved clinical condition.

Conclusion: Systematic reviews reveal MDT programmes result in moderate weight losses compared to other interventions but focussing on alternative outcomes may provide enhanced health risk analysis and have better longitudinal health projections.

1. Conflict of Interest: None disclosed

2. Funding: Programme commissioned and funded by Portsmouth City PCT.

HTP.025

The ghrelin peak is a consequence rather than a cause of meal initiation in humans

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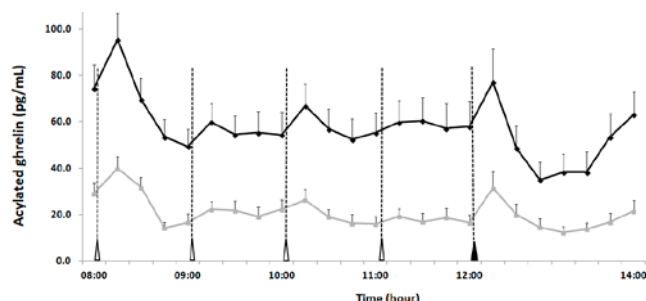


Figure: Mean (+SEM) plasma acylated ghrelin concentrations for lean (—●—) and obese subjects (—■—) after four identical 167kcal meals (▲) and one 1041kcal meal (▲), n=37.

Introduction: Acylated ghrelin is the only currently known orexigenic hormone. Exogenous ghrelin robustly stimulates food intake. It has been described that there is an increase in plasma acylated ghrelin concentration before meals, therefore a ghrelin peak is widely considered as the main metabolic signal of meal initiation.

Methods: We studied plasma acylated ghrelin kinetics in 20 lean and 17 obese subjects during planned meals. Subjects were given a 167 kcal breakfast every hour from 8:00 to 11:00 am (56.6% carbohydrate, 37.2% fat, and 6.2% protein) and a 1041kcal lunch at 12:00 (53.1% carbohydrate, 30.6% fat, and 16.3% protein).

Results: Our results confirm the presence of plasma acylated ghrelin peaks, but occurring after (10 min) rather than before meal initiation. These significant increases in plasma acylated ghrelin occurred, regardless of the caloric intake (167 or 1041 kcal) or BMI status (lean or obese) ($p < 0.05$).

Conclusion: Our results challenge the role of acylated ghrelin peak in meal initiation. The role and the underlying mechanism of these ghrelin peaks remain to be investigated. The insulin secretion (cephalic or the first phase), the pre-meal drop in glycaemia, the gastric content or distension could be involved in this acute physiological feature.

HTP.026

Omental adipose tissue fibrosis does not impact on insulin-resistance in morbid obesity

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Introduction: In chronic obesity, fibrosis accumulation occurs in adipose tissue limiting adipocyte fat buffering capacity. So far the clinical impact of adipose tissue fibrosis remains unclear. The aim of our study was to investigate whether omental adipose tissue (OAT) fibrosis may account for a more severe insulin-resistance in morbidly obese population.

Methods: OAT biopsies were obtained from 28 obese subjects (age 41.9 ± 1.6 y; BMI 48.5 ± 1.4 Kg/m²) undergoing bariatric surgery. The patients, characterized by anthropometric, biochemical and oral glucose tolerance test (OGTT) evaluation were divided in two age-, waist- and BMI-matched groups (n=14) according to the severity of insulin-resistance assessed by hyperinsulinemic euglycaemic clamp (Group A, $M = 4.34 \pm 0.4$; Group B, $M = 2.14 \pm 0.2$ mg·kg⁻¹·min⁻¹; $p < 0.001$). OAT expression of Collagens 1, 3 and 6, pro-fibrotic mediators (TGF- β , Activin A, CTGF), hypoxia (HIF-1 α), inflammation and macrophage infiltration (IL6, CD68) markers was analyzed by Real Time PCR.

Results: The groups did not differ in any gene analyzed. Group B showed higher serum aminotransferases and γ GT than Group A (AST, A: 17.8 ± 2.3 ; B: 41.9 ± 8.8 mg/dl, $p < 0.01$; ALT, A: 38.3 ± 3.4 ; B: 57.3 ± 7.5 mg/dl, $p < 0.05$; γ GT, A: 33.6 ± 3.5 ; B: 51.1 ± 6.3 mg/dl, $p < 0.05$). Interestingly, in both groups Collagen 6 significantly correlated with Collagen 1, 3 and with HIF-1 α , TGF- β and CD68 mRNA levels, supporting their role in fibrosis development and the link between collagen and macrophage accumulation.

Conclusion: These findings suggest that, within morbidly obese population, OAT transcription levels of fibrogenic proteins does not explain a more severe peripheral insulin-resistance, which instead seems mostly driven by the hepatic damage.

1. Conflict of Interest: None disclosed.

2. Funding: Italian Ministry of Research and University, Research Project PRIN

HTP.027

New association between the FTO rs9939609 polymorphism and cataracts in a Mediterranean population

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Background: Age-related cataract is a common eye disease in middle aged and elderly subjects, which is characterized by lens opacities and visual impairment. Despite its high prevalence and cost, very little is known about the main risk factors. Although it is accepted that incidence of cataracts increases with ultraviolet radiation exposure and type 2 diabetes, results are still controversial for obesity. Our aim was to analyze the association between obesity and the fat mass and obesity

(FTO) gene with cataracts in a high cardiovascular risk Mediterranean population.

Methods: We analyzed 1094 high-cardiovascular risk participants (aged 67+/-7 years) in the PREDIMED-Valencia study. We identified 157 cases of diagnosed cataracts (14.4%). We obtained clinical and anthropometric data and determined the FTO rs9939609 polymorphism.

Results: Prevalence of cataracts was higher ($P=0.028$) in women (16.1%) than in men (14.4%). Although we observed an association between type 2 diabetes and cataracts (17.6% in type 2 diabetes subjects vs 11.6% in non-diabetics; $P=0.005$), we did not detect such association with obesity (14.8% in obese vs 13.9% in non-obese; $P=0.163$). However, we observed a clear association between the FTO rs9939609 (T>A) polymorphism and cataracts. Thus, prevalence of cataracts increased as the number of obesity-related alleles (A) increased: 13.9% in TT, 14.1% in TA and 18.1% in AA ($P=0.016$). In the multivariate analysis adjusted for the confounding factors, carriers of the A allele had a higher risk of cataracts (OR: 1.52; 95%CI: 1.02–2.27; $P=0.041$) than TT.

Conclusions: We reported a new association between the FTO rs9939609 polymorphism and cataracts in Europeans.

HTP.028

Hormonal contraceptives use was a stronger predictor of iron status than weight, inflammation or the TMPRSS6 rs855791 genotype in overweight and obese young women

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Introduction: Young women are at risk of iron deficiency. Evidence suggests obesity and inflammation may further exacerbate this risk. This study aimed to investigate the strongest determinants of iron status in young, healthy overweight and obese women.

Methods: Medical history, anthropometric (height, weight, waist) and biochemical (haemoglobin, transferrin saturation (Tsat), ferritin, soluble transferrin receptor (sTfR), sTfR/log ferritin (sTfR-F), hepcidin, C-reactive protein (CRP)) data were collected from 76 women (18–25y) with BMI >27.5 kgm⁻². Participants were genotyped for the rs855791 polymorphism of the TMPRSS6 gene known to be correlated with various iron markers. Associations were analysed using multiple linear regression. Data: mean±SD.

Results: Mean age and BMI were 22.1±2.5y and 33.6±4.2 kgm⁻². 9.2% of participants were anaemic (Hb<120 gL⁻¹) with no cases of anaemia of inflammation (sTfR-F<1.0) detected. Hypoferritinaemia (<15 µg⁻¹) and elevated sTfR (>2.39 mgL⁻¹) were identified in 17.1% and 5.3% respectively. Hepcidin (8.7±7.5 ngmL⁻¹) was significantly associated with ferritin ($\beta=0.528$; $p<0.01$), Tsat ($\beta=0.295$; $p<0.01$) and rs855791 ($\beta=0.212$; $p=0.03$). Inflammation was moderate (CRP: 6.0±7.5 mgL⁻¹), with 14.5% having clinically elevated CRP (>10mgL⁻¹). Regression analysis using anthropometric and inflammatory variables, rs855791 and ethnicity, polycystic ovary syndrome and hormonal contraception as predictors showed contraception as the strongest predictor of serum iron, Tsat, sTfR and sTfR-F (all $p<0.05$).

Conclusion: The most prevalent abnormality was hypoferritinaemia with no apparent contribution of inflammation or hepcidin to iron deficiency risk, suggesting aetiology of inadequate intake, absorption or high loss of iron. Hormonal contraceptive use was a significant factor influencing iron status across the cohort presumably as a result of reduced menstrual iron loss.

1. Conflict of Interest: Research relating to this abstract was supported by Meat and Livestock Australia. The authors declare that Meat and Livestock Australia had no influence on any part of the abstract, including the conclusions drawn.

2. Funding: Research relating to this abstract was funded by Meat and Livestock Australia

HTP.029

Hypoglycemic effect of allylthiocyanate in insulin-resistant obese mice

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Introduction: Obesity is associated with an increased risk of developing insulin resistance and type 2 diabetes. Mitochondrial dysfunction is associated the pathophysiology of insulin resistance. Allylthiocyanate (AITC) occurs in many cruciferous vegetables and is reported to have anticancer activity. However, the effect of AITC on insulin resistance and mitochondrial function has not been investigated yet.

Method: We measured glucose uptake in insulin-resistant C2C12 myotubes and L6-GLUT4myc cells. To test the effect of AITC on insulin resistance and glucose utilization, we fed obese mice with 25 and 50 mg/kg of AITC for 10 weeks.

Results: We observed AITC increased glucose uptake in insulin-resistant C2C12 myotubes and augmented GLUT4 translocation in L6-GLUT4myc cells. AITC increased the mRNA expressions of TFAM1 and PGC1- α and this led to the increase of mitochondrial DNA content. Moreover, AITC increased mitochondrial respiration. Supplement of AITC effectively inhibited hyperglycemia and decreased fasting serum insulin levels. IPGTT measurement showed AITC improved glucose tolerance. AITC inhibited hepatic gluconeogenesis and ameliorated high fat diet induced mitochondrial dysfunction.

Conclusion: Collectively, these data suggest that positive effect of AITC on insulin resistance is partly mediated the modulation of mitochondrial dysfunction.

1. Conflict of Interest: None Disclosed

2. Funding: This study was supported by Korea Food Research Institute.

HTP.030

Anti-obesity effect of shikonin in high fat diet induced obese mice

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Introduction: Shikonin is a major component of Lithospermum erythrorhizon and has been shown to have various biological functions including antimicrobial, anti-inflammatory, and antitumor effects. The main objective of this study was to investigate effects of shikonin on diet-induced obesity in mice fed with a high-fat diet (HFD) and to clarify the underlying mechanism.

Methods: C57BL/6J mice were fed a normal or high-fat diet with or without shikonin supplementation for 8 weeks. Body weight, visceral fat pads and biochemical parameters were determined. Adipose tissue and liver related genes and protein expression levels were assessed by qRT-PCR and Western blot analysis.

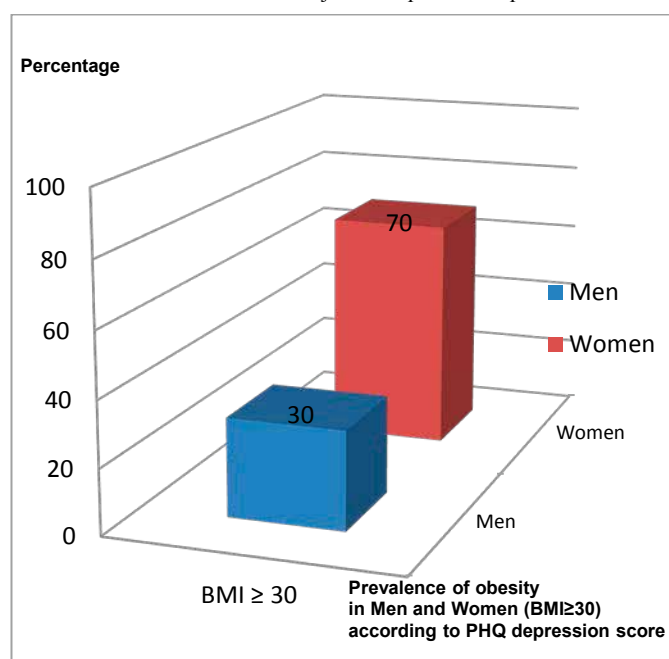
Results: Shikonin decreased body weight gain, white adipose tissue (WAT) mass and serum lipid profiles increased by HFD. Serum insulin and leptin levels in shikonin fed group were decreased compared with the HFD group. Furthermore, shikonin attenuated adipose tissue genes and protein associated with adipogenesis. Shikonin also down-regulates lipogenic genes such as sterol regulatory element-binding protein 1a, fatty acid synthase, sterol-CoA desaturase 1 and glycerol-3-phosphate acyltransferase in liver.

Conclusion: These results suggest that shikonin prevents obesity by inhibiting adipogenesis and lipogenesis related gene expressions.

1. Conflict of Interest: None Disclosed

2. Funding: This study was supported by Korea Food Research Institute.

HTP.031

Comparative study of depression in obese men and womenPatankar- Puranik Manjiri²¹Australia and New Zealand Obesity Society, Sydney, Australia,²The Obesity Society, Silver Spring, United States of America**Objective:** Evaluate the longitudinal bi directional relationship between obesity, gender and depression.**Background:** Popular concepts of body image and thinness, affect women more than men. Being obese is more likely to be negative in women because of society's ideal of a thin woman, an ideal that isn't as powerful as a male counterpart.**Method:** A randomized trial of 1997 respondents was done. We focused 998 males and 999 females aged 30–55 years with BMI [Body mass index] between 30 and 35 as a measure for obesity along with structured psychiatric interview through a Patient Health questionnaire. The questionnaire included assessment on signs of depression as Irritability, mood swings, feeling of low self-esteem etc.**Results:** Obesity at baseline increases the risk of onset of depression. Obese female with a BMI ≥ 30 are 70% more prone to depression while obese men with a BMI of ≥ 30 are just 30% prone to depression.

Depression affects twice as many women as men. Obese women are 39 times more likely to suffer from depression than those of normal weight. In contrast, obese men are only 2.54 times more likely to be depressed, compared to men of normal weight

Conclusion: Among middle-aged women, depression is strongly and consistently associated with obesity. In obese patients, mood should be monitored. This awareness could lead to prevention, early detection, and co treatment for ones at risk, which could ultimately reduce the burden of both conditions.

HTP.032

Autophagy protects endoplasmic reticulum (ER) stress-induced insulin resistance and mitochondrial apoptotic cell death

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Introduction: Insulin resistance (IR) is a major characteristic of obesity and diabetes. Endoplasmic reticulum (ER) pathway appears to act directly as a negative regulator of the insulin pathway. Recent finding

suggest that dysregulation of autophagy is implicated in insulin resistance, although the exact mechanism of action is still not clear. Autophagy is a novel cytoprotective mechanism to survive under unfavourable condition.

Method: We evaluated tunicamycin induced-ER stress markers, glucose uptake, and insulin resistance in autophagy gene-deficient cells. To examine the cytoprotective effect of autophagy on mitochondrial apoptotic cell death, we investigated the molecular mechanisms underlying the ER-mitochondria cell death signals.**Results:** ER stress increased autophagy as demonstrated by increased LC3-II and autophagosome formation. Tunicamycin-induced ER stress increased in autophagy gene-deficient cells, ULK1 and Atg5. Insulin resistance also rapidly increased in autophagy gene-deficient cells. Although ER stress acts to protect cell death but it eventually triggered cell death when ER dysfunction is severe or prolonged.**Conclusion:** Collectively, these data suggest that autophagy attenuated ER stress-induced insulin resistance and mitochondrial apoptotic cell death.**1. Conflict of Interest:** None Disclosed**2. Funding:** This study was supported by Korea Food Research Institute.

HTP.033

A five-year longitudinal study investigating the prevalence of childhood obesity in Leeds: Do national targets capture the real picture?

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Introduction: There has been a levelling off in obesity prevalence occurring in the child population. However, most studies are cross sectional and have relied upon the use of body mass index (BMI). The aim of this research was to examine the prevalence of obesity over time in the same individuals comparing different measures of adiposity: BMI, waist circumference (WC) and waist to height ratio (WHtR).**Methods:** Five year longitudinal repeated measures study (2005–2010). Children were aged 11–12 years at baseline and measurements were repeated at age 13–14 years and 15–16 years (n = 746).**Results:** The estimated prevalence of obesity defined by BMI decreased in boys (18%, 12% and 10% in year 7, 9 and 11 respectively) and girls (14%, 15% and 11% in year 7, 9 and 11). In contrast, the prevalence estimated by WC increased sharply (boys; 13%, 19% and 23%; girls, 20%, 46% and 60%). The prevalence of obesity estimated by WHtR lies between the estimates based on WC and BMI (boys 18%, 13% and 14%; girls, 14%, 26% and 28%).**Conclusion:** The health burden associated with obesity may be higher than expected, regardless of the observed stabilisation in BMI. The increases in central adiposity are a serious concern especially in girls as by year 11 almost two thirds are obese. Children appear to be getting fatter and the additional adiposity is being stored centrally. This raises the question of whether the Government's obesity definition will be adequate to change future rates of obesity related diseases.

HTP.034

Prevalence of child thinness in English schoolchildren

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Introduction: Childhood malnutrition is a public health problem, and its association with performance, morbidity and mortality are well established. We aim to estimate the prevalence of underweight/thinness in English schoolchildren.**Methods:** Stature and body mass data of 9614 (47% females) participants, aged 9–16 years, were collected between 2008–2012 as part of the East of England Healthy Heart Study using standard procedures. BMI (kg.m-2) was calculated from these data. Participants' weight statuses were classified using the International Obesity Task Force (IOTF) age

and sex specific BMI cut-off points. Demographics were collected by a questionnaire.

Results: The overall underweight prevalence was 5.9% (95% CI, 5.4 to 6.4); which ranges from 8.3% (95% CI, 4.0 to 14.7) among 9 years to 6.0% (95% CI, 2.2 to 12.6) in the 16 year olds. This was as low as 4.6% (95% CI, 1.9 to 9.3) in Black or Black-British, and as high as 8.7% (95% CI, 5.1 to 13.5) in Asian or British-Asian. Underweight was significantly ($p < 0.041$) more prevalence in girls (6.4%, 95% CI, 5.7 to 7.2) than in boys (5.5%, 95% CI, 4.9 to 6.1).

Conclusion: Childhood underweight may be prevalent than we thought in the UK. Recent finding suggests that half of the doctors in England and Wales lack knowledge on how to measure for underweight in children, meaning that many cases would have gone unnoticed. There are different reasons for prevailing childhood underweight, which may be: rising food prices, poor diet and fear of being overweight or obese.

1. Conflict of Interest: None

2. Funding: Research relating to this abstract was funded by University of Essex Research promotion fund.

HTP.035

The Effect of Weight Cycling on Fat Distribution

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Introduction: Weight cycling is fluctuations in body weight due to repeated dieting. Reports have suggested weight cycling alters fat distribution, whilst others have shown no effect. The aim of this study was assess white adipose tissue (WAT) distribution and intrahepatocellular lipid content (IHCL)

Methods: Male C57Bl/6 mice were maintained on high fat or control diet for 18 weeks. Single weight cycled groups swapped diets at 6 week periods, with fat content analysed at each swap. Multiple weight cycled mice swapped diets every 4 weeks, comparing fat content at the end of a single cycle and three weight cycles. Fat content and distribution was assessed using ^1H MRS and MRI with a 4.7T MR scanner.

Results: Initial weight gain was associated with an increase in all depots of WAT with no effect of IHCL. Continual high fat feeding increased IHCL content, whilst intermittent high fat feeding appeared to increase internal WAT, whilst showing no significant changes in IHCL content compared to controls. This alteration in fat distribution was maintained over multiple weight cycles. Chronic high fat mice had higher plasma insulin concentration compared to weight cycled mice in a reduced weight state, and was trending towards a higher concentration compared to weight cycled mice after weight gain. Glucose tolerance appeared to be decreased in weight cycled mice after weight gain, whilst chronic high fat mice did not show glucose intolerance compared to controls.

Conclusion: Weight cycling increases internal adiposity and decreased glucose tolerance.

HTP.036

The Effect of a Single Weight Cycle on Brain Function

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Introduction: Weight cycling is fluctuations in body weight due to repeated dieting. This study assessed changes in homeostatic and hedonic markers of the brain in response to acute weight change and a single weight cycle.

Methods: Male C57Bl/6 mice were maintained on high fat (FFF) or control diet (CCC) for 18 weeks. Weight cycling groups swapped diets at 6 week periods (CFC and FCF). Acute weight change groups was assessed after 1 week of swapping diets (acute weight loss/gain: aWL/aWG). RT-qPCR performed on the hypothalamus, ventral tegmental area (VTA), nucleus accumbens (NAc) and prefrontal cortex (PFC).

Results: aWG showed a significant decrease in orexigenic signalling, whilst aWL showed the opposite. aWG showed an increase in anorexic signalling in the hypothalamus. Hypothalamic DAT expression

was significantly increased with aWG, whilst aWL resulted in decreases in TH and D2R mRNA VTA expression, and increased DAT mRNA NAc expression.

Orexigenic gene expression showed an increased trend in CFC animals, whilst FCF and FFF animals showed a decreased trend in AgRP only. FFF animals showed a significant increase in VTA TH, D2R and DAT mRNA expression. A significant decrease in D1R mRNA expression in CFC and FCF groups was observed, whilst COMT mRNA expression was significantly increased. PFC TH expression was significantly lower in CFC mice and D2R expression was significantly higher in CFC animals.

Conclusion: Homeostatic alterations in gene expression were more apparent during weight change. Similarly, changes in dopaminergic markers were dependent on weight state, either dynamic or stable.

HTP.037

Dietetic-led specialist weight management service: A successful community pilot

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Introduction: NICE Clinical Guideline 43 suggests a staged care model for weight management. Cambridgeshire Community Services NHS Trust Nutrition and Dietetics developed a Level 2 specialist weight management service in response to a gap in service provision. Level 2 was commissioned alongside a Level 3 service delivered by Cambridge University Hospitals Foundation Trust.

Methods: Patients failing Level 1 were referred to Level 2. Specialist dietitians undertook assessments and devised individualised plans; direct referral to both Improving Access to Psychological Therapies (IAPT) and Physiotherapy (MSK) were possible, where indicated. Additional problems such as un(der)treated depression or potential sleep apnoea, triggered GP review. Patients' progress was measured by weight change. Patients failing Level 2 could go to Level 3.

Results: Patients referred to Level 2 had a high mean BMI (47.9 kg/m²), high levels of social deprivation (45% from Quintile 1 & 2 wards) and high levels of pre-existing comorbidities (75% had one or more comorbid conditions). Over 1/2 of the patients seen had additional problems identified in their assessment and treatment, with 28 referred to IAPT and 31 to MSK during their treatment. Substantial numbers were referred for sleep studies and to Level 3. Weight loss of $\geq 5\%$ was achieved in more than 35% of those attending the service at 6 months.

Conclusion: A Nutrition & Dietetic Service can successfully deliver level 2 weight management services in the community.

1. Conflict of Interest: None disclosed

2. Funding: NHS Cambridgeshire Public Health Commissioning funded the pilot of this programme.

HTP.038

With the Pronokal® Method slimming programme, the higher the grade of obesity, the greater the weight loss. Promesa II study

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Introduction: The Pronokal method is a multidisciplinary programme under medical monitoring that includes dieting, physical exercise, and coaching. It comprises three stages (active, diet re-education, and maintenance). The purpose of this study was to assess the efficacy of the method in obese patients (BMI ≥ 30) according to their grade of obesity.

Methods: A multicentre, epidemiological study on weight loss following Pronokal Method. During active stage, patients were kept on a very

low calorie ketogenic diet (protein diet) and were administered protein preparations with a high biological value until they lost 80% of the weight they should lose. They then entered the re-education stage, and were reintroduced to natural foods. The weight loss achieved was analysed according to the BMI using Student's *t*-tests and ANOVA comparison tests.

Results: The data from 2088 obese patients (54.2% grade I [GI], 29.5% grade II [GII] and 16.2% grade III [GIII]) were recorded during 4 months. Weight loss was significant in all groups ($p < 0.001$). The percentage of weight loss was greater the higher the baseline grade of obesity ($p < 0.05$). During the active stage, the mean weight lost was -10.0 ± 5.5 kg in GI, -13.7 ± 7.4 kg in GII, and -20.5 ± 17.8 kg in GIII ($p < 0.05$ all comparisons). In the re-education stage, the weight loss from baseline was -16.6 ± 5.2 kg for GI, -21.9 ± 7.7 kg for GII, and -33.6 ± 18.7 kg for GIII ($p < 0.05$ all comparisons).

Conclusion: The Pronokal method slimming programme is effective for weight loss in obese patients. The higher the grade of obesity, the greater weight loss achieved.

HTP.039

The efficacy of the Pronokal® method based on fat mass loss and on minimisation of lean mass loss

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Introduction: The Pronokal® method is a multidisciplinary slimming programme under medical monitoring, that includes dieting, physical exercise, and coaching. It comprises 3 steps, the first is based on a protein diet [PD] made up of protein preparations with high biological value.

Methods: A randomised (1:1), open-label, controlled, prospective, single-centre study to evaluate efficacy of Pronokal® method (PD group) vs low-calorie (hypocaloric) diet (HD group) in weight loss. During the first 12 months, 9 control visits were performed (at 15 days and then every 2 months). At all visits, weight and body composition were registered by DEXA (Dual-Emission X-ray Absorptiometry). The differences between groups were analysed in the sample of 53 patients (27 in the PD group, and 26 in the HD group) that completed 12 months of follow-up.

Results: There were no significant differences between the groups as regards the baseline primary variables. Weight loss at 12 months was significantly higher in the PD group (mean: -19.8 kg vs -7.0 kg; $p < 0.001$). In the PD group, 92.6% of the weight lost (18.4 kg) was fat mass, while in the HD group only 77.9% of the weight lost was fat mass (5.47 kg) and 22.1% lean mass. Therefore, the percentage of body fat mass decreased from 45.28% to 36.32% in the PD group and from 45.97% to 43.11% in the HD group.

Conclusion: The Pronokal method is shown to be more effective than a low-calorie diet for weight loss at the expense of fat mass, with very low loss of lean mass.

HTP.040

Appetite regulation after different doses of endurance training in overweight sedentary men

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Introduction: Exercise-induced weight loss has been suggested to be disappointing, due to compensation in the form of increased energy intake mediated through an increased appetite. The objective was to

evaluate appetite responses after an endurance training intervention prescribing two doses of exercise.

Methods: sixty-four healthy overweight sedentary men were randomized to a control, a moderate dose exercise (~ 30 min/day) and a high dose exercise (~ 60 min/day) group for 12 weeks. Plasma ghrelin, peptide YY (PYY) 3–36, insulin, and glucose as well as subjective appetite ratings were measured in relation to a standard breakfast and an acute bout of exercise before and after the intervention. *Ad libitum* energy intake was assessed after 3 h after the meal test.

Results: Despite two different doses of exercise a similar loss of fat mass (MOD: 4.2 ± 0.5 kg HIGH: 3.7 ± 0.5 kg) was obtained independent of exercise dose. Based on the energy spent during exercise the amount of fat lost was greater than predicted in MOD. In the fasted state insulin decreased independent of exercise dose, whereas feelings of fullness and satiety increased in HIGH. There were no augmented appetite responses in hormonal and subjective measures of appetite in relation to a standard breakfast after the endurance training intervention. In response to an acute exercise bout ($\sim 60\%$ $\text{VO}_{2\text{max}}$) plasma ghrelin increased within the exercise groups after endurance training.

Conclusions: An increase in appetite cannot explain the apparent discrepancy between the energy spent during training and the subsequent loss of fat mass after two doses exercise.

HTP.041

Calogenetic Balance, an educational program for lifelong weight control based on measured resting metabolic rate and intake of favourite foods, promotes adherence and success rate

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Introduction: Recommendations for daily caloric intake are usually based on calculated mean values, which can markedly and unpredictably differ from the real ones. This discrepancy can create confusion and facilitate undesirable weight gain even eating healthy foods. Calogenetic Balance was designed to improve these conditions by using individually measured resting metabolic rate (RMR) to assess personal daily caloric needs.

Methods: Lean, overweight or obese participants (180 women, 27 men) were referred by physicians or recruited via media/seminars. The program included seminars on energy balance and regular nutritional counseling. RMR was measured via indirect calorimetry. Daily nutritional schedules included individual food preferences, adapted if needed to standard nutritional rules. Daily caloric deficit was kept under 700 kcal.

Results: Initial BW (kg) were: 63.6 ± 4.7 ($n=21$) lean; 77.5 ± 6.6 ($n=81$) overweight and 94.7 ± 11.3 ($n=105$, by 6 dropouts) obese. After 6-months BW was reduced by all (but 3, $+0.7 \pm 0.2$) participants, by -2.7 ± 1.6 (lean), -4.7 ± 2.2 (overweight) and -6.4 ± 3.3 (obese). In a subgroup of obese patients followed for 12 months BW was reduced by -8.7 ± 3.7 ($n=32$).

Conclusions: The most relevant subjective statement by all participants was that the familiarity with the own real metabolic capacity gives security, removes confusion and promotes motivation and adherence. The observed consistent reduction in BW indicates, that an educational program like Calogenetic Balance will contribute to prevent and cure obesity by maintaining any local and individual nutritional habits.

1. **Conflict of Interest:** No conflicts of interest to declare
2. **Funding:** No funding to declare

HTP.042

Does visceral fat show a stronger association with glucose metabolism than overall obesity in people at high diabetes risk?

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Introduction: Visceral adipose tissue (VAT) measured by CT is strongly associated with an adverse metabolic risk profile. We assessed whether similar associations can be found with ultrasonography, by quantifying the strength of the relationship between different measures of obesity and indices of glucose metabolism a population at high risk of diabetes.

Methods: A cross-sectional examination of 1466 participants (788 men) of the ADDITION-PRO study. We measured standard anthropometrics, VAT and subcutaneous adipose tissue (SAT) by ultrasonography, and per cent body fat by bioelectrical impedance. Indices of glucose metabolism obtained were: HbA_{1c}, and insulin and glucose from a three point OGTT from which markers of insulin sensitivity and beta-cell function were calculated. Linear regression of standardised obesity measures on indices of glucose metabolism was done with adjustment for age, sex and hormone treatment.

Results: Mean age was 66.1 years (SD: 7.0), mean BMI 26.9 kg/m² (SD: 4.3). All measures of obesity were positively associated with indicators of glycaemia and inversely associated with indicators of insulin sensitivity. One SD increase in BMI in men was associated with a 19% (95% confidence interval: 16;21) decrease in Gutt's insulin sensitivity index, while the corresponding association for VAT was also 19% (95% CI: 16;21). The associations were broadly equivalent for all measures of obesity. There were no clear differences in the associations between the sexes.

Conclusion: In this population, there was no evidence that measuring abdominal fat distribution with ultrasound leads to a stronger characterisation of detailed measures of glycaemia compared with conventional anthropometric measures.

1. Conflict of Interest: None.

2. Funding: The Danish Strategic Research Council, Internal Steno Diabetes Center research funds.

HTP.043

Short sleep duration and large variability in sleep duration are associated with dietary risk factors for obesity in Danish school children

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Introduction: Lack of sleep and increased consumption of energy-dense foods and sugar-sweetened beverages (SSB) have all been suggested as factors contributing to the increased prevalence of overweight and obesity. The aim was to evaluate whether objectively measured sleep duration (average and day-to-day variability) as well as parent-reported sleep problems are independently associated with proposed dietary risk factors for overweight and obesity in 8–11 year old children.

Methods: In this cross-sectional study data on sleep duration and day-to-day variability in sleep duration were measured in 669 Danish apparently healthy children by an objective measure (actigraphy) for 8 nights, and the Children's Sleep Habits Questionnaire (CSHQ) was filled out by the parents. Diet was recorded using a web-based food record for 7

consecutive days. Fasting blood samples were obtained for measurements of plasma leptin and ghrelin levels.

Results: Independent of potential confounders, sleep duration (hours/night) was negatively associated ($P \leq 0.001$) with energy density (ED) of the diet ($\beta = -0.35$ kJ/g), added sugar ($\beta = -1.83$ E%) and SSB ($\beta = -1.05$ E%). Furthermore, variability in sleep duration (min/night) was positively associated ($P \leq 0.02$) with added sugar ($\beta = 0.35$ E%) and SSB ($\beta = 0.21$ E%), and CSHQ-score was positively associated with ED ($\beta = 0.16$ kJ/g, $P = 0.04$).

Conclusion: Our study suggests that short sleep duration, high sleep duration variability, and experiencing sleep problems are associated with a poor, obesity promoting diet in children.

1. Conflicts of Interest: None

2. Funding: Research was supported by a grant from the Nordea Foundation.

HTP.044

The acute effects of calcium supplementation on appetite and satiety in overweight women

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Introduction: In recent years, research has suggested that calcium (Ca) consumption could play an important role in the maintenance of body weight [1]. It has been suggested that appetite and food intake may be affected by Ca intake in the diet [1; 2]; however the mechanism is unclear.

Methods: Ten overweight /obese females (18–45 y, 25–37 kg/m²) participated in this study. Subjects consumed either 500 mg Ca (Calcium-Sandoz[®] Syrup) or placebo (PL) mixed into orange juice. Subjects recorded appetite ratings using visual analogue scales (VAS) every 30 min for 3 hours. Postprandial plasma glucose, insulin and GLP-1 concentrations were also measured. Energy intakes from an *ad libitum* lunch and over 24 hours were assessed.

Results: The Ca significantly reduce hunger and prospective food consumption ($p = 0.07$) and ($p = 0.012$) respectively. In addition, the Ca significantly reduced energy intake at the *ad libitum* lunch compared with PL (1006 (SEM 43.80) kcal versus 1122 (SEM 66.98) kcal, respectively, ($p = 0.017$). Ca enrichment had no significant effect on plasma glucose levels; whilst the postprandial insulin responses were significantly higher ($p = 0.007$). There were significantly lower GLP-1 levels with Ca ($p < 0.001$).

Conclusion: These results suggest that calcium supplement may play an important role in reducing food intake in overweight/obese women. Further investigation in other groups would be required.

References

- 1 Zemel, M.B., et al., *Regulation of adiposity by dietary calcium*. *Faseb J*, 2000. 14(9): p. 1132–8.
- 2 Davies, K.M., et al., *Calcium intake and body weight*. *J Clin Endocrinol Metab*, 2000. 85(12): p. 4635–8.

HTP.045

As early as in the preschool age obese children have decreased fasting ghrelin levels but the physiological postprandial decrease is sustained

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Introduction: Obesity develops when energy intake exceeds energy expenditure over time. Ghrelin is an important hormone involved in this balance by being the only peripheral orexigenic substance. Fasting ghrelin levels are elevated and fall rapidly after food intake. Paradoxically, obese individuals have decreased fasting ghrelin levels compared to normal weight and the postprandial meal suppression is blunted. Little is known about in what age these changes occur.

Methods: 30 obese and 37 normal weight children 4–6 years (4,77 ± 0,12) were recruited. After 6–12 hours of fasting, blood samples for fp-ghrelin, fp-glucose and fp-insulin were drawn. Obese children were

served a standardized breakfast and postprandial s-ghrelin was measured at 60 minutes. Total p-ghrelin, p-insulin and p-glucose were measured with commercially available RIA human kits.

Results: Obese children had significantly lower fp-ghrelin levels and higher fp-insulin levels compared to normal weight ($p<0.05$). There was a strong trend towards a negative correlation between fp-ghrelin and fp-insulin ($p=0.054$). After a standard breakfast, obese children significantly lowered their p-ghrelin levels ($p<0.05$).

Conclusion: Our study shows that obese children develop changes in systems that regulate energy expenditure already in the preschool age. Even though the basal ghrelin levels are changed, obese young children show a physiological postprandial ghrelin decrease. Lately, studies have pointed towards an important role for ghrelin as a glucose regulator, with an inverse relationship between ghrelin and insulin levels, a trend that was also observed in this study on young children.

HTP.046

Drivers of change: Weight status, cardiorespiratory fitness and elevated blood pressure

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Introduction: There is evidence that adult obesity, elevated blood pressure (BP) and cardiorespiratory fitness can be traced back to childhood. How these factors are related and drive changes in another over time is poorly understood. We aimed to evaluate how a change of weight status determines elevated systolic BP in a cohort of schoolchildren.

Methods: We followed 1,418 (56% males) schoolchildren, with mean (SD) age at baseline of 11.5 (± 0.5) years between 2008 and 2010. Weight status and fitness were assessed according to IOTF BMI cut-off points and FITNESSGRAM standards respectively. Elevated BP was determined using standard procedures. Longitudinal changes were classified as either a good or a bad change.

Results: About 23.9% and 19.6% made bad changes in weight status and fitness respectively. 16.9% at baseline and 18.0% at follow-up had elevated systolic BP. Girls (79.4%) made significantly ($p<0.05$) better changes in their weight status than boys (73.5%). Overall, those that made bad changes in weight status were over two times (O.R 2.8 95%CI 1.9 to 4.1) more likely to have elevated follow-up systolic BP after adjusting for changes in fitness and baseline systolic BP. This likelihood was higher in boys (O.R 3.1, 95%CI 1.9 to 5.0) than in girls (O.R 2.5, 95%CI 1.4 to 4.7).

Conclusion: Obesity is a sine qua non, causative factor for metabolic syndrome. Our study suggests that bad changes in body weight are a significant predictor of a future elevated BP independent of changes in cardiorespiratory fitness and prior BP status.

1. **Conflict of Interest:** None

2. **Funding:** Research relating to this abstract was funded by University of Essex Research promotion fund.

HTP.047

Is there any correlation between sex hormones, SHBG levels and insulin resistance in premenopausal and postmenopausal obese women?

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Objective: Sex hormones are closely related to regulation of adiposity. Sex hormone binding globulin (SHBG) is primary plasma transport protein for sex steroids. Studies suggested that SHBG is a biologic

marker for insulin resistance. This study aimed to determine the relations between sex hormones – SHBG levels and insulin resistance in pre- and postmenopausal obese women.

Method: This was a cross sectional study. 69 obese women who were attending obesity outpatient clinic were enrolled. Patients who were diagnosed as DM or were taking any medication known to interfere with glucose and insulin secretion and also the patients who were diagnosed as PCOS or had hirsutism and hyperandrogenemia were excluded. All patients were euthyroid. Subjects were divided into groups of premenopausal ($n=33$) and postmenopausal ($n=36$). BMI, serum levels of fasting glucose, serum insulin, sex hormones, HbA1c measured.

Results: In pre- and postmenopausal group mean age was 37.3 ± 8.1 years -56 ± 6.5 years respectively. Mean BMI was similar in both groups (38.2 ± 5.8 kg/m² vs. 37.8 ± 5.4 kg/m² respectively). Postmenopausal women had lower SHBG levels than premenopausal (38.7 ± 15.2 - 45.2 ± 18.9 nmol/L respectively, $p=0.039$). SHBG levels were correlated with DHEAS ($p=0.025$) in premenopausal and FSH ($p=0.04$) in postmenopausal groups. We did not found any correlation between SHBG concentrations and insulin resistance calculated by HOMA index in all patients.

Conclusions: Our results, as well as in many other studies suggested that SHBG levels decreased in menopause. We did not found association of SHBG with insulin resistance in obese women. Further studies are required to explore this.

HTP.048

The effect of covertly reducing portion size of a single meal on day-long energy intake in overweight and obese adults

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Background: Larger portion sizes have been found to lead to increased energy intake, but there is little evidence of the effect of reductions in portion size.

Methods: A single day, randomised crossover study investigated the effect of covertly reducing portion size at breakfast on day-long energy intake in overweight and obese men and women ($n=33$, mean BMI 29 kg/m², mean age 43 years). Breakfast portion size was reduced by 20% and 40% from a standard based on 25% of the gender-specific average estimated energy requirements. Energy intake was measured by observation at an *ad libitum* lunch and using a weighed food diary for the remainder of the day. Mixed models were used to determine the effect of portion size condition on subsequent energy intake.

Results: Energy intake at lunch and over the rest of the day did not differ according to condition, leading to a reduced day-long energy intake after a smaller breakfast meal.

	Standard portion size	Portion size reduced by 20%	Portion size reduced by 40%
Average energy provided at breakfast (kJ)	2925	2340	1755
Energy intake at lunch (kJ)	2930 \pm 203	2853 \pm 198	2911 \pm 179
Energy intake over the whole day apart from breakfast (kJ)	7374 \pm 361	7566 \pm 468	7414 \pm 417
Total daily energy intake (kJ)	10287 \pm 395	9897 \pm 491	9161 \pm 437

Mean \pm SEM.

Conclusion: Covert portion size reduction at a single meal does not prompt compensatory behaviour within the day in overweight and obese adults. This suggests reduction of the portion size of pre-packaged foods could be a useful public health strategy to limit energy intake.

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HTP.049

Effect of gender, dietary restraint and liking on personal and social norms for food and drink portion sizes

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Background: Personal norms (PNs) for portion size are indicative of habitual amount consumed, whereas social norms (SNs) for portion size can represent perceived habits of others. Norms may influence the amount of food people view as appropriate to consume.

Methods: Pictures of 17 different PSs of 12 food and drink items were presented in random order on a computer screen. 30 lean men and women (BMI 2025 kg/m², aged 18–60 years) indicated whether each picture was more or less than they or others would normally consume. The PN and SN for each item were determined using the method of constant stimuli. A portion size index (PSI) was created by dividing the norm by a reference. The difference between PNs and SNs, and the effects of gender, dietary restraint and liking on the relationship between norms, were examined using regression analyses.

Results: There was no significant difference in mean PSI between PNs and SNs (1.39 vs. 1.32, NS). Women's PNs were smaller than their SNs (1.24 vs. 1.36, $p<0.05$), whereas men's PNs were larger than their perception of SNs (1.55 vs. 1.27, $p<0.001$). PNs in women were smaller than in men (1.24 vs. 1.55, $p<0.001$). Lower dietary restraint was associated with larger PNs than SNs (1.45 vs. 1.28, $p<0.01$). PNs were larger for foods with high liking scores (1.45 vs 1.32, $p<0.01$), but SNs were not different.

Conclusion: On average there was no significant difference between PNs and SNs. This relationship was moderated by gender and dietary restraint, but not liking.

Funding: This study was funded by the Medical Research Council (U105960389).

HTP.050

Biochemical and clinical assessment of hypogonadism in obese men

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Objective: Obesity can be associated with biochemical and clinical hypogonadism in men. Studies in the past have suggested that testosterone concentrations of obese men are lower than non-obese. The aim of our study was to compare the serum androgen concentrations and androgen deficient symptoms of obese and non-obese men.

Methods: In this cross sectional study 38 obese men, and 37 age matched healthy non obese men for control group; who were attending obesity outpatient and family medicine clinics were enrolled. Total, bioavailable and free testosterone, SHBG, BMI and waist circumference were measured. Patients were asked to complete an Aging Males' Symptoms (AMS) and International Index of Erectile Function (IEFF) scales.

Results: Mean age was similar in both groups (45.3±9.1 years for obese vs. 45.3±8 years for control group). Mean BMI and waist circumference

of obese and control groups were 34.3±3.3 kg/m², 109.4±15.6 cm vs 24.4±2.8 kg/m², 90.7±9.8 cm respectively. Although obese men had lower SHBG and testosterone levels, the difference was not statistically significant. There was no difference in the average AMS total scores and IEFF scores ($p>0.05$). On the other hand, waist circumference was negatively correlated with SHBG ($p=0.011$), free- ($p=0.011$) and total testosterone levels ($p=0.001$), but not with AMS and IEFF scores ($p>0.05$).

Conclusions: Our study demonstrated there was not a statistically significant difference between obese and nonobese men according to biochemical and clinical hypogonadism. However, abdominal obesity was negatively correlated with SHBG, total- and free testosterone levels but not with clinical hypogonadism or erectile dysfunction.

HTP.051

The Bariatric Physician in a Community based Tier 3 Weight Management Programme: An emerging role

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Introduction: Access to bariatric surgery (Tier 4) for those with complex obesity is increasingly restricted to patients completing Tier 3 weight management programmes, which can vary in structure and content.

Methods: In 2011, NHS Portsmouth commissioned a Tier 3 service offering a 12 week programme including dietetics, exercise, psychological support and full anthropometry. A further 12 weeks is offered to those demonstrating full engagement. The physician assesses all patients contemplating bariatric surgery or with medical needs. Those desiring bariatric surgery meeting local criteria are offered specialist information/preparation sessions.

Results: Since inception, 1174 primary care referrals have been received, 28% await first appointment, 280 have completed 12 weeks, 137 completed 24 weeks. The physician performed 139 assessments with most frequent onward referral for possible obstructive sleep apnoea (OSA). 31 patients were referred to Tier 4, with only 1 refused surgery on assessment. 11 patients received funding based on newly diagnosed co-morbidities.

	Number referred on-wards	Diag-nosed/receive d treatment	Fund-ing for surgery	12 week weight loss			24 week weight loss	
				(1–5%)	(5–10%)	(>10%)	(5–10%)	(10%)
Bariatric Surgery	31	18 procedures 9 awaiting appointment	n/a	46%	24%	6%	20%	19%
OSA	33	27 (10 severe)	9					
Idiopathic Intracranial Hyper-tension	1	1	1					
Type 2 DM	1 (to GP)	1	1					

Conclusion: A bariatric physician embedded within a community Tier 3 weight management provision is effective in assessing surgical suitability, uncovering undiagnosed complications of obesity and facilitating access to funding for surgery potentially improving patients' health and wellbeing.

1. Conflict of Interest: None Declared

2. Funding: NHS Portsmouth

HTP.052

The effect of testosterone replacement therapy on serum pro- and anti-inflammatory biomarkers and apolipoprotein levels in hypogonadal men with diabetes

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Introduction: Metabolic syndrome, Type 2 diabetes and heart disease, considered as inflammatory diseases, are associated with low testosterone and improved by testosterone replacement therapy (TRT). We investigated whether TRT has an effect on cytokines and apolipoproteins in hypogonadal patients with diabetes.

Methods: Randomized and double-blind placebo-controlled study of 24 hypogonadal men over the age of 40 years with Type 2 diabetes. Patients were randomised to i.m testosterone (n=11) or placebo (n=13) every 2 weeks for 6 months. Levels of pro- and anti-inflammatory factors were assessed in serum. CRP, TNF- α , adiponectin, Apo B, and LP (a) were investigated at baseline, 3 and 6 months. The body mass index (BMI), waist to hip ratio (W/HR) and waist circumference alone were recorded.

Results: Levels of serum adiponectin were significantly decreased after three months TRT treatment (from 38.00.87 \pm 764 to 2978.10 ng/ml \pm 672, $P=0.02$), compared to the placebo group, in agreement with our previous study. No significant differences in the remaining serum parameters were observed. No significant changes in body composition were found.

Conclusion: Short-term testosterone replacement therapy did not show a beneficial effect on pro-inflammatory and anti-inflammatory biomarkers, atherogenic factors and body composition in hypogonadal men at risk of Type 2 diabetes. The protective role of testosterone needs further investigation with larger populations and longer term studies.

HTP.053

The role of ethnicity in the deposition of body fat- Five-year results of the Multi-cultural Community Health Assessment Trial (M-CHAT)

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Cross-sectional studies have reported that the amount of visceral adipose tissue (VAT) differs by ethnicity. However, no longitudinal studies have been conducted to determine if the rate of accumulation of VAT is ethnic-dependent. The purpose of this study was to investigate the role of ethnicity in five-year changes in body fat distribution.

Aboriginal, Chinese, European and South Asian healthy men and women (n=825) were recruited across normal, overweight and obese body mass index (BMI). Participants were assessed for VAT by CT scan, body fat by DXA scan, anthropometry and demographics at baseline, three-years and five-years. Data were analyzed using mixed effects models.

A total of 624 participants had at least one follow-up visit (median = 5.35 years). There was an average increase of 0.3%, 0.3% and 0.9% in BMI, waist circumference, and VAT, respectively and an average decrease of 0.9% in body fat per year. There were no ethnic differences in the change of BMI, waist circumference or body fat over time. After controlling for baseline age, sex and changes in body fat, there was a significant ethnic difference in the increase in VAT over time (p interaction = 0.004) such that Aboriginals had greater increases in VAT than Europeans and South Asians.

Aboriginal men and women accumulated VAT at a faster rate than Europeans and South Asians. This may explain their greater prevalence of insulin resistance and diabetes. More aggressive prevention in this ethnic group may help to slow down the accumulation of VAT and consequent risks for cardiometabolic complications.

HTP.054

Infants with larger appetites grow faster in early childhood: Findings from twins discordant for appetite in infancy

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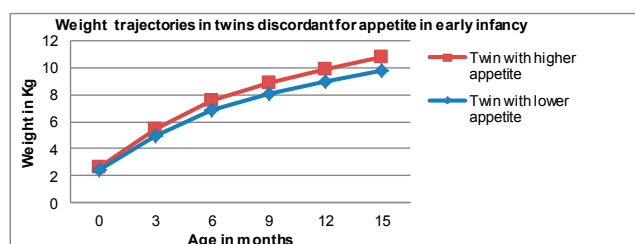
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Introduction: Discordant sibling designs make it possible to examine phenotypic associations while controlling for familial confounding. This study tested the hypothesis that within-sibling differences in appetite in early infancy are associated with different growth trajectories.

Methods: Data were from Gemini, a population-based cohort of 2402 families with twins. Appetite at 3 months was assessed with an appetite overall rating and the Baby Eating Behaviour Questionnaire (BEBQ). Weights from birth were based on measurements by health professionals or by parents using weighing scales sent to the home. Growth trajectories were examined for 336 pairs of non-identical, same-sex twins who were discordant for appetite at 3 months. Growth curves were analysed using multilevel modelling taking into account clustering, and adjusting for sex and birth weight.

Results: Based on the overall appetite rating, the twin with the larger appetite grew faster than their co-twin with lower appetite ($\beta=0.013$, $SE=0.001$, $p<0.001$). At age 6 months, the twin with larger appetite was on average 589 gms heavier; and the difference increased to 799 gms by 12 months (see Figure). Findings were similar classifying the infants by discordance on BEBQ subscales.

Conclusion: Appetite in early infancy is prospectively associated with growth in early childhood in a controlled sibling design, suggesting a causal role for appetite in early weight gain.



1. Conflict of Interest: None disclosed

2. Funding: Research relating to this abstract was funded by Cancer Research UK (C1418/A7974).

HTP.055

Nutritional Intake of the Portuguese population: Energy, macronutrient and ethanol intake

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We aim to describe energy, macronutrient and ethanol intake and to measure the prevalence of inadequate macronutrient intake in a representative sample of Portuguese adults according to demographic characteristics (sex, age, education, marital status, residence). 3047 adults, were interviewed face-to-face at home by trained interviewers with a questionnaire specifically designed for the study "Portuguese Population's Food Habits and Lifestyles" (led by SPCNA). Dietary intake was estimated by a single 24h recall, quantified with the aid of a photo album. Foods were converted into nutrients with Food Processor® software. The prevalence of inadequate intake was established according to

the WHO nutrient intake goals for preventing diet-related chronic diseases. Mean energy intake was 2056 kcal, and the average contribution of protein, CHO, total fat and ethanol to total daily energy intake was 19.1%, 45.8%, 31.3% and 3.8%, respectively. Intake of energy and macronutrients was inversely associated with age. Highest energy intake was reported for people with 6 and 9 years of education, singles and living in the North. The highest ethanol intake was found amongst men aged 45–64 years, with 4 years of schooling. Most Portuguese adults reported an intake of protein and total fat above the acceptable range, and below for CHO. The highest prevalence of inadequacy was found for protein for women (81.5%) and for CHO for men (89.3%).

Funding: This study was sponsored by Nestle Portugal.

HTP.056

Identification and characterisation of a milk protein hydrolysate that increases satiety signalling in vitro and reduces feed intake in vivo

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Introduction: Milk-derived protein hydrolysates have been shown to increase gastrointestinal satiety signalling, thus aiding weight management and appetite control. Connections between the brain and gut play a major role in the regulation of satiety hormone production and subsequent food intake. In this study, a bovine milk protein derived hydrolysate was screened for (1) effects on in vitro satiety signalling, using the murine, epithelial, enteroendocrine cell line STC-1 and (2) effects on the activation of neural GPCRs using a cell line which overexpresses the 5-HT_{2C} receptor. The effect of the hydrolysate on feed intake in C57BL/6 mice was also analysed.

Methods: STC-1 supernatant levels of GLP-1 peptide were measured using an MSD assay, following 4 hour exposure to the hydrolysate. Activation of the 5-HT_{2C} receptor was examined using a high throughput intracellular calcium assay. The in vivo effects of the hydrolysate were examined in 16 hour food restricted C57BL/6 mice following intra peritoneal (i.p.) injection of the hydrolysate. Subsequent feed intake was measured for 8 hours post-injection.

Results: The hydrolysate significantly increased the production of GLP-1 peptide from STC-1 cells. Significant hydrolysate-mediated increases in intracellular calcium indicated activation of the 5-HT_{2C} receptor. Mice that had been injected with the hydrolysate displayed significantly lower cumulative feed intake at all time points from 1 hour post-injection to 8 hours post-injection.

Conclusion: The identification of milk protein derived bioactives could provide potential ingredients for dairy-based functional foods with positive health benefits.

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HTP.057

Weight loss and body composition changes following treatment with ketogenic enteral nutrition

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Introduction: Ketogenic enteral nutrition therapy (KEN) is a modification of the protein sparing modified fast in which a nutritional formula is introduced through a nasogastric tube for 10 days 24h/d¹. After each cycle of KEN, patients (pts) are suggested to follow a low-carb diet. The aim of the study was to perform a retrospective analysis of body composition changes with bioelectrical impedance analysis after KEN.

Methods: We selected 3,128 pts (824 males, mean age 44.3 ±12.9 years, body mass index 38.4 ±7.1 kg/m²) who had three subsequent

controls of body composition: before KEN (t₀), at the end of KEN (t₁) and ten days after (t₂).

Results: Pts well tolerated treatment, results are shown in table (test T referred to T₂ vs T₀ is <.0001 for all aims):

	T ₀	T ₁	T ₂
Weight (Kg)	106.8±23.4	99.9±22.1	100.7±22.1
Fat mass (Kg)	44.4±12.8	42.0±12.8	40.3±12.4
Body Cell Mass (BCM; Kg)	32.6±8.8	31.2±8.3	31.2±8.3
Total Body Water (Kg)	44.9±11.2	41.2±10.2	43.5±10.5

Conclusions: We conclude that KEN is a safe and effective treatment for obesity.

Reference

1 Cappello G, Franceschelli A, Cappello A, De Luca P. Ketogenic enteral nutrition as a treatment for obesity: short term and long term results from 19,000 patients. *Nutr Metab* 2012;9:96.

1. **Conflict of Interest:** None Disclosed

2. **Funding:** No Funding

HTP.058

Integrating technology with routine health services – going myPace for weight management

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Introduction: DEBATE (Dietitians Energy Balance Tools for Engagement) is a collaborative project between the European Food Information Council (EUFIC), Brunel University, White October and the European Federation of the Associations of Dietitians (EFAD). The project sought to develop technology, including a smartphone application, to be integrated into dietetic practice to support weight management.

Methods: A programme of open, collaborative qualitative research with dietitians and consumers informed the conceptualisation, design, development and evaluation of technology to support dietitians in their practice. Data was collected with dietitians (n=75) in five diverse European countries using face-to-face interviews and two online surveys.

Results: Participating dietitians and consumers expressed a need for technology that provided an extension of the professional/patient relationship in-between consultations. They requested a tool that was carefully yet simply embedded into established healthcare practice as well as the day-to-day routines of food purchase, consumption, movement and exercise. Informed by established behaviour change theory and practical dietetic experience, myPace takes a scalable, integrative, ‘small steps’ approach to weight loss, incorporating elements of monitoring and motivation. Goal-based behaviour and ‘perception’ tracking allow users to understand their unique triggers for eating and activity behaviours and assist dietitians in personalising treatment.

Outlook: The weight management-supporting smartphone application, myPace, was developed in collaboration with dietitians in five European countries. A small, real life evaluation of myPace is on-going to establish practice-based evidence for its performance in different contexts.

1. **Conflict of Interest:** None Disclosed

2. **Funding:** Research was funded by the European Food Information Council (EUFIC).

HTP.059

Defining metabolically healthy obesity: Role of dietary and lifestyle factors

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Introduction: There is a current lack of consensus on defining metabolically healthy obesity (MHO). Limited data on dietary and lifestyle behaviours and MHO exist. This study compared the prevalence, dietary factors and lifestyle behaviours of metabolically healthy and unhealthy obese and non-obese subjects according to different criteria.

Methods: Cross-sectional sample of 1,008 men and 1,039 women aged 45–74 years participated in the study. Participants were classified as obese (BMI ≥ 30 kg/m²) and non-obese (BMI < 30 kg/m²). Metabolic health status was defined using five existing MH definitions based on a range of cardiometabolic abnormalities. Dietary composition and quality, food pyramid servings, physical activity, alcohol and smoking behaviour were examined.

Results: The prevalence of MHO varied considerably between definitions (2.2% to 11.9%), was higher among females and generally increased with age. Agreement between MHO classifications was poor. Among the obese, prevalence of MHO was 6.8% to 36.6%. Among the non-obese, prevalence of metabolically unhealthy subjects was 21.8% to 87%. Calorie intake, dietary macronutrient composition, physical activity, alcohol and smoking behaviours were similar between the metabolically healthy and unhealthy regardless of BMI. Greater compliance with food pyramid recommendations and higher dietary quality were positively associated with metabolic health in obese (OR 1.45–1.53 unadjusted model) and non-obese subjects (OR 1.37–1.39 unadjusted model). Physical activity was associated with MHO defined by insulin resistance (OR 1.87, 95% CI 1.19–2.92, $p = 0.006$).

Conclusion: A standard MHO definition is required. Moderate and high levels of physical activity and compliance with food pyramid recommendations increase the likelihood of MHO.

1. Conflict of Interest: None disclosed.

2. Funding: This work was supported by a research grant from the Irish Health Research Board (reference HRC/2007/13).

HTP.061

Prevention of overweight from birth till age 3 years; preliminary results

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Background: The prevalence of overweight among children is rising rapidly and childhood overweight increasingly occurs at a younger age. The 'BBOFT+' intervention aims at implementing healthy lifestyle habits through focusing on effective child rearing from birth: sleeping, breastfeeding, (outdoor) activity, breakfast, soft drinks and TV time. This study aims to evaluate the effects on the prevention of overweight of the BBOFT+ intervention, compared to care-as-usual (CAU), as applied to children of 0–3 years and their parents.

Method: In a cluster-randomized control trial, 68 Youth Health Care teams participated. Parents of more than 2500 children filled out questionnaires at the age of 2 weeks, 6, 15 and 36 months. Parent-reported child's weight and length are used.

Results: The first univariate analyses show no difference in nightly sleep duration between the BBOFT+ and the CAU group at the age of 6 months. However, at the age of 15 months, children of the CAU group slept at night on average 6.6 minutes shorter than children in the BBOFT+ group ($p < 0.05$). At age 15 months, no difference in BMI-SDS, parental control, reinforcement or warmth was found between the BBOFT+ and the CAU group.

Conclusion: The BBOFT+ intervention seem to have an effect on sleep at the age of 15 months. Further analyses will be conducted for the topics outdoor exercise, activity and play, breakfast, soft drinks and TV time. Furthermore the differences in BMI between BBOFT+ and CAU will be evaluated. These will be presented during the congress.

HTP.062

Body composition in modern population of Ukrainian adolescents

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Introduction: There is a tendency to the pediatric obesity epidemic across the World. The information of the modern body composition peculiarities is necessary to determine a tendency to the overweight in pediatric population.

Methods: There are 969 healthy and 208 obese adolescents aged 10 to 17 y.o. from industrial region of Ukraine were anthropometrically examined with measuring weight, height, waist and hip, upper-arm and upper-leg circumferences, standard skinfolds, calculation of fat, lean and muscle body mass.

Results: BMI above 85 percentile was registered in 15,0 \pm 2,1% (95% CI) adolescents. It was established fat mass predominance in girls ($p < 0,001$) and muscle mass in boys ($p < 0,01$). Determined that the percentage of body fat is correlated with the waist to height ratio ($r = 0,67$), whereas relationship with the waist to hip ratio has not been established ($r = 0,09$). According to the regression analysis some equations to calculate the fat and muscle components of the body composition by the simple anthropometric parameters were elaborated.

Analysis of the body composition according to SD of BMI showed a progressive increase in fat and lean body mass. It was found the muscular component was reduced both in BMI deficiency and excess.

Conclusion: The prevalence of overweight in Ukrainian adolescence lower compared with Western European countries. It seems waist to height ratio much better reflects the abdominal fat predisposition rather than waist to hip ratio, which is mainly gender dependent. Both low and high BMI are accompanied by a muscle mass decreasing. All anthropometric parameters significantly clustered relatively to BMI SD as well as cardiovascular risk markers in obese.

HTP.063

The Influence of Dietary Habits on Physical Development and Trends of Anthropometric Parametres in University Students

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Introduction: Slovakia belongs to the countries with the moderate prevalence of obesity. The aim of our study was to determine the prevalence of overweight and obesity among medical students in relation to their eating and exercise habits and their changes over last 20 years.

Methods: During 1992–2012 we obtained data from 4,247 fourth year medical students from Comenius University; 1,379 (32.5 %) men and 2,868 (67.5 %) women, mean age 22.6 \pm 1.4 yrs. The anthropometric measurements, food intake data, the energy balance were evaluated.

Results: The average values of anthropometric parameters in men and women were in recommended limits. BMI above 24 had only 256 of women (8.95 %), but 356 of men (25.85 %) had BMI above 25. Higher WHR (≥ 1.0 in men, ≥ 0.8 in women) had 36 of men (2.6 %) and 221 of women (7.7 %). Increased body fat (> 20 % in men, > 25 % in women) had 153 of men (11.1 %), but 890 of women (31.1 %).

During the previous years we register worsening of some anthropometric parameters, we found increased number of students with higher risk values; and the average values of monitored parameters have had upward trends for both men and women. Student's food consumption has not met with recommended dietary allowances. Negative trends in eating habits were recorded.

Conclusion: From the standpoint of obesity and complication it is necessary to give higher attention to primary prevention in dietary behaviour and also to whole healthy life style attitude.

HTP.064

Parent mealtime actions, nutritional status and food intake in children from São Paulo, Brazil

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Introduction: Obesity in children in Brazil has increased dramatically. Among the etiology factors, parent feeding practices are likely to influence children's food intake and as consequence, their weight. Thus, we sought to identify which parent mealtime actions (PMA) are positively or negatively associated with children's food consumption and their weight, contributing to develop effective strategies to prevent and control obesity in children.

Methods: 582 parents answered questions of the Portuguese validated version of the Parent Mealtime Action Scale and referred the frequency of their children's food intake, the characteristics of the family meals and their socioeconomic conditions. Children's weight and height were directly measured. Multiple linear regression models were applied to analyze the association between the frequency of each food item intake and the PMA, controlling for some covariates. Association between the frequency of each PMA and children nutritional status was determined using ANOVA.

Results: Children who ate more fruits and vegetables had parents who often ate these foods and made them available; these parents also seldom offered their children special meals. Children who consumed more energy-dense foods had parents who frequently modeled this eating habit and rarely set limits on its intake. Overweight children's parents presented frequent restrictive practices and infrequent insistence on eating.

Conclusions: Some parent mealtime actions were associated with children's food intake and nutritional status showing that it is important to consider parent feeding practices in the prevention and control of obesity in children.

1. Conflict of Interest: This study does not present any conflict of interest.

2. Funding: Research relating to this abstract was funded by Coordenação de Aperfeiçoamento de Pessoal de Nível Superior do Ministério da Educação e Cultura do Brasil.

HTP.065

Abdominal Adiposity (AbAd) in CKD patients: Association with total and high molecular weight adiponectin, insulin resistance and inflammation

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Introduction: In this cross-sectional study we evaluated the association between AbAd with total- (T-Adipo) and high molecular weight adiponectin (HMWAdipo). Additionally we assessed the relations between T-Adipo and HMW-Adipo with insulin resistance and high-sensitivity C-reactive protein (hs-CRP) in nondialyzed CKD patients.

Methods: Anthropometry: body mass index (BMI: weight/height²), AbAd assessed by waist-to-height ratio (WheIR=WC/height). Patients grouped as: Low-AbAd (WheIR<0.5485); High-AbAd (WheIR≥ 0.5485). Laboratory parameters: T-Adipo, HMWAdipo, hs-CRP, glucose and insulin used for homeostasis model assessment of insulin resistance index (HOMA_{IR}) estimatives. Glomerular filtration rate was estimated

(eGFR; MDRD equation). Statistycal analyses were adjusted for gender, age and eGFR (StataCorp 8.2).

Results: CKD Patients (n=134; 56% men), under multidisciplinary treatment (mean±SD) (3±2 years) presented eGFR= 29±13 ml/min., age= 65±12 years, BMI= 26±4 kg/m², serum albumin= 4.2±0.3 g/dL. WheiR, T-Adipo, HMWAdipo, Insulin, Glucose, HOMA_{IR} and hs-CRP were similar between genders. Low-AbAd vs High-AbAd groups differences were solely significant (p<0.01) for: HMW-Adipo; HOMA_{IR} and hs-CRP, but not for T-Adipo. Correlation between AbAd with T-Adipo was positive (p=0.023) but negative with HMWAdipo (p<0.0001). T-Adipo and HMWAdipo were inversely correlated (p<0.0001), both showed no correlation with glucose. T-Adipo wasn't correlated with: HOMA_{IR}, hs-CRP, insulin. HMWAdipo was negatively correlated (p=0.02) with: HOMA_{IR}, hs-CRP, insulin. Multiple regression (dependent variables: WheiR, TotAdipo, HMWAdipo, age, gender and eGFR): AbAd was an independent predictor of HOMA_{IR} (p=0.004) but not of hs-CRP.

Conclusion: AbAd is associated with decreasing levels of HMWAdipo and is independent predictor of insulin resistance in CKD patients. HMWAdipo, but not T-Adipo, correlates with insulin resistance and chronic inflammation.

HTP.066

High body adiposity and cardiovascular disease risk factors: Differences between male and female renal transplant recipients

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Introduction: High body adiposity and cardiovascular disease (CVD) risk factors prevalence was compared between male and female renal transplant recipients (RTR).

Methods: Study design: retrospective cross-sectional. Pre-transplant (Pre-tx) period data and weight gain during the first year post-tx were obtained from patients charts and post-transplant (Post-tx) data were collected during the routine visit at nephrology clinic. Body mass index (BMI)>25 kg/m² defined overweight and BMI>30 kg/m² defined obesity.

Results: RTR patients (102 patients; 54% men) with 49.0±1.2 years and 114.3±9.0 months Post-tx were evaluated. Obesity (11%) was exclusively observed in women. Pre-tx overweight prevalence was low (26%) and similar between men and women. Overweight (to 38% in men and 51% in women) and obesity (to 11% in men and 23% in women) prevalence was higher in Post-tx. Women, compared to men, showed higher (women vs. men; p<0.05): BMI values (26.7±0.8; 24.7±0.5 kg/m²), weight gain during first year post-transplantation (9.2±1.1; 5.5±1.0 kg), abdominal obesity (57%; 23%) and diabetes (34%; 16%) prevalence, in Post-tx period. Body adiposity and CVD risk factors associations evidenced that, solely in women: pre-tx overweight increased the risk for diabetes in post-tx; pos-tx high BMI and abdominal obesity increased the risk for metabolic syndrome; abdominal obesity increased the risk for dyslipidemia.

Conclusions: After renal transplantation occurs high body adiposity prevalence and increased risk for metabolic syndrome. Compared to men, women shows higher total body adiposity values, abdominal obesity and diabetes prevalence. Abdominal obesity increases the risk for dyslipidemia solely in women. Therefore, the high adiposity raises women risk for worse outcomes after transplantation.

HTP.067

Autoperception of physical and mental state in full-time professors in UABC, campus Mexicali

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Introduction: There are currently new factors that can influence overweight and obesity beyond positive energetic balance and sedentarism, such as the erroneous perception of body image and food intake.

Objective: To determine the relationship between autoperception of body image and feeding habits with MBI in professors that work at UABC, campus Mexicali.

Material and Methods: Observational, transversal and relationship study of 334 professors. A validated questionnaire was applied, divided in three sections to evaluate sociodemographic and anthropometric data, anatomic models of images (Montero) to evaluate autoperception of body image and nine items in a Lickert type scale to evaluate autoperception of feeding habits. Information was processed with the SPSS-18.0 statistics package, attaining descriptive and parametric statistics ($p < 0.05$).

Results: The average BMI was 25.5 kg/m². Prevalence of overweight plus obesity was 48.5% (59% in males and 41.9% in females). 42.5% of professors had an erroneous perception of their body image related to their BMI ($p < 0.05$). Regarding eating habits 57.2% of males and 74.3% of females with overweight and obesity do not have healthy eating habits ($p < 0.05$), but nonetheless 48.5% of professors with overweight plus obesity refer having healthy eating habits.

Conclusions: Professors with overweight and obesity have an erroneous perception of their body image and healthy eating habits.

1. **Conflict of Interest:** None

2. **Funding:** No Funding

HTP.068

Risk or resilience? Food cue responses, ad libitum intake, and physical activity behaviors in lean adolescents with obese or overweight mothers

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Introduction: The offspring of obese/overweight parents are at raised risk for developing obesity due to a mix of genetic, environmental and behavioral influences. Identifying the behavioral factors that promote weight gain in this group – as well as factors that might protect them from becoming obese – could help guide interventions.

Methods: Twenty-six lean adolescents, and 10 obese/overweight adolescents participated. Of the lean adolescents, 16 had obese/overweight biological mothers (lean high-risk [leanHR]), and 10 had lean biological mothers (lean low-risk [leanLR]). As part of a neuroimaging paradigm, following a ~5h fast, subjects viewed words representing high energy-density [ED] foods and low-ED foods, and rated their desire to eat each food. They were then given a multi-item ad libitum meal to measure intake. Families completed questionnaires, including the Power of Food Scale.

Results: LeanHR adolescents reported greater desire to eat the high-ED foods than both the leanLR and obese/overweight groups ($p < .05$). The leanHR group also had higher Power of Food scores ($p < .05$) and reported participating in more after-school/weekend physical activity ($p < .05$) than the other groups. Intake was highest for the obese/overweight group, followed by the lean-HR, then the leanLR group ($p < .01$).

Conclusion: Lean adolescents at raised familial obesity risk show heightened appetitive responses to high-ED food cues and increased intake compared to other lean teens – but also greater physical activity participation compared to both leanLR and obese/overweight teens.

Obesogenic eating styles might increase their risk of weight gain – but the risk may be offset by protective behaviors such as physical activity.

1. **Conflict of Interest:** None.

2. **Funding:** K99DK088360

HTP.069

The neural basis of familial obesity risk: Brain responses to food cues in lean adolescents with obese/overweight mothers

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Introduction: The offspring of obese/overweight parents are at increased risk of becoming obese. To investigate the biobehavioral basis of this phenomenon, we compared neural responses to high energy-density (ED) food cues in currently lean adolescents who were at high, or low, familial risk for obesity. We also examined responses in adolescents who were currently obese/overweight.

Methods: We recruited 26 lean adolescents, and 10 obese/overweight adolescents. Of the lean adolescents, 16 had obese/overweight mothers (lean high-risk [lean-HR]), and 10 had lean mothers (lean low-risk [lean-LR]). All subjects participated in an fMRI scan during which they were visually-presented with words representing high-ED foods, low-ED foods, and non-foods and asked to evaluate their appetitive reactions to each stimulus.

Results: In response to high-ED (vs. low-ED) foods, both lean-HR and obese/overweight adolescents showed less activation in the cingulate cortex (anterior, middle, posterior), when compared with lean-LR adolescents. There were also group differences in several frontal structures such that lean-HR and obese/overweight adolescents showed relatively decreased responses to high-ED foods.

Conclusion: Like obese/overweight adolescents, lean-HR adolescents showed decreased high-ED food cue responses in circuits involved in self-regulation and control, when compared to lean-LR adolescents. This relative lack of activation could promote overeating and weight gain.

1. **Conflict of Interest:** None.

2. **Funding:** K99DK088360

Tuesday, 14 May, 2013

T2:PS1 – Appetite / Food Choice

T2:P.001

A computed tomography scan method to assess liver volume and fat content in obese adult Yucatan minipigs*Ochoa M, Lallès JP, Meurice P, Val-Laillet D, Malbert CH*

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Introduction: Non-alcoholic fatty liver disease is frequently found in obese adults and might result in liver enlargement together with fat infiltration. Our aim was to assess the effect of diet-induced obesity on liver volume and fat content using CT-Scan, and to correlate the CT-Scan data with post-mortem volume measurements.

Methods: Twelve anaesthetized minipigs underwent CT-Scan acquisitions before and after the onset of diet-induced obesity as confirmed by body weight and adiposity changes. Liver volume was obtained using ultra-fast level set based segmentation from 3D images (MIA software). Dual energy attenuation change (Hc) on thick abdominal slices was calculated to estimate liver fat content. After euthanasia (n=9), livers were extracted and total volume was determined using water displacement.

Results: Body weight (from 26.6±1.0 to 51.9±0.5 kg) and body fat (from 38±1 to 47±1%) increased in the obese condition ($p<0.0001$; $R=0.55$, $p=0.01$). Liver volume (from 1156±31 to 1470±39 ml) and Hc (from 3.1±0.4 to 4.5±0.3 Hounsfield units) also increased ($p<0.01$). CT-estimated liver volumes were correlated with post-mortem measurements (1508±53 vs. 722±43 ml; $R=0.72$, $p=0.02$). No correlation between Hc, liver volume and body fat was found.

Conclusion: Increased liver volume, Hc, adiposity and weight in the obese condition are in line with previous studies describing enlarged fatty liver and increased adiposity in obese humans. Blood withdrawal after liver extraction probably explains the difference between *in vivo* CT-Scan and post-mortem volume measurements. Overall, this study suggests that CT-Scan could be a valid non-invasive method for measuring liver volume and fat content in obese minipig.

T2:P.002

Night eating syndrome and obesity a complex correlation network*Mastrostefano MM^{1,2,3,4}*

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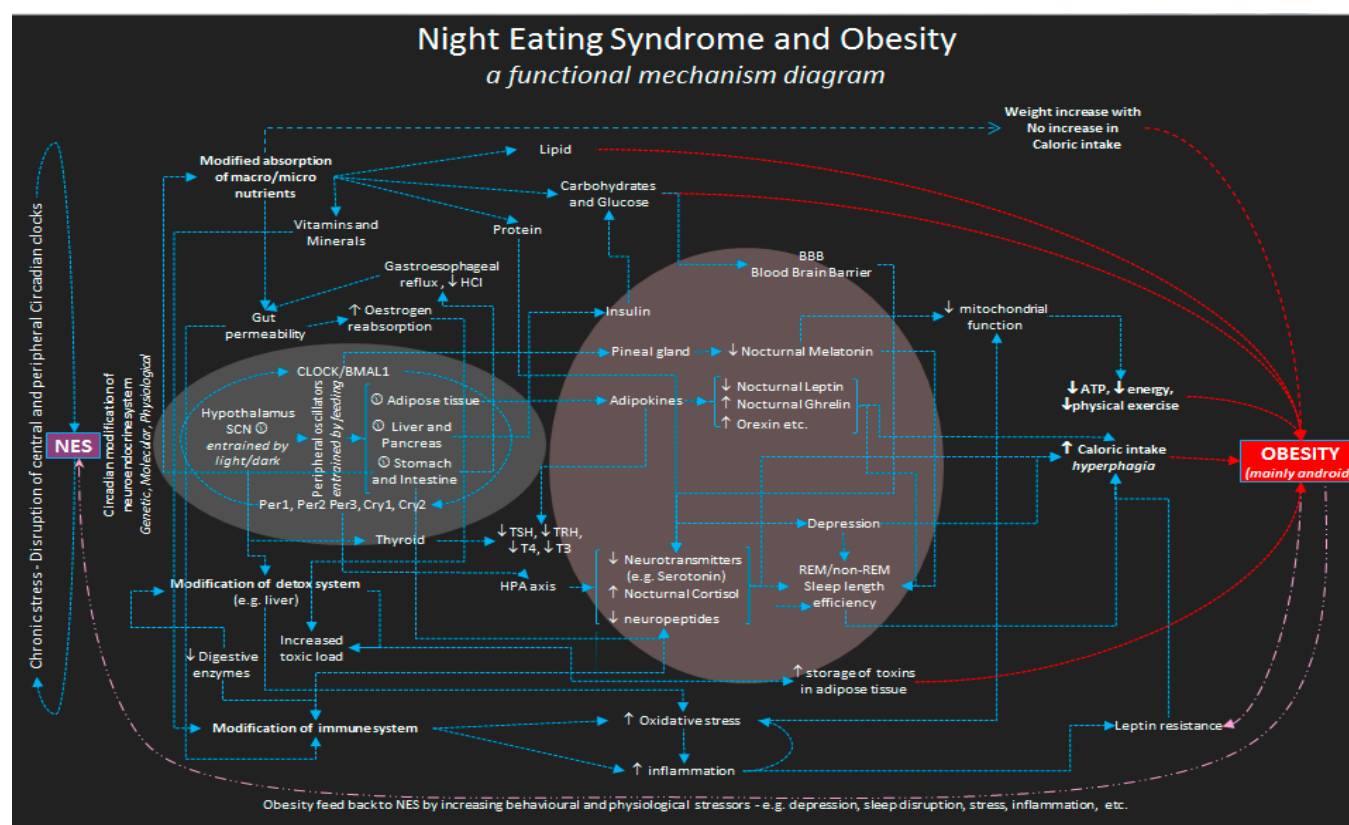
Introduction: Night Eating Syndrome (NES) is a distinct disorder precipitated by stress and manifested by a delayed circadian rhythm of food intake (evening/nocturnal eating hyperphagia, morning anorexia) with an intact sleep rhythm. This work describes the potential link between NES and obesity focusing on two main elements: the alteration of circadian rhythms and the specificity of some neuroendocrinal networks.

Methods: Functional mechanism review compiled by using literature review.

Results: Most studies converge in suggesting that NES may imply a circadian problem of coordination between the master clock in the hypothalamus and the peripheral clocks in gastrointestinal system and the adipose tissue. Specific NES circadian rhythm is the first focus of this paper. Recent research on animal models support the hypothesis that night eating, may lead to obesity even if caloric intake is kept constant compared to diurnal feeding.

Recent studies also show that neuroendocrinal networks and in particular the serotonergic system are implicated in the eating pattern observed in NES via significant modulatory input to the master clock in the hypothalamus. This is the object of the second focus of the paper.

Conclusion: Considering that NES has an incidence of about 1% within the general population, that it is a strong predictor of weight increase and that it occurs with disproportionate frequency among obese individuals where it often undermines weight loss, this paper argues that enhancing the understanding of NES and its treatment, would make a valuable contribution to the current battle against the obesity epidemic.

1. **Conflict of Interest:** None2. **Funding:** None

T2:P.003

Computerised tool for assessment of hedonic liking and implicit wanting for high fat food predicts normal eating behaviour and 24-hr energy intake in a community sample

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Background: The Leeds Food Preference Task (LFPQ) is a computerised food image-based tool to assess hedonic liking and implicit wanting for food. The tool is sensitive to nutritional and physiological laboratory-based interventions and a good predictor of laboratory test-meal intake and food choice.

Objective: We examined the utility of the LFPQ for predicting free-living energy intake and eating behaviour in a large community sample.

Methods: Two-hundred and thirty-three working adults (BMI: 30.2 ± 3.9 kg/m²; Age: 42.6 ± 11.2 yrs; 67% women) participated in data collection procedures following their enrolment in a NIH-sponsored RCT. Image-based measures of liking (ratings) and implicit wanting (frequency-weighted forced choice response time) for high (>50% energy) versus low (<20% energy) fat foods were measured in a standardised, non-hungry state using the LFPQ. Energy intake was measured using three, telephone-administered 24-hour dietary recalls. Normal and disordered eating behaviours were measured respectively using the Three Factor Eating Questionnaire (TFEQ) and Eating Disorder Examination Questionnaire (EDEQ).

Results: After controlling for age, gender and BMI, liking and wanting for high fat food were significant predictors of total daily energy intake (L:p=0.004; W:p=0.002) and frequency of fast food consumption (L:p<0.001; W:p<0.001); inversely associated with cognitive restraint (L:p=0.023; W:p=0.002) and positively associated with hunger (L:p<0.001; W:p<0.001) and disinhibition (L:p=0.003; W:p<0.001). There was no relationship between liking or wanting for high fat food and variables from the EDEQ.

Conclusion: The LFPQ is a good predictor of normal eating behaviour and total energy intake. This tool can be used effectively in large community samples.

1. Conflict of Interest: None Disclosed.

2. Funding: This study was supported by NIH Grant NIH/RO1-DK50456 (to S.A.F.).

T2:P.004

Mindfulness Moderates Hedonic Reactions Following Food Cue Exposure

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Introduction: Exposure to high-calorie food cues in experimental settings increases appetitive responses (hunger, desire to eat) and food intake. Experimental observations are analogous to what occurs in the food environment whereby chronic activation of hedonic reward systems contributes to weight-gain. Evidence from intervention studies suggests that mindfulness techniques (MTs) attenuate reactivity to food cues thereby limiting behavioural reactions that lead to overeating. MTs may reduce reactivity via acceptance and diffusion of emotive states without acting upon them. We expected that an empirically developed mindful induction and food-cue exposure would cause less reactivity to high-calorie food-cues, and less intake of food, compared to standard food-cue exposure.

Method: Forty females (*M/SEM*: 30 yrs, ± 1.2; 25.4 kg/m² ± 0.7) were randomly allocated to either a mindfulness (MFCE) or standard (SFCE) food-cue exposure condition. Appetitive state was assessed before and after cue-exposure using VAS. A large plate of cookies was used as a surreptitious means of measuring intake.

Results: Hunger decreased and fullness increased for the MFCE compared to the SFCE participants (*ps* < .05); a reduction in feel-like-eating

ratings for MFCE compared to SFCE participants approached significance (*p* = .08). Significantly more cookies were eaten post-exposure by SFCE compared to MFCE participants (*M* = 22 g/125 kcal vs. 7 g/40 kcal; range: 0–3 vs. 0–7 cookies; *p* < .001).

Conclusions: Results support the proposition that MTs can attenuate reactivity to food-cues and limit cue related intake. Results are discussed regarding the use of MTs to counteract appetitive vulnerabilities for weight-gain.

T2:P.005

The effects of liraglutide on palatability and ad libitum energy intake in obese adults without diabetes

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Introduction: The effects of liraglutide on meal palatability in obese individuals are unknown.

Methods: In this double-blind, incomplete 2-period crossover trial, participants (*n* = 49, age 48.3 ± 13.2 years, BMI 34.2 ± 2.7 kg/m² [mean ± SD]) were randomised to 5 weeks of treatment with once-daily s.c. liraglutide 1.8 mg, 3.0 mg, or placebo. After each 5-week period, a 5-hour meal test was performed. Appetite ratings, meal palatability (*post-hoc* analysis), nausea and well-being were assessed using visual analogue scales (0–100 mm) following an energy-fixed breakfast. Energy intake and palatability at a subsequent *ad libitum* lunch were also measured.

Results: No statistically significant treatment differences in mean overall palatability of the breakfast meal were noted. Liraglutide 1.8 mg and 3.0 mg increased mean postprandial satiety and fullness ratings after the breakfast, and reduced hunger and prospective food consumption, resulting in mean reductions of ~16% *ad libitum* energy intake with liraglutide 1.8 mg (treatment-difference -588 kJ [95% CI -951; -224]; *P* = 0.002) and 3.0 mg (-568 kJ [-937; -199]; *P* = 0.003) versus placebo. The mean palatability rating of the lunch meal was greater for participants on liraglutide 1.8 mg (treatment-difference 5.9 mm [-1.3; 13.2]; *P* = 0.11) and 3.0 mg (7.9 mm [0.5; 15.3]; *P* = 0.04) versus placebo. No statistically significant treatment differences in mean postprandial nausea or well-being ratings were observed.

Conclusion: Despite increased palatability ratings of the lunch meal with liraglutide, participants still consumed less than those on placebo, supporting liraglutide's mechanism of action as a satiety signal to reduce appetite and food intake. The reductions in food intake with liraglutide were apparently not confounded by nausea or reduced palatability.

1. Conflict of Interest: WHMS declares no conflict of interest. BS, CBJ and AF are employed by and own stock in Novo Nordisk A/S

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T2:P.006

Fasting leptin concentrations are associated with hedonic preference for high fat food in obese adults independent of adiposity or energy requirements

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Background: Leptin is thought to signal information about energy stores to inhibit or stimulate eating. However, the action of circulating physiological levels of leptin on short-term appetite control is not well understood.

Objective: We examined fasting plasma leptin concentrations in obese adults in relation to hunger and hedonic preference for high fat food using a computerized food image-based procedure.

Methods: Thirty-four overweight/obese men and women (BMI: 30.3 ± 3.9 kg/m²; Age: 42.4 ± 8.1 yrs) undertook laboratory appetite assessments on 3 separate testing periods during a 12-week exercise trial.

Plasma was collected and resting metabolism (RMR) and body composition (%BF) measured following a standardized overnight fast at weeks 0, 6 and 12. Outcome measures included fasting ratings of hunger and image-based measures of liking (ratings) or implicit wanting (frequency-weighted forced choice response time) for high (>50% energy) versus low (<20% energy) fat foods.

Results: Cross-sectional analyses showed that leptin concentrations were higher in women than men ($p=0.001$), declined with age ($p=0.007$) and were positively associated with %BF ($p<0.001$). After controlling for age and gender, adiposity-adjusted leptin was associated with liking ($p=0.023$) and wanting ($p=0.006$) for high fat food but not hunger ($p=0.531$). These relationships remained after controlling for RMR.

Conclusion: In obese adults, fasting physiological leptin concentrations were positively associated with hedonic preference for high fat food images independent of individual adiposity or energy requirements. These data are consistent with the hypothesis that resistance to leptin could diminish control over hunger and enhance the hedonic preference for high fat food.

1. Conflict of Interest: None Disclosed.

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T2:P.007

Thylakoids, extracted from spinach, affects fasting levels of blood-lipids, glucose and ghrelin, in a two months diet-intervention study in overweight women

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Introduction: Thylakoids have been found to affect appetite-regulating hormones in humans(1) and prevent weight-gain in animals(2). The aim of this study was to investigate thylakoids effect in a double-blinded two-months diet with overweight (BMI 27.5 ± 1.9 kg/m²), middle-aged (52 ± 5.7 yrs.) women.

Methods: Subjects ($n=30$) followed an energy-restricted diet (-10% /day) of three meals/day, and a daily requirement of 60 minutes exercise. Every second week fasting blood-samples were taken, as well as measurements of weight and body composition. 15 subjects got 5,6g of thylakoids daily, supplemented in a blueberry shot (thylakoid group). The other 15 subjects received a daily placebo blueberry shot (control group).

Results: All subjects lost bodyweight (thylakoid gr: -7.2% , control gr: -6.4%). Thylakoid supplementation resulted in significantly decreased plasma levels of total-cholesterol and LDL-cholesterol, compared to the control group ($p<0.05$). Moreover, the thylakoid group resulted in significantly decreased levels of blood-glucose and increased levels of ghrelin ($p<0.05$), reaching normal levels, compared to the control group.

Conclusion: Present results propose that thylakoids may be used as a functional ingredient to affect metabolic parameters in a positive way when following a weight-loss scheme.

References

- Köhnke R. et al. Thylakoids promote release of the satiety hormone cholecystokinin while reducing insulin in healthy humans. *Scand. J. Gastroenterol.* 2009;44, 712–719.
Emek SC. et al. A large scale method for preparation of plant thylakoids for use in body weight regulation. *Prep. Biochem. Biotechnol.* 2010;40, 13–27.

1. Conflict of Interest: No conflicts of interest.

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T2:P.008

Increasing eating frequency is not an adequate strategy for obese men to better control their appetite

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Introduction: The effects of frequent eating on health are unclear. We assessed the short-term consequences of eating frequently on appetite and metabolism in obese subjects.

Methods: Seventeen obese men participated in: (i) two sessions consisting of a breakfast in one intake at T0 (F1), or in four isocaloric intakes at T0, T60, T120, T180 min (F4), followed by an ad libitum buffet (T240). Subjects rated their appetite. (ii) two sessions consisting of the same breakfasts F1 and F4 in a Clinical Center, followed by a standardized meal. Blood sampling was performed to study ghrelin, glucagon-like peptide-1 (GLP-1), and metabolic kinetics. Indirect calorimetry measurements were performed.

Results: After F4, at T240 min, GLP-1 concentration was higher ($P = 0.006$), ghrelin concentration ($P = 0.03$) and hunger ratings ($P < 0.001$) were lower. In F4, subjects consumed at the buffet, less food in grams ($P = 0.04$) and less energy from low energy dense foods ($P = 0.01$), but total energy intakes were not different between conditions. In F4, the area under the curve was lower for insulin ($P = 0.02$) and non-esterified fatty acids (NEFA) ($P = 0.03$). Diet induced thermogenesis was reduced in F4 ($P = 0.03$) between T0 and T240.

Conclusion: Even if subjective and physiological data suggest a beneficial effect of frequent eating on appetite in obese men, no effect was demonstrated on energy intake. The decrease in diet induced thermogenesis and lipolysis, reflected by NEFA profiles, could be deleterious on energy balance in long run.

1. Conflict of Interest: The authors declare no conflict of interest

2. Funding: Research relating to this abstract was funded by Fondation Nestlé France and Thermes de Brides Les Bains.

T2:P.009

The Impact of a Low and High Intensity Exercise Intervention on Appetite, Hunger, Cognitive Factors and Food Reward

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Introduction: Exercise is often used to promote better weight management; however the role of exercise intensity is unclear. Non-homeostatic (cognitions and food reward) influences on appetite have the potential to stimulate compensatory eating. The aim was to investigate the effect of exercise intensity during a supervised exercise programme on appetite, cognition and food reward.

Methods: Twenty-one overweight/obese women (33.8 ± 5.4 kg/m²; 29 ± 10 age; 30.3 ± 4.4 ml/kg/min) were randomised to low (LI) or high (HI) intensity conditions (40 or 60% of $\text{VO}_{2\text{reserve}}$) matched to expend 1500 kcal/week in a 3-month exercise intervention (compliance= $97 \pm 4\%$). Appetite (desire to eat, fullness and hunger) and cognitive factors (TFEQ) as well as food reward (liking and wanting) and food preference for foods varying in fat content and taste were assessed during the first and last weeks of the programme.

Results: Compensation based on FM and FFM changes after the exercise intervention was $53 \pm 71\%$ and $78 \pm 182\%$ in LI and HI, respectively. Appetite and cognitive factors did not differ according to exercise intensity or across the exercise intervention. However, food wanting ($p<0.05$) and liking ($p<0.05$) were shown to increase after LI exercise compared to no change after HI exercise.

Conclusion: High intensity exercise appears to suppress the increase in food wanting and liking observed after energy matched exercise sessions, although measured compensation was not different between the

exercise conditions. These findings suggest that food wanting and liking might lead to a greater compensatory eating in LI.

1. Conflict of Interest: None Disclosed

2. Funding: No funding

T2:P.010

Macronutrients and postprandial glucagon secretion in obese and normal weight women

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Introduction: The aim of the study was to assess the effect of dietary macronutrients on circulating glucagon level in obese and normal weight women.

Methods: In 20 insulin sensitive women (11 obese and 9 normal weight) plasma concentrations of insulin and glucagon levels were assessed prior to, and after 3 different macronutrients test meals.

Results: AUC_{total insulin} in obese group was increased after protein and carbohydrates than fatty test meals consumption (3981±2171 vs. 2349±1004 μIU*h/mL, p<0.05 and 4869±2784 vs. 2349±1004 μIU*h/mL, p<0.05, respectively), but similar after protein and carbohydrates ingestion. While, in normal weight group AUC_{total insulin} was increased after carbohydrates than fatty test meal ingestion (3929±1719 vs. 2231±509 μIU*h/mL, p<0.05), and similar after carbohydrate and protein as well as after protein and fatty test meals (3929±1719 vs. 3046±1406 μIU*h/mL and 3046±1406 vs. 2231±509 μIU*h/mL, respectively). However, AUC_{total insulin} was significantly increased in obese than normal weight women, only after carbohydrate test meal ingestion (4869±2784 vs. 3929±1719, p<0.05).

AUC_{total glucagon} were similar after all test meals ingestion (921±356 vs. 957±368 vs. 926±262 ng*h/mL and 1196±14 vs. 1360±662 vs. 1792±1176 ng*h/mL, respectively). AUC_{total glucagon} was significantly lower in obese than normal weight women after fatty meal, only (926±262 vs. 1792±1176 ng*h/mL; p<0.01).

Conclusion: The macronutrients affect similar postprandial glucagon secretion. Obese are characterized by impaired glucagon secretion after fatty meal consumption.

1. Conflict of Interest: None Disclosed

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T2:P.011

Shorter sleep is associated with higher energy intake in infants

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Background: Shorter sleep is associated with higher weight in children, but whether the mechanism is through energy intake or energy expenditure is unknown. Studies in adults show that acute sleep deprivation influences the hormonal regulators of energy intake (EI), but there are no studies examining associations between habitual sleep duration and EI in children. If sleep-related differences in EI precede differences in weight, this could be indicative of a causal process.

Methods: Parents of 1303 infants from the Gemini cohort provided data on sleep duration and weight and completed 3-day diet diaries when the infants were 15–20 months old. Total EI (kcal), macronutrient intake (gms), and macronutrient intake as a percentage of total EI, were calculated from the diary data.

Results: Sleep duration was not associated with weight, but showed a significant negative association with energy intake (p=0.005). Children sleeping <10 hours a night consumed on average 93 kcal more each day

(95% CI 13–173) than those sleeping ≥13 hours. Fat and carbohydrate intake showed similar linear associations with sleep duration (p=0.021; p=0.008), but there was no association with protein intake or percentage of EI from each macronutrient.

Conclusion: This study provides the first evidence that shorter sleep is associated with higher EI in infancy; although at this age, there was no association with weight. This suggests that higher EI may be a mechanism through which sleep influences weight gain.

T2:P.012

A combination of fibers and proteins in a biscuit efficiently reduces appetite sensations in human with influence on some physiological markers

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Introduction: The objective of this study was to evaluate the single and potential combined effects of proteins and fibres in biscuits on appetite sensations, food intake and physiological markers.

Methods: In a crossover randomised design, 56 subjects attended the laboratory on 4 days and test one different biscuit each day at breakfast time: control biscuit (C), fibre-enriched biscuit (F), protein-enriched biscuit (P), fibre and protein-enriched biscuit (FP). Energy intake was evaluated daily by measuring food consumption during *ad libitum* standard lunch, afternoon snack and dinner. They also had to fill VAS at regular time interval in order to evaluate their appetite sensation. Among the 56 volunteers, 16 attended the laboratory on the next day so that different parameters of satiety such as gastric emptying, glycaemic response and gastrointestinal hormones were measured.

Results: HPHF induced reduced appetite sensations compared C, HF and/or HP. Moreover, HF and HPHF slowed gastric emptying vs. C and also vs. HP for HF. The glycaemia level was lower after HPHF and HP vs. C. Peak insulinemia 30 min after breakfast was lower after HPHF and HF vs. HP. Active GLP-1 is increased after HP vs. the other biscuits. Ghrelin is more reduced after C. There is no effect on CCK and PYY.

Conclusion: The interest of combining fibres and proteins in a cereal product is shown in satiety feelings. The mix of fibre and protein activate mechanisms which are induced by fibre (such as reduced insulinemia and slowed gastric emptying) and protein (such as reduced glycaemia).

1. Conflict of Interest: None disclosed

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T2:P.013

Exposure to diet-congruent food images improves appetite control in female dieters: Implications for diet compliance and weight management

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Introduction: This study examined whether rapid exposure to diet-congruent foods (foods associated with slimming) could increase dieters' resolve to lose or maintain body weight and improve food intake control when challenged with high energy food.

Methods: In a between-subjects design, diet-related cognitions and snack food intake were assessed after rapid exposure (23ms) to diet-congruent, or non-food images in female dieters who were losing or maintaining weight (n = 26) compared to female non-dieters (n = 41). Diet-related cognitions were assessed using a lexical decision task and food intake control was measured by the provision of high or low fat, sweet or savoury tasting snacks.

Results: Results showed that after exposure to diet-congruent images, dieters consumed less energy than after non-food images. In contrast, non-dieters' intake did not differ between exposure conditions. Diet-related cognition measured by the lexical decision task could not account for the difference between dieters' and non-dieters' food intake control.

Conclusion: These data suggest that even rapid exposure to diet-congruent food images can improve food intake control in dieters. Future research will examine the implementation of diet-congruent food exposure as a strategy to facilitate weight management in dieters.

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T2:P.014

Satiety effects of sweet drinks versus water

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Introduction: It has been proposed that consuming water in place of sugar-containing drinks has a potentially important role to play in reducing energy intake and risk of obesity. Part of the evidence for this comes from studies of the short-term effects of calorie-containing drinks on appetite and satiety.

Methods: To avoid carry-over effects inherent in cross-over designs, we carried out a parallel groups study of the satiety effects of sucrose-sweetened (161 kcal) and sucralose-sweetened (3 kcal) blackcurrant drinks versus the equivalent volume of water (300 ml, 0 kcal). The drink was consumed 20 minutes before an 'ad libitum' lunch-time test meal (2100 kcal served). Intake in the same meal served the previous day without a drink beforehand (baseline) was used to control for individual differences in energy intake. Participants were healthy, non-dieting males (n=36) and females (n=36) (mean age 23 years, BMI=22.1 kg/m²).

Results: Mean meal intakes in the baseline and test meals were very similar (baseline male = 1036 and baseline female = 684 kcal). Adjusting for baseline energy intake, test meal intake was respectively 132 kcal (p=.03) and 28 kcal lower after the sucrose and sucralose-containing drinks than after water. The corresponding data for males and females separately were 184 and 79 kcal (sucrose), and 4 and 52 kcal (sucralose).

Conclusion: Sucrose consumption suppressed subsequent energy intake, especially in men. Neither sweet drink caused a (significant) increase in overall energy intake. The basis of possible gender differences in responses to sweet drinks is worthy of further investigation.

1. Conflict of Interest: None disclosed.

2. Funding: This research was partly funded by Sugar Nutrition UK.

T2:P.016

Dietary protein and energy intake in lean and obese mice

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Introduction: The protein leverage hypothesis suggests intake of dietary protein is prioritised above other macronutrients & modest changes to protein result in significant changes to energy intake (EI) and weight. While proven in lean mice whether obese mice respond similarly is unknown.

Methods: Forty 6-week-old C57/Bl6J mice were fed 6 week conditioning diets either Standard or High Fat chow (F 59%). Two groups, obese (OB) and lean (LE), were generated. Equal subgroups were randomly allocated to two 2 week diet treatments; Low Protein (P 9% | LP) then High Protein (P 23% | HP) chow or *vice versa*. Mice had *ad libitum* access to chow; food intake was recorded 2nd daily; weight weekly.

Results: OB were significantly heavier than LE (mean \pm SEM (g): 27.7 \pm 0.36 vs. 26.2 \pm 0.36, p=0.01). Both OB and LE mice showed significant differences in daily food intake for the subgroup fed HP then LP (Food Intake (g/day) OB mice: HP: 3.55 \pm 0.1, LP: 4.1 \pm 0.12; p<0.001 | LE mice: HP 3.3 \pm 0.1, LP: 4.2 \pm 0.1 p<0.001). For mice fed LP then HP,

food intake for the OB (but not LE) mice significantly differed (Food Intake (g/day) OB mice: LP: 3.9 \pm 0.1; HP: 3.8 \pm 0.1; p=0.01 | LE mice: LP: 3.5 \pm 0.1; HP: 3.4 \pm 0.1 p=0.15). Diet allocation was not associated with significant changes to body weight.

Conclusions: For lean and obese mice food intake on the LP diet increased by at least 15%. While no short-term changes in body weight were noted, longer-term weight changes are possible. This may have implications for human obesity.

1. Conflicts of Interest: No conflicts of interest are identified

2. Funding: The Sydney University Nutrition Research Foundation funded the research in this abstract

T2:P.017

The acute effect of malt extract vs. sucrose on glucose and insulin response, subjective appetite sensations and ad libitum energy intake

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Introduction: There is a difference in the amount and composition of reducing sugars in malt extract compared to sucrose. Furthermore, malt extract contains small amounts of protein. Therefore, malt extract may be a better alternative than sucrose when used as a sweetener in soft drinks and sweetened foods. This has not been scientifically investigated. Thus, the objective of this study was to compare the effect of malt extract and sucrose on plasma concentrations of glucose and insulin, subjective appetite sensations, and *ad libitum* energy intake.

Methods: 19 young, healthy, normal-weight men participated in a randomized, double-blinded crossover study. Test drinks were soft drinks (750 mL) containing 75 g of carbohydrate from either malt extract or sucrose. Blood was sampled before and every 15 min during the first hour after the test drink was consumed and subsequently every 30 min during 2 hours. Visual analogue scales were used to record appetite sensations and well-being before and frequently after the test drink was consumed. An *ad libitum* meal was served 3 hours after the test drink had been consumed.

Results: No differences were found in plasma concentrations of glucose and insulin between the two test days. Neither appetite sensations, nor preferences for special foods, or energy intake were different on the two occasions.

Conclusion: In the present study we found that malt extract had a similar effect as sucrose on blood glucose and insulin, as well as on subjective appetite sensations and *ad libitum* energy intake.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded by Harboe Brewery A/S

T2:P.018

Factors associated with diet soda consumption by employees of public universities in São Paulo state (Brazil)

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Introduction: The dietary sweeteners are widely used by industries in various types of products such as diet sodas. The consumption of these beverages has grown in recent years, highlighting the importance of understanding the factors that motivate this behavior. The aim of this study was to determine the factors associated with diet soda consumption by employees of public universities in São Paulo state (Brazil).

Methods: Cross-sectional study with adults and elderly of public universities in São Paulo state (Brazil). An online questionnaire with socio-demographic, anthropometric and habit of diet soda consumption was applied. Nutritional status was determined by Body Mass Index (BMI). It was performed the chi-square test, with significance level p <0.05, to assess the association between soda consumption and the study varia-

bles. Statistical analyzes were performed with SPSS 17.0. The project was approved by the ethics committee of the institution.

Results: The study included 1323 individuals and 36.1% of those reported being of consumers artificial sweeteners. It was observed that the factors associated with higher consumption of diet soda were age ≥ 60 years ($p = 0.014$), income \geq US\$ 1,800.00 ($p = 0.001$), presence of diabetes mellitus ($p = 0.000$), overweight ($p = 0.001$) and difficulty controlling body weight ($p = 0.000$). The frequency of physical activity, years of education and gender were not associated.

Conclusion: Age, income, BMI, presence of diabetes mellitus and difficulty controlling body weight were identified as factors associated with the prevalence of diet soda consumption.

T2:P.019

Short sleep duration is associated with next day food wanting and liking in adults

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Background: Aerobic exercise has been shown to increase sleep duration, yet the effects of resistance-based exercise on sleep duration remain to be elucidated. Furthermore, current evidence suggests that short sleep duration results in increased food intake. However, it is unknown whether this is due to greater hedonic "liking" and/or motivational "wanting" for certain foods.

Objective: We firstly examined the acute effects of an isocaloric resistance- and aerobic-based exercise session on sleep duration, and secondly whether sleep duration affected next day wanting and liking for foods varying in fat content and taste.

Methods: Seven men and seven women (BMI: 22.7 ± 1.9 kg/m²; body fat-DXA: $21.0 \pm 7.9\%$) participated in three randomized crossover sessions: aerobic-based exercise, resistance-based exercise, and sedentary control. Sleep duration (short sleepers ($n=7$): <7 hours of sleep/night; reference group ($n=7$): ≥ 7 hours of sleep/night, assessed during the control session) was measured with two biaxial accelerometers for 22 hours following the exercise intervention. Implicit wanting, explicit wanting and liking for different visual food cues were measured with a validated computer task the following morning.

Results: There were no differences in sleep duration, implicit wanting, and explicit wanting or liking for foods between exercise conditions. However, short sleepers had a greater mean explicit liking (51 ± 15 vs. 32 ± 9 mm; $P=0.016$) and wanting (49 ± 16 vs. 32 ± 11 mm; $P=0.041$) for foods, compared to the reference group.

Conclusion: Based on this relatively small sample size, short sleepers had a greater explicit wanting and liking for foods compared to the reference group.

1. Conflict of Interest: None Disclosed

2. Funding: No Funding

T2:P.020

Effects of comfort food consumption on the stress response in rats

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Introduction: stress induces preference for more palatable (comfort, CF) food and increase or decrease food intake and body weight. The effects of foot-shock (FS, 3 days) and chronic mild unpredictable stress (CMUS, 14 days) on food intake and its physiological consequences in rats were investigated.

Method: control (CO) and stressed adult male Wistar rats fed with commercial chow associated or not with CF were used. Data were compared by two-way ANOVA plus Bonferroni test. Significance was established at $p < 0.05$.

Results: All rats preferred CF. FS and CMUS rats reduced the ingestion of commercial chow; CMUS also reduced the intake of CF and weight loss. Entries and time spent in the EPM open arms were higher in FS and lower in CMUS versus CO; entries and time spent in closed arms was not altered by FS, but it was higher in CMUS versus CO. Access to CF decreased the time spent in the EPM open arms compared to CO fed with commercial chow. FS and intake of CF increased the latency to first crossing and time spent in the center of the open field, which was decreased by CMUS. CF attenuated corticosterone response to stress. Serum triglycerides decreased after FS and increased with CF.

Conclusion: FS and CMUS anorexigenic effect depends on the stressor and the quality of food available. The intake of more palatable food attenuates the endocrine stress response. The anxiolytic effect of FS is potentiated by CF and the anxiety caused by CMUS was not prevented by CF.

1. Conflict of Interest: None disclosure

2. Funding: Fundação de Apoio à Pesquisa do Estado de São Paulo (FAPESP) and Coordenadoria de Apoio ao Pessoal de Ensino Superior (CAPES)

T2:P.022

Dim light increases meal duration but not energy intake during an ad libitum meal

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Introduction: Visual cues seem to be important for the regulation of food intake and meal termination (Scheibehenne et al., 2010). Specifically, it has been suggested that under dim light conditions food consumption can be increased due to increased meal duration, comfort and disinhibition (Wansink, 2004). Aim of the present study was to evaluate the effect of dim light on energy intake, meal duration, appetite and relaxation feelings in healthy volunteers.

Methods: Twenty participants (10♂/10♀, BMI: 23.9 ± 2.8 kg/m², age: 22.6 ± 4.9 y) took part in this randomized, crossover study. Each volunteer participated in two trials where he/she consumed an *ad libitum* lunch meal, after a standardized breakfast snack, under dim (1.3 watt/m²) or bright light (16.4 watt/m²) conditions. Appetite (hunger, fullness and prospective food consumption) and relaxation feelings were recorded before and after meal consumption using visual analogue scales. Meal duration was also recorded.

Results: Data analysis revealed that meal duration was significantly longer under dim light compared to bright light conditions ($P=0.01$). Specifically, under dim light participants needed 7.3 min more to consume their meal (95%CI: 1.7–12.8). No intervention effect was found for energy intake, appetite and relaxation feelings.

Conclusion: The results of the present study failed to confirm that increased meal duration due to dim light, a condition usually found in restaurants, leads to increased food intake. One possible explanation for the increased meal duration found may be that participants needed more time to adapt and eat under lower light conditions. More research is necessary to confirm these findings.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded by IST College – University of Hertfordshire, Athens, Greece

T2:P.025

Comparison of Personal and Social Norms for Food and Drink Portion Sizes with UK Suggested Portion Sizes

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Background: Beliefs and opinions on how much is considered appropriate to eat may influence intake.

Methods: 30 healthy lean men and women (BMI 20–25 kg/m², aged 18–60 years) completed a computer-based task where they viewed portion sizes of 12 widely consumed food and drink items and were asked to indicate if this was more or less than they would normally consume or others would normally consume. Pictures of 17 different portion sizes of each item were repeatedly presented in a random order and the method of constant stimuli was used to determine the personal and social norms for each item. Differences in weight and energy content were calculated and one-sample median tests were used to compare norms with on-pack suggested portion sizes.

Results: Suggested portion sizes were smaller than median norms for all items, with differences of >250 kJ per portion for approximately half of the items.

Food	Difference between suggested portion size and median norm			
	Weight (g)		Energy (kJ)	
	Personal norm	Social norm	Personal norm	Social norm
Banana	-10*	-14*	-40	-56
Biscuits	-41*	-32*	-802	-626
Cake	-26*	-19*	-507	-371
Cheese	-23*	-20*	-391	-340
Lasagne	-81*	-4	-648	-32
Muesli	-18*	-49*	-277	-755
Orange juice	-101*	-126*	-155	-193
Pasta	-111*	-85*	-751	-575
Peas	-16*	-18*	-47	-52
Sandwiches	-23	-7	-233	-71
Sausages	-50*	-31*	-640	-396
Smarties®	-40*	-42*	-769	-807

*: p<0.01

Conclusion: Norms for portion sizes are usually larger than suggested portion sizes which could contribute to the risk of overconsumption.

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T2:P.026

From willpower to weight: The role of self-regulation enhancement in eating control

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Introduction: It has long been recognised that those wishing to lose weight for health or other reasons, run the daily gauntlet of an obesogenic environment which bombards them with tempting opportunities to eat, and demands little in terms of energy expenditure. However, the need for individual attempts at self-regulation has nowhere been so controversial as in the field of weight control. From restraint theory to Baumeister's 'ego depletion' model, the potential of attempts to exert self-control to backfire is well documented. And yet there is substantial evidence that willpower is a trainable skill with potential benefits in the field of eating, weight management and other behaviours.

Methods: Using data from the European Union Tempest study of self-regulation in adolescents, and other studies of self-regulation, this review discusses evidence for the potential to enhance individuals' ability to regulate their eating.

Results: Techniques that can promote self-regulation in children and adults include habit-forming behavioural interventions, controlled exposure techniques and small environmental manipulations.

Conclusion: Promotion of transferable self-regulatory skills has the potential to bring substantial benefits for those individuals seeking to lose weight and maintain weight losses.

T2:P.027

Workplace stress and eating behaviour: type of stress

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Introduction: Psychosocial stress (job strain) is a risk factor for disease [1]. Evidence suggests that an estimated 80% of people alter their caloric intake either by increasing or decreasing consumption [2] when stressed. We investigated the effect of type of stress on eating behaviour.

Methods: We recruited 234 (167 female, 67 male) public sector teaching/educational employees in the North East of Scotland, to keep a weighed intake food diary for 7 days. Concurrently, hourly VAS recorded temporal changes in stress (during waking hours). An end of day questionnaire recorded daily hassles detailing type of hassle, time and perceived stress.

Results: Average energy intake was 1933 kcal (SD 482). Correlations between nutritional intake and stress confirmed that greater frequency of hassles was associated with increased fat (P<0.05, 0.13) and sugar intake (P<0.05, 0.16) and total hassle score with snack food fat intake (P<0.05, 0.14). Greater sugar intake was strongly associated with physical stress (P<0.05, 0.15) and environmental stress (P<0.05, 0.16), respectively. Environmental stress was also associated with increased saturated fat intake (P<0.05, 0.14). Hours worked or slept had no relationship with nutritional intake.

Conclusion: Ego threatening and interpersonal stresses were not associated with change in energy intake. Work hassles and environmental hassles (e.g. running late) were associated with increased sugar and saturated fat intake, typically the nature of these hassles means that subjects are likely to consume energy dense, ready to eat foods; a potential risk factor for obesity.

References

1. Kivimäki et al, (2012) The Lancet;380(9852),1491–7.
2. Dallman (2010) Trends Endocrinol Metab;21:159–65.

1. Conflict of Interest: AMJ holds commercially funded grants and has acted as a consultant within the food industry sector.

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T2:P.028

Fat inhibition using alginate enriched bread

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Problem: The obesity epidemic highlights the need to identify novel ways to treat obesity. Previously reported data has demonstrated the release rate of alginate from an alginate enriched bread, and that isolated alginate maintains up to 50% of its pancreatic lipase inhibition properties (Houghton et al., 2012. Proc Physiol Soc). The current study aimed to assess if alginate bread (AB) reduced fat digestion in a model gut system (MGS).

Method: *Model Gut* – The MGS consists of digestion in the upper gastrointestinal tract, including mouth, stomach and small intestines. *Fat Inhibition* – Control bread (CB) and AB were prepared by a Greggs, with alginate added 4% by weight. Three fat substrates (trioleate (C:18), tributyrates (C:4) and trioctanoate (C:8)) were added to the MGS and then with either 5.2 or 10 g CB or AB. The glycerol was measured using a colorimetrically assay after 180 minutes to assess fat digestion.

Results: *Fat Inhibition* – fat substrate inhibition is reported for AB in the table below and is reported in % compared to substrate alone (n=9), there was no inhibition for CB.

Fat Substrate	Tributyrates	Trioctanoate	Trioleate
5.2g	40 (0.15)	48 (0.3)	79 (21)
10g	51 (3.5)	57 (8.6)	100 (14)

Conclusion: The findings indicate that the alginate bread is able to inhibit all substrates examined, ranging from 40–100%. These data together along with previous data suggest that alginate-enriched bread has the potential to benefit weight loss. Current clinical studies will aim to confirm this.

T2:PS2 – Behavioural Change

T2:P.029

The development of body image scales aiming to improve parental recognition of childhood overweight: The Map Me Study

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Evidence shows that parents tend not to recognise when their child is overweight¹. Parents make visual comparisons within peer groups and tend to rely on extreme cases as a reference point¹. Without recognition of overweight in their child parents are unlikely to take action. It may prove beneficial to encourage parents to focus on more visible characteristics than body mass index (BMI)² to identify and assess overweight. Body image scales (BIS) are visual images of body shape; however, existing BIS do not correspond to BMI cut-offs for overweight and obesity used in the UK. The Map Me study is developing new age- and gender-specific BIS of known BMI based on UK90 cut-off criteria³. The scales will be created in paper-based and web-based format. A cluster randomised trial (CRT) will test the effectiveness of the BIS in improving parental recognition of childhood overweight.

3D body scans of 543 children (350 4–5 years and 193 10–11 years) were obtained using 3D surface body scanning technology ([TC]², Cary, NC, USA). Weight status using UK90 criteria³ was determined from height and weight measurements. BIS are being developed using the body scan data and associated BMI information. A parent panel and professional group have been established to discuss early BIS prototypes and contribute to further development. The BIS developed will be presented along with findings from a feasibility study.

References

- ¹Jones, et al. *Int J Obesity*, 2011;35:953–962.
- ²Parkinson, et al. *Int J Obesity*, 2011;35:510–516.
- ³Cole, et al. *Arch Dis Child*, 1995;73:25–29.

Funding: This work was funded by the National Prevention Research Initiative (NPRI, <http://www.npri.org.uk>) incorporating funding from Alzheimer's Research Trust; Alzheimer's Society; Biotechnology and Biological Sciences Research Council; British Heart Foundation; Cancer Research UK; Chief Scientist Office, Scottish Government Health Directorate; Department of Health; Diabetes UK; Economic and Social Research Council; Health and Social Care Research and Development Division of the Public Health Agency (HSC R&D Division); Medical Research Council; The Stroke Association; Wellcome Trust; Welsh Assembly Government; and World Cancer Research Fund.

T2:P.030

Impact on food preferences of functional and hedonic labels

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Introduction: Descriptive terms are frequently used on food packaging. These terms flag attributes that are primary motives for choosing food, such as taste, as well as secondary attributes that are sometimes perceived to contradict taste (ie health). This study explores whether these labels can increase preference for an unambiguously healthy food (an apple) over a less healthy alternative (chocolate).

Methods: 439 participants were asked to select a sandwich and a drink followed by a dessert (apple or chocolate bar) as part of a “combo meal”. Participants were randomly allocated to one of five apple labeling conditions: apple, healthy apple; succulent apple; healthy and succulent apple; succulent and healthy apple. Choice of dessert was the primary endpoint. Measure of the perceived qualities of the apple (taste, health, value, quality, satiety) were also assessed, as well as individual measures (restraint, belief that tasty foods are unhealthy, BMI).

Results: The labels combining both health and taste messages significantly increased selection of the apple (H&S 66%, S&H 62%), while the single labels had no impact on the rate of apple selection (H: 51%, S: 52%, No label: 50%). Other predictors of apple choice were perceived tastiness and belief that tasty foods are not healthy.

Conclusion: Interventions that enhance the perceived taste attributes of healthier foods, or the perceived link between tastiness and healthiness are likely to be more effective at achieving healthier diets than those emphasizing health alone.

1. Conflict of Interest: None

2. Funding: Department of Health Policy Research Programme, UK

T2:P.031

Diet behavior among ‘Emerging adults (18–25 year olds)’: A qualitative study

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Introduction: 18–25 year olds are vulnerable with respect to weight gain but are also hard to reach. Understanding diet behavior in this under researched age group is crucial for future obesity prevention strategies.

Aim: To explore diet behavior of young adults with attitudes, perceptions, intentions, barriers and facilitators.

Methodology: Seven focus groups were conducted among young people in North-East of Scotland from various educational institutions and community groups. A topic guide was developed for consistency of data

collection. Informed consent was obtained. Discussions were recorded, transcribed and analysed using Framework analysis.

Results: Five themes (Diet behaviour, Influences on diet behaviour, Knowledge and sources of information, Attitudes, Behaviour change) and several sub-themes were identified. The results suggest:

- Young people were reasonably knowledgeable about what constitutes a healthy diet but had some misconceptions
- Diet behaviour was strongly influenced by parents/childhood experiences
- They want ‘variety’ in food but also are driven on a daily basis by stresses (such as exams, lack of time, mood) and their organising skills during these times
- There was evidence of ‘healthy eating phases’ with relapses affected by the above factors
- The major motivators for maintaining a healthy diet were to ‘look better’ and ‘feel great’ now, rather than concern about future health although future health was of some concern
- There were mixed opinions about the ‘cost’ and ‘taste’ of food.

Conclusion: Interventions to change diet behavior in this age group should incorporate these crucial factors.

1. Conflict of Interest: None

2. Funding: None

T2:P.033

Impact on food preferences of priming a healthy eating goal

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Introduction: This study explores whether food advertisements can prime a healthy eating goal and thereby increase preferences for healthy over less healthy food.

Methods: A 2x2 factorial design (prime/no prime and load/no load) was used in which 143 participants were randomly allocated to a healthy eating goal prime (three adverts that paired fruits and vegetables with positive mood) and cognitive load (holding in working memory a string of 6 consonants while performing the tasks of interest). Goal activation was assessed using a size estimate task. Food preference was assessed using a choice task (7 pairs of fruits and snacks). Additional measures included current hunger and thirst, dietary restraint, age, gender, and self-reported weight and height.

Results: No effects were found of any intervention on size estimates. Hunger reduced preference for fruits ($B=-0.65$, $p=0.002$), an effect countered by the prime ($B=2.20$, $p=0.03$). These effects were unaffected by cognitive load.

Conclusion: This study provides preliminary evidence that healthy eating can be promoted using simple adverts as primes. The lack of impact of cognitive load on the impact of the adverts is compatible with these effects occurring through non conscious processes but more sensitive measures of such processes are being used in a replication of this study.

1. Conflict of Interest: None

2. Funding: Department of Health Policy Research Programme, UK.

T2:P.034

Weight-based stigmatization & binge eating behavior among obese treatment-seeking women aged 18–45 years with obesity in Belarus

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Introduction: To evaluate the associations between weight-based stigmatization and binge eating behavior in treatment-seeking women aged 18–45 years with obesity in Belarus.

Methods: One hundred eighty three women aged 18–45 completed three questionnaires: 1) Stigmatizing Situations Inventory, 2) EDE Questionnaire, and 3) Binge Eating Questionnaire. Correlation analysis

was used to assess the relationship between stigmatizing experiences and eating behavior.

Results: Stigmatization experience predicted both binge eating behavior ($R^2 = 0.20$, $PB .001$). Significant differences in the number of binge eating predicted weight based on the stigma was associated with the effect of psychological stress. Specifically, 26.84% of the variance in eating account for stigmatizing experiences between 8.6% and 35.45% ($p < .01$) was associated with the effects of various indicators of psychological stress.

Conclusions: These data show that the weight-based stigmatization predicts eating behavior and, on the other hand, the psychological distress caused by stigma, is an important stimulus that causes compulsive overeating.

1. Conflict of Interest: None Disclosed

2. Funding: No Funding

T2:P.035

Development of a complex intervention in managing “Maternal Obesity” using “Mobile Technology” (MOMTech)

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Introduction: Maternal obesity is associated with a significant increase in the risk of maternal and neonatal mortality and morbidity, obesity development in the offspring and cost implications for the NHS. We aimed to develop a complex intervention to evaluate the use of text messaging in the management of maternal obesity.

Methods: A phased approach was taken to develop and evaluate this complex intervention, of which the preclinical and phase I, are presented here. Through a structured literature search and focus groups with women and midwives a preliminary prototype was developed. Additional focus groups were carried out to verify acceptability of the intervention components. This was followed by a usability testing to explore implementation of the intervention into the practical setting. The results of the focus groups were analysed thematically.

Results: Women and midwives welcomed an additional support particularly text messaging for maternal obesity management as a modern and discrete service. A message delivery platform, 96 motivational text messages and diaries were developed to enable goal setting for diet and physical activity behavior change and self-monitoring purposes. The verification process identified several areas for improvement. Participants felt that consultations went well, some text messages needed rewording, one message a day was ideal, and the diary layout and colours needed changing. A few minor software improvements were also identified.

Conclusion: The intensive engagement of service users and care providers through an iterative process has led to development of the MOMTech products for further evaluation. Amendments will be made, prior to piloting with pregnant women.

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T2:P.036

Using synchronous, distance-education technology to deliver a weight management intervention

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Introduction: Eat Smart, Move More, Weigh Less is an evidence-based, 15-week, adult weight management program. Weekly lessons inform, empower, and motivate participants to live mindfully as they make choices about eating and physical activity.

Methods: Synchronous, distance education technology is used to conduct weekly sessions for participants by a live instructor. Program effectiveness is indicated by changes in weight, Body Mass Index, waist circumference, blood pressure, eating and physical activity behaviors, and confidence in ability to eat healthy and be physically active.

Results: A total of 48 real-time, online Eat Smart, Move More, Weigh Less classes were conducted from January 2011 to August 2012 (n=469). Most participants were female (91%) with an average age of 49.3 years. Positive changes in BMI were observed with an increase in the number of participants with a BMI < 30 (42.5% to 51%). The average weight loss was 7.8 pounds. Number of participants with a normal blood pressure increased from 28.5% to 44%. Participants reported: being more mindful of what and how much they ate (94%), being more mindful of how much daily physical activity they got (89%), and eating fewer calories (88%).

Conclusion: This project demonstrates the feasibility of using synchronous distance technology to deliver a behavior change-based weight management program. Positive outcomes related to weight, blood pressure, and healthy eating and physical activity behaviors can be achieved with a real-time, online delivery. The project demonstrates the potential to increase the reach of weight management programs such as Eat Smart, Move More, Weigh Less.

T2:P.037

A randomised controlled trial to test the effectiveness of a brief intervention for weight management for obese adults in primary care

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Background: 25% of the UK's adult population is obese, however no NHS treatment service exists and GPs rarely discuss weight management with patients or support behaviour change. Evidence demonstrates the effectiveness of brief, opportunistic interventions by GPs for tobacco control and problem drinking. No trial has examined whether screening to identify overweight or obesity in adults and brief intervention are effective. Our RCT examines the effectiveness of a brief opportunistic intervention for weight management and the active engagement of GPs in supporting weight loss, in obese adults in primary care.

Methods: Patients (n=1824; BMI 30+, excess body fat, 18+ years) attending their GP for reasons other than weight management will be randomised to one of two interventions. The GP will either encourage weight loss to benefit health (advice-control) or offer referral to a commercial weight management service available in the NHS and a follow up review session one month later (assistance-intervention). Main out-

come will be weight change at one year. We will also record participants' and GPs' reactions to both interventions. Participants will be contacted at 3-months and 12-months to identify actions they've taken to manage their weight. Objective weight will be recorded at 12-months.

Results: We present the trial protocol and decisions made.

Discussion: Trial results could make the case for brief interventions for obese people consulting their GP and introduce widespread simple treatments akin to the NHS Stop Smoking Service. Likewise, the intervention could be introduced in the Quality and Outcomes Framework and influence practice worldwide.

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T2:P.038

Do your friends make you fat? The role of social networks in the development of obesity

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Introduction: There is increasing evidence to suggest that social networks influence general health and the risk of disease. Recent research indicates that overweight and obesity cluster in and spread through social networks, although the processes through which this occurs are not well understood. The aim of this study was to review the existing literature to understand the social processes through which social networks might influence the development of overweight/obesity.

Methods: A scoping literature review was undertaken to map the key concepts, methods and approaches used to understand the role of social networks in the development of overweight/obesity. A number of systematic review methods enhanced the rigour of the review: two reviewers were used and clear inclusion and exclusion criteria were applied post hoc, once the scope of the literature was known.

Results: Several explanations for the clustering of overweight/obesity emerged: shared exposure to 'contextual' influences (such as the availability of healthy foods among particular social groups), the tendency for people with similar body weight or dispositions to cluster together (homophily), and the spread of social norms through social networks. The findings suggest that body weight norms, eating habits and disposition towards physical activity might be influenced through processes of social comparison, social support or sense of belonging.

Conclusion: This study shed light on the social processes through which social networks influence the development of overweight/obesity. These findings provide opportunities for developing interventions that exploit such networks to prevent the spread of overweight/obesity.

T2:P.039

Evaluation of the sucrose addiction model

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Introduction: In recent years there has been extensive media coverage of the addictive potential of different types of food, particularly foods high in sugar. This "addiction" has also been blamed for contributing to increasing rates of obesity. The work presented here, based on the sucrose addiction model described by Avena *et al.* 2008, aims to investigate the addictive potential of a 10% sucrose solution via analysis of the central (brain) signalling pathways involved with drug-addiction and energy balance, and detailed characterisation of home cage activity and behaviour.

Methods: Male Sprague Dawley rats were provided with *ad lib.* water with 12 hour access to chow accompanied by 10% sucrose solution or additional water starting 4 hours after lights off for 4 weeks. On the last day of the study, sucrose/additional water and chow were withheld to create a period of withdrawal. Activity was monitored using infrared beams and behaviour scored manually. Brains were collected for *in situ*

hybridisation analysis of gene expression in the hypothalamus (energy balance centres) and nucleus accumbens (hedonic/reward centre).

Results: Despite consumption of high volumes of sucrose solution, compensation in chow intake resulted in a similar calorie intake to rats provided with water alone; this resulted in both groups of rats having a similar body weight. Behaviour and activity patterns appeared to be similar in all groups.

Conclusion: Further investigation is required to better understand the environmental conditions and experimental paradigms under which behaviours indicative of sucrose addiction are expressed in this rodent model.

1. Conflict of Interest: None

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T2:P.040

Promoting the Consumption of Fruits and Vegetables Leads to Weight Reduction in Apparently Healthy People

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Introduction: Lately much concern has been given to preventing weight gain which occurs during adulthood. Aim of the present study was to explore the effect of a telephone-based intervention promoting fruit and vegetable consumption on body weight of apparently healthy adults.

Methods: Forty three apparently healthy adults (44% men, mean age: 27±5.8 yrs, BMI range 18.0-29.4 kg/m²), were randomized to a Control (n=21) or Telephone group (n=22). Telephone group received weekly dietary counseling through telephone, promoting fruit and vegetable consumption, until the end of the study. Control group received no other contact until the end of the study. Participants' dietary and socio-economic characteristics were assessed at baseline and at the end of the study, 2 months later.

Results: No significant differences were found at baseline between the two groups, except educational status (p=0.026). At the end of the intervention a difference in weight change was noted between the two groups (1.14 kg, 95% CI: 0.16-2.11 kg; p=0.023). In particular, the Telephone group lost weight (-0.60±1.8 kg), as opposed to the Control group who gained weight (0.54±1.3 kg). Further analysis revealed that within the "Telephone" group the weight loss was mainly noted between participants in the upper class of BMI normal range (≥24 kg/m², p=0.018), while participants with BMI<24 kg/m² maintained their weight (p=0.753)

Conclusion: Promoting the consumption of fruit and vegetables leads to a small weight reduction of adults being in the upper class of BMI normal range or overweight. More research is needed to explore long-term maintenance.

1. Conflict of Interest: None Disclosed

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T2:P.041

Prevalence and intention to change dietary and physical activity health risk behaviours in working Australian young adults

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Introduction: Prevalence, intention to change and co-occurrence of four behaviours in a working Australian adult population were investigated. The health risk behaviours (inadequate fruit and vegetables, excessive dietary fat, excessive sugary beverages and physical inactivity) were selected based on their potential to prevent obesity.

Methods: Participants aged 18–60 years and employed ≥ 7 hours per week, were recruited from one Australian university. Participants completed sociodemographic and stage-of-change questionnaires (classifying participants into precontemplation, contemplation, preparation, action or maintenance). Height and weight were also measured.

Results: In this sample (n=105), 73% were female, mean age was 33.8 years, mean BMI was 23.8 kg/m², 86% were in the highest socio-economic quintile and 73% had a university degree.

87% of participants consumed inadequate fruit and vegetables, 43% had excessive dietary fat, 42% had excessive sugary beverages and 29% were physically inactive. The proportions intending to change each behaviour were 57%, 25%, 18% and 24%, respectively. 66% exhibited two or more risk behaviours and 38% intended to change two or more risk behaviours. Fruit and vegetable intake and dietary fat were the most commonly paired risk behaviours (39%) and the pair most intended to change (19%). Being male or overweight/obese increased the likelihood of having multiple risk behaviours by 3.1 times (95% CI: 1.06-9.03) and 2.7 times (95% CI: 1.02-6.93), respectively.

Conclusion: Targeting two behaviours, in particular increasing fruit and vegetable intake and decreasing dietary fat consumption, may be most appropriate when designing health promotion programs for behaviour change in working populations.

T2:P.042

Improving parental recognition of unhealthy weight in their children

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Recognising child weight status and understanding the health consequences of child overweight is important if parents are to make appropriate lifestyle changes for their child. However, parents tend not to recognise overweight/obesity in their child; they report making comparisons with other children, using extreme cases as their reference point¹. Parents are more sensitive to visual cues such as skinfolds than body mass index² and are more likely to make changes if they perceive their child's weight as being a health problem³.

This study will develop a visual method to improve parents' ability to correctly assess their child's weight status and supporting information to increase their knowledge of the health consequences of childhood overweight. In *Stage 1*, 3D body scans were taken from 4-5 and 10-11 year olds to produce age- and gender-specific body image scales (BIS) which were further developed using qualitative work with parents in *Stage 2*. *Stage 3* was a feasibility study to inform *Stage 4*, a cluster randomised trial (CRT). The CRT will randomise schools and recruit parents to test whether the BIS and supporting information are effective in improving parental recognition of childhood overweight, understanding of its consequences and intention to take action. *Stage 5* will assess the impact of the BIS and supporting information on child weight status at 12 month follow-up.

References

- ¹Jones AR et al (2011). *Int J Obes*;35:953-62.
- ²Parkinson et al (2011). *Int J Obes*;35:210-516.
- ³Rhee et al (2005). *Pediatrics*;116:e94-101.

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T2:P.043

The Physical Activity and Nutrition Intervention (PANI) Tool

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Introduction: The PANI Tool is hosted on the Health Well website (www.thehealthwell.info/PANI). It is a web-based tool developed in response to a recognized need from policy makers and practitioners for more information about effective obesity prevention and management activities occurring across Ireland. It was developed in collaboration with the Public Health Agency (Northern Ireland) and the Health Service Executive (Republic of Ireland).

Methods: Details about the delivery, development, evaluation and perceived effectiveness of obesity-related interventions were collected through an online questionnaire. These details were then incorporated into a web interface, written in an open source content management system called Drupal, developed through a series of stakeholder workshops.

Results: The tool currently contains over 170 interventions.

Using the web interface involves three steps:

- 1) Users specify the type of intervention they are looking for: its target population, focus (prevention or management) and intended outcomes.
- 2) Users are then presented with details of relevant interventions alongside lists of related documents drawn from the Health Well website
- 3) Finally, using a number of interactive tools, users systematically appraise the relevant interventions and identify those that warrant further investigation.

The tool was launched in February 2012; in its first six months there were just under 2,500 sessions recorded.

Conclusion: Initial feedback is positive and confirmed the need for greater transparency about local interventions. A number of enhancements that will improve the web interface and ensure the database is kept up to date were identified.

T2:P.044

Factors influencing the continuous raise of obesity and diabetes prevalence in Albanian population during the last two decades

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Introduction: Obesity is a risk-factor for many preventable, highly prevalent, and potentially fatal chronic health conditions, including cardiovascular disease, diabetes, and some types of cancer. The aim of our study was to analyze different modifiable factors influencing obesity and type 2 Diabetes epidemics, and their contribution in the rapid increase of these diseases in Albania, during the last two decades.

Method: We analyzed the data published about Albania between 1990 and 2010, in different scientific reviews, through internet research for national or international sources about the nutrition state, population structure, lifestyle habits, and from various Diabetes screening campaign organized in Tirana, capital of Albania during 2006-2011.

Results: During the transition, overweight and obesity, and prevalence of undiagnosed Diabetes has more than doubled, with figures climbing even higher. The ageing population, urbanization, increased total calories intake and decreased physical activity are some of the factors that are already present in Albanian population, fueling the continuous raise of obesity and newly diagnosed type 2 Diabetes.

Conclusions: Clearly rapid and alarming changes in diet, sedentary behavior and population structure are occurring in Albanian population. Albania, as other developing countries is facing a rapid and continuous increase in obesity and type 2 Diabetes prevalence. Recent large-scale trials have demonstrated that lifestyle changes can reduce the incidence of type 2 Diabetes and the situation urges to start the implementation of similar prevention programs in Albania, in order to prevent the further increase and burden of obesity and type 2 Diabetes.

T2:P.045

Prevalence of Eating Disorders in Severe Obese Patients

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Introduction: Obesity rates have increased exponentially worldwide in the past thirty years for reasons that we do not entirely understand. Severely obese patients often show an eating disorder. The understanding of this clinical condition is very important in view of an appropriate therapeutic programme: nutritional/ bariatric surgery.

Methods: We evaluated 507 patients (176 M and 331 F), aged 18–59 years, with severe obesity (IMC ³ 40 Kg/m²). All patients had a full clinical and psychiatric assessment. Medical screening included routine hemato-biochemical and metabolic evaluation followed by a psychiatric assessment with a semi-structured interview and tests for psycho-diagnosis (BES, BIS-11, EDI-2, BUT, BDI, SF-36, STAI-Y).

Results Sample group was homogeneous for age, BMI, body composition, anthropometric measurements, fasting blood glucose, cholesterol, triglycerides. Psychiatric interview and psycho-diagnosis showed a prevalence of 7.29% for BED, 7.88% NES and 2.95% Bulimia.

Conclusion: About 20% of patients with severe obesity are affected by a compulsive Eating Disorder (NES, BED, Bulimia). This condition does not appear to directly affect metabolic parameters, but represents a therapeutic challenge. These severely obese patients may require psychotherapy for reducing Eating Disorders and become compliant to individualized obesity treatment.

T2:P.046

Increasing Physical Activity in Primary Schools in an English County

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Introduction: Lack of physical activity in primary school children is considered to be a major driver of the obesity epidemic. In an English county with slightly above average obesity levels, an intervention to increase physical activity in and outside school in 7 to 10 year olds placed facilitators in schools to help five schools to achieve this aim.

Methods: A pre and after design (baseline and post intervention) collects questionnaire data from children. Schools were selected to represent a range of areas in the county with a range of deprivation levels as measured by the index of multiple deprivation. Questionnaires ask about the type and intensity of activities children engage in and their attitudes towards physical activity. Children completed the internet survey in class at school. In addition qualitative data will be collected from children, teachers and facilitators. An opt-out consent procedure was used with parents and children.

Results: At baseline 419 children have taken part in the study. Mean age was 8 years (SD 0.95); 51% of the children were boys. The most popular physical activities were football, cycling, swimming and walking. Attitudes towards physical activity were generally positive.

Conclusion: The baseline data indicate that the pupils are active and have a positive attitude to physical activity. It will be interesting to see whether the facilitators' tailored interventions will improve on these baseline data.

T2:P.047

Obesity prevention with Face Aging Visualization by APRIL®

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Methods: Starting with a simple 2D digital photograph, APRIL® works by applying aging characteristics based on a statistical database of thousands of real people. This database refers to a patented technology developed at the Max-Planck-Institute in Germany which utilizes for its visualization a database with more than 3000 faces of different culture, gender, age and life style to calculate the individual aging process. With this also aging of uploaded images of children can be scientifically based visualized. In general face agings between 7 and 70 years of age and lifestyle effects when aging can be shown.

Results: APRIL® supports and initiates effective discussion with people to prevent increased BMI because the visualization of their face, showing aging, with and without obesity effects, is a very personal and exciting experience, and helps many people realize that gaining too much weight presents a huge risk factor of diseases.

Conclusion: APRIL® is used in independent studies worldwide but also at events in kiosk systems, using the APRIL® API web service, or online at AgeMe.com to educate and make people think of obesity risks.

T2:P.048

Examining behaviour change in morbidly obese people participating in a lifestyle modification programme using the Precede-Proceed modelJepsen R¹, Aadland E¹, Andersen JR^{1,3}, Natvig GK^{1,2}¹Sogn og Fjordane University College, Førde, Norway, ²University of Bergen, Bergen, Norway, ³Førde Hospital Trust, Førde, Norway

Introduction: Behaviour change in relation to diet and physical activity is difficult for morbidly obese people. Both individual and socio-environmental factors and structures are in play. It is a challenge to capture this complexity in study designs. The aim of the study was to examine if the Precede-Proceed model (Green & Kreuter, 2005) provides a useful framework for the examination of the behaviour change processes and their outcomes in morbidly obese subjects participating in a lifestyle modification programme.

Methods: 49 morbidly obese adults were followed for two years while they participated in a lifestyle modification programme in Western Norway. A broad and continuous data collection (socio-demographic and clinical data, diet, physical activity, aerobic fitness, quality of life, self-efficacy, social support, local environment etc) was performed to evaluate the processes and outcomes of behaviour change during and between a total of four residential periods.

Results: The Precede-Proceed model is a socio-ecological, theory-driven model allowing for a thorough, multi-levelled approach. The data were structured and analysed in accordance with the model and its theoretical foundation in order to understand more of the complexity of behaviour change related to the lifestyle modification programme.

Conclusion: The Precede-Proceed model provides a useful framework for the examining of the processes and outcomes of behaviour change in morbidly obese people participating in a lifestyle modification programme.

Reference

Green, L. W., & Kreuter, M. W. (2005). *Health program planning: an educational and ecological approach*. New York: McGraw-Hill.

1. Conflict of Interest: None disclosed

2. Funding: Research related to this abstract was funded by Sogn og Fjordane University College, Norway

T2:P.049

Behavioral factors of weight loss process: Effects of short-term psychotherapy programTyutjev RA^{1,2}, Smirnov SV¹, Bobrovskiy AV¹, Fokin VA²¹Doctor Bormental Weight Loss Centre, Tomsk, Russian Federation,²Siberian State Medical University, Tomsk, Russian Federation

Introduction: We have developed short-term CBT program with basic 4-day long course and additional group meetings weekly during one year period. The aim was to change eating behavior, to initiate and keep weight loss process, to decrease psychological and social consequences of obesity.

Methods: We have designed scale to describe 11 psychological and behavioral parameters: caloric restriction (800-1200 for females and 1000-1600 for males), split meals, selection of optional ration, determination of hunger and satiety; differentiation of hunger and appetite, expression of owner's emotions, motivation, providing non-food enjoyments, self-esteem, social support and assertiveness. 26 obese participants were randomized from 7 similar psychotherapeutic groups.

Results: Initial average weight was 97,46±20,42 kg, BMI 35,54±6,19. After 1 month average weight decreased to 91,96±19,02 kg with BMI 33,29±5,91 (p<0,01), after 3 month it was 85,97±17,99 kg and BMI 31,39±5,81 (p<0,01). Thus, we have found significant weight loss during first 3 month. We have found some significant correlations with weight, using Spearman correlation test (table 1).

Table 1.

Period	Parameter	Correlation
1 month	caloric restriction	0,34**
	non-food enjoyments	0,40*
3 month	caloric restriction	0,51*
	social support	0,35**

* p<0,05 ** p<0,1

Conclusion: Our method approved to be effective in 3-month period of weight loss. Significant factors were caloric restriction, providing of non-food enjoyments and social support. At the present time, further studies are being done to assess the effectiveness of the given approach over a longer period (one year).

1. Conflict of Interest: None Disclosed

2. Funding: No Funding

T2:P.050

Food Behavior and Eating Habits in School Children

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Objectives:

- Estimate the prevalence of overweight and obesity in our study population,
- Assess the nutritional status of children by studying their food behavior and eating habits.

Methodology: A study was conducted on a sample of 340 children (153 girls and 187 boys) aged 6 to 12 years old, enrolled in the commune of Constantine in 2011. Data included anthropometric measurements, dietary habits and socioeconomic status. The IOTF criteria were used to assess overweight and obesity. Statistics were performed using the software StatviewTM. The significance level was set at 0.05.

Results: The overall prevalence of overweight is 21.76%. That of obesity is 5%. A significant association was observed between obesity and female gender ($p = 0.007$). Overweight and obesity are more common in families of low socio-economic level (51.35%, 52.94%) compared to the average (12.16%, 23.53%) and the high level (33.78%, 17.65%). Most obese children do not have breakfast compared to children of normal weight (23.53 % vs 11.65 %, $p < 0.0001$). They are more likely to take their lunch twice a day (64.70 % vs 59.84 %, $p < 0.05$). Dinner is consumed by 97% of children at home. A percentage of 30.52% of normal weight children, 27.03% overweight and 29.41% obese children eat their meals in front of the television. Carbonated soft drinks are taken by 15.59% of children more than five times a week.

Conclusion: Our study reveals the existence of behaviors associated with an increased risk of overweight and obesity, including unhealthy eating habits and low socioeconomic status.

T2:P.051

Recovered Obese Patients' Motivation Towards Healthy Eating and Physical Activity from an Interdisciplinary and Complete Motivational Therapeutics

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Introduction: Recovered Obese Patients' Motivation towards Healthy Eating and Physical Activity from an Interdisciplinary and Complete Motivational Therapeutics Self-Determination Theory (SDT) (Deci and Ryan) explains how different stimulæ influence motivation. The internalization of motivation helps the individual to keep learnt habits. From an interdisciplinary and therapeutic view to treat obesity where the aim is to develop self-determination habits; our objective is to analyze the motivation tendency on patient undergoing maintenance treatments, varying from non-motivation, external motivation, introjected, integrated, intrinsic or self-determined motivation as regards healthy habits.

Method: Cross section analysis in November 2012. The scale BREQ-3 valid in English and Spanish was used to measure the level of motivation referring to physical activity and similar for eating habits. The results of this scale were summarized together with the RAI (Relative Autonomy Index) where the minimum value is -24 and the maximum value is +24. Quantitative data of average interquartile rank and categorical data with percentual rates were described. The Microsoft Access Windows 2007 program was also used for the analysis.

Results: 49 people were included in 98 surveys. Answer rates: total = 81/98 = 82.6%; physical activity = 40/49 = 81.6% and healthy eating = 42/49 = 85.7%. The average age was 48.9 (SD 11.3) 71, 4% were women. The average lost care kilos were 84.2%. The average RIA related to physical activity 12.89 (SD 7.01) and healthy eating 12 (SD 5.20)

Conclusion: The RIA significantly leads to self-determination in both aspects.

T2:P.51A

Development of HAPPY (Healthy and Active Parenting Programme for the early Years) an intervention to prevent childhood obesity: a theory-based approach

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Introduction: Interventions that make extensive use of theory tend to have larger effects on behaviour. The Intervention Mapping (IM) framework (Bartholomew, 2001) incorporates theory into intervention design, implementation and evaluation, and was applied to the development of a community-based early obesity prevention intervention for a multi-ethnic population.

Methods: IM was applied as follows: 1) Needs assessment of parents, wider community and practitioners; consideration of evidence-base, policy and practice; 2) Identification of outcomes and change objectives following identification of barriers to behaviour change mapped alongside psychological determinants e.g. knowledge, self-efficacy, beliefs 3) Selection of theory-based methods and practical strategies to address barriers to behaviour change e.g. strategies for responsive feeding; 4) Design of the intervention by developing evidence-based interactive activities and resources e.g. visual aids to show babies stomach size. The activities were integrated into an existing parenting programme 5) Adoption and implementation: parenting practitioners were trained by healthcare professionals to deliver within Children Centres.

Results: HAPPY is aimed at pregnant women (BMI > 25); consists of 12 x 2.5 hr. sessions (6 ante-natal from 24 weeks; 6 postnatal upto 9 months and addresses 1) mother's diet and physical activity 2) breast or bottle feeding 3) infant diet and parental feeding practices 4) infant physical activity 5) parenting practices: parenting styles and skills.

Conclusion: The theory-based, pragmatic, and culturally-relevant intervention is currently being evaluated by a feasibility trial.

Reference

Bartholomew LK, Parcel GS, Kok G, Gottlieb NH. Intervention mapping: designing theory and evidence based health promotion programs. MountainView, CA: Mayfield; 2001

1. **Conflict of Interest:** None

2. **Funding:** DH; NIHR Programme Grant.

T2:PS3 - Dietary Patterns

T2:P.052

Participants in a commercial online weight loss program can improve diet quality during weight loss: A randomized controlled trial

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Introduction: Higher diet quality is associated with less weight gain in cohort studies. However, limited research has examined diet quality within weight loss interventions. The aim was to compare changes in diet quality in overweight adults participating in a commercial web-based weight loss program and whether an association exists between diet quality and degree of weight loss.

Methods: Overweight (BMI 25-40kg/m²) adults (18-60 years) were recruited from the Hunter Region, NSW, Australia. Participants were randomized to three groups: a standard weight loss program (Basic [n=94]), an enhanced version that provided additional personalized e-feedback and reminders (Enhanced [n=98]), or a wait-list control group (Control [n=97]). Diet quality was calculated using the Australian Recommended Food Score (ARFS) using dietary data from the Australian Eating Survey food frequency questionnaire (FFQ) at baseline and 12-weeks (n=289).

Results: The mean change in ARFS in the enhanced group (2.2±5.7) was significantly higher ($P=0.032$) than the control group (0.1±6.6). There were no significant differences between the enhanced and basic ($P=0.056$), or basic and control groups ($P=0.98$). The ARFS, fruit, meat, grain, dairy and water scores at 12-weeks were significantly associated with greater percentage weight loss ($r=0.13-0.22$, $P=0.035 - <0.001$).

Conclusion: Improvements in diet quality within a commercial weight control program were associated with greater weight loss. Future research could examine whether using brief tools to assess diet quality could reduce the burden of reporting diet in weight loss trials.

1. **Conflict of Interest:** CEC was a consultant to SP-Health.

2. **Funding:** Australian Research Council Linkage Grant.

T2:P.053

Sources of energy and nutrients in the diets of Polish obese children aged 13-36 months – a nation-wide study

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Introduction: During the last decade we have observed a significant increase of obesity prevalence among children in Poland.

Aim: Analysis of the diets of obese children aged 1-3 years compared to nutritional recommendations.

Methodology: 52 obese children (BMI z-score \geq 2SD) were selected from a representative nation-wide sample of 400 children aged 13-36 months. Their nutritional status was assessed using anthropometric data (body weight, height, BMI, BMI z-score). Energy and nutritional value of children diet was calculated with Dieta5.0 programme based on 3-day diet record. The selection of food was compared to the model food ration. The main nutritional sources of energy and nutrients were determined.

Results: The diets of obese children differed from current recommendations. The intake of bread, cereals, meat and juices was higher than recommended (120-150%). The children ate less vegetables and fruit, milk and fermented milk beverages than recommended in model food rations (50-70%). The main sources of energy were: bread and potatoes, main sources of protein – meat products and dairy products. Vitamins B, vitamin D, calcium were provided mainly by commercial foods for toddlers. The share of energy from sucrose was high (14% vs. 10% of recommended). The sources of sugar included dairy desserts, juices and baby cereals.

Conclusions: Food selection in toddlers' diets differed from the guidelines and may result in overweight. It is necessary to monitor obese children's diets in terms of excessive intake of sugar.

T2:P.054

Dietary habits and physical activity in 12-15 year old adolescents in Dubai; United Arab Emirates (UAE)

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Introduction: The Global School Health Survey 2010 reported that 40% of pupils aged 12-15 years are overweight or obese; double what was reported in 2005. Following such concerns the government introduced mandatory school health education sessions to students, and produced strict guidelines on school food and drink provision (September 2011). The aim of this survey was to obtain information about adolescents' dietary and activity habits, and their association with the increased prevalence of obesity.

Methods: A cross-sectional study of 1,022 students (539 boys; 483 girls) aged 12-15 years, from 17 government schools in Dubai, UAE. Dietary practices and physical activity was collected using a short self-completed questionnaire.

Results: 16% of pupils reported they never ate breakfast. 72% of pupils never brought food from home; the most popular food bought at school were sandwiches and juice followed by chocolate and chips. 12% and 31% of pupils respectively reported that they daily consumed fast food items and sugar sweetened or energy drinks. 30% of pupils reported drinking milk every day, and 24% consumed fruits three or more days a week. 37% of pupils reported exercising or playing sport daily, whereas 60% reported they daily watch more than 2 hours of TV.

Conclusion: Despite the recent changes in school policies, pupils are still failing to eat a healthy diet and engage in physical activity. There needs to be further interventions promoting changes in lifestyle amongst adolescents, and enhancing provision of healthy food in schools to be more appealing to students.

1. **Conflict of Interest:** None Disclosed.

2. **Funding:** Research relating to this abstract was funded by a research grant from Zayed University, United Arab Emirates.

T2:P.055

Mediterranean dietary pattern is inversely associated to inflammation in young people: The ATTICA study

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Aim: To investigate whether people's different dietary habits are associated with inflammation.

Methodology: The sample consisted of 1608 young men and women (aged <45) and we measured indicative markers of chronic systemic inflammation: fibrinogen, homocysteine, CRP, IL-6 and TNF- α . We used the EPIC questionnaire to assess dietary habits, and we calculated the weekly portion consumption of various food groups. Furthermore, we measured alcohol consumption in glasses per day. Finally, we estimated the Mediterranean dietary score, which included 11 main ingredients of the Mediterranean diet. The aim of this indicator is to estimate the adherence to the Mediterranean diet, since it was suggested that it is preferable to assess total dietary habits than study nutritional ingredients separately. A value higher than the suggested indicator shows wider adherence to this pattern, while a lower value shows adoption of a diet closer to a western pattern.

Results: We found that higher adherence to the Mediterranean diet is inversely associated with CRP, IL-6, and TNF- α ($B \pm$ standard error: -0.442, \pm 0.161, $p < 0.01$, -0.045 \pm 0.023, $p = 0.054$ and -0.493 \pm 0.246, $p < 0.05$, respectively) after adjusting for probable confounding factors. Fibrinogen and homocysteine did not present any correlation to this indicator.

Conclusion: The greater the adherence to the Mediterranean diet, the better protection of the organism against inflammatory processes in young people.

T2:P.056

Eating frequency according to body mass index categories in Portuguese adults

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Introduction: This study aimed to analyze the association between the number of daily meals and snacks and BMI categories.

Methods: The sample included all subjects in the fourth Portuguese Health Survey older than 19 years (15463 men and 17181 women). Interviewers obtained information on sociodemographic, health and anthropometric characteristics, and daily number of meals and snacks. Multinomial logistic regression models (crude and adjusted for confounders namely proxy reporting information, gender, age, education, income, smoking status, and physical activity) were fitted to estimate the association between eating episodes and BMI categories (underweight < 18.5 kg/m², 18.5 kg/m² \leq normal weight < 25.0 kg/m², 25.0 kg/m² \leq overweight < 30.0 kg/m², and obese \geq 30.0 kg/m²).

Results: After adjustment for confounders, subjects who eat at least one daily snack are less likely to be underweight and overweight (underweight: 1 snack: OR = 0.697, 95% CI: 0.679-0.716; 2 snacks: OR = 0.531, 95% CI: 0.513-0.549; 3 or more snacks: OR=0.332, 95%CI: 0.313-0.352; overweight: 1 snack: OR = 0.980, 95% CI: 0.972-0.988; 2 snacks: OR = 0.989, 95% CI: 0.980-0.998; 3 or more snacks: OR=0.692, 95%CI: 0.682-0.703) but only those who eat 2 or more snacks are less likely to be obese (2 snacks: OR = 0.908, 95% CI: 0.896-0.919; 3 or more snacks: OR=0.917, 95%CI: 0.900-0.935) compared with those who do not eat any daily snack.

Conclusion: A higher number of daily snacks decreased the risk of being underweight, overweight and obese.

T2:P.057

Dietary patterns in the elderly: Influence of early life social circumstances and area of residence

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Introduction: Few studies have examined diet quality in the elderly in Great Britain. We examined the influence of area of residence and early life social circumstances on dietary patterns among older British men.

Methods: Cross-sectional study of 4252 men (60–79 years) from the British Regional Heart Study. Food frequency questionnaire data were used to examine daily fruit/vegetable consumption and to generate two dietary scores – the Healthy Diet Index (HDI) and the Elderly Dietary Index (EDI), with higher scores indicating greater compliance with dietary recommendations. Linear and logistic regression analyses assessed associations of adult and childhood social class (based on father's occupation) and area of residence with dietary patterns.

Results: Men with non-manual childhood social class had higher EDI scores (adjusted mean difference=0.54, $p<0.001$) and were slightly more likely to consume fruit and vegetables daily (OR=1.22, 95% CI: 0.98–1.51), independent of adult social class. Men with non-manual adult social class also had higher EDI scores (adjusted mean difference=1.30, $p<0.001$) and were much more likely to consume fruit and vegetables daily (OR=1.56, 95% CI: 1.26–1.93), independent of childhood social class. HDI score was not associated with childhood or adult social class. Region of birth and region of residence were related to daily fruit and vegetable consumption and both HDI/EDI scores, with the highest consumption/scores seen in the Southern region and the lowest in Scotland.

Conclusion: Dietary patterns in the elderly are influenced by area of residence and social class, with adult social class appearing dominant over early life social class in determining dietary patterns.

1. Conflict of Interest: None declared.

2. Funding: The British Regional Heart Study is a British Heart Foundation Research Group. JL Atkins is funded by a PhD studentship by the National Institute of Health Research School for Primary Care Research.

T2:P.058

How well do Slimming World members' food choices meet current healthy eating recommendations?

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Introduction: This study investigated how Slimming World (SW) members' food choices compared with UK 'EatWell Plate'¹ healthy eating guidelines and acceptability of SW's eating plan.

Methods: 2695 SW group members completed a web-based questionnaire to investigate dietary habits and intake using the validated Leeds University Short Form Food Frequency Questionnaire. Acceptability of the plan (ease of use, sustainability, lifestyle fit, cost) were assessed using 5-point Likert scales. Data was independently analysed by Leeds Metropolitan University.

Results: BMI significantly decreased while following the plan (mean change -1.5 kg/m² at 2-months; -5.2 kg/m² at 13-months ($p=0.000$)). Since following the plan, 94% of members said they now had a healthier diet. Reported intakes met EatWell Plate recommendations for high-fat/sugar foods, fruit and vegetables. Participants reported consuming red meat 2–3 times/week and processed meat rarely or never. 51.9% reported eating oily fish at least once a week. 53.5% reported eating dairy foods 1–2 times/day and 89% reported choosing semi/skimmed milk. The most commonly reported snack food was fruit (87.3%). 79.8% reported the plan easy to follow and 71.4% reported it easy to sustain over time. Only 18.7% reported it difficult when eating out. Over 60% reported spending the same or less money on food since following the plan.

Conclusion: A food frequency questionnaire allowed a large-scale assessment of dietary habits. These findings indicate that SW members are choosing a diet that fits well with EatWell plate recommendations while losing weight and thereby making sustainable healthy choices.

Reference

¹Foods Standards Agency. The Eatwell Plate. Available from: <http://www.food.gov.uk/multimedia/pdfs/publication/eatwellplate0210.pdf>

T2:P.059

Workplace stress and eating behaviour: Influence of health promotion?

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Introduction: Stress can influence food choice, and feeding behaviour, with high levels of stress associated with increased saturated fat consumption and decreased overall calorie intake [1]. A relationship between stress and eating behaviour has been observed with eating behaviour identified as susceptible to change due to stress both indirectly and also as an emotion coping strategy [1,2]. We were interested if the workplace Healthy Working Lives (HWL, www.healthyworkinglives.com) health promotion initiative influenced nutritional intake of workers in the public sector.

Methods: 150 participants (109 female, 41 male) were recruited from educational establishments with HWL promotion and 84 participants (58 female, 26 male) with no HWL promotion. Both are public sector teaching/educational establishments, in the North East of Scotland, UK. Participants completed a 7d weighed intake diary. Hourly VAS recorded temporal changes in stress (during waking hours). An end of day questionnaire recorded daily stress detailing type of hassle, time and perceived stress.

Results: On average, the workplaces with HWL had a lower proportion of overweight and obese workers, than the workplace without (27 and 11 % Vs 45 and 15 %, respectively, $P<0.05$). The food diary data revealed that both workplaces had a similar nutritional profile, for energy intake (KJ), snack intake (KJ), fat intake (33% of calories), alcohol intake (4% of calories). On average, VAS and daily hassles were also similar.

Conclusion: Data collection is on-going to equalise subject numbers to confirm trends.

References

Wardle J et al. *J Psychosom Res* 2000;48:195–202.
Raspopow et al. *Horm Behav* 2010;58:677–684.

1. Conflict of Interest: AMJ holds commercially funded grants and has acted as a consultant within the food industry sector.

2. Funding: The authors are funded by the European Community's 7th Framework Programme under grant agreement 245009 (NeuroFAST, www.neurofast.eu) and the Scottish Government.

T2:P.060

Personification dietary intake based on individual resting metabolic rate in adult obese patients

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Background: To estimate adequacy of dietary intake based on individual resting metabolic rate in adult obese patients.

Methods: During research the selection consisting of 56 people with various degrees of an obesity aged from 19 till 65 years from which 14 males and 42 females was created. Examinees were on hospitalization in unit within 14 days and were parted on two groups: the first group consisted of 30 people (9 males and 21 females), the second group

consisted of 26 people (5 males and 21 females). The first group received isocaloric diet: 1997±63 kcal/days at average values of RMR 2091 ± 100 kcal/days, the second group received hypocaloric diet: 1580 kcal/days at average values of RMR 2067±87 kcal/days. The assessment of individual level of a power exchange was carried out when entering on the device Fitmate Med.

We measured body composition by "ABC-01 Medass" where levels of mass of a body, lean, active cellular, fat mass and the general liquid were estimated when entering and at an extract.

Results: Body fat mass decreased significantly in the first group: 2,77±0,28 kg against 1,97±0,24 kg ($p < 0,05$). Statistical analysis revealed no significant changes of body mass (4,37±0,41 kg against 4,32±0,29 kg), lean mass (1,56±0,34 kg against 2,07±0,30 kg), active cellular mass (0,97±0,20 kg against 0,83±0,18 kg) between the groups.

Conclusions: This study showed that the accounting of individual resting metabolic rate is reasonable at personification dietary intake in adult obese patients. Isocaloric diet is preferable to a reduction in body weight mainly due to the fatty component, which improves the quality of the process of weight loss and prognosis.

T2:P.061

Low intake of vitamin B, C and poor quality of diet are associated with obesity-related sleep disorders in Finnish men

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Introduction: Quality of diet may influence sleep quality via affect levels of neurotransmitters. To test this hypothesis, we compared dietary intakes and energy yield nutrients in people with obesity-related sleep disorders to healthy counterparts.

Methods: One-hundred-seventy Finnish men recruited for a sleep study ISRCTN77172005. Of them, 28 diagnosed apnea (52.2-year-old, 101±17kg, BMI=31); 50 insomnia (49.6-year-old, 96±14kg, BMI=30); 55 healthy overweight/obese without medications and diseases (HOB, 49.9-year-old, 88±8kg, BMI=28) and 37 healthy normal weight (HNW, 51.0-year-old, 75±5.9kg, BMI=23). Three-day food records were used to analysis foods consumptions and energy yield nutrients and were compared among the groups by ANOVA.

Results: All groups met Finnish recommendation of vitamins and minerals, but apnea and insomnia had lower intakes of B1 (12-17% and 19-25%, respectively), B2 (14-18% and 10-14%), B6 (9-22% and 10-23%), C (about 40% for all), potassium (8-10% and 9-11%) and calcium (12-17% and 8-14%) than HOB and HNW ($p<0.05-0.001$) but not B12. Fiber intakes were under recommendation in apnea (11.4±3.2g/1000kcal), insomnia (10.3±3.1g/1000kcal) and HOB (12.4±4.7g/1000kcal) groups and insomnia had lower intakes than HNW (12.5±3.5g/1000kcal, $p=0.006$) and HOB ($p=0.005$). Apnea and insomnia had lower folate and carbohydrate intakes under recommendation but exceeded total fats of recommendation compared to the healthy groups ($p<0.05-0.001$). These differences are largely due to that apnea and insomnia groups consumed more meat, butter and eggs but less potatoes, fruits and margarine than the HOB and HNW groups ($p<0.05-0.01$).

Conclusion: Low intakes of vitamin B1, B2 and B6 and poor quality of diet are associated with obesity-related sleep disorders.

T2:P.062

Self-critical analysis of the lunch nutritional profile during the 11th International Congress on Obesity

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Introduction: The Lunch during a Congress on Obesity should reflect some of the characteristic given to the population in order to meet the nutritional requirements, avoid excessive intake of nutrients linked to the development of diseases and obesity.

Methods: During the last International Congress on Obesity were served 4 congress lunches that included one sandwich, one yogurt, one chocolate bar, one fruit. A meal has been considered: a sandwich made with soft whole bran sliced bread (48 g), cheese (25 g), mayonnaise (8 g), ham (28 g) and some lettuce (8 g); a raspberry yogurt (125 g), a bounty chocolate bar (57 g) and an orange (170 g).

Results: Considering the key nutrients identified for the development of Guideline Daily Amounts the nutritional value of the meal is: energy: 767 kcal (38% of the daily intake); Sugars: 59,5 g (66%); Fats: 38,4 g (55%); saturated fats 20,3 g (101%); Sodium 0,9 g (38%); Fiber 7,5 g (30%), added sugars 39,5 g (79%). The energy density of the lunch is 1,63 kcal/g.

Conclusion: The energy content of the meal is adequate but being high in fat and sugars the energy density is high and according to WHO the consumption of high energy dense foods is correlated to obesity; notably saturated fats in this single meal exceed the daily limit. We should learn from this analysis how difficult could be for common people to eat healthy diets and we should improve the nutritional profile of the congress lunch.

1. **Conflict of Interest:** None Disclosed

2. **Funding:** No Funding

T2:P.063

Comparison of Day-long Fasting and Low CH diet according to GH/IGF-1 axis and Insulin Resistance in Obese Subjects. An Eighteen Months Follow-up

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Introduction: Nutritional habits, sleeping pattern and meal frequency are known to have impact on human health. In Ramadan, some Muslims fast during the day-light hours for a month providing us a unique model of intermittent fasting(IF) in humans. In the present study, we have investigated the effects of IF versus low carbohydrate diet(LCD) on obese subjects.

Methods: 23female subjects (BMI 29-37,aged 28-42years) were followed for 18 months. Their daily diets were aligned as LCD. During IF, there was no daily calorie restriction.Nutritional pattern was changed as 1 meal in the evening and a late supper 1 hour before sleeping.Blood glucose, insulin, TSH,GH, HbA1c, IGF-1, Homa-IR and urinary acetate levels were monitored.

Results: While subjects lost 1950±372g in a month during the follow-up, in IF period, weight loss was decreased to 975±212g. As the BMI decreased, glucose, insulin and Homa-IR levels decreased.TSH levels decreased, with decreasing BMI in all patients. GH levels were at baseline at the begining, increased in the first three months, stayed steady during the follow-up and IF period, while IGF-I increased gradually during the follow-up and made a 1.82 fold peak at the 21st day of fasting period and stayed at those levels for two months.

Conclusion:Our preliminary results suggest that, day-long fasting model can not be a weight loss programme but can be thought as a detoxification/regeneration process as glycogen stores are regenerated everyday. Changes in the IF period, may be due to omitting at least two meals when the body is metabolically active and circulating ketones.

T2:P.064

Development and validity of a questionnaire to test the knowledge of primary care personnel regarding nutrition in obese adolescents

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Introduction: The obesity is considered a serious public health issue. In order to increase knowledge concerning the capabilities of health care professionals in caring for obese adolescents and adopt more efficient preventive and control practices for this morbidity, a questionnaire was developed and validated to assess non-dietitian health professionals on their Knowledge of Nutrition in Obese Adolescents.

Methods: The questionnaire was developed in five phases: 1) definition of the seven dimensions considered; 2) development of 6 questions within each dimension and preliminary evaluation of the questionnaire by experts; 3) measurement of criteria by testing the questions on 35 dietitians and 265 non-dietitian primary care practitioners; 4) reliability assessment by question exclusion based on item difficulty, item discrimination, internal consistency and reproducibility index determination; and 5) scoring the completed questionnaires.

Results: Dietitians obtained a higher number of correct answers than non-dietitians (Mann-Whitney U test, $P < 0.05$), confirming the validity of the questionnaire criterion. Item discrimination was performed by correlating the score for each item with the total score, using a minimum of 0.2 as a cutoff value for the correlation coefficient. Item difficulty was controlled by excluding questions answered correctly by more than 90% of non-dietitians, or less than 10% of dietitians. The final questionnaire maintained 26 of the original 42 questions, increasing Cronbach's α value from 0.788 to 0.807. Test-retest agreement between respondents was classified as good to very good (Kappa test, > 0.60).

Conclusion: The questionnaire developed for primary care practitioners is valid, consistent and suitable for application over time.

1. Conflict of Interest: The authors declare that they have no competing interests.

2. Funding: Research relating to this abstract was funded by Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES).

T2:P.065

Effect of Short-Term High-Omega-3 Feeding on Meal Pattern

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Introduction: Saturated fatty acids (SFAs) induce obesity, characterised by metabolic dysfunction and altered feeding behaviour. Nutraceutical intervention, including consumption of polyunsaturated fatty acids, and, specifically, omega-3 FAs, may offer a promising treatment. Omega-3s attenuate weight gain by enhancing satiety, but their meal pattern signature is unknown. We hypothesised that it would differ from that of SFAs and reflect any metabolic improvement.

Methods: For three weeks, male Wistar rats were fed isoenergetic high-fat diets, providing 40% of energy as fat from SFAs (coconut oil) or omega-3s (Incomomega™, Croda; $n=6$ /group). Control rats were fed a diet providing 10% of energy as fat (mainly soybean oil). Body weight and plasma triglyceride concentrations were measured weekly, and 24-hour meal patterns recorded on the final day by automated cages (LabMaster™, TSE Systems). Fat pads were weighed at termination.

Results: Despite similarly increased cumulative energy intake in both high-fat groups (both $p < 0.01$ vs. control), weight gain, adiposity and triglycerides were reduced by omega-3 feeding (-31%, -37% and -65%, respectively; all $p < 0.01$ vs. control). However, this improvement was not underpinned by enhanced satiety ($p > 0.05$ vs. control and high-SFA), despite reduced nocturnal meal number (-33%, $p < 0.01$ vs. control). This may have been offset by reduced feeding rate ($p < 0.01$ vs. control).

Diurnal satiety was reduced by high-SFA feeding, as expected ($p < 0.01$ vs. control).

Conclusions: Long-term exposure (> 3 weeks) may be required for the emergence of a characteristic meal pattern in the rat model which supports the metabolic improvement observed with omega-3 FA intake.

1. Conflict of Interest: None

2. Funding: BBSRC Capacity Building Award in Integrative Mammalian Biology

T2:P.066

Diet compositions of a multiethnic, post-bariatric surgery population

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Introduction: The obesity epidemic affects the world's population without discrimination for age or ethnicity. Little is known about the inter-ethnic differences in post-bariatric surgery patients especially their dietary intakes.

Methods: In this retrospective study, patients who have undergone metabolic bariatric surgery (MBS) between the periods of September 2008 to September 2011 were included. The assessment period was 3 and 6 months post-operatively where dietitian-administered diet recalls were obtained. Outcomes measured were excess weight loss (% EWL) and macronutrient compositions among the ethnic groups.

Results: A total of 61 patients from Chinese, Malay and Indian ethnicities were included. Pre-operative BMI (kg/m^2) was 43.7 ± 8.7 . Eight patients underwent the gastric bypass (RYGB), 9 had the mini-bypass and 44 underwent the laparoscopic sleeve gastrectomy. The Chinese lost the most weight at 3 months with 40.3% EWL and had more patients meeting the recommended protein requirements of $\geq 60\text{g/day}$. Overall, the average total caloric intake was 36.5% contributed by protein, 42.4% by carbohydrates and 32.4% by fat. At 6 months, Indians lost the most weight (56.2% EWL) although the difference between ethnicities was insignificant. Overall, the average, total daily calories were made up of 23.3% protein, 47.1% carbohydrates and 30.3% fat. There were no significant differences in these intakes between ethnicities. Significance for carbohydrate intakes between 3 and 6 months was detected ($p < 0.05$).

Conclusion: The reason for variances in MBS outcomes among ethnic groups are complex. Understanding dietary and lifestyle patterns can help us further tailor interventions. Additionally, MBS patients should be reviewed regularly to prevent malnutrition.

1. Conflict of Interest: None disclosed

2. Funding: No funding

T2:P.067

Body Dissatisfaction and Eating Attitudes in Normal Weight and Overweight Adolescents

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Introduction: There is evidence that men as well as women are willing to adhere to hard to reach body ideals, which would be translated into unhealthy behaviours to lose weight. The purpose of this study was to investigate if there are differences in body dissatisfaction and in eating attitudes among individuals who are normal weight and those who are overweight.

Method: Participated 120 men and women with ages ranging between 15 and 19 years old ($M = 16.8$; $SD = 1.1$); 60 of them were normal weight and 60 overweight. We used the Collins' body-figures continuum and the Eating Attitudes Test (EAT-40).

Results: Overweight individuals showed more body dissatisfaction than the normal weight ones ($t(85.2) = 4.117$, $p < .01$; 84.7% of the overweight individuals chose as ideal a slimmer figure than the one they chose as real, but not extremely slim. In both groups, body dissatisfaction was related to motivation to lose weight, however, while body dissatisfaction amongst normal weight individuals was significantly

associated to vomit induction and use of laxatives, that was not the case for the overweight ones, exhibiting even a higher level of motivation to lose weight than their normal weight counterparts ($t(118) = -2.449$, $p = .014$).

Conclusion: The body ideal chosen by overweight individuals is very similar to a normal weight shape, and it might constitute a realistic goal to aim when trying to lose weight. Such result is linked to the one about the avoidance of unhealthy compensatory behaviours.

T2:P.068

Influence of Dietary Habits on Body Weight in Qatari School Children

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Introduction: The state of Qatar has undergone a rapid nutrition transition, and this is suggested to be secondary to the rapid change noted in fertility to urbanization. This transition has led to a considerable imbalance in food consumption with low nutrient density characterizing the diet and over-consumption evident among more than a third of households.

Methods: Study was conducted on a sample from Qatari school children. A representative sample (1500 children) were selected between the ages of 6-12 from 23 schools using multistage cluster random sample, while 200 cases from each age group were targeted as primary sampling unit. Information on eating habits and knowledge concerning nutrition were obtained by utilizing a standardized self-administered questionnaire

Results: More than one third of the sample (38.6%) has bad food habits and no significant differences were noticed between boys and girls. Consequently, girls have healthier food habits than boys (25.3% vs. 22.3% respectively). Generally, the studied children mean intake from fruits, vegetables and starchy foods were less than the international recommended number of servings per day for children. However, the majority of the boys and girls with bad food habits have unhealthy body weight compared with those who have healthy body weight (123 vs. 77 boys and 203 vs. 168 girls respectively).

Conclusion: Overweight considered a major health problem in school children. Unhealthy nutritional habits flourished among all levels of schoolchildren. There is a need for special educational interventions that target dietary and promote healthy eating life styles among children

T2:P.069

The effect of eating rate on postprandial hunger, satiety, glycaemic response and triglyceride levels in patients with type 2 diabetes

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Introduction: A fast eating rate has recently been associated with reduced satiety, increased body weight and insulin resistance. The present study compared the effect of different eating rates on hunger and fullness, as well as glucose, insulin and triglycerides in patients with type 2 diabetes.

Methods: Twenty-five diabetic patients on metformin (mean age 63.3 \pm 7.9) were recruited. A test meal of 300 ml ice cream (675 kcal) was consumed in random order on two different sessions by each subject: meal duration took either 5 or 30 min. Visual analogue scales (VAS) of the subjective feelings of hunger and fullness were completed at baseline and at 30-min intervals after meal termination, for 3 hours. Postprandial hunger and satiety were estimated as area under the curve (AUC). Serum levels of glucose, triglycerides and insulin were measured at the same time intervals.

Results: Mean diabetes duration was 5.3 \pm 3.1 years and BMI 29.1 \pm 1.1 kg/m². Hunger AUC was lower after the 30-min meal than after the 5-min meal (mean \pm SD AUC30 min meal: 24.1 \pm 8.2, AUC5 min meal: 26.4 \pm 8.6 mm, $P=0.018$) whereas fullness AUC was higher (mean \pm SD AUC30 min meal: 66.6 \pm 12.8, AUC5 min meal: 62.1 \pm 13.9 mm, $P=0.005$). Glucose and triglyceride levels were not different between sessions. Insulin levels were significantly higher 30 minutes after the 30-min meal than after the 5-min meal (35.7 \pm 26.4 vs 26.4 \pm 20.1 mIU/L, $p=0.03$)

Conclusions: Eating at a slower rate leads to increased satiety and decreased hunger in patients with type 2 diabetes.

1. Conflict of Interest: None disclosed

2. Funding: No funding

T2:P.070

Socioeconomic differences in purchases of more vs. less healthy foods and beverages: Analysis of 25,000 British households in 2010

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Introduction: Socioeconomic differences in diet-related outcomes including obesity are well-recognised, but are not fully explained by observational studies of self-reported consumption. We provide a novel analysis based on detailed purchasing data collected using barcode scanners to record take home food purchases.

Methods: Regression analyses of purchasing data for foods and beverages for 25,674 British households in 2010, compared by socioeconomic status (as measured by occupation), and reported (a) at a category-level as the proportion of energy purchased from each of 43 food and beverage categories (and combined into three groups by relative healthiness) and (b) at a nutrient-level as the proportion of grams/energy purchased. Participants' agreement or disagreement with the statement "My diet is very important to me" was used to measure attitudes.

Results: Higher SES groups purchased significantly more energy from healthier foods/beverages, while lower SES groups purchased significantly more energy from less healthy food/beverages. At the nutrient level, socioeconomic differences were less marked, although lower SES was associated with purchasing smaller proportions of fibre, protein and total sugars, and more sodium. Attitudes towards diet were strongly associated with SES with those in higher SES groups more likely to perceive their diet as important to them, but there was little evidence for a mediating effect of attitudes on the relationship between SES and food purchasing.

Conclusions: The observed pattern of purchasing of more vs. less healthy foods and beverages across SES groups highlights targets for intervention as well as further exploration.

1. Conflict of Interest: None disclosed

2. Funding: Research relating to this abstract was funded by the UK Department of Health Policy Research Programme as the Policy Research Unit in Behaviour and Health (PR-UN-0409-10109). The Department of Health had no role in the study design, data collection, analysis, or interpretation.

T2:P.071

Adolescent Dietary Intake: Weekday vs. Weekend

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Introduction: Although English secondary schools are legally required to meet food and nutrient-based standards, overall food intake is not restricted to that provided by schools. Recent Danish findings (Rothausen et al. 2012) highlight important differences in energy intake between weekday (school-dominated) and weekend (home-dominated) environment. Knowledge of such environmental influences on dietary

intake can help improve delivery of targeted interventions for weight control. The current study compared UK adolescent weekday and weekend dietary intake.

Methods: Participants (n=63; 54% boys) aged 13-14 years completed 7-day diet diaries. Nutritional adequacy of diet was assessed against Department of Health (1991) guidelines. Paired sample t-test assessed differences between nutritional intake for weekday (Monday-Friday) versus weekend (Saturday-Sunday) stratified by gender.

Results: No significant difference was reported for overall energy intake (weekday 1749±469; weekend 1807±592), although both genders' intake of saturated fat (+1%) and sugar (+10%) exceeded recommendations. Only boys reported a difference in weekday vs. weekend consumption of saturated fat (weekend: +16% p=.019), whereas only girls reported a difference in sugar (weekend: +20%, p=.023). Against recommended levels, boys under-consumed potassium, selenium throughout the week and deficits of iron, zinc and copper at weekends. Girls had low intakes of potassium, selenium iron and vitamin A in both environments.

Conclusion: Although there was no significant difference in energy intake, weekends recurrently demonstrated less healthy dietary consumption. The scale of these differences, especially in relation to fat and sugar, may have long-term implications that result in unwanted and unhealthy weight gain.

1. Conflict of Interest: None Disclosed

2. Funding: Research supporting this abstract was funded by the school as part of a Healthy lifestyle assessment.

T2:P.072

Excess body weight in Immigrant vs Portuguese children – prevalence and some determinants

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Introduction: In the last decades the levels of overweight and obesity have increased in children. Studies have shown that the estimate prevalence of childhood overweight in the Europe is 24%⁽¹⁾. The municipality of Barreiro belongs to the third district in Portugal with more immigrants' population (45.168)⁽²⁾, but the knowledge about immigrant eating practices and obesity determinants is unclear.

Methods: It was collected data for a random sample of 789 individuals of both sexes (aged 5 to 11 years, 49.2% of males and 50.8% female) in public schools in Barreiro. Data concerning socio-economic variables were obtained through a questionnaire applied to the children's person in charge. To assess the nutritional status, anthropometric data was collected. Initially it was made a descriptive and exploratory data analysis using SPSS 18.0 and Epitools. Relations between nutritional status and several independent variables were analyzed through chi-square tests, multinomial regression and log-linear models⁽³⁾.

Results: Prevalence, by sex with CI95% were: Excess body Weight (M-0.15 [0.11; 0.19] and F-0.22 [0.18; 0.27]), Obesity (M-0.15 [0.12; 0.20] and F-0.15 [0.12; 0.20]).

Conclusion: Prevalence of excess body weight and obesity are within the range of those described in other studies in Europe. Nutritional status is associated with soda consumption, particularly in females and Caucasian children as well as sleeping hours. Log linear models confirm some relation's between nationality, etnia, practicing sports and eating practices.

References

1. WHO (World Health Organization);
2. SEF (2011) Relatório De Imigração, Fronteiras e Asilo;
3. Agresti, A.(2002) *Categorical Data Analysis*. John Wiley & Sons, New Jersey.

T2:P.073

Body composition in patients with c obesity: Role of dietotherapy

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Objectives: To estimate the influence of hypocaloric diet on anthropometric parameters, body composition in patients with obesity.

Methods: 300 patients with obesity were examined. At the time of initial assessment body mass index (BMI) averaged 41.9±0.4 kg/m², waist circumference (OT) – 110.6±3.2 cm, hip circumference (OB) – 117.1±3.3 cm, the ratio of OT/OB – 0.95±0.9. All patients received a hypocaloric diet with energy value of 1500 kcal/day. Before and after 2 weeks of dietary intervention the dynamics of the indicators of body composition using bioimpedance analysis were investigated.

Results: Average body weight had decreased from an of 114.6±1.3 to 108.8±1.2 kg (p<0,001); BMI – from 41.9±0.4 to 39.6±0.4 kg/m² (p<0,001); the ratio OT/OB – 0.95±0.01 (p<0,01). Body fat had reduced from 55.5±0.8 to 51.4±0.8 kg (p<0,001). The content of total water had decreased from 43.5±0.5 to 42.2±0.51 (p<0,001). Decrease in body weight positively correlated with reduce of content of body fat mass (r=0.631, p<0.01).

Conclusions: The application of hypocaloric diet is accompanied with clinically significant decrease in body weight and fat mass in patients with abdominal obesity, thereby reducing the risk of obesity-associated diseases.

T2:P.074

Effects of a short-term hypocaloric diet on inflammation markers in overweight subjects

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Introduction: Low-grade inflammation is linked to metabolic syndrome and obesity. Studies have shown decreased concentrations of inflammatory markers with reduced energy intake. The aim of this study was to compare the effects of two short-term (10 days) hypocaloric diets on inflammation markers.

Methods: 38 overweight participants (16 women, 22 men), mean age 52.8 years, were randomized into two diet groups: a very low kcal diet group (VLCD; Ø 600 kcal/day), and a low kcal diet group (LCD; Ø 1200 kcal/day). The inflammation markers adiponectin, leptin, interleukin-6 (IL-6), tumor necrosis factor-α (TNF-α), C-reactive protein (CRP), and insulin sensitivity (HOMA-IR) were recorded at baseline and after 10 days of treatment.

Results: At 10 days, both groups showed a non-significant reduction in body weight (-2.8±1.5 kg) and percent body fat (-2.0±1.4%), while lean body mass did not change. No significant differences were seen in IL-6, TNF-α, and CRP. Plasma leptin fell significantly both in the entire and VLCD group (p=0.002), but not significantly in the LCD group. Plasma adiponectin concentrations decreased significantly in both groups when examined together (p=0.004). A significant reduction in the leptin/adiponectin ratio was observed in the VLCD group only (p=0.01). HOMA-IR did not change in both groups. A significant correlation was seen between body weight loss and leptin change in the VLCD group (r=0.592; p=0.005) and when examined both groups together (r=0.375; p=0.02).

Conclusion: A 10-day hypocaloric diet was sufficient to significantly reduce plasma leptin concentrations and the leptin/adiponectin ratio in overweight adults.

1. Conflict of Interest: None Disclosed

2. Funding: No Funding

T2:PS4 – Exercise, Activity and Inactivity

T2:P.075

Physical inactivity and muscle mitochondrial function in diabetes are associated with specific changes in plasma lipidome

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Introduction: Type 2 diabetes associates with decreased muscle mitochondrial content&function and changes in lipid composition, both of which might be related to physical inactivity, leading to obesity-related metabolic disease. We studied interrelations of physical activity, skeletal muscle mitochondrial content/function and plasma lipidome in middle-aged lean healthy (n=28; 23.2±2.2 kg.m⁻²), obese/overweight (n=29; 30.4±2.8 kg.m⁻²), prediabetic (n=24; 31.3±3.2 kg.m⁻²), and diabetic men (n=15; 31.4±3.9 kg.m⁻²).

Methods: Metabolic phenotyping included euglycemic hyperinsulinemic clamp (an assessment of insulin sensitivity), oral glucose tolerance test, MRI (adiposity and fat distribution) and ¹H-MRS (liver, muscle lipids). Physical activity was monitored with accelerometers and questionnaires. Samples of *vastus lateralis* were obtained by needle biopsy. Peroxisome proliferator activated receptor coactivator-1α (PGC1α) and mtDNA content were determined by qRT-PCR. Cytochrome C oxidase (COX) activity was measured by oximetry in permeabilised muscle fibers. Plasma lipidome was analyzed by mass spectrometry.

Results: Insulin sensitivity was positively associated with physical activity (r=0.520, p<0.0001, n=95), and PGC1α mRNA (r=0.375, p=0.0005, n=83), which were together with muscle COX and mtDNA decreased in diabetes (p<0.05). Plasma lysophosphatidylcholins (LPC) were decreased in obesity, prediabetes and diabetes (p<0.05) and positively associated with physical activity (polyunsaturated LPC r=0.348, p=0.001, n=86), muscle COX activity (saturated LPC r=0.261, p=0.037, n=64) and PGC1α mRNA (LPC19:0 r=0.550, p<0.0001, n=74; LPC22:4 r=0.488, p<0.0001, n=74).

Conclusion: Type 2 diabetes is accompanied by physical inactivity, specific changes in plasma lipidome and reduced muscle mitochondrial content & function. Interrelations of the three suggest physical inactivity might contribute to the pathogenesis of T2D also by regulating lipid composition.

T2:P.076

Exercise Effects on Serum Biomarkers of Angiogenesis

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Introduction: Physical activity (PA) is associated with decreased risk of several cancers, but the mechanisms are unestablished. PA may alter cancer risk via effects on insulin resistance; less explored potential mechanisms include angiogenesis, required for tumor growth promotion. PA may affect these biomarkers through changes in adiposity. We measured the effect of PA on serum concentrations of angiogenic markers: vascular endothelial growth factor (VEGF), osteopontin, pigment epithelium-derived factor (PEDF) and plasminogen activator inhibitor-1 (PAI-1).

Methods: We investigated these associations in postmenopausal sedentary, overweight/obese women (BMI 25–40 kg/m²), 50–75 years, in a randomized-controlled trial. Participants were randomized to a (1) moderate intensity aerobic exercise program (N=87), 45 minutes/day, 5 days/week, or (2) stretching control (N=86). Weight, height, and body-fat were measured at baseline and 12-months. VEGF, osteopontin, PEDF and PAI-1 were measured by immuno-assay.

Results: Exercisers completed a mean 176 (91) minutes/week of aerobic exercise; and lost an average of 1.3 kg vs. 0.1-kg weight-gain in controls (P = .01), and lost 8.5 g/cm² of intra-abdominal body fat vs. a gain (0.1 g/cm²) among controls (P = .045).

At 12-months, women randomized to exercise reduced PEDF (-3.7%) vs. controls (+3.0%) P=0.02; adjusted for BMI. There were no significant changes between intervention and control arms for PAI-1, VEGF or osteopontin. PEDF correlated significantly with insulin leptin estradiol, PAI-1, BMI and total fat mass (all P<0.0001) but not with osteopontin, VEGF, or IGF-1

Conclusions: 12-months of moderate intensity exercise produced a significant reduction in PEDF, a negative regulator of angiogenesis.

1. Conflict of Interest: None Disclosed

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T2:P.077

Men and women show similar reductions in fat mass after 12 weeks of supervised exercise

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Background: It is commonly believed that women experience less exercise-induced weight loss compared with men. Gender differences could be explained by compliance, energy expenditure (EE), or compensatory responses in energy intake (EI).

Purpose: To examine the impact of 12 weeks supervised and fixed EE aerobic exercise on body composition, appetite and food intake in men and women.

Methods: 107 obese men (n=35) and women (n=72) (BMI=31.4±4.2kg/m² and age= 40.9±9.2years), completed a 12 week supervised exercise program designed to increase EE by 2500kcal/wk. Portfolios of anthropometric, physiological and behavioural variables were measured at weeks 0 and 12. EI was measured objectively using a realistic test meal design in the laboratory.

Results: 12 weeks of exercise induced significant reductions in body mass (-3.03±3.4 and -2.28±3.1kg), fat mass (-3.14±3.7 and -3.01±3.0kg) and % body fat (-2.45±3.3 and -2.45±2.2%) in men and women respectively (all p<0.0001) but there were no significant differences for gender (p>0.05). There was a significant increase in fasting hunger after 12 weeks of exercise (11.0±21.1 and 14.0±22.9mm, p<0.0001) but no effect of gender (p>0.05). There was no significant change in total daily EI between week 0 and 12 (+47.6±578.5, and -31.5±459.3 kcal, p>0.05) in men and women respectively.

Conclusions: Men and women responded to the exercise intervention in a similar manner and achieved the same fat loss when the exercise was supervised and exercise EE was equivalent. Compensatory mediating processes in response to a mandatory exercise regime were similar in men and women.

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T2:P.078

Physical activity changes during weight loss treatments

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Introduction: Weight loss treatment and maintenance emphasises the need for physical activity. We evaluated the physical activity component of two weight loss programmes, either standard care (SC) as defined by national guidelines, or a commercial provider (CP; Weight Watchers) over the period of weight loss and then maintenance.

Methods: 772 adults (mean body mass index: $31.4 \pm 2.6 \text{ kg/m}^2$) were recruited by primary care practices in Australia, Germany and the UK and randomly assigned to 12 months SC, or the CP, and were followed up at 24 months. Change in physical activity levels were assessed by pedometer recordings and the International Physical Activity Questionnaire (IPAQ)-short form.

Results: There was a significant difference in weight loss between groups at 12 months (last observation carried forward analysis -5.06 kg for CP versus -2.25 kg for SC; $p < 0.0001$) and 24 months (-4.14 kg for CP versus -1.99 kg for SC; $p < 0.001$). Both groups reported increases in physical activity using the IPAQ from baseline to 12 months to 24 months (within groups $p < 0.0001$) and in pedometer steps from baseline to month 12 only (within groups $p < 0.0001$). However differences between groups with both methods of assessment were not significant.

Conclusion: Despite similar increases in reported activity there were significant differences in weight loss and regain between groups. This implies that these methods may lack the accuracy or precision to measure changes in physical activity during weight loss interventions.

1. Conflict of Interest: None

2. Funding: This study was investigator initiated but was funded by Weight Watchers International through a grant to the Medical Research Council (UK).

T2:P.079

Design and validation of a questionnaire focusing on sedentary occupations and active transports – reproducibility and validity study (ACTI-Cités project)

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Introduction: Measuring the different dimensions of physical activity (PA) is important to define strategies for PA promotion and obesity prevention. In this field, there is increasing interest for better assessment of sedentary occupations (SO) (time spent sitting) and active transport (AT) (walking, cycling) but few existing instruments appear relevant for this purpose. We assessed the properties of an adapted version of a validated PA questionnaire focusing on these domains.

Methods: An adapted version of the Recent Physical Activity Questionnaire (RPAQ, Besson *et al.*, Am J Clin Nutr 2010) included additional questions on various types of SO (television, computer, etc.) and AT (frequency and duration of trips). Cognitive testing was performed, and reproducibility (1-month test-retest) was assessed in 34 adult volunteers. In addition, for 60 subjects, questionnaire data were compared with data collected from both activity logbooks and movement counters (accelerometer Actigraph GT3X and GPS QStarz GQ1000eX) worn during 15 days. Intra-class correlation coefficients, linear regressions, and Bland-Altman graphs were used for data analysis.

Results: Cognitive testing showed a good level of understandability (score of 26.4/28 for variables of interest). Reproducibility was comparable to that of other PA questionnaires from the literature. Comparisons between answers to the questionnaire and objective measurements show promising results for both SO and AT (no significant difference, with $p > 0.26$ for all variables of interest).

Conclusion: The development of this adapted questionnaire will help in assessing specific dimensions of transport-related PA and SO that appear of major interest in public health policies toward tackling obesity.

1. Conflict of Interest: None

2. Funding: This work is part of the ACTI-Cités project funded by the French Institut National du Cancer (INCa, project n°2011-113).

T2:P.080

Effect of long-term different physical activity training on human LHCN-M2 myoblast differentiation

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Introduction: Contracting skeletal muscle releases different myokines that exert both local and endocrine positive metabolic effects (1). Besides, physical exercise seems to modulate skeletal muscle plasticity. The aim of this study was to evaluate whether different-type, long-term training might modulate myogenic differentiation using in vitro system.

Methods: Human LHCN-M2 myoblasts (2) were exposed for 4 days to culture medium supplemented with low concentration of serum from n. 5 aerobic (Swimmers) or n. 5 anaerobic (Body Builders) male subjects trained for long-term (mean 5 years). Myogenic differentiation was assessed by calculating the fusion index (FI) number and by evaluating expression levels of MyoD and Myogenin using phase contrast microscopy and western blotting, respectively.

Results: LHCN-M2 myoblasts treatment with aerobic sera induced about 1.2-fold increase in myotube formation (FI mean 72% vs 59%) to respect to anaerobic sera as well as increased ratio of myogenin/MyoD expression resulting of about 2-fold greater in cells treated with Swimmers to respect to Body Builders sera.

Conclusion: Long-term aerobic training seems to enhance skeletal muscle differentiation at greater extent to respect to anaerobic exercise.

References

1. Pedersen BK., 2011 Brain Behav. Immun.; 25:811;
2. Zhu CH. et al, 2007 Aging Cell. 6:515

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T2:P.081

Similar improvements in exercise capacity and cardio-metabolic risk following high intensity interval training (HIT) in individuals with a low and high BMI

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Introduction: HIT is a novel time-efficient exercise approach, but suggestions have been made that it may not be suitable for obese individuals with a limited exercise capacity. Here we compare improvements in exercise capacity and cardio-metabolic risk following 10 weeks of instructor-led group-based HIT in sedentary individuals with a high and low BMI.

Methods: 30 sedentary volunteers (11M, 19F, $40 \pm 2 \text{ y}$), separated into low (LO) and high (HI) BMI groups (24.4 ± 0.5 , $32.0 \pm 0.7 \text{ kg.m}^{-2}$, respectively; $P < 0.05$), undertook HIT ($\leq 25 \text{ min}$ per session, $3 \times \text{wk}^{-1}$) exercise classes. Improvements in exercise capacity ($\text{VO}_{2\text{max}}$), body composition (bioimpedance), insulin sensitivity (oral glucose tolerance test) and blood lipid profiles were measured as the relative change from baseline.

Results: Adherence to the HIT intervention was not different between the two groups (LO $87 \pm 2\%$, HI $82 \pm 4\%$; $P > 0.05$). Training induced small decreases in weight (LO $1 \pm 1\%$, HI $1 \pm 1\%$; $P < 0.05$) and relative fat mass (LO $3 \pm 2\%$, HI $2 \pm 2\%$; $P < 0.05$), while increasing $\text{VO}_{2\text{max}}$ (LO $11 \pm 2\%$, HI $9 \pm 2\%$; $P < 0.05$). Fasting insulin concentrations were reduced (LO $18 \pm 7\%$, HI $10 \pm 7\%$; $P < 0.05$) concomitant with improved insulin sensitivity (Matsuda) (LO $26 \pm 9\%$, HI $25 \pm 7\%$; $P < 0.05$) post training. Fasting serum concentrations of triglyceride (LO $16 \pm 10\%$, HI

10±4%; $P<0.05$) and total cholesterol (LO 6±3%, HI 5±3%; $P<0.05$) were reduced in response to training. No significant differences between groups were detected in effect size for the variables reported.

Conclusions: Instructor-led, group-based HIT appears to be successful in improving exercise adherence and may provide an effective lifestyle intervention to reduce cardio-metabolic risk factors also in obese individuals.

1. Conflict of Interest: None disclosed.

2. Funding: Research relating to this abstract was funded by BUPA Foundation.

T2:P.082

The Effect of Body Mass Index and Body Fat Percentage on Fundamental Movement Skills (FMS)

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Introduction: Mastery of FMS has been linked to increased PA levels in childhood. Physical inactivity has a direct link with obesity in adults and children. The aim of this study is to identify the effect of BMI and BF% on the FMS mastery in young children.

Method: Following ethics approval, 292 children (mean age =8.4±0.5 years) volunteered to perform 8 FMS (run, hop, gallop, jump, balance, kick, throw and catch). The skills were video recorded and assessed using the process orient checklist (NSW DoH, 2000) Sprint speed (sec) and jump height (m) were also measured objectively. BMI (kg/m²) and BF (%) were measured to determine weight status.

Results: Pearson's correlations identified a significant negative association between BF% and sprint times/Mastery level of the Sprint ($P=0.029$, $r=0.132$; $P=0.003$, $r=-0.143$, respectively) and between BF% and BMI for jump height ($P=0.0001$, $r=-0.261$, $P=0.013$, $r=-0.15$ respectively). Normal weight children had significantly faster sprint times compared to overweight children when weight status was determined by BMI and BF ($P=0.05$; $P=0.042$, respectively).

Discussion: The results suggest that increased weight status has a negative effect on FMS which is consistent with previous research (Jones et al., 2010). Children with a higher body fat percentage have lower FMS mastery, demonstrated through the poorer objective measurement outcome. Locomotor skills are negatively affected by increased weight status in children.

References

Jones et al. (2010) J Sci and Med in Spt, 13, 589–596.
DoH (2000) NSW Dept Ed and Training, 16.

T2:P.083

Enhanced glucose metabolism is preserved in cultured primary myotubes from obese donors in response to exercise training

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Introduction: It was suggested that human cultured primary myotubes retain the metabolic characteristics of their donor *in vitro*. The aim of the present study was to investigate whether the metabolic responses to endurance training are also conserved in culture.

Methods: Healthy obese subjects completed a 8-week supervised aerobic exercise training program in which *vastus lateralis* muscle biopsies were performed before and after training. The evolution of both anthropometric and blood parameters as well as VO₂max was investigated. Muscle biopsies were used either for Western blot analysis or digested to harvest myogenic progenitors that were differentiated into myotubes. Glucose oxidation, palmitate oxidation and glycogen synthesis assays were performed on myotubes pre and post-training. Gene expression was assessed by RT-qPCR.

Results: Our data indicate that in parallel of *in vivo* improvement of whole-body aerobic capacity and glucose metabolism, biopsies-derived primary myotubes showed similar patterns *in vitro*. Indeed, glucose oxidation as well as glycogen synthesis were higher in myotubes after training and inhibition of palmitate oxidation by glucose was enhanced. This was associated with consistent changes in the expression of metabolism-linked genes such as GLUT1, PDK4 and PDHA1. Interestingly, no difference in myogenic differentiation capacity was observed pre and post-training.

Conclusion: Aerobic exercise training is associated with metabolic adaptations *in vivo* that are preserved in human cultured primary myotubes. It can be hypothesized that skeletal muscle micro-environmental changes induced by endurance training lead to metabolic imprinting on myogenic progenitor cells.

1. Conflict of Interest: None Disclosed.

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T2:P.084

Physical activity, Vitamin D and Metabolic Risks in Obese Youths Involved in a Physical Activity Promotion Program

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Introduction: In children, physical activity (PA) and serum vitamin D (VIT-D) are inversely related to metabolic risks. This study aimed to investigate the relationship of changes in physical activity (PA) patterns, serum vitamin D (VIT-D) and metabolic risk factors over a six-months PA promotion program with overweight/obese youths.

Methods: 57 overweight/obese youths of both genders, 7–16 year-olds, from Porto public schools comprised the sample and were evaluated pre and post program. Measurements included PA patterns (accelerometers), blood analysis (metabolic risk factors - glucose, insulin, HDL and LDL cholesterol, triglycerides; and VIT-D), waist circumference (NHANES protocol), and maturational stage (Tanner criteria). Participants participated in a PA promotion program (six months, twice a week) aiming to increase PA patterns. For all the measured variables, the delta (Δ) was calculated. The independent associations of Δ metabolic risks with Δ vigorous PA (VPA) (independent variable) were examined using multiple linear regressions, in two models: crude and adjusted for gender and maturational stage at baseline. The same procedures were used to analyze the association of Δ VIT-D (independent variable) with the Δ risk factors, in three models: the first two, and a further adjustment for Δ VPA.

Results: Data showed that higher Δ VPA was associated with an increased Δ VIT-D ($\beta = 0.41$). The influence of Δ VIT-D in the metabolic risks disappeared after adjustment for Δ VPA.

Conclusion: In the evaluated youth obese sample, higher VPA appears to reduce the chance of decreased VIT-D. The influence of this variable in metabolic risks seems to be dependent of the levels of VPA.

T2:P.085

The effects of individual, family, and environmental factors on physical activity levels in children

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Information: Physical activity (PA) can play an important role in preventing excess weight and obesity, both during childhood and in later years. This study aims to identify individual, family and environmental factors that determine PA levels in a population sample of Irish children.

Methods: Cross-sectional analysis of the first wave (2008) of the nationally representative Growing Up in Ireland study (N=8,568). A two-stage clustered sampling method was used where schools served as the primary sampling unit (response rate: 82%) and age eligible children from participating schools were the secondary units (response rate: 57%). Parent reported child PA levels and potential covariates include favourite hobby, cumulative screen time (CST), sports participation (parent and child reported) and child BMI (measured by trained researcher). Univariate and multivariate multinomial logistic regression (forward block entry) examined the association between individual, familial and environmental correlates and PA levels.

Results: The children were classified as achieving low (25%), moderate (20%) or high (55%) PA levels. In the fully adjusted model, male gender (OR 1.64 [95%CI: 1.34-2.01]), an active favourite hobby (OR 1.65 [95%CI: 1.31-2.08]) and membership of sports/fitness team (OR 1.90 [95%CI: 1.48-2.45]) significantly increased odds of being in the high PA group. Exceeding two hours CST (OR 0.66 [95%CI: 0.52-0.85]), overweight (OR 0.41 [95%CI: 0.27-0.61]) or obesity (OR 0.68 [95%CI: 0.54-0.86]) significantly decreased odds of being in the high PA group.

Conclusion: Future PA initiatives could be targeted at overweight/obese children. These should be multifaceted and encompass a broad range of hobbies/activities (individual factors) which are currently popular among children.

1. **Conflict of Interest:** None

2. **Funding:** No funding

T2:P.086

Measured Resting Energy Expenditure in Young Arab Females: Correlations with Body Composition and Agreement with Prediction Equations

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Introduction: There are no studies reported on the accuracy of commonly used resting energy expenditure (REE) predictive equations in estimating REE among the Arabic population. The aim of this study was to assess correlates of measured REE, and to compare measured REE values with values calculated from REE predictive equations.

Methods: Seventy nine healthy women volunteered to participate in the study. All participants were free of diseases, aged 18-30 years, and were from Arabian Gulf and Sham countries. All volunteers fasted for 8 hours, abstained from vigorous physical activity, smoking and caffeinated beverages for twelve hours before measuring body composition and REE. REE was measured by indirect calorimetry and body composition was assessed by a bioelectrical impedance analysis

Results: REE predicted by Harris-Benedict equation was significantly higher (+ 90.2 kcal, $p < 0.001$), and REE predicted by Owen equation was significantly lower (- 101.9 kcal, $p < 0.001$) compared to measured REE. Measured REE was not significantly different from REE predicted by either Mifflin equation or Schofield equation ($p > 0.05$). Mean measured REE varied significantly with BMI ($p < 0.001$), but not with age or ethnic background. Measured-REE was highly correlated with all body composition parameters.

Conclusion: Harris-Benedict equation overestimated REE and Owen underestimated REE. Mifflin-St Jeor equation and WHO/FAO/UNU provide an estimate of REE that is highly correlated and in good agreement with the REE measured by indirect calorimetry in the study participants. Significant difference in REE was noted between participant with different BMI groups.

T2:P.087

Outdoors environments are important for health enhancing physical activity in deprived environments

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Introduction: Physical activity (PA) is important for weight management but PA may be restricted by environmental influences (obesogenic environments). The study aims to assess the importance of outdoors environments in deprived areas on PA engagement.

Methods: 46 children (8.6 ± 0.55 years; BMI: 17.7 ± 4.4 kg/m², BF% 21 ± 9) from the two most deprived wards of Coventry, UK wore a combined HR and GPS monitor (Garmin 406) for 4 days from which time spent in moderate to vigorous physical activity (MVPA) was determined. Children took part in focus group interviews exploring environmental facilitators and barriers to PA which were analysed using thematic analysis.

Results: Children spent more time in MVPA in outdoor (greenspace, street) than indoor environments (outside = $49 \pm 35\%$ vs. inside $27 \pm 25\%$, $P = 0.00$) for both weekdays and weekends ($P=0.01$). Children reported that they were more active and preferred PA in outdoors environments. Children spent more significantly more time in MVPA outdoors on weekdays during increased hours of sunlight (spring/summer) compared to reduced hours of sunlight (autumn/winter) (69 ± 30 mins vs 44 ± 60 mins, $P=0.01$). Children reported that weather, parental constraints and safety were barriers to PA. There was no difference in time in MVPA outside or inside between weight status groups ($P<0.05$).

Conclusion: Outdoor environments are important for health enhancing PA but interactions with outdoor environments is limited by seasonality, parental constraints and safety in deprived environments. Interaction with outdoor environments was not influenced by weight status.

T2:P.088

Physical Activity Recommendations and Blood Pressure in preschool children

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Introduction: Elevated Blood Pressure (BP) is a major public health problem. It is well recognized that BP tracks from children into adults. Some researchers suggest that moderate levels of physical activity (PA) are predictors of lower values of systolic blood pressure (SBP). The purpose of this study was to analyze the associations between compliance of PA recommendations and blood pressure preschool children.

Methods: The sample comprised 307 preschool children (47%female) with mean age of 5 years. PA was assessed during 7 consecutive days by accelerometer (Actigraph GTM1). We analyzed the recommendation of at least one hour daily of moderate-vigorous PA (MVPA). The Body fat mass (%BF) was estimated from four skinfolds thicknesses. Blood pressure was measured using the Colin monitor. Dietary intake will be obtained by a 3-day dietary record (2 weekdays and 1 weekend).

Results: The prevalence of BP above the 90th percentile (P90) was 7.8% and 1.3% respectively for SBP and DBP. About 12.2% of the children did not accomplish the recommended daily MVPA. Children who did not meet the daily recommendations of MVPA were twice as much more likely to have SBP values above the P90 compared to those who meet the daily recommendations (OR: 5.4 IC95%: 2.1-13.6; $p<0.05$), even after adjustment to %BF and dietary intake.

Conclusion: We found an association between the no accomplishments of daily PA recommendations with SBP in pre-school children. Further longitudinal studies are needed to confirm this data.

1. **Conflict of Interest:** None Disclosed/Payment was received.

2. **Funding:** Research relating to this abstract was funded by SFRH/BPD/81566/2011

T2:P.089

Effects of exercise modality on short term post-exercise energy compensation in adults*Cadieux S, McNeil J, LaPierre M, Pharand D, Doucet E*

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Background: Exercise-induced weight loss is often much less than anticipated. This may result from the compensation of exercise-induced energy expenditure (EE). However, much of the available data has focused on aerobic exercise only. To our knowledge, it is unknown whether resistance and aerobic-based exercises may lead to different degrees of energy compensation.

Objective: We evaluated the acute effects of exercise modality (resistance and aerobic) on post-exercise energy intake, macronutrient preferences, and total EE.

Method: Sixteen moderately active men and women participated in three randomized crossover sessions: a resistance- and an aerobic-based exercise session performed at 70% of 1RM and of VO₂max, respectively, as well as a sedentary control session. Exercise EE was continuously measured (indirect calorimetry) throughout the training sessions, which were designed to produce an isocaloric EE of 4 kcal/kg body weight. EE and energy intake were monitored for 34 hours post-exercise with 2 biaxial accelerometers and a validated food menu, respectively.

Results: There were no differences in total energy intake, EE, macronutrient intake, and energy compensation across sessions. However, men and women responded differently to resistance vs aerobic as far as energy intake at lunch was concerned ($p < 0.05$). This effect is mostly apparent in men between the aerobic and resistance sessions.

Conclusion: Training modalities appear to have exerted a different impact on acute post-exercise energy intake between sexes. These results thus suggest that post-exercise energy intake might be acutely influenced by exercise modality; however these effects disappear over time.

1. Conflict of Interest: None Disclosed

T2:P.090

Influence of perceived environment on the physical activity of obese patient – comparison with a population of non-obese volunteers*Maire A^{1,2}, Roux D^{1,2}, Dugas J^{1,2}, Disse E^{1,2}, Laville M^{1,2}, Simon C^{1,2}*

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Introduction: Engagement in physical activity (PA), one of the pillars of obesity care, is determined by psychosocial and environmental factors. The objectives are to study the role of these factors on obese patients engagement in PA and to determine if their influence(s) varies with different types of PA.

Methods: 5 validated questionnaires (PA practice; motivation, self-confidence, social support and environment perception) were administered to 143 obese patients seen for a medical assessment in nutrition service. These same questionnaires were also administered to 90 non-obese volunteers, to compare results of these two populations.

Results: Engagement in leisure walking correlated positively with residence type (and therefore indirectly with higher population density) ($p=0.04$) and the density of walking and cycling networks ($p=0.01$). It correlated negatively with distance to local sport equipments ($p=0.01$). Preferential use of walking or cycling for non-professional trips also tended to be associated with the type of residence ($p=0.07$). Leisure time spent sitting and watching a screen was conversely associated with perceived neighborhood safety ($p=0.02$) and with the positive opinion of the walking and cycling activities ($p=0.07$). However, leisure PA others than walking were not associated to any of the studied neighborhood features. The analysis of data from non-obese volunteers is in progress.

Conclusion: For obese patients, in addition to individual and interpersonal determinants, neighborhood features are associated with walking and sedentary occupations.

1. Conflict of Interest: None

2. Funding: None

T2:P.091

Inverted body mass index (iBMI) is a better predictor of FATmax and aerobic fitness than body mass index (BMI) in pre-pubertal children*Duncan MJ¹, Campolier M¹, Birch SL¹, Hankey J¹, Nevill AM²*

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Introduction: The exercise intensity that elicits maximal fat oxidation (FAT_{max}) has been associated with aerobic fitness and BMI. Recent work has suggested that inverted body mass index (iBMI) may be a better proxy for weight status in children as a measure of leanness. No studies to date have examined whether this is the case for variables related to metabolic health. This study compared iBMI and BMI as predictors of FAT_{max} and aerobic fitness in children.

Methods: 32 children (16 boys, 16 girls, aged 10-11 years) completed an incremental cycling test to estimate aerobic fitness (VO_{2peak}) and FAT_{max} assessed by breath-by-breath calorimetry (Cortex MetaMax 3B®, Germany). Height and mass were assessed using a Seca stadiometre and weighing scales (Seca Instruments, Germany) from which iBMI (cm²/kg) and BMI (kg/m²) were determined.

Results: iBMI was significantly related to FAT_{max} ($P = .01$) and VO_{2peak} ($P = .03$) as was BMI ($P = .05$ and $.04$ for FAT_{max} and VO_{2peak} respectively). iBMI was a better predictor of FAT_{max} ($P = .03$, adjusted $r^2 = .113$) and VO_{2peak} ($P = .03$, adjusted $r^2 = .106$) predicting 11.3 and 10.6% of the variance in these variables compared to BMI which did not significantly predict FAT_{max} ($P < 0.05$) and predicted 10% of the variance in VO_{2peak} ($P = .043$).

Conclusion: iBMI is a biologically sound alternative to BMI which is a better predictor of children's FAT_{max} and VO_{2peak} compared to BMI. Thus, iBMI should be considered when examining the association between weight status and exercise fat metabolism in children.

T2:P.092

The effect of 2 types of exercise in body composition and neuropeptides among obese adolescents*Corgosinho FC, de Mello MT, Grotti APC, Sanches PL, Munhoz RC, Tock L, Landi DCM, Tufik S, Dâmaso AR*

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Introduction: It is well known that many neuropeptides play role on energy balance, obesity development and maintenance, however the impact of different types of exercise in neuropeptides and adipokines have not been explored.

Objective: The aim of this study is to verify the effect of aerobic training (AT) and aerobic plus resistance training (AT+RT) on neuropeptides, adipokines as well in body composition.

Methods: A total of 80 obese adolescents were enrolled in one year interdisciplinary therapy. They were divided into two groups: A ($n=35$) and A+R ($n=45$). Blood samples were collected to analyze neuropeptides and cytokines. Neuropeptides and adipokines were measured by enzyme-linked immunosorbent assay. Body composition was measured through plethysmography. The variables were collected at baseline and after 1 year of intervention.

Results: Although AT+RT presented higher % fat mass and lower % of lean mass at baseline, combined exercise was able to improve significantly body composition when compared to AT group, presenting lower % of fat mass ($p=0.009$) and higher % of lean mass ($p=0.001$). AT group, reduced not only % of fat mass but, also % of lean mass. Considering adiponectin there was an increase in AT+RT group while there was a decrease in the concentrations of AT group. Both alpha-MSH and grelin presented an increase in AT group being statistically different than AT+RT group.

Conclusion: AT+RT can improve not only body composition but may also modulate neuropeptides as well adipokines, acting as a better strategy com combat obesity.

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2. Disclosure: The authors have no financial relationships relevant to this article to disclose.

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T2:P.093

Differences between BMI, activity patterns, and aerobic capacity accordingly with sleep duration in adolescents

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Introduction: The purpose of the present study was to analyze the differences between tertiles of sleep duration regarding BMI, sedentary behavior, physical activity (PA), and aerobic capacity.

Methods: The sample comprised 452 adolescents (11.95±1.20yr; 20.39±3.57kg/m²) baseline data participants of PESSOA program. Sedentary behaviors and PA were objectively assessed (Actigraph-GT1M), aerobic capacity was estimated with a field test (shuttle-run), and sleep duration was self-reported. Tertiles of sleep duration were defined as T1 less than 8h, T2 8-9h, and T3 more than 9h sleep per night.

Results: Chi-square analysis of the prevalence of BMI conditions in each of the sleep tertiles revealed significantly lower results of healthy BMI and higher results of pre-obesity and obesity in T1 (55.3% vs 44.7%), when compared with T2 (72.9% vs 27.1%, p<.01), and T3 (65.6% vs 34.4%, p<.05). One-way ANOVA indicated that T2 and T3 presented lower time in sedentary activities (p<.01), and daily PA (p<.05), compared with T1. This last result was emphasized by the decrease in very vigorous PA that occurred in boys with the increment of hours slept per night (p<.001). No differences were observed concerning aerobic capacity (p>.05). Regression analysis revealed that sleep duration decreased with increasing age (p<.001).

Conclusions: In the current study, a more favorable BMI occurred with sleep durations between 8-9 hours per night, suggesting sleeping duration as an excessive weight marker. The decrease in sedentary activities and total daily PA with increasing sleep duration reinforces the relevance of addressing these behaviors as independent entities in the promotion of healthier lifestyles.

T2:P.094

Survey of behaviour and weight change amongst users of walkit.com, an urban walking journey planner website

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Introduction: Walking has been a targeted area of research as a potential intervention to improve weight loss and activity levels. Recent NICE guidance suggested walking as the most likely way adults could achieve the recommended levels of activity^[1].

Methods: There are approximately a million unique users a year of walkit.com, an urban walking journey planner website, covering 49 British cities. Users of walkit.com are invited to take part in an anonymous annual online survey. In 2012 a series of additional questions regarding activity levels and weight were included, in order to investigate the impact of walking on the weight and activity level of users.

Results: The annual survey was completed by 413 users aged between 16–75 years. 332 of these users agreed to answer the additional health related questions.

Respondents who used exercise as part of a weight loss programme, reported an average weight loss of 9.74 kg (during weight loss programme). 82% of these respondents stated that they incorporated walking into their everyday life.

Conclusion: The results of this survey show that a service such as walkit.com is a potential tool to help encourage increased activity levels in those trying to lose weight. In particular, to increase walking incorporated into daily activities, which is more likely to result in a sustained change to behaviour.

Reference

- [1] National Institute for Health and Clinical Excellence (2012) [Walking and cycling: local measures to promote walking and cycling as forms of travel or recreation]. [PH41]. London: National Institute for Health and Clinical Excellence.

1. Conflict of Interest: None disclosed

2. Funding: Self-funded

T2:P.095

Physical activity levels and overweight/obesity prevalence among Mexican adult participants of a sporting event

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Introduction: Physical activity (PA) levels may vary according to the characteristics of the population. The World Health Organization estimates that there are more than one billion adults with overweight (OW) and obesity (O). The purpose of this study was to evaluate the PA levels and OW/O prevalence in an adult population of a sporting event, held in the city of Tijuana.

Methods: The International Physical Activity Questionnaire (IPAQ) was applied to 789 participants. Also, the level of education (LE), occupation, age and sex status information was obtained. Weight and size were evaluated using conventional methods and body mass index (BMI) calculated (kg/m²). The results were analyzed by Spearman correlation coefficient.

Results: The mean age was 37.9 (18-59), 72% women. The prevalence of OW was 38.7%, and O was 25.1%. The average of sedentary lifestyle was 27.4%, light AP was 35.1%, moderate PA was 21.8%, and vigorous PA was 15.7%. The correlation of PA was positive with LE (0.092, p=0.005), and negative with the age (-0.059, p<0.05) and BMI (-0.103, p<0.005). The correlation of BMI was positive with age (0.236, p<0.001), occupation (0.068, p<0.05), and negative with the PA level (-0.103, p<0.005) and LE (-0.142, p<0.001).

Conclusion: These findings indicate that the prevalence of OW/O (63.8%) of this sample were similar to other populations. Therefore, LE can favor the PA levels and help reduce the prevalence of OW/O in the population of Tijuana.

1. Conflict of Interest: None Disclosed

2. Funding: No Funding

T2:P.096

Aerobic Plus Resistance Training Improve Bone Metabolism and Inflammatory State of Obese Adolescents

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Introduction: Obesity is a worldwide epidemic with high prevalence of comorbidities included alterations in bone mineral metabolism. The purpose of this study was to evaluate the role of two types of exercise training (aerobic and aerobic plus resistance exercise) on adipokines parameters and bone metabolism in obese adolescents.

Methods: This is a clinical trial study with interdisciplinary weight loss therapy. Forty two post-pubertal obese adolescents were submitted in an interdisciplinary weight loss therapy with physical exercise, medical monitoring, physical exercise, nutritional and psychological intervention. Serum analysis of leptin, ghrelin, adiponectin, glucose and insulin

were collected. Anthropometric measurements, body composition, bone mineral density, visceral and subcutaneous fat were performed.

Results: Both training groups were reductions in body mass index, total fat, central fat, visceral fat, subcutaneous, insulin concentration and HOMA-IR index. Aerobic plus resistance training showed statically improvement in bone mineral content and an effective reduce in visceral/subcutaneous ratio, central/peripheral ratio, leptin and improve adiponectin concentration. Insulin and HOMA-IR index were negative predictors of bone mineral content in the combined training group. Moreover, the fat distribution was a negative predictor for bone mineral density in bouth groups.

Conclusions: Aerobic plus resistance training promotes a protective role in bone mineral content associated to an improvement in adiponectin and leptin concentrations. These results reflect an improvement in the inflammatory state of obesity in this population.

1. Conflict of Interest: None Disclosed

2. Funding: AFIP, CNPq, CEMSA and CAPES, CEPE FAPESP (CEPID/ Sleep #9814303-3 S.T), FAPESP (2006/00684-3; 2008/53069-0; 2011/50356-0; 2011/50414-0), CAPES (PNPD/2011), UNIFESP-EPM.

T2:P.097

Self-reported physical activity in relation with weight status and socio-demographical factors

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Introduction: Body weight represents a balance between energy intake and expenditure. Physical activity (PhA) and healthy lifestyle influence these two sides. Insulin abnormalities (resistance/sensitivity, hyperinsulinism) are mechanisms involved in obesity in sedentary. Physical effort induces important metabolic processes that prevent obesity. Sedentary time is correlated with high risk for diabetes, cardiovascular disease and mortality. Aim-assessment of PhA in relation with weight status and demographical factors.

Method: 311 adult persons-representative group for age, sex, residence (urban, rural) of Galati County population. PhA was quantified by self-declared performance of ≥ 30 minutes of physical effort at least 3 times a week. We assessed waist circumference, body mass index (BMI) and evaluated obesity degree (WHO criteria) and abdominal obesity risk categories.

Results: 59.16% of the subjects performed exercise. Men effectuated PhA more frequently (61.82%) than women (58.0%). A higher percent of men from urban area (65.67%) performed PhA than in rural (55.81%). Women performed PhA comparably in urban (58.87%) and rural areas (56.58%). A higher PhA prevalence appeared for age groups 20–29 (77.14%), 50–59 (67.39%) and 60–65 years (57.89%) than for age groups 30–39 (52.05%), 40–49 (51.78%) and >65 years (44.68%) as well as during summer time ($p < 0.05$).

Persons with PhA had significantly lower BMI ($25.82 \pm 5.48 \text{ kg/m}^2$) than sedentary ones ($28.40 \pm 6.19 \text{ kg/m}^2$). Persons with PhA were more frequently normal and overweighted, while sedentary persons were more frequently obese. Waist was significantly lower, with low and medium risk categories in active subjects ($89.98 \pm 15.49 \text{ cm}$) than in sedentary persons ($94.48 \pm 17.17 \text{ cm}$) who also had high risk category waist ($p < 0.05$).

Conclusions: Physical activity is performed more frequently by men, in urban area or during summer. Young and aged persons were more active (more spare time). Active persons were frequently normal and overweighted and had low-medium risk waist than sedentary persons, indicating the major role of physical activity in preventing obesity and its consequences. Identification of factors which influence physical activity are important tools in the prevention and management of obesity.

T2:P.098

Differences in fundamental movement skill mastery and habitual physical activity levels in normal weight and obese children: A one year follow up study

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Introduction: Fundamental movement skills such as running and jumping are observable skills that form the basics of sports specific movements and those required for physical activity (PA). Increased weight status has been found to negatively affect FMS mastery and children with increased mastery may participate in more PA. Therefore this study aimed to identify any differences in FMS mastery between normal weight and overweight/obese children and to identify if subsequent PA differed between the groups one year later.

Methods: 118 children (66 boys, aged 7–10 years) performed 8 FMS, video analysis (NSW, 2000) allowed the calculation of overall FMS mastery. Height (m) and mass (kg) were assessed with a Stadiometer and weighing scales (Seca Instruments, Germany) and BMI (kg/m^2) was determined. One year later, habitual PA was measured (4 day pedometer wear) and FMS mastery assessed again.

Results: FMS mastery was significantly higher in normal weight children than overweight/obese at both testing time points ($P < 0.01$) and both groups improved their FMS mastery after one year ($P < 0.05$). However, there were no differences between the groups habitual PA levels at the one year follow up ($P = 0.19$).

Conclusion: Despite the increased mastery of FMS in normal weight children, they did not participate in more PA one year later. Therefore greater FMS mastery in young children may not lead to increased PA levels in the short-term. Future studies should assess longitudinal changes in PA levels and FMS mastery to identify whether FMS mastery can predict future PA levels.

1. Conflict of Interest: None

2. Funding: No Funding

T2:P.099

Obesity and Strength Exercises in Children: Body Composition Influence

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Introduction: Great levels of explosive dynamic strength (EDS) are needed to improve intermittent physical activity (PA) performance. Isometric strength (IS) has been associated with healthier metabolic and body composition profiles. Hence, interactions between strength performances and body composition would be explaining differences normal and overweight-obese boys (OB). The aim of this study was to compare EDS and IS between NB and OB.

Methods: Two-hundred and one boys were recruited (8.9 ± 0.8 yrs; BMI $19.9 \pm 4.3 \text{ kg.m}^{-2}$; %FM $22.4 \pm 8.5\%$). Children were considered overweight or obese based on the body mass index (BMI) age-specific cut-off points; fat free mass (FFM) and fat mass percent (%FM) was estimated by anthropometry. To assess EDS, a Standing Broad Jump (SBJ), 30 meters speed race (S) and 10 x 5 meter Shuttle Run (SR) was used. IS was assessed with a handgrip dynamometer. PA behaviour was determined using questionnaires. Maturation was assessed by photographic models. Independent sample T-test was performed to compare absolute and relative strength test values. Interaction between body composition and EDS were analyzed.

Results: NB were better than OB on SBJ (126.1 ± 20.8 vs $117.7 \pm 27.1 \text{ cm}$; $P < 0.013$), S (6.6 ± 0.7 vs $6.9 \pm 0.9 \text{ m/s}$; $P < 0.005$), SR (19.7 ± 5.7 vs $21.7 \pm 4.8 \text{ m/s}$; $P < 0.013$). No significant differences were found on IS (15.1 ± 3.5 vs $15.8 \pm 3.5 \text{ N.kgFFM}^{-1}$; $P > 0.195$). Significant interactions were found between FFM, waist circumference and EDS ($P < 0.05$).

Conclusion: As expected OB presented higher levels of IS and lower in EDS, however there were not differences in IS when values had been

adjusted to FFM. On the other hand EDS differences must be explained by regional fat distribution and FFM.

1. Conflict of Interest: Payment received from Spanish Ministry of Sciences and Technology.

2. Funding: Research relating to this abstract was funded by Sports Council (Spanish Ministry of Sciences and Technology)

T2:P.100

Fear of Falling: The effects on activity participation in younger overweight women

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Introduction: Studies in elderly populations suggest a relationship between obesity, activity restriction and activity participation (Simoes et al 2006; Brach et al 2004). However there is limited information on activity restrictions in younger obese adults. One possible reason for activity restrictions could be fear of falling. In elderly populations, fear of falling is associated with restricted activities and lower levels of activity participation, particularly in women, and is also related to obesity (Deshpande et al 2008). It is therefore feasible that fear of falling may be a problem in younger obese adults and a subsequent barrier to activity participation.

Methods: Semi-structured interviews of 12 overweight women under 50 years old.

Results: All participants reported activity restrictions and 8 reported fear of falling. There was some suggestion that fear of falling lead to activity avoidance in some adults. Younger adults and those more active were less likely to report problems.

Discussion: Our findings warrant further investigation. These findings are important to inform the design of interventions to promote activity in overweight women.

References

Simoes et al (2006). Associations of physical activity and body mass index with activities of daily living in older adults. *J Commun Health*; 31; 6: 453–467
Brach et al (2004). The relationship among physical activity, obesity, and physical function in Community-dwelling older women. *Preventive Medicine* 39: 74–80
Deshpande et al (2008). Activity restriction induced by fear of falling and objective and subjective measures of physical function: a prospective cohort study. *J Am Geriatr Soc* 56; 615–620

1. Conflict of Interest: None disclosed

2. Funding: PhD is part funded by a bursary from UCLAN.

T2:P.100A

Impact of low physical activity on obesity: Argentina 2005–2009

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Introduction: In 2005 and 2009, the Ministry of Health of Argentina held a Risk Factors National Survey (RFNS). The data collected shows that the country has increased the prevalence rate in obesity and low physical activity, for all age groups.

Methods: 23 provinces and Buenos Aires City. Population: age 18 and over living in private households in cities over 5,000 habitants. Sample (households) 2005: 41,392, 2009: 42,118. We performed a cross-sectional econometric model to explain the relationship between the rate of prevalence of low physical activity and obesity.

Results: For years studied, increase in prevalence of low physical activity explained 33% of the increased prevalence of obesity. There is a strong positive correlation between obesity and low physical activity, while in 2005 this was 88% in 2009 this increased to 93%.

Conclusion: The relationship between low physical activity and obesity remained stable. Due to increase of low physical activity in the years under study, there has been a rise in obesity. The programs for prevention of obesity, not only must focus on healthy eating, but also in increased physical activity. It remains for future research, identify and quantify the causes of the remaining 67% of the prevalence of obesity in Argentina.

T2:PS5 – Quality of Life, Mental Health and Disorders

T2:P.101

Obesity, cognitive functioning and mental health in young women

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Introduction: An adverse effect of obesity on mood and cognitive performance has been reported and may be related to chronic inflammation or obesity related co-morbidities. The Food, Mood & Mind study aims to investigate the influence of obesity on cognitive function and mental health in young women.

Methods: A convenience sample of healthy women, 18-35 years with a BMI 18.5-25 kgm⁻² or ≥27.5 kgm⁻² were recruited. Participants undertook a validated computer-based cognition test evaluating; thinking, response speed, impulsivity, attention, information processing, memory and executive function. Depression was assessed by the Depression and Anxiety Scale (DAAS) and a fasting blood test measured inflammatory status via C-reactive Protein (CRP).

Results: To date, 110 women (aged 25.8 ± 4.5 years) of the target sample of 300 have completed the study with only 10% overweight or obese (36.4 ± 11.4 kgm⁻²). Although mean cognition scores were within normal limits, the memory domain score (visual memory span, digit span and word recall) was significantly lower in the overweight/obese women (p=0.015). Depressed mood (p=0.050) and CRP (p=0.02) was higher in the overweight/obese women.

Conclusion: Overweight and obesity may negatively impact cognitive function and mental health, even in healthy young women free of obesity related co-morbidities. A larger sample is required to confirm these initial findings.

1. Conflict of Interest: None disclosed

2. Funding: Research relating to this abstract was funded by Meat & Livestock Australia.

T2:P.102

Quality of life in longer-term members of a commercial weight loss organisation

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Introduction: This study examined quality of life in 620 participants who had attended Slimming World for a mean (SD) of 23 (20) months, lost 15.2% (9.0%) weight and were trying to maintain/further their weight-loss during a subsequent 6-month study period.

Methods: Weight was recorded on joining, at the start of the study period (measurement 1) and 6-months later (measurement 2). At measurement 1 and 2 participants answered the Impact of Weight on Quality of Life-Lite (IWQOL) questionnaire¹ which measures weight-specific perceived quality of life on five dimensions of daily life; physical functioning, self-esteem, sexual life, public distress, and work. Linear regression analysis was used to identify the associations between questionnaire responses at measurement 1 and measurement 2, and percentage change weight over the study period.

Results: At measurement 1, heavier participants perceived that their weight caused more difficulties with their physical functioning, self-esteem, sexual life, work and caused them more public distress than those with less weight to lose (all p<0.001). Weight loss over the six-months between measurement 1 and measurement 2 was associated with improved perceptions of all dimensions of quality of life measured;

physical function ($p<0.001$), self-esteem ($p=0.009$), sex life ($p<0.001$), public distress ($p<0.001$), and work ($p<0.001$).

Conclusion: These data suggest that weight status impacts on quality of life, which can be improved by weight loss.

Reference

1. Kolotkin, R. L., R. D. Crosby, et al. (2001). "Development of a Brief Measure to Assess Quality of Life in Obesity." *Obesity Research* 9(2): 102–111.

1. Conflict of Interest: JS, AA, CP and JL work for Slimming World. SW was supported by Slimming World for this work.

2. Funding: EC contract No. FP6-513946: diet, obesity and genes and Slimming World.

T2:P.103

Quality of life outcomes and obesity surgery: A systematic review of prospective long term studies

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Background: Quality of life (QoL) is often poor in patients with severe obesity. The aim of this study was to investigate long term changes in QoL after obesity surgery.

Methods: We did a PubMed/Medline search in November 2012 – screening articles for obesity surgery and QoL outcomes. The inclusion criteria were that QoL was measured with a validated instrument before and at least 5 years after surgery.

Results: Eight studies with 1997 patients met the inclusion criteria. The response rate ranged from 63 to 96%. The studies were from Austria (Int J Psychiatry Med 2007, 37:69-79), China/Taiwan (Obes Surg 2005, 15: 1299-1303; Obes Surg 2012,22:1827-34), Finland (Obes Surg 2011, 21:1585–91), France (Br J Surg 2010, 97:884-91), Netherlands (Obes Surg, 2011,21:871–9), Sweden (Int J Obes, 2007,31:1248-61) and USA (Surg Obes Relat Dis, 2012, 8: 625-33). Gastric bypass was used in 3 studies, adjustable laparoscopic banding in 4 studies and vertical banded gastroplasty in 3 studies. Generic measures were used in 6 studies, obesity-specific measures in 3 studies, and condition specific measures in 4 studies. QoL improved greatly after surgery in all studies. However, we also detected a pattern two years after surgery, where QoL started to decline in some patients, before stabilizing at the 5 year follow-up. Nevertheless, the average long term results were well above baseline in all studies.

Conclusion: Long term improvements in QoL are experienced by the majority of the patients undergoing obesity surgery in prospective studies.

1. Conflict of Interest: None Disclosed

2. Funding: No Funding

T2:P.104

Personality traits associated with a good outcome 1 year after bariatric surgery

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Introduction: Bariatric surgery is the most effective treatment for severe obesity. Most of the patients improve their health significantly after surgery and lose substantial weight; however there are some patients who fail.

The main objective of this study was to identify psychosocial factors and indicators of personality traits before surgery that might help to predict good outcome.

Methods: 152 patients (women: 75.7%, average age: 42.1 ±11.8 years) were assessed before bypass gastric with anthropometric measures (body mass index (BMI), a semi-structured interview (demographic data and Binge Eating Disorder diagnose (DSM-IV)) and self-appraisal questionnaires: Beck Depression Inventory, Beck Anxiety Inventory, Rosenberg (self-esteem) test and NEO-PI-R (psychological personality inventory which measures Big Five personality traits). One-year follow-up was conducted. A good outcome was defined as weight loss of more than 50% of excessive weight.

Results: Excess weight loss ≥ 50% was observed for 138 patients (91%). A binary logistic regression was performed to assess variables associated with successful outcome. No psychosocial factor was associated with outcome. A lower BMI (Odd Ratio 0.851, P value (p) 0.022, Confidence Interval (CI) 0.741-0.977), a younger age (OR 0.905, p 0.013, CI 0.836-0.979) at the moment of surgery, traits of personality of openness (OR 1.050 p 0.014, CI 1.010-1.091) and agreeableness (OR 1.074 p 0.031 CI 1.006-1.145) (NEO-PI-R) were associated with good outcome.

Conclusions: In a one-year follow-up, psychopathology before surgery is not a good predictor of outcome. Some personality traits are associated with good outcome, but these findings must be corroborated at a long-term follow-up.

1. Conflict of Interest: None disclosed.

2. Funding: Research relating to this abstract was funded by the Ministry of Research of Luxembourg.

T2:P.105

Assessment of fatigue in obese patients

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Introduction: The aim of this study was to validate the Fatigue Severity Scale (FSS) in obesity and to assess the prevalence of fatigue among obese individuals.

Methods: Before and after a three-week residential multidisciplinary integrated weight reduction program, 220 patients were asked to fill in the questionnaires: FSS, Profile of Mood States (Fatigue-Inertia subscale, POMS-Fatigue, and Vigor-Activity subscale, POMS-Vigor), and the Obesity-Related Well-Being (ORWELL-97). A subsample of 50 patients completed the questionnaire within two days.

Results: The prevalence of fatigue using a cut-off value of 4 for the FSS score was 59%. Correlations were found between FSS and POMS-Fatigue and -Vigor scores ($r=0.58$ and 0.53 , respectively). A relation was also found between FSS and ORWELL97 ($r=0.52$, 0.42 to 0.61). From the factorial analysis only 1 factor was extracted explaining 63% of variance, with factor loading values ranging from 0.71 (item 7) to 0.87 (item 6). Intraclass Correlation Coefficient was 0.89 (0.82 to 0.94), while the agreement as measured using the Standard Error of Measurement was 0.43 (0.36 to 0.54) corresponding to 13% (11 to 17%). Cronbach's alpha values ranged from 0.94 to 0.93. The internal responsiveness of FSS was comparable to the ORWELL97 (Standardized Response Mean=0.50 and 0.44, respectively).

Conclusions: Fatigue is an important and frequent symptom in obese patients and should be routinely assessed in both research and clinical practice. This can be achieved using the FSS, which is a short, simple, valid and reliable tool for assessing and quantifying fatigue in obese patients.

T2:P.106

Family stress and body size in 2-6 year old children predisposed to obesity. Results from the “Healthy Start” study

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Objective: Psychological stress among young children may be associated with childhood overweight and obesity. We examined if higher levels of family stress was associated with body size among a select group of 2-6 year old children, all socially or biologically predisposed to overweight, due to maternal low education, maternal obesity prior to pregnancy or a high birth weight.

Methods: Baseline data from 583 children participating in the “Healthy Start” intervention study was analyzed. The Danish version of the Strengths and Difficulties Questionnaire (SDQ) was used to indicate child stress measured as SDQ Total Difficulties (SDQ-TD) score and Prosocial Behavior (PSB) score. Ten questions from a modified version of the Parental Stress Index (PSI) were used to indicate parental stress (PSI score). Heights and weights were measured, and BMI z-scores were calculated.

Results: A direct linear trend was found between SDQ-TD score and BMI z-score ($\beta = 0.021$, $p = 0.11$). Having a SDQ-TD score above the 90th percentile was associated with BMI z-score ($\beta = 0.36$, $p = 0.05$). Neither PSB or PSI scores were associated with BMI z-score. Analyses were adjusted for parental socioeconomic status, parental BMI, family structure, dietary factors, and physical activity.

Conclusion: The results suggested a threshold effect between SDQ-TD score and BMI z-score, but not between PSB score and BMI z-score, or between PSI score and BMI z-score. These results suggest that child stress may be a risk factor for childhood overweight and obesity, but more research is needed before firm conclusions can be drawn.

1. Conflict of Interests: None disclosed

2. Funding: Research related to this abstract was funded by TrygFonden, Danish Medical Research Council and Helsefonden.

T2:P.107

Stress, sweet substance dependence (SSD), and basal leptin level in overweight women

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Introduction: Stress may favor to food consumption, especially of foods high in sugars. The frequent and excessive intake of these foods can contribute to the emergence of SSD. The objective of this study was to know the prevalence of SSD between women with and without stress, and the effects of this dependence in basal leptin level.

Methods: The stress was diagnosed through the 'Inventory of Stress Symptoms by Lipp' and the sample was stratified into two groups (with and without stress). The SSD was characterized by "Questionnaire for Assessment of Abuse and Dependence Sugar". The basal leptin level was measured and compared between with and without SSD women.

Results: Fifty-seven women participated of this study, 31 with stress (54.38%) and 26 without stress (45.61%). Approximately 77% (n=24) of women with stress were also identified with the SSD. Stressed women had 7.71 times more chance to have SSD. When was compared without and with SSD women, the last one said to eat candies to improve the mood; to eat a large amount of sweet to feel good; to spend time to get sweet food; and others. The mean basal leptin level was significantly higher ($p < 0.01$) in women with SSD (35.97 ± 16.23 ng/mL) than no SSD women (27.51 ± 15.26 ng/mL).

Conclusions: Stressed women are more susceptible to SSD than no stressed women and SSD is associated to basal leptin level increased.

1. Conflict of Interest: None Disclosed.

2. Funding: This research was supported by The State of São Paulo Foundation (FAPESP).

T2:P.108

Global self-esteem in longer-term members of Slimming World

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Introduction: This study examined change in self-esteem in 620 members who had attended Slimming World (SW) for at least 6-months (mean (SD) 23 (20) months) and lost on average 15.2% (9.0%) weight. Members were then followed up over a subsequent 6-month study period.

Methods: Weight was recorded on joining, at the start of the study period (measurement 1) and 6-months later (measurement 2). At both measurements participants rated how their global self-esteem had changed over time using 5-point Likert scales (ranging from “not at all” to “very much”). Subjects were grouped into tertiles of change in weight between measurement 1 and measurement 2 (those who lost, maintained or gained weight). Regression analysis was used to relate self-esteem to subsequent weight change.

Results: Change in self-esteem at measurement 1.

How did your feelings of self-esteem:	Mean	SD
Change after your first week?	3.3	1.4
Change after you first month?	3.8	1.1
Change after your first six months?	4.3	1.0
Improve since you joined SW?	4.3	1.0

A greater improvement in self-esteem since joining SW was related to greater weight-loss (kg) ($R^2=0.018$, $p=0.001$), but not to duration of membership. Members who had lost or maintained weight over the study period reported more of an improvement in feelings of self-esteem at measurement 2 compared to measurement 1. Members who had gained weight reported less of an improvement ($p < 0.001$).

Conclusion: Positive changes in self-esteem were related to weight-loss and weight-loss maintenance in participants of the SW programme.

1. Conflict of Interest: All authors (except SW) work for Slimming World. SW was supported by Slimming World for this work.

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T2:P.109

Adult ADHD among obesity/overweight patients with eating behavior abnormalities

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Introduction: Despite the gravity of the obesity epidemic in Russia, the correlation between obesity and ADHD has not been investigated yet.

Methods: Dutch Eating Behavior Questionnaire (DEBQ) was used as a tool for identifying and classification eating behavior. The Adult ADHD Self-Report Scale (ASRS v1.1) was used for diagnosing ADHD. Bourdon Test was used for research attention. SCL-90-R (Symptom Check List-90-Revised) was used in the research of psychopathological symptoms.

Results: 45 obesity/overweight patients aged between 24 and 57 were examined all of whom suffered from various types of eating behavior abnormalities. Signs of ADHD were revealed in 29 cases (64% of patients). According to Bourdon test results, the level of attention among

ADHD patients (group 1) was significantly lower than that of patients without ADHD (group 2).

SCL-90-R test results suggested that psychopathological symptoms among group 1 patients were manifested more vividly.

Conclusion: The results obtained suggest that Russian obesity patients are more prone to ADHD, which, in turn, is in full conformity with international statistics. This enables us to develop an efficient obesity treatment methodology.

1. Conflict of Interest: None Disclosed

2. Funding: No Funding

T2:P.110

Association of inflammatory markers with cardiometabolic risk factors

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Introduction: Visceral obesity, hyperglycemia, hypertension, insulin resistance and dyslipoproteinemia are cardiometabolic risk (CMR) characteristics. These factors are associated with subclinical inflammation, characterized by elevations in inflammatory markers. The aim of the study was to associate IL-1 β with CMR factors and other biomarkers in a sample of Brazilian adolescents.

Methods: Cross-sectional study with 487 adolescents (10-14 years), which were obtained anthropometric measurements and determined plasma concentrations of IL-1 β , IL-6 and TNF- α , and subsequently calculated the HOMA-IR index. Pearson correlation was performed between the levels of IL-1 β , CMR factors (BMI, weight, CC, GC%, cholesterol and fractions, TG, blood pressure, blood glucose, insulin and HOMA), IL-6 and TNF- α .

Results: Generally, was found a positive association between levels of IL-1 β to IL-6 ($r = 0.24$, $p < 0.05$) and TNF- α ($r = 0.11$, $p < 0.05$) and negative association with DBP ($r = -0.10$, $p < 0.05$) and HDL-c levels ($r = -0.15$, $p < 0.05$). In male was found association with IL-6 ($r = 0.17$, $p < 0.05$), TNF- α ($r = 0.26$, $p < 0.05$) and HDL-c levels ($r = -0.17$, $p < 0.05$). In female, levels of IL-1 β were positively associated with triacylglycerol ($r = 0.18$, $p < 0.05$) and IL-6 ($r = 0.32$, $p < 0.05$).

Conclusion: The association of inflammatory markers with some CMR factors found in adolescents, mainly in the lipid profile, shows a possible early exposure of this population to CMR.

Reference

Després, J.P., Lemieux, I., Bergeron, J. et al. Abdominal obesity and the metabolic syndrome: contribution to global cardiometabolic risk. *Arter Thromb Vasc Biol*, 28:1039–1049, 2008.

T2:P.111

Obesity and cardiovascular diseases in adults and elderly in Croatia

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Introduction: Inappropriate dietary habits and inadequate physical activity resulting in obesity are the most common risk factors for cardiovascular diseases (CVDs) morbidity which are the leading cause of death in adults in industrialized countries.

Methods: 100 subjects of 40 to 70 ages were recruited for the study. Study encompassed short questionnaire used to collect data on dietary and lifestyle habits and morbidity of CVDs and anthropometric measurements used to determine weight, height, BMI, body fat percentage and visceral fat level.

Results: Although 64% of participants declared them self as persons who take care of their health, obtained data have shown that 55% of participants are overweight and 27% obese, leaving only 17% of participants in normal weight category. Body fat percentage was normal in only 17% of participants, while 29% of participants had high, and 52% very high body fat percentage. Visceral fat index was high in 39% of

participants. Results have also revealed that 61% has at least one of studied health problems (hypertriglyceridemia, hypercholesterolemia, hypertension, myocardial infarction and stroke) and 50% of those with health problems had more than one problem at the same time. 65% of participants have declared to believe that diet and physical activity can positively influence their health but dietary questionnaire has shown that their dietary habits are inadequate and knowledge on functional foods and dietary supplements low.

Conclusion: Having in mind awareness on positive impact of diet and physical activity on health, community interventions might help in lowering the incidence of CVDs.

T2:P.112

Weight change and risk of long-term death in overweight and obese Brazilian elderly

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Introduction: Weight loss recommendations for elderly with excessive weight may differ from adults. We aimed to evaluate the influence of weight changes on mortality of overweight/obese elderly (≥ 60 years) of the Bambuí (Brazil) Cohort Study of Ageing.

Methods: The proportional difference in weight between baseline (1997) and 2000 was calculated for participants who had body mass index (BMI) ≥ 25 kg/m² in 1997. Then, we classified weight loss, gain or stability as a $\geq 5\%$ decrease, $\geq 5\%$ increase or $< 5\%$ change in either direction, respectively. Cox models estimated hazard ratios (HR) and 95% confidence intervals (CI) for death up to the 11th year of follow-up, adjusted for weight change (stability, loss and gain; stability as reference), BMI at baseline, and demographic, lifestyle, clinical and laboratorial characteristics. We excluded smokers in sensitivity analysis.

Results: 578 of the selected participants (70% female, 10% smokers) had weight reassessed. 140 (24.2%) died during a mean follow-up time of 6.9 years. Weight loss ($n=147$, 26%) significantly increased the risk of death in comparison to stability ($n=359$, 62%; HR 1.52, 95% CI 1.03-2.25). Weight gain ($n=72$, 12%) showed a tendency to increase the risk of death (HR 1.64, 95% CI 0.99-2.70). Results were similar for non-smokers both for weight loss (HR 1.68, 95% CI 1.10-2.57) and gain (HR 1.77, 95% CI 0.99-3.18).

Conclusion: Due to an increased risk of death associated with weight change, promoting healthy lifestyle habits to maintain weight stability is probably more effective than weight loss to improve survival of overweight/obese elderly.

T2:P.113

Visceral obesity is a greater problem than obesity per se in the elderly Polish population

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Introduction: The aim of the study was to assess age-related prevalence of overweight and obesity as well as visceral obesity in the elderly Polish population.

Methods: Into the study 708 subjects in age 55–60 years (380 women and 328 men) and 4,624 in age 65–104 years (2,202 women and 2,422 men) were enrolled from PolSenior study population. Subjects of age 65–104 years were divided into 6 subgroups (65–70, n=770; 71–75, n=900; 76–80, n=812; 81–85, n=749; 86–90, n=773 and over 90 years n=620). Weight, height and waist circumference were measured and BMI was calculated. Obesity was diagnosed based on WHO criteria, while visceral obesity according to IDF criteria.

Results: Similar frequency of overweight and obesity diagnosed accordingly to BMI was observed in subjects in age 55–60 yrs and over 65 yrs (41.1% vs. 40.8% and 33.8% vs. 31.9% respectively). Also the prevalence of overweight in woman and men in age 55–60 yrs and over 65 yrs was similar (37.9% vs. 36.4% and 44.8% vs. 44.6%; 37.1% vs. 39.0% and 29.9% vs. 25.6%, respectively). In the elderly population frequency of visceral obesity was significantly higher than diagnosed on the basis of WHO criteria [80.8% vs. 31.9%; $p<0.001$; Kappa: 0.19 (95%PU: 0.18–0.20)], both in women and men [89.5% vs. 39.0%; $p<0.001$; Kappa: 0.13 (95%PU: 0.12–0.15) and 72.8% vs. 25.6%; $p<0.001$; Kappa: 0.21 (95%PU: 0.19–0.23), respectively]. The prevalence of visceral obesity was significantly greater among women than men (89.5% vs. 72.8%; $p<0.001$).

Conclusion: In the elderly Polish population the visceral obesity is the greater problem than obesity diagnosed on the basis of WHO criteria.

1. Conflict of Interest: None Disclosed

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T2:P.114

CBT of overweight: what factors influence on life satisfaction level?

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Introduction: We developed a short-term CBT programme with a basic 4-day intensive course, with optional support group sessions weekly for 1 year. Our aim was to affect a positive change in eating behaviour and weight loss while reducing the psycho-social consequences of obesity.

Methods: We have developed special psychological scale to describe 11 parameters: caloric restriction (800–1200 for females and 1000–1600 for males), split meals, selection of optional ration, determination of hunger and satiety; differentiation of hunger and appetite, expression of emotions, motivation keeping, providing non-food enjoyments, self-esteem, social support and assertiveness. We also used the Satisfaction with life Scale by E.Diener. 26 subjects were selected at random from 7 psychotherapeutic groups across 3 Russian cities.

Results:

Period	Weight, kg	Difference, % from initial weight	Life satisfaction scale	Difference, % from initial life satisfaction level
Initial	97.46±20.42		20.35±5.99	
4th day	95.91±20.21	-1.61±1.12	22.31±5.30	+15.36±32.02
1 month	91.96±19.02	-6.32±1.80	23.31±6.45	+19.58±34.85
3 month	85.97±17.99	-11.68±3.71	23.61±6.40	+24.57±45.13

Life satisfaction level has significant correlations with: on the 4th day - Body weight dynamic (0.42), Expression of emotions (0.41), Hunger-appetite (0.41); after 3 month - Non-food enjoyments (0.56), Expression of emotions (0.45), Selection of optional ration (0.44), Hunger-appetite (0.44), Assertiveness (0.39).

Conclusion: During initial weight loss period, we have found significant increasing of life satisfaction level. Basic factors, increasing life satisfaction level, were body weight dynamic, expression of emotions, differentiation of hunger and appetite, non-food enjoyments, selection of optional ration and assertiveness.

1. Conflict of Interest: None Disclosed

2. Funding: No Funding

T2:P.115

Health-related Quality of life (HrQoL) and psychopathology in pediatric obesity: An exploratory study

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Introduction: Obesity/overweight is a serious pediatric health condition that may be associated with lower HrQoL, more psychopathological problems and a higher dissatisfaction with body image (BI). Research on these variables is recent and there is still a gap in the study of the relations between them. This study aims to (1) investigate potential differences between children with obesity/overweight and children without a chronic health condition in generic HrQoL, psychopathology and BI; and to (2) explore the links between BMI and HrQoL and psychopathology, considering the child's age as a moderator.

Methods: The sample consisted of 150 children/adolescents with obesity/overweight and 197 healthy children/adolescents (8–18 years old). All children completed self-report instruments (DISABKIDS, KIDSCREEN and SDQ).

Results: Children/adolescents with obesity/overweight reported lower HrQoL, higher levels of psychopathology (emotional symptoms, behavioral problems, hyperactivity and problems with colleagues), and higher levels of BI dissatisfaction, comparing to healthy children. Regression analyses showed that higher BMI predicted poorer HrQoL (general, social inclusion and limitations), regardless of child's age.

Conclusion: These findings underline the need of a multidisciplinary intervention that includes psychological interventions, aimed at promoting children's HrQoL and psychosocial adjustment. Additionally, weight reduction seems to be essential not only for the improvement of child's physical health but also of their HrQoL, since it has been found that a poorer HrQoL was associated with increased BMI.

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T2:P.116

Association of physical activity with prevalence of depression, anxiety and level of self-esteem among participants of a sporting event in an adult Mexican population

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Introduction: Longitudinal studies report that higher prevalence of depression (D) and anxiety (A) has been determined between subjects with low levels of physical activity (PA). Also, that self-esteem (SE) may improve with PA. The purpose of this study was to evaluate the association of PA with the prevalence of D, A, and SE levels among adult participants of a sporting event held in the city of Tijuana.

Methods: The IPAQ-S was applied to 789 participants, as well as Rosenberg Self-Esteem Scale, Hamilton Anxiety Scale and Montgomery-Asberg Depression Scale. The level of education (LE), occupation, age and sex status were obtained. Weight and size evaluated using conventional methods and BMI calculated (kg/m^2). The data was analyzed by Spearman correlation coefficient.

Results: The mean age was 37.9 (18–59), 28% men, the BMI was of 27.4 kg/m^2 (17.2–53.2). The prevalence of A was 71.6%, D was 52.2%, and low SE was 36%. The PA correlate negatively with the prevalence of D (-0.118 , $p<0.05$) and A (-0.164 , $p=0.005$). There was no significant correlation of the PA with the SE level. The prevalence of A correlate with BMI (0.201, $p=0.001$). The prevalence of D and A were positively correlated with the occupation (0.15, $p<0.01$; 0.127, $p<0.05$), and negatively with LE (-0.20 , $p<0.001$; -0.134 , $p=0.01$).

Conclusion: These findings indicate that the prevalence of A may increase the prevalence of OW/O. Therefore, the PA and the LE may help reduce the prevalence of D and A in the population of Tijuana.

1. **Conflict of Interest:** None Disclosed

2. **Funding:** No Funding

T2:P.117

Psychological profile in patients after acute myocardial infarction related to obesity

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Introduction: Previous studies agree that post-myocardial infarction (MI) anxiety and depression occur unrelated to the severity of MI and other medical factors. The aim of this study was to determine obesity-related psychological factors in patients after MI.

Methods: The study included 109 men and 28 women during the first month after acute MI. There were 30% of overweight men in the sample, while 58% of them had obesity grade I. We found 11% overweight women, while 71% of them were in the range of obesity grade I. All patients completed questionnaires related to psychological functioning: anxiety, depression, anger expression and control, body dissatisfaction, and binge eating.

Results: In the sample, 11% patients showed anxiety symptoms, while 2.8% were depressed, 22.5% had difficulty controlling anger, and 27.4% problems with anger expression. In the sample, there were 9.5% patients with symptoms of binge eating. We obtained a significant difference in body dissatisfaction and binge eating symptoms in patients with different obesity degrees. Obesity patients grade II and III were dissatisfied with their body compared to overweight patients. Obesity grade I patients were significantly more dissatisfied and more likely to overeat than overweight patients were.

Conclusion: Anxiety, anger and binge eating are significant psychological determinants of overweight and obese post-MI patients that inevitably define the overall approach to the treatment. Additional studies are needed to confirm our results and to compare them with those in patients after acute MI and normal BMI.

T2:P.118

Questionnaires Identify Unrecognised Burden of Depression in those with Obesity

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Introduction: Research demonstrates a higher incidence of obesity in people with anxiety and depression. We studied the prevalence of anxiety and depression in obese patients attending a multi-disciplinary Weight Management Clinic.

Methods: Proof of concept retrospective pilot study in 152 patients referred was undertaken. Personal health questionnaire9 (PHQ9) and Generalised anxiety Depression 7 (GAD7) questionnaires using standard cut off scores >9 were used to identify depression and anxiety. We included patients with Body Mass Index (BMI) >35 Kg/m² without previous mental illness. Scores were collected prior to first clinic visit. Linear and binary logistic regressions were used to look for association for continuous and categorical variables respectively using STATA version 11.

Results: The mean age was 47.8 years (74% females), mean BMI 44.6 and 27.3% had diagnosed depression who were excluded in subsequent analysis. Using standard criteria, 47.7% and 29.3% had depression using PHQ9 and GAD7 respectively, as yet unidentified. The median (IQR) PHQ9 and GAD7 scores were 9(9) and 5(9) respectively.

In a linear regression model, only age appears to be independently associated with both PHQ9 and GAD7 scores negatively. Using PHQ9,

only age (OR: 0.92 to 0.99) and presence of IHD (OR: 1.18 to 29.9) is significantly associated with depression and using GAD7 no comorbidities are associated.

Conclusion: Use of these validated depression scores appear to identify an additional burden of depression in obese people. This would help in individualising psychological interventions thereby improving outcomes in a weight management clinic and reducing dropout rates.

T2:P.119

Psychological wellbeing changes associated with weight loss in obese subjects

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Introduction: The positive impact of weight loss on physical health is well documented. Less is known about the impact of weight loss on psychological wellbeing. Obese people appear to have a greater prevalence of anxiety, depression and low self-esteem. Anxiety and depression often co-exist as do obesity and depression. As the evidence for a relationship between obesity and mental health builds understanding changes in psychological health and wellbeing as part of weight management becomes more necessary.

Method: The Motivate Program, a structured program was developed to help patients with chronic conditions. All patients were refractory to conventional weight management therapy. The program was delivered by specifically trained staff in bi-weekly group sessions for 6 months. Key components included eating habits, activity habits and behavioural tools. 180 participants completed ≥75% of the sessions. Psychological wellbeing was measured using the SF36v2 health survey, Hospital Anxiety Depression Scale (HADS), and the clinical outcomes in routine evaluation (CORE).

Results: Participants achieved a mean weight loss of 6% at 6 months (p<0.001). Significant positive changes were also found in each of the psychological measures. SF-36v2 showed significant improvements in vitality (p<0.001), mental health (p<0.001) and in the summary score for mental health (p<0.05). HADS indicated significant improvements in anxiety (p<0.01) and in depression (p<0.01). CORE showed significant improvements in life functioning (p<0.01), wellbeing, problems/symptoms, total score and total score (risk removed) (all p<0.001).

Conclusion: The study demonstrated that weight management using a behavioural approach can improve some aspects of psychological wellbeing in obese patients.

T2:P.120

Changes in self-esteem associated with weight change in longer-term participants of a commercial weight management programme

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Introduction: This study examined associations between weight-loss and self-esteem in 292 (277 women and 15 men) longer-term members of a commercial weight management programme (CWMP), Slimming World.

Methods: Change in self-esteem was measured with a modified version of the Rosenberg self-esteem questionnaire and responses were adapted to 5-point Likert scales. Participants were asked to complete the questionnaire at one time point, to rate their self-esteem both retrospectively for when they joined, and at present. Associations between dimensions of self-esteem and weight change were examined by regression analysis.

Results: Mean (SD) joining weight was 89.0 (20.0) kg, time taken to reach current weight was 16.3 (13.5) months. Mean (SD) weight change was -15.6 (11.4) kg and BMI change was -5.7 (4.0), (both p<0.001), maintained for 11.7 (12.8) months. Percent variance in weight change associated with each component of self-esteem is given in parentheses. Participants' initial reported lack of self-respect (3.0%), lack of self-pride (2.4%) and sense of failure (3.9%) all decreased (all p<0.001) in

association with reaching their current weight. Self-satisfaction (12.8%), feelings of self-achievement (10.6%), positive attitudes towards themselves (9.9%), sense of self-worth (10.6%) and self-efficacy (7.3%) all significantly increased (all $p < 0.001$). Multiple regression models including age, gender, height and start weight accounted for 35.4% of the variance in weight change. Adding self-esteem components increased the variance explained to 50.4%.

Conclusion: Successful weight-loss was associated with reported improvements in self-esteem in members of a CWMP.

T2:P.121

Relationship between maternal feeding practices and overweight children's body dissatisfaction

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Introduction: The objective of this study was to explore the relationship between maternal feeding practices and verbalizations, and their children's body dissatisfaction and weight loss activities.

Method: Participated 94 girls and 74 boys between seven and 11 years old ($M = 8.9$; $SD = 1.3$; 78 normal weight and 78 overweight), and their mothers ($MBMI = 25.5$; $SD = 4.3$). We used the Collins' body-figures continuum to evaluate children's body dissatisfaction. Also, children were asked if they had ever carried out some activities to lose weight. Mothers answered Restriction and Pressure to eat subscales from the Child Feeding Questionnaire, and one Questionnaire on Verbalizations about Body Figure and Physical Appearance built ex professo for this study.

Results: Overweight children were more dissatisfied with their body ($t(154) = 7.761$, $p < .01$, and reported more activities in order to lose weight ($t(129.142) = -4.671$, $p < .01$ than normal weight children. Also, only into the overweight children's group, but not into the normal weight group, those whose mothers verbalized more tended to be more dissatisfied with their own body figure, and those whose mothers verbalized more and used to restrict their children's feeding, mentioned more activities in order to lose weight. In the case of the normal weight group, none significant relation was found.

Conclusions: One possibility is that mothers exert these behaviours as a consequence of their children's high weight, or that their children's weight is the result of the mother's feeding practices, as some studies suggest.

T2:P.122

Aspects of emotion recognition in obese and normalweight adults

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Introduction: As repeatedly described in the literature, patients with eating disorders (anorexia, bulimia) have problems with experiencing, describing and identifying their own emotions which implicates an association with the construct of alexithymia. Empirical studies that focus on this association in obese adults are scarce and show inconsistent results. Furthermore, the ability to recognize and to identify emotional cues in the environment has been rarely studied in obese adult. Results of the few existing studies suggest that obese subjects have a diminished ability to decode nonverbal expressions of emotions. The present study aims at comparing obese and normalweight adults regarding their alexithymic characteristics, their ability to decode facial emotional cues, and to understand emotions. We expect obese adults to have greater deficits in recognizing and understanding emotions and to show alexithymic characteristics to a higher extend.

Methods: The sample consists of $N=306$ adults ($n=117$ obese adults with a $BMI \geq 30$ and $n=189$ normalweight adults with a BMI 18.5 to 24.9). We used the Toronto Alexithymia Scale and the subscales C and

G of the Mayer-Salovey-Caruso Emotional Intelligence Test a as well as an experimental task where the subjects were supposed to find the correct out of 8 response options to name facial expressions of emotions.

Results: At the moment, data analyses are still in process. Preliminary results suggest that obese women show alexithymic characteristics to a higher extend than normalweight women whereas obese men don't differ from nonobese. Detailed analyses will be presented and discussed.

1. Conflict of Interest: None

2. Funding: This work was supported by the Federal Ministry of Education and Research (BMBF), Germany, FKZ: 01EO1001.

T2:P.123

Omega-3 fatty acids intake is associated with a decline in depressive symptoms in subjects with metabolic syndrome

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Introduction: Metabolic syndrome (MetS) and depression are both important public health problems. It has been demonstrated that MetS may be an important predisposing factor for the development of depression, but less is known about the impact of MetS dietary treatment on relieving depression. Mediterranean diet has been associated with reduced prevalence and incidence of both MetS and depressive symptoms. The aim of the present study was to examine the effects of an energy-restricted diet, with Mediterranean dietary components, for reducing metabolic syndrome on self-perceived depression.

Methods: A total of sixty-one male and female subjects (Age: 49 ± 10 y; $BMI: 36.1 \pm 4.3$ kg/m^2) with metabolic syndrome (according to the IDF criteria) were rated for depressive symptoms using the Beck Depression Inventory (BDI). Subjects followed a hypocaloric diet (-30% energy restriction) with Mediterranean dietary components for six months. BDI questionnaire, adherence to the diet, anthropometric and biochemical variables were analysed.

Results: About 28% of the subjects presented self-perceived depression (BDI score ≥ 10) at baseline (BDI score: 14.5 ± 6.5). After six months of dietary treatment and with the subsequent weight loss (8.4 ± 5.3 kg; $p < 0.001$), only 7% of the subjects reported a BDI score ≥ 10 . The decline in depressive symptoms was significantly associated with a higher consumption of omega-3 fatty acids during the dietary treatment (adjusted $R^2 = 0.078$, $p = 0.022$).

Conclusions: This study evidenced that an effective hypocaloric diet with Mediterranean dietary components, not only decreases body weight, but also improves self-perceived depression traits in subjects with MetS, being this improvement related with a higher consumption of omega-3 fatty acids.

1. Conflict of Interest: None Disclosed

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T2:P.124

Psychological variables associated with weight loss in obese patients

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Introduction: Lifestyle modification measures achieve significant and sustained weight loss in only a small minority of obese patients. These study aims to characterize this subtype of patients in terms of individual psychological functioning.

Methods: Twenty obese patients with weight loss (more than 10% of initial weight) and maintenance for at least two years, and fourteen control couples without weight loss throughout the same period, completed the instruments: Acceptance and Action Questionnaire, Multidimensional Scale of Perceived Social Support, Proximity and Connection to Others Scale; Internalized Shame Scale, Other as Shamer Scale, Functions of Self-Criticizing/Attacking Scale; Mindful Attention Awareness Scale, Figural Rating Scale; Rumination/Reflection Questionnaire, Social Comparison Scale, Self-compassion Scale, Depression Anxiety and Stress Scale and Brief Symptom Inventory.

Results: There were no significant differences in socio-demographic and clinical characteristics between groups. Control group scored higher in measures of Brief Symptom Inventory ($p=0,033$) and showed higher difference between the actual silhouette and silhouettes perceived as ideal, socially valued or more attractive for the opposite sex ($p<0,001$). Study group scored higher in Scale of Perceived Social Support ($p=0,006$), Proximity and Connection to Others Scale ($p=0,02$) and Self-Compassion Scale ($p=0,009$).

Conclusions: In study group, higher levels of perceived social support are probably associated with lower levels of depression and anxiety. These patients also demonstrated compassionate and empathetic attitude toward oneself, helping to explain the success of weight loss measures. Obese patients who didn't lose weight reported body size dissatisfaction and clinically relevant psychological symptoms. Taken together, these data can be used to support therapeutic decisions.

T2:P.125

Body shape and the related factors in Japanese university students

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Introduction: The aim of our study is to clarify the body shape and the related factors in Japanese university students.

Methods: The subjects were 621 students in central Japan (348 males and 273 females). Male students were all coed university students. Out of 273 female students, 154 females were coed university students, and 119 females were women's university students. The survey was conducted using an anonymous self-administered questionnaire. The questionnaire clarified the subjects' physical status, lifestyles, eating behaviors (Eating Attitudes Test 20), perception of body shape, and other factors related to eating.

Results: Six percent of all males were overweight (body mass index (BMI) ≥ 25), 13% were underweight (BMI < 18.5), and 81% were normal weight ($18.5 \leq \text{BMI} < 25$). Three percent of all females were overweight, 19% were underweight, and 78% were normal weight. Ideal body shape was large comparing with their current body shape in males, but small in females. The underweight was associated with low ideal-

BMI and inexperience of diet in both males and females. The underweight was associated with a concern with body weight in females, but with unconcern with body weight in males.

Conclusion: These results indicated that factors related to body shape were different between males and females in Japanese university students.

1. **Conflict of Interest:** None disclosed

2. **Funding:** No funding

T2:P.126

Narratives in obese adults with depressive symptoms participating in an interdisciplinary therapy: a phenomenological study

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Introduction: Obesity is a chronic disease that globally affects men and women. It is an inflammatory condition characterized by the accumulation of adipose tissue. Depression is a common mood disorder in contemporary society that can be an obesity-related disease. The object of this research is to perform a phenomenological study of experiences and meanings of depressive symptoms in obese adults participating in an interdisciplinary therapy. The study is done through collection of narratives, an effective qualitative method to analyze the intersection between individuals and the context in which they live (PAULILO, 1999).

Methods: Five women with moderate depressive symptoms, detected by the Beck Depression Inventory (1996), between thirty and fifty years old, participating in an interdisciplinary therapy were selected for the interviews. Oral interviews were performed with each woman to collect narratives, then, they were recorded and transcribed. Meaning units are identified in the narratives, and then organized by their convergences, divergences and idiosyncrasies (MARTINS, 1992).

Partial Results: In general, all the women interviewed emphasized in the narratives a specific moment in their lives that turned the past into a negative time. It looks like the review of the past before this moment is indifferent.

Conclusion: The present, for these women, is a reflection of a specific event in life that turned the past into a negative time, nevertheless, there are two possibilities to deal with this event that happened in the past: actively or passively.

T2:P.127

Ideal body image and eating behaviors in Japanese young adults

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Introduction: The aim of the present study is to verify the ideal body image in Japanese young adults, focusing on gender difference, and to investigate the relation between ideal body image and eating behavior.

Methods: The subjects were 618 Japanese university students (ages: 18-23 years). The anonymous self-administered questionnaire was conducted. The questionnaire clarified the subjects' physical status, perception of body shape, and eating behaviors (Dutch Eating Behavior Questionnaire (DEBQ)).

Results: In males, the ideal body weight and body mass index (BMI) were higher than the current body weight and BMI. In females the ideal body weight and BMI were lower than current body weight and BMI. The ideal body shape was smaller than the perception of current body shape in females. In addition, the scores of restraint, emotional, and external eating of DEBQ were higher in females than those of males. Furthermore, the scores of these 3 eating behaviors were higher in

females than males in normal-weight subjects, and restraint eating and external eating were higher in females than males in underweight subjects.

Conclusion: These results indicate that there is a gender difference in ideal body shape and the difference is associated with different eating behavior.

1. Conflict of Interest: None disclosed

2. Funding: No funding

T2:P.128

Evidence against response competition as a factor in acute rimonabant anorexia

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Introduction: Preclinical research suggests that the acute anorectic effect of cannabinoid CB1 receptor antagonist/inverse agonists in rats is occurs as an indirect consequence of response competition from compulsive scratching and grooming. As rimonabant's pruritic effects can be attenuated by the opioid receptor antagonist naloxone, we directly tested the hypothesis that naloxone co-treatment would block acute rimonabant anorexia.

Methods: Subjects were fully habituated adult male Lister hooded rats. Behavioural satiety sequence (BSS) methodology was used to profile the effects of an anorectic dose of rimonabant (1.5mg/kg, IP) in the presence/absence of naloxone (expt 1: 0.01, 0.1mg/kg; expt 2: 0.05mg/kg, IP).

Results: In both studies, rimonabant significantly suppressed food intake and time spent eating while simultaneously inducing compulsive scratching and grooming. In expt 1, although 0.1 mg/kg naloxone weakly attenuated rimonabant's effects on ingestive and compulsive behaviours, the higher dose of 1.0 mg/kg suppressed the compulsive measures but did not significantly affect the anorectic response. In expt 2, a mid-range dose of naloxone (0.05mg/kg) markedly attenuated the compulsive grooming and scratching induced by rimonabant but did not impact the anorectic effect of the compound. The apparent independence of the ingestive and compulsive effects of rimonabant was further confirmed by the "normalization" of behavioural structure (BSS), but not of peak feeding behaviour, under naloxone co-treatment.

Conclusion: These data strongly suggest that the acute anorectic response to rimonabant is not secondary to compulsive scratching and grooming.

1. Conflict of Interest: None disclosed

2. Funding: Supported by the Institute of Psychological Sciences, University of Leeds

T2:P.131

Assessment of body image as prognosis in weight maintenance

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Objectives: To assess body image perception and satisfaction in recovered obese patients who maintain their weight.

Method: 76 patients (28 men, 48 women), 27-70 years (mean 50), who maintain their weight with a normocaloric diet, motivational groups and physical activity, after losing, at least, 10 kilos (average 36 kilos). A method adapted from Stunkard and Stellard is used, with 9 anatomical models according to sex, with BMI of 17 to 33. The patients choose the model that most closely represents them and the figure they would ideally like to have. Height and weight are measured, and real, perceived and desired BMI are calculated.

Results: as regards self image perception, 58.3% of women and 62.5% of men look themselves almost as they really are; 12.5% of women look themselves fatter, and 29.2% thinner; 37.5% of men look themselves thinner. According to the degree of apparent satisfaction with the self

image, 83% of women and 76% of men would like to have a slender image than that achieved.

Conclusions: Most patients do not show body schema distortion, but they would like to be thinner after an average of 2 years of weight maintenance. We are going to continue investigating whether the ideal image is a motivator as it increases the demand with the body and avoids weight regain, or a dissatisfaction factor threatening the achievement.

T2:P.133

Weight satisfaction mediates the relationship between weight status and health-related quality of life in Australian but not in Tongan secondary school children

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Introduction: This study investigated the effect of weight satisfaction on the relationship between weight status and health-related quality of life (HRQoL) in secondary school children in a higher income country, Australia, and a lower income country, Tonga.

Methods: Participants were 12–18 year old children from the Pacific Obesity Prevention in Communities (OPIC) Project; 2951 from Australia and 2163 from Tonga. Height and weight were measured and weight status classified using IOTF-BMI cut-offs. Self-reported HRQoL was assessed by the PedsQL, and an additional question measured weight satisfaction.

Results: Overweight/obesity prevalence was 26% in Australia and 43% in Tonga. Weight dissatisfaction was 16% in Australia and 26% in Tonga. In Australia, overweight and obesity were associated with a lower HRQoL, while in Tonga, there was no association between overweight and HRQoL, and obesity was associated with a higher HRQoL. In both countries, higher weight status was associated with a lower weight satisfaction, but more so in Australia. Furthermore, a lower weight satisfaction was associated with a lower HRQoL. Inclusion of all three factors in the model showed that weight dissatisfaction fully mediated the weight status-HRQoL relationship in Australia, but had only a minor effect on the relationship in Tonga.

Conclusion: For Australian children, weight dissatisfaction explained the low HRQoL associated with overweight or obesity. For Tongan children, the combined presence of obesity, body dissatisfaction yet higher HRQoL remains unexplained. Economic and socio-cultural influences are important contextual factors in Tonga and further studies may uncover their influences on weight satisfaction and HRQoL.

1. Conflict of Interest: None Disclosed

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T3/T4:PS1 – Guided Posters

T3T4:P.001

Longitudinal change in BMI, overweight, and obesity and the influence of lifestyle factors in the Stockholm Public Health Cohort (2002–2010)*de Munter JSL, Tynelius P, Rasmussen F*

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Background: Recent reports have shown that overweight and obesity are still rising, including in Sweden. It is unclear whether the recent rise in weight is due to an increase in unfavorable lifestyle. Therefore, this study aims to identify the current association between lifestyle and longitudinal weight status in Stockholm County.

Methods: Study subjects were participants of the Stockholm Public Health Cohort (2002–2010, $n=63909$). BMI (kg/m^2), overweight/obesity ($\text{BMI} \geq 25$) and obesity ($\text{BMI} \geq 30$) were calculated from self-reported height and weight. We used adjusted regression models and population attributable fractions (PAF) to assess the impact of self-reported lifestyle factors (smoking, physical activity, alcohol, and fruit intake) and weight status.

Results: On average participants gained weight between 2002 and 2010. Among women, mean BMI increased with 0.45 (95%CI:0.39–0.51) kg/m^2 , and the prevalence of overweight ($\text{RR}=1.12$, 95%CI:1.09–1.15) and obesity also increased ($\text{RR}=1.38$, 1.30–1.47). The pattern was similar for men. Lifestyle factors were related to weight status, for example, inactive men were more obese in 2010 ($\text{RR}=2.17$, 1.88–2.52) than the most active men. Adjusting for multiple lifestyle factors attenuated the increase in BMI, but could only explain the increase partially. The PAF for a healthy lifestyle was 22.0% (95%CI:18.0–25.8) for overweight and 40.7% (32.5–48.0) for obesity in women and, respectively, 13.1% (10.0–16.1) and 41.4% (33.2–48.5) in men.

Conclusion: The most recent increase in weight was to a considerable extent explained by unfavorable lifestyle factors. Physical activity had the strongest influence on BMI, which underlines especially the importance of continuing efforts to stimulate physical activity in society.

T3T4:P.002

Sleep duration and overweight: A “U-shaped” association only in current smokers*Villier A^{1,2}, Fagherazzi G^{1,2}, Lajous M¹, Clavel-Chapelon F^{1,2}*¹INSERM U1018, Center for Research in Epidemiology and Population Health (CESP), Villejuif, France, ²Paris South Univ, Villejuif, France

Background: The association between sleep duration and obesity has already been widely studied, but less is known about potential interactions with smoking.

Material & Methods: In 2005, 45,599 women from the E3N cohort were asked to report information on sleep duration, body mass index (BMI), waist and hip circumferences (WC, HC). Multivariate logistic regression models were used to estimate odds ratios (OR) and 95% confidence intervals (95%CI) of being overweight ($\text{BMI} \geq 25 \text{ kg/m}^2$) or being above the third quartile of the WC ($>86 \text{ cm}$) and HC ($>103 \text{ cm}$) distributions, according to sleep duration categories ($<7 \text{ h}$, $7\text{--}9 \text{ h}$, $\geq 9 \text{ h}$).

Results: Linear trends in the risk of being overweight ($p=0.0002$) or having a $\text{WC} > 86 \text{ cm}$ ($p<0.0001$) with increasing sleep duration were observed. Compared to women who slept between 7 and 9 h/day, those who slept $\geq 9 \text{ h}$ were at increased risk of being overweight ($\text{OR}=1.21$ [1.15–1.28]) or to have a $\text{WC} > 86 \text{ cm}$ ($\text{OR}=1.33$ [1.26–1.41]). We found a significant interaction between smoking status and sleep duration for both BMI ($p=0.0029$) and WC ($p=0.0044$). Results among non-smokers or ex-smokers were similar to those above, but in current smokers, a “U-shaped” association was detected. Women who slept $<7 \text{ h}$ or $\geq 9 \text{ h/day}$ were at increased risk of being overweight ($\text{OR}=1.48$ [1.15–1.91] and 1.15 [0.91–1.45] respectively) or to have a $\text{WC} > 86 \text{ cm}$ ($\text{OR}=1.52$ [1.18–1.97] and 1.41 [1.12–1.78] respectively). Associations for HC were weaker than those for WC.

Conclusion: Short and long sleep durations were strongly associated with an increase in odds of being overweight, but among smokers only. Our results should encourage other studies to focus on potential mechanisms linking sleep duration and corpulence, especially abdominal obesity.

T3T4:P.003

Quantitative evaluation of the Jamie Oliver Ministry of Food Program, Ipswich, Australia*Flego A¹, Herbert J¹, Moodie M¹, Swinburn B^{3,4}, Gibbs L², Keating C¹, Waters E²*¹Deakin Health Economics, Faculty of Health, Deakin University, Melbourne, Australia, ²The McCaughey Centre, Melbourne School of Population Health, University of Melbourne, Melbourne, Australia, ³WHO Collaborating Centre for Obesity Prevention, Deakin University, Melbourne, Australia, ⁴School of Population Health, Faculty of Medical and Health Sciences, University of Auckland, Auckland, New Zealand

Introduction: Community-based programs aimed at improving cooking skills, cooking confidence and individual eating behaviours have flourished in recent years. Whilst evidence exists of their effectiveness, only small behavioural changes have been reported and limitations in study design may have impacted on results.

Jamie Oliver's Ministry of Food (JMoF) is arguably the most well-known community cooking skills program having enjoyed considerable interest synonymous with the celebrity chef himself. Established in the United Kingdom, the program has been adapted for Australia and started in 2011 in Ipswich, Queensland. To date, evaluation of the program is limited. This presentation outlines the quantitative evaluation of the JMoF Australia program.

Methods: The design is non-randomised, pre-post comparing an intervention and a wait-list control group with repeated measures at baseline, program end (10 weeks) and 6 months post completion. Data collection is from January 2012 until late 2014. Primary outcome measures are change in cooking confidence and change in self-reported mean vegetable intake. Secondary measures include change in individual cooking/eating behaviours and social connectedness/self-esteem. A sample of 250 participants per group will enable detection of a mean change of 0.5 serves per day of vegetables (80% power). Magnitude of change within and between groups will be determined using split-plot in time ANOVA's for continuous variables and chi-squared analysis for categorical variables.

Results: Characterisation of the baseline aggregate sample will be presented.

Conclusion: This evaluation will provide quantitative evidence of the effectiveness of the JMoF program in improving health and wellbeing and producing dietary behaviour change.

1. Conflict of Interest: The authors wish to declare that the evaluation has been commissioned by The Good Foundation.

2. Funding: Research relating to this abstract was funded by The Good Foundation.

T3T4:P.004

Vivons en Forme (VIF) Programme: Evaluation of the role of the national coordination on local stakeholders*Roy C², Sotty E², Tracq-Sengeissen I³, Brunagel M³, Romon M¹*¹EA 2694 universite lille2, Lille, France, ²FLVS Association, Roubaix, France, ³ERNST and Young Company, Paris, France

Introduction: Vivons en Forme, (VIF) is an EPODE-like program involving 250 towns. EPODE has been described as a large-scale, centrally coordinated, capacity building approach for communities to implement effective and sustainable strategies to prevent obesity. The program relies on strong political will and a national coordination team providing local program managers and communities with information to facilitate implementation of actions and evaluation. As implementation of the program relies on a strong involvement of local politics and

managers, the aim of this study is to assess if the national coordination team answers to the needs of local managers.

Methods: Qualitative interviews with local program stakeholders and national policy actors were conducted and completed by questionnaires sent to local projects managers. Analysis was guided by the question: what is the added value of the program in relation to the expectations of local stakeholders

Results: The program is seen to have an added value through stimulation and of capacity building of stakeholders particularly for towns starting the program. Communication tools targeting parents and children are used by the majority of the towns. Local managers need more help to assess the health impact of the interventions.

Conclusion: The programme VIF is seen to contribute to structure local public action on diet and physical activity and to facilitate the involvement of local stakeholders. Local evaluation is now necessary to enhance the ability of the towns to implement strategies to tackle obesity tailored to the needs of their population.

1. Conflict of Interest: VIF is funded by Orangina -Schweppes, Nestle Foundation, Ferrero, Kellogg

2. Funding: Research relating to this abstract was funded by Ferrero and Nestle Foundation...

T3T4:P.005

Adipose tissue trans fatty acids and changes in body weight and waist circumference

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Introduction: Previous studies have suggested that intake of *trans* fatty acids (TFA) may play a role in the development of obesity. For fatty acids not synthesized endogenously in humans, such as TFA, the proportions in adipose tissue tend to correlate well with the habitual dietary intake. Biomarkers may provide a more accurate measure of habitual TFA intake than dietary questionnaires. Our objective was to investigate the associations between specific TFA in adipose tissue and subsequent changes in body weight and waist circumference (WC).

Methods: TFA concentrations in adipose tissue biopsies from a random sample of 1869 men and women aged 50-64 y drawn from a large Danish cohort study were determined by gas chromatography. Baseline data on weight, WC and potential confounders were available together with information on weight and WC five years after enrolment. TFA were divided into: total 18:1t, 18:1 Δ6-10t, vaccenic acid (18:1 Δ11t) and rumenic acid (18:2 Δ9c, 11t). The data were analysed using multiple regression with cubic spline modelling.

Results: The median proportion of total adipose tissue 18:1t was 1.17 % (90 % central range: 0.72, 1.74) in men and 1.13 % (0.74, 1.71) in women. No significant associations were observed between total 18:1t, 18:1 Δ6-10t, vaccenic acid or rumenic acid and changes in weight or WC.

Conclusion: The present study suggests that the proportions of specific TFA in adipose tissue are not associated with subsequent changes in body weight or WC within the exposure range observed in this population.

1. Conflict of Interest: None disclosed

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Strategic Research (Contract 2101-06-0005). The Danish Cancer Society financed the Diet, Cancer and Health cohort study.

T3T4:P.006

Comparison of intervention and cohort study of dietary protein in body weight regulation – reconciling opposing evidence?

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Introduction: Physiological evidence indicates that high protein diet may increase satiety, thermogenic response and decrease subsequent caloric intake. Thus diet high in protein might prevent weight gain and weight regain following weight loss. Clinical trials, including the Diet, Obesity and Genes trial (DiOGenes), show such effect. Large-scale, long-term, observational cohort studies suggest the opposite effect i.e. higher protein diets may increase body weight. Discrepancy between trials and cohort studies could be that individuals recruited for trials are a subset of the population in cohort studies important for the effect of protein. The aim of this study is to investigate explanations of the discrepancy by analyzing different subsets on participants in a cohort study.

Methods: Subsets (n=936) of the Diet, Cancer and Health (DCH) cohort (n=57,055) comparable with the DiOGenes trial (n=548) was selected based on inclusion criteria of DiOGenes, matching DCH-participants with DiOGenes-participants on exposure and different possible confounders and finally analyzed similar to DiOGenes.

Results: When matching on protein intake, glycemic index and body fat % a high protein intake was associated with better weight maintenance compared with low protein intake indicating similar effect as the DiOGenes trial. However, the association of protein on weight change did depend on matching criteria and the statistical analysis.

Conclusion: The association between dietary protein intake and subsequent body weight changes appears to depend on the selection characteristics of the participants and the statistical analysis, which may reconcile the otherwise contrasting evidence from physiological and clinical human experiments and large-scale cohort studies.

T3T4:P.007

Correlation between BMI change and health care utilisation of outpatient visits in a German adult population

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Objective: The aim of this study is to analyse the correlation between body weight changes (BMI-categories) and outpatient utilisation of a general adult population.

Methods: Health care utilisation of outpatient visits including GPs, internists, gynaecologists, surgeons, orthopaedists, urologists, ophthalmologists, dermatologists, neurologists, psychotherapists, and others were based on data from 5,147 participants of four population-representative health surveys (baseline surveys: MONICA-S3 1994/95 and KORA-S4 1999/2001; follow-ups: KORA-F3 2004/05 and KORA-F4 2006/08) in Augsburg, Germany. Generalized linear regression

models with negative binomial distribution adjusted for sex, age and socioeconomic status (SES) were calculated.

Results: Compared to the people who maintain normal weight, the average utilisation of GPs by formerly normal weight participants who gain weight were estimated to be +37%. People who maintain preobesity were estimated to have +35% of GP visits, those who gain weight after preobesity +44% or those who maintain severe obesity +97%. In the case of internists, participants who maintain moderate obesity (+134%) or severe obesity (+78%) and those with weight gain from moderate obesity reported +93% more visits. The latter group also had +68% more consultations with other physicians. GP utilisation was lower in middle to high SES groups, while all utilisation rates increased with age.

Conclusion: There is a trend for higher outpatient physician utilisation when people gain weight or stay overweight/ obese during 7- to 10-years. Future research should further analyse the associations between weight development and health care utilisation. Potential cost savings could be accomplished if preventive programs effectively targeted these individuals.

T3T4:P.008

Sustainable prevention of obesity through integrated strategies: The SPOTLIGHT project's conceptual framework and design

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Introduction: It is suggested that effective interventions to prevent obesity through lifestyle behavioural change should address both the individual and the environment, in a systems-based multi level approach. Guided by an extensive socio-ecological model, the EU-funded SPOTLIGHT project aims to increase and combine knowledge on the wide range of determinants of obesity in a systematic way, and to identify multi-level intervention approaches that are strong in terms of Reach, Effectiveness, Adoption, Implementation and Maintenance (RE-AIM).

Methods: SPOTLIGHT comprises a series of systematic reviews on: individual-level predictors of success in behaviour change obesity interventions; social and physical environmental determinants of obesity; the use of remote imaging techniques to assess the physical environment; and on the RE-AIM of multi-level interventions. An interactive web-atlas of European multi-level interventions will be developed, and enhancing and impeding factors for implementation will be described. Obesogenicity of neighbourhoods will be assessed using remote imaging techniques linked to geographic information systems. Survey data on health and lifestyles of adults residing in the mapped neighbourhoods will be linked to the obesogenicity, to examine the influence of the environment on obesity.

Discussion: SPOTLIGHT offers the potential to develop approaches that combine an understanding of the obesogenicity of environments, and thus how they can be improved, with an appreciation of the social and individual factors that explain why people respond differently to such environments and interventions. Its findings will inform a broad range of stakeholders engaged in studying, developing and implementing policies to tackle the obesity epidemic in Europe.

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T3T4:P.009

Maternal and paternal education is both directly and through the parent's own BMI indirectly associated with overweight in children

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Introduction: Childhood overweight is known to associate with parental BMI and socioeconomic factors of the family. However the interrelationships and potential causal pathways between socioeconomic variables, parental BMI and childhood overweight have been less intensively explored.

Methods: The cross-sectional LATE-study was carried out in child and school health care in Finland in 2007–2009. The data for the analyses consisted of 4409 children; younger age-group: 3–5-years-olds and 1st grade (6–8 y) students and older age group: 5th (11–12 y) and 8th, 9th grade (14–16 y) students. Associations between parental BMI, education and labour market status, family type, and child overweight were examined by logistic regression analyses. Parental education and BMI had the most consistent association with children's overweight. The direct effects of maternal and paternal education and indirect effects through BMI were assessed using a path model.

Results: Parental BMI and education were the strongest predictors of childhood overweight. Children of overweight parents had significantly increased risk of being overweight in all age and gender groups. Maternal and paternal education had direct negative effects, both alone and together, on overweight among the younger boys. Paternal education had a direct negative effect on overweight also among the older boys. An indirect effect of maternal education, mediated by the mother's own BMI, was found among the older boys and girls.

Conclusion: To reduce the increasing trends of childhood obesity, there is a need for evidence-based interventions tailored for families with low socioeconomic status and identified with overweight problems.

1. Conflict of Interest: None

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T3T4:P.010

Interpregnancy weight retention and risk for adverse perinatal outcomes: An epidemiological study

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Objective: We examined interpregnancy weight retention from the first to the second pregnancy and the risk for adverse perinatal outcomes during the second pregnancy.

Method: A regional Belgian cohort of women who had their first two consecutive singleton births between 2009 and 2011 was used (N=7468). Multivariate logistic regression models, adjusting for relevant confounding variables were constructed.

Results: Mean pre-pregnancy BMI between the two first consecutive pregnancies increased from 23.3 kg/m² (SD 4.0) to 23.9 kg/m² (SD 4.4)

($p=0.0001$). Risk for pregnancy induced hypertension (PIH) and gestational diabetes mellitus (GDM) in the second pregnancy was increased with 28% ($p<0.0001$) and 20% ($p=0.001$) respectively, per unit increase in BMI between the first and second pregnancy; but only in underweight and normal weight women. The effect of one unit increase in BMI between pregnancies was reflected in a 7% increased risk for caesarean section in underweight and normal weight women ($p=0.02$) versus a 9% increased risk in overweight and obese women ($p=0.0009$). Women with excessive gestational weight gain (GWG) during their first pregnancy showed a significant higher adjusted odds for GDM in the second pregnancy and this was only significant in the overweight and obese women (OR 2.73; CI 1.42–5.25, $p=0.002$).

Conclusion: This study shows that weight retention between the first and second pregnancy is associated with an increased risk for perinatal complications, even in underweight and normal weight women. Besides the prevention of maternal obesity before the first pregnancy, stabilizing interpregnancy maternal weight for all women appears an important target for reducing adverse perinatal outcomes in a second pregnancy.

1. Conflict of Interest: None Disclosed.

2. Funding: AB was supported by a PWO project from Flanders. RD is senior clinical researcher for FWO Vlaanderen (2010-2015), and BVDB is funded by the Netherlands Organisation for Scientific Research (NWO; Brain and Cognition Program; 2008-2012), and by EU 7th Framework Program (FP7-Health-2011; BrainAGE; 2012-2017).

T3T4:P.011

Sugar sweetened beverage and high fat food consumption are related to raised BMI z-scores among a cohort of Australian children from 4 to 10 years of age

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Introduction: Longitudinal evidence on the relationships between unhealthy diets and BMI in children is crucial for appropriately targeting obesity prevention activities. This paper describes relationships between consumption of sugar sweetened beverages (SSB), high fat foods (HFF) and longitudinal changes in standardized body mass index (BMI z-score) over 6 years among a prospective cohort of Australian children aged 4 to 5 years at baseline.

Methods: Data from 4,164 children participating in the Longitudinal Study of Australian Children (LSAC) were analysed. The LSAC collects data from a large representative cohort of Australian children every two years. Data from the four waves beginning in 2004 were utilised. A multi-level growth model was used to test relationships between BMI z-score and daily frequency of consuming SSB and HFF. BMI z-score was calculated using WHO standards.

Results: The final growth model identified that BMI z-score was decreasing at an average rate of 0.028 units per wave. However, overall, higher levels of BMI z-score were associated with greater levels of HFF and SSB consumption, independent of BMI z-scores at wave 1. For every additional occurrence of daily SSB intake an increase of 0.015 in BMI z-score was observed. Similarly for every additional occurrence of HFF intake an increase of 0.014 in BMI z-score was observed.

Conclusion: While there is evidence that BMI z-scores are decreasing, higher BMI z-scores are strongly associated with the consumption of HFF and SSB in young children. Urgent action to address these behaviours is needed, including targeted interventions and stronger policy measures.

1. Conflict of Interest: None Disclosed

2. Funding: None

T3T4:P.012

Breakfast skipping is not associated with the development of overweight in 2 year old children: The GECKO Drenthe birth cohort

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Background: It is known that overweight is related to skipping breakfast in schoolchildren, however, it is not yet known if this relation might already exist at two years of age.

Methods: We used cross-sectional data of 1348 two year old children, born between April 2006 and April 2007 in the GECKO Drenthe birth cohort to examine the association between breakfast skipping and overweight. Weight and length of the children was measured at Well Baby Clinics and overweight was classified as BMI z-scores of $\geq 2SD$ (WHO). Breakfast frequency was self-reported by the parents. At the time of ECO2013 data on breakfast skipping at age 5 will be available.

Results: Of all children 1.9% was overweight, and 2.8% did not eat breakfast daily, of which 1.8% ate breakfast ≤ 5 days/week. Children skipped breakfast more often in families of non-Dutch mothers, lower educated parents and single-parent families. Breakfast frequency was not associated with overweight or BMI Z-score in these two year old children after adjustment for ethnicity, educational level of the mother, BMI of the parents and single-parent family.

Conclusion: Breakfast skipping in two year old children is rare. The present data do not support that breakfast skipping is related to overweight in preschool children. In contrast to known risk factors, e.g. maternal BMI and parental education level, breakfast skipping is not likely to play a role in early onset of childhood overweight. At what age to start prevention of overweight by good meal habits is a topic for future research.

T3T4:P.013

Waist-to-height ratio is more accurate than body mass index to quantify reduced life expectancy

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Introduction: Our aim was to compare the effect of central obesity (measured by waist-to-height ratio-WHtR) and total obesity (measured by body mass index-BMI) on life expectancy expressed as years of life lost (YLL), using data on British adults.

Methods: A Cox proportional hazards model was applied to data from the prospective Health and Lifestyle Survey (HALS) and the cross sectional Health Survey for England (HSE). The number of years of life lost (YLL) at three ages (30, 50, 70 years) was found by comparing the life expectancies of obese lives with those lives at optimum levels of BMI and WHtR.

Results: Mortality risk associated with BMI in the British HALS survey was similar to that found in US studies. However, WHtR was a more accurate indicator of mortality risk. For the first time, data have been produced to quantify YLL at different values of WHtR for both sexes separately and for three representative ages.

Conclusion: This study supports the simple message "Keep your waist circumference to less than half your height"[1]. The use of WHtR in public health screening, with appropriate action, could help add years to life.

Reference

1. Ashwell M, Gunn P, Gibson S: Waist-to-height ratio is a better screening tool than waist circumference and BMI for adult cardiometabolic risk factors: systematic review and meta-analysis. *Obes Rev* 2012;13:275–286.

1. Conflict of Interest: MA devised and copyrighted the Ashwell® Shape Chart; distributed on a non-profit making basis.

2. Funding for this research (partial) was provided by the Actuarial Profession.

T3T4:P.014

Physical activity modulates the association between a genetic predisposition score and BMI in an elderly population: The SUN Project

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Introduction: In most of cases, obesity is a complex multifactorial phenotype which results from the interaction between “obesogenes” and environmental factors. The objective of this study was to evaluate the contribution of a genetic predisposition score (GPS) based on four obesity-related loci on BMI in an elderly population of the SUN (Seguimiento Universidad de Navarra) study, and whether physical activity levels could modulate this effect.

Methods: With this purpose we selected 887 participants (age 69±6 years old) from the SUN Project and genotyped them for four obesity related SNPs in the *FTO* (rs9939609), *MC4R* (rs17782313), *PPARG2* (rs1801282) and *CLOCK* (rs1801260) genes. DNA was obtained from saliva while lifestyle and dietary data were collected by validated self-reported questionnaires. Genotyping was assessed by RT-PCR plus allele discrimination.

Results: In the entire sample it was observed that GPS did significantly correlate with BMI ($r = 0.089$, $p = 0.008$). A higher effect was shown in subjects with a low physical activity practice ($r = 0.107$, $p = 0.025$), but no significant correlation was observed among subjects with high physical activity levels ($r = 0.075$, $p = 0.117$). Nevertheless, the formal interaction test between physical activity practice and GPS for BMI was not statistically significant.

Conclusion: Physical activity practice may improve adiposity status in those subjects genetically predispose to higher BMI levels.

1. Conflict of Interest: None Disclosed

2. Funding: The SUN Study has received funding from the Spanish Government (Grants PI01/0619, PI030678, PI040233, PI042241, PI050976, PI070240, PI070312, PI081943, PI080819, PI1002658, PI1002293, RD06/0045, G03/140 and 87/2010), the Navarra Regional Government (36/2001, 43/2002, 41/2005, 36/2008) and the University of Navarra, Línea Especial, Nutrición y Obesidad (University of Navarra), Carlos III Health Institute (CIBER project, CB06/03/1017) and RETICS network. The scholarship to C. Galbete from the Asociación de Amigos de la Universidad de Navarra is fully acknowledged.

T3/T4:PS2 – Miscellaneous

T3T4:P.015

A longitudinal examination of parental depression and monitoring on children's BMI in middle childhood

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Introduction: This study examined influence of potential determinants on children's BMI in middle childhood namely parental depression and monitoring using a longitudinal design.

Methods: We followed 221 5-years old children and their 111 parents for 4 years, as a part of an ongoing Three Generations Study. Parents reported on their depressive symptoms, general monitoring of their children (whereabouts and activities), media monitoring, children's activity levels, as well as their and their children's weight and height. Linear mixed-effects models were fitted to the data controlling for parent's BMI z-scores, education level and income.

Results: The combined model of significant predictors of child's BMI z-scores showed that (1) changes in parental depression were positively associated with changes in child BMI z-scores (level-1 effect), (2) children whose parents had a higher BMI and monitored their media exposure less had higher BMI z-scores at age 9 than other children

(level-2 effect), and (3) children whose parents modified their media exposure less had a more steeply increasing BMI z-score from ages 5-9 years. Further, in a mediation model, the effect of parental media monitoring on children's BMI z-scores at age 9 was mediated through children's screen time; less media monitoring predicted more child screen time, which predicted higher child BMI z-scores.

Conclusion: This study demonstrates the long-term impact of home environment in middle childhood on child's BMI. The identified family factors such as parental media monitoring (but not general monitoring), and parental depression underscore the importance of continuous efforts addressing these factors in preventive interventions.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded by grant DA 051485 from the Division of Epidemiology, Services, and Prevention Branch, National Institute on Drug Abuse (NIDA), and the Cognitive, Social, and Affective Development, National Institute of Child Health and Human Development (NICHD), National Institutes of Health (NIH), U.S. Public Health Service (PHS). Additional support was provided by Grant MH 37940 from the Psychosocial Stress and Related Disorders, National Institute of Mental Health (NIMH), U.S. PHS and Grant HD 46364 from the Cognitive, Social, and Affective Development Branch, NICHD and Division of Epidemiology, Services, and Prevention Branch, NIDA, NIH, U.S. PHS.

T3T4:P.016

Foot loading is altered in overweight and obese children: Findings from plantar pressure analysis

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Introduction: Pes planus (flat feet) is a potential co-morbidity of childhood obesity. Changes to the structure of the foot can lead to aberrant function of the lower limb resulting in musculoskeletal complication(s) and reduced functional activities of childhood. The aim of this study was to determine the impact of overweight and obesity on loading of the paediatric foot during walking.

Methods: One hundred children were recruited from local schools: 22 obese (9.9 years ± 1.5 years, BMI SDS 2.39 ± 0.49), 22 overweight (9.4 ± 1.7 years, BMI SDS 1.3 ± 0.1) and 56 expected weight children (9.1 ± 1.5 years, BMI SDS -0.62 ± 1.2). Foot loading was measured using dynamic plantar pressure analysis with a MatScan® 3150 pressure distribution platform (TekScan, USA). Variables for analysis were peak pressure (kPa), pressure-time integral (kPa/s) and normalised peak vertical force (N/kg).

Results: Significant differences for peak pressure and pressure-time integrals were found for obese and overweight children at the heel, mid-foot and forefoot ($p < 0.05$). Significant differences for normalised peak vertical force were found at the mid-foot and forefoot for obese and overweight children ($p < 0.05$).

Conclusion: Findings from this study identified sites of increased foot loading in obese and overweight children. These findings are consistent with the view that obesity impacts on the structure of the foot. Specialist assessment of the foot in children with obesity is warranted.

1. Conflict of Interest: None Disclosed

2. Funding: No Funding

T3T4:P.017

Protein sources in infancy as predictors for body mass index and IGF-1 concentration at the age of 6 years

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Introduction: The aim was to study the association between total protein intake as well as protein from various dietary sources at the age of 12 months and BMI and IGF-1 at 6 years.

Methods: Subjects were 137 children studied from birth to 6 years of age. Dietary intake at 12 months was assessed by three day weighed food records. Information about height and weight during the first year of life and at 18 months and 6 years was gathered. IGF-1 was measured at 6 years of age.

Results: Children in the highest quartile of animal protein intake at 12 months (consuming ≥ 11.9 percent of total energy (E%) as animal protein) had higher BMI at 12 months (0.7 ($0.0, 1.3$) kg/m^2), 18 months (0.7 ($0.1, 1.3$) kg/m^2) and 6 years (0.8 ($0.2, 1.4$) kg/m^2) than children in the lowest quartile (<7.7 E% from animal protein). The difference in BMI at 6 years was independent of breast milk intake at 12 months. Dairy protein intake at 12 months was a positive predictor of IGF-1 at 6 years for girls (5.4 ($2.5, 8.2$) $\mu\text{g/l}$), independent of current height or weight.

Conclusion: Our results highlight the need for special emphasis in infant dietary guidelines aiming at avoiding excess animal protein intake in the complementary feeding period. Our findings of a positive relationship between dairy protein intake at the age of 12 months and IGF-1 levels in 6-year-old girls may be of relevance, as increased IGF-1 might be an indication of early puberty.

1. Conflict of Interest: None Disclosed

2. Funding: The studies were supported by science funds of Landspítali-The National University Hospital of Iceland, the University of Iceland and the Icelandic Centre for Research (RANNIS). Additional support was provided to Inga Thorsdottir through the Motivational award at Landspítali and to Birna Thorisdottir from the Research Fund for Graduate Students (RANNIS).

T3T4:P.018

Body composition in infants born to pregnant mothers at risk of gestational diabetes

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Introduction: Worldwide, childhood obesity has dramatically increased. Body composition in early life may play a key role in programming disease later in life. Maternal high blood glucose level is a recognized risk factor for excessive fetal growth, adverse pregnancy outcomes and fetal adiposity. However, post-natal adiposity and growth trajectory in infants born to mothers at risk of gestational diabetes mellitus (GDM) is not known.

Methods: A total of 146 pregnant women at risk of GDM (mean age 34.7 ± 0.4 years; mean pre-pregnancy BMI 25.3 ± 0.5 kg/m^2 ; <20 weeks gestation) were recruited in a clinical trial comparing two healthy-diets. Offspring body composition measurements were performed at birth (0-3 days) and at 3 months of age by air-displacement plethysmography (PeaPod).

Results: Table 1 shows gender-specific body composition results, fat mass (FM), fat-free mass (FFM) and percentage fat mass (%FM) at each time point.

	Age	N	Weight (kg)	FFM (kg)	FM (kg)	%Fat
Male	Birth	41	3.23 ± 0.42	2.94 ± 0.33	0.29 ± 0.14	8.82 ± 3.46
	3 months	16	6.55 ± 0.69	4.81 ± 0.49	1.71 ± 0.37	26.03 ± 4.35
Female	Birth	40	3.24 ± 0.30	2.86 ± 0.23	0.37 ± 0.15	11.35 ± 4.08
	3 months	23	5.79 ± 0.64	4.39 ± 0.42	1.39 ± 0.38	23.78 ± 4.79

*Data are presented as mean \pm standard deviation.

Conclusion: This study provides unique gender-specific data on infant body composition born to mothers at risk of GDM.

1. Conflict of Interest: Professor Brand-Miller is co-author of books about the glycemic index of foods, and manages the University of Sydney Glycemic Index Research Service. She is President of a not-for-profit food endorsement program based on the glycemic index.

2. Funding: Research relating to this abstract was funded by an NHMRC grant.

T3T4:P.020

A Community Intervention on Self-perception and Lifestyles among Women from Chiapas, Mexico

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Objective: To assess changes in self-perception and healthy lifestyles in a group of rural women from central Chiapas, through an educational intervention with social support.

Methods: A convenience sample was conducted among ≥ 16 old women. Two questionnaires were used, a self-perception questionnaire (AF5) and a healthy style profile (PEPS-1). AF5 assess physical, social and family dimensions; the PEPS-1 evaluates six dimensions (nutrition, physical activity, health responsibility, stress management, interpersonal support and self-actualization). An educational program to change self-perception and lifestyles was conducted over a three month period and divided into 13 sessions. The components of each session included: a topic, ranging from nutrition, health, and psychology; an inter-relations group dynamic; and structured physical activity.

Results: 654 women participated in the study (39 ± 14 y). After the intervention, significant changes on self-perception of physical ($p = 0.0001$), social ($p = 0.01$), and family ($p = 0.02$) dimensions were observed. There were no changes in labor or emotional dimensions. Differences in emotional dimensions ($p = 0.0001$) between age groups were observed. It was also observed that there were changes in five dimensions among younger women and in six dimensions among women older than 40y. Changes in the inter-personal support were higher among older than 40y of age. None of the dimensions changed among younger than 18y.

Conclusions: After a three month community intervention, promoting changes in self-perception and lifestyles, significant changes were observed in several dimensions of the AF5 and PETS-1 questionnaires among older than 18y, rural women from central Chiapas, Mexico.

T3T4:P.021

Social support efficacy on weight loss and metabolic syndrome in a Mexican Public Institution: A pilot study

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Introduction: Social Support (SS) may be an effective treatment for long-term weight loss and reducing obesity. However, a recent systematic review of studies indicates that these results are inconsistent.

Objective: To analyze the effect of lifestyle changes, through SS, on adiposity and metabolic syndrome (MS).

Methods: The study design was a pre and post treatment, which included 41 women attending an open invitation to participate in the study. All participants ≥ 18 years old, with a BMI ≥ 25 kg/m^2 , and waist circumference (WC) ≥ 88 cm were included in the study. Participants attended group sessions every two weeks during three months and group interaction was encouraged among them. Participants were instructed on healthy eating, exercise, label reading and portion management. Anthropometric measurements and biomarkers were taken at the beginning and end of the study (weight, height, CC, glucose, cholesterol, triglycerides, HDL-cholesterol, LDL-cholesterol, insulin). BMI, insulin resistance index (HOMA-IR,) and insulin secretion index (HOMA-SI) were calculated. To observe differences between pre and post test, a Wilcoxon test was performed.

Results: 25 women completed the study (71%). An intention to treat analysis was performed. On average, participants lost 3.1 kg in weight ($p < 0.001$), 3.9 cm in WC ($p < 0.001$), and 1.3 kg/m^2 of BMI ($p < 0.001$). Biochemical markers did not reach statistical significance.

Conclusions: These results warrant to continue this study to reach statistical power.

T3T4:P.022

Study of a community intervention program on physical activity in obese and overweight patients

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Objectives: To evaluate the association between regular physical exercise through a community intervention program and health status in obese and overweight patients in the Northern Area of Pontevedra.

Methods: We use traditional methods of assessing physical activity (IPAQ questionnaire and accelerometer) and most common clinical parameters (weight, height, BMI). There will be a descriptive analysis and linear correlation analysis.

Results: The results obtained in this study show that intervention in the community achieved a significant reduction in weight (p 0.0023), BMI (p 0.002) and AC (p 0.0015). The accelerometers reveal that there was a significant decrease (p 0.0199) in terms of the steps / week (p /s). The IPAQ-L was stated that the perception of its PA patients during the study decreases, perceiving the beginning 9553.76 (± 2287) METS and at study end 8736.34 (± 1695.39) METS. In the correlation analysis between AF measurements and anthropometric measurements are close to 0, i.e., there is no linear relationship.

Conclusions: Obesity in Spain is a social problem that requires emergent response and intervention strategies designed for this purpose. An intervention on the community to seek a change of healthier habits positively influences it, profiting both cardiovascular risk and an improvement in the anthropometric measurements of these individuals is necessary. For this the roles of health personnel is shown as a key element in the prevention and keep up the health of this population.

T3T4:P.023

How Czech Army solves the problem with obesity

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Background: Although soldiers are selective group which is supposed good physical condition and health, the Czech army faced the problem of overweight / obesity. At present in the Army of the Czech Republic around 30% of soldiers are overweight and 12% obese (BMI adjusted for waist circumference and % body fat).

Methods: From 1999 in the Czech Army a programme of Primary Preventive Care (PPC) is being implemented – this PPC is for soldiers of assorted professions, functions and education in age group (25, 30, 33, 36, 39, 40–55 year). The number of examined is about 6000-per year. Anthropometrical, laboratory and clinical knowledge give sufficient information about everyone and so it is possible to determine individual medication and preventive recommendations. The objective of those recommendations is to retard the manifestation of foremost civilization-linked diseases (diabetes mellitus type II, metabolic disorders, dyslipidaemia, hypertension, atherosclerosis...).

Results: The need to establish a preventive program to reduce the incidence of overweight / obesity among soldiers came of the results of PPC. It has been created all-embracing program composed of (none) pharmacological treatment, diet counselling, controlled physical training and also educational seminars and refresher courses.

Conclusions: This preventive program the fight against obesity has been started in 2012 and the first results show that it could be successful.

1. Conflict of Interest: No Conflict of Interest

2. Funding: Research relating to this abstract was funded by “Long-term plan of development of organization 1011”.

T3T4:P.024

Barriers and facilitators to a healthy family diet: Informing obesity interventions - a mixed methods study from the 'Growing Up in Wales Environments for Healthy Living' (EHL) study

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Introduction: In this study we examined factors associated with dietary choices in families with young children.

Method: Ten percent of the families (n=61) participating in the EHL study (n=621), were asked to consent to an in-depth semi-structured interview regarding dietary behaviours. Interviews explored parents knowledge of, and incentives and disincentives to healthy eating. Transcripts underwent thematic analysis. Mothers on the EHL birth cohort study also provided self-reported demographic characteristics by questionnaire and 7-day food diaries (completed by mothers, fathers and children).

Results: 61 mothers and 35 fathers participated. Recommendations suggest interventions on two levels.

1) Individual level: Previous habits and experiences (such as ability to cook) profoundly influenced parents ideas about diet. Dietary habits were usually formulated during teenage years and pregnancy/parenthood was a time when parents became more receptive to change.

2) Population level: Barriers to healthy eating were shift work, low income, lack of local access to cheap fruit and vegetables, and cheap healthy convenience food options. It was suggested that supermarkets could play a greater role in improving family diet behaviours.

Conclusions: Socioeconomic barriers (cost, access and local habits) were the main barriers to healthy diets for families with young children. Improving dietary behaviours for children will require environmental and society level changes rather than individually targeted methods.

1. Conflict of Interest: The author declares no conflict of interests.

2. Funding: National Institute for Social Care and Health Research (NISCHR)

T3T4:P.025

Evaluation of natural experiments in obesity prevention: Audit of data availability and adequacy in Australia

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Background: Evaluation of natural experiments has the potential to generate much needed evidence for the impact of environmental changes and policy implementation on public health, including obesity prevention. The ability to respond to opportunities in true natural experiments requires timely access to adequately detailed data sources that include appropriate outcome measures, in addition to those that capture the range of exposures.

Methods: National audit of existing data sources (national, state, ongoing and ad hoc) relevant to evaluation of natural experiments with the potential to reduce overweight and obesity in Australia. Data sources were assessed for content, quality, coverage, collection frequency and public availability.

Results: Although there has been significant investment in obesity prevention initiatives at both local and very large scale levels in Australia, there is a critical lack of ongoing routine monitoring of nutrition and physical activity behaviours and risk factors related to population overweight and obesity prevalence. There are more data sources related to behaviours of children and adolescents although these are largely ad hoc and provide insufficient detail to support evaluation of policy experiments.

Conclusions: Compared to many European countries and the USA, existing opportunities to respond to and evaluate natural experiments in Australia are limited. Without adequate monitoring data, facilitating effective evaluation of natural experiments in policies and environments that influence weight status will require both responsive and flexible funding sources and development and use of a catalogue of valid and relevant outcome data items.

1. Conflict of Interest: None Disclosed

2. Funding: None

T3T4:P.026

A qualitative evidence synthesis on the management of male obesity: The ROMEO Project

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Introduction: Men are less likely than women to realise they have a weight problem and to engage in weight management programmes, but little is known about effective ways to engage overweight and obese men with such services. We undertook a realist qualitative evidence synthesis to investigate; what weight management interventions work for men, with which men, and under what circumstances?

Methods: We identified twenty-three studies that included men and had weight management as their primary focus: four qualitative studies linked to randomised controlled trials of weight loss or weight maintenance interventions, eight qualitative studies linked to non-randomised intervention studies, and eleven qualitative studies not linked to any intervention.

Results: Men are motivated to engage with weight management programmes because of health concerns and the perception that certain programmes had 'worked' for other men. Barriers to engagement and adherence with programmes included a lack of support for new food choices by friends and family and reluctance to undertake extreme dieting. Retaining a degree of autonomy over what is eaten and flexibility about having treats and alcohol were attractive features of programmes, as were groups where humour facilitated social support and adherence. Men were motivated to attend programmes that took place in settings that were convenient, non-threatening and congruent with their masculine identities.

Conclusion: Men's perspectives and preferences within the wider context of family, work and pleasure should be sought when designing weight management services, which is rarely done at present.

1. Conflict of Interest: None

2. Funding: National Institute of Health Research, Health Technology Assessment programme

T3T4:P.027

Weight outcomes in 1.2 million Slimming World members during their initial 3 months' membership

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Introduction: The majority of adults in the UK are now overweight/obese. Weight management on a national scale requires behavioural and lifestyle solutions that are accessible to large numbers of people. Slimming World holds over 9500 weekly weight management groups in community venues across the UK supporting up to 500,000 people each week.

Methods: Electronic weekly weight records were collated for self-referred, fee-paying participants of Slimming World joining between January 2010 and April 2012. This analysis reports weight change outcomes in 1,211,294 adult, non-pregnant participants during their first 3 months' attendance. Data were analysed by regression using the R statistical program. Those attending only week 1, where no weight change data were available (n=145,247) were not included in this analysis.

Results: Mean (SD) joining BMI was 32.6 kg/m² (6.3), age 42.5 years (13.6) and 5% were men. Mean (SD) BMI change was -1.5 kg/m² (1.3), weight change -4.1 kg (3.5), percent weight change -4.6% (3.7), and number of sessions attended was 7.3 (4.0). For participants attending at least 75% of sessions (n=359,285), mean (SD) BMI change was -2.5 kg/m² (1.3), weight change -6.7 kg (3.6) and percent weight change -

7.5% (3.5). Weight loss was greater in men than women (6.1% (4.3) vs 4.6% (3.6) respectively. All comparisons were significant (p<0.001).

Conclusion: This is the largest ever audit of a lifestyle-based weight management programme, demonstrating that Slimming World has a significant impact on the health of the nation as a practical option for weight management strategies in the community, achieving large-scale, clinically safe and effective weight loss.

1. Conflict of Interest: All authors work for Slimming World.

2. Funding: This work was funded by Slimming World.

T3T4:P.028

12 month weight outcomes in 45,395 high-engagers with the Slimming World weight management programme

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Introduction: There is a lack of published data on self-referred, fee-paying members of commercial organisations in the longer term. Slimming World is a commercial weight management organisation providing weekly weight loss support. The programme is an open system in that there is no set programme duration, members can join, drop out and rejoin at any time and pay to attend for as long as they wish depending on individual needs. The aim of this analysis was to look at weight outcomes of those who regularly engaged during a 12 month time window.

Methods: In June 2012 electronic weekly weight records were collated for those members who had joined UK Slimming World groups between January 2010 and June 2011. Records for those who attended at least 75% of sessions over a period of 12 months were included in the analysis (n=45,395).

Results: Mean (SD) joining weight was 92.2 kg (19.8), age 46.9 years (13.9) and BMI 34.1 kg/m² (6.5), 7.2% were men.

	Mean	SD
Number of weeks attended	45.1 (85.1% of possible sessions)	3.4
Weight change (kg)	-12.4	8.3
Percent weight change (%)	-13.1	7.3
BMI change (kg/m ²)	-4.6	3

Percent weight outcomes were similar in men and women.

Conclusion: These data show that those who choose to engage for >75% of possible sessions in a 12 month period achieve clinically significant weight loss exceeding 10%.

1. Conflict of Interest: All authors work for Slimming World.

2. Funding: This work was funded by Slimming World.

T3T4:P.029

Weight outcomes as a function of BMI in 1.2 million members of a commercial weight management programme

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Introduction: Current guidance for obesity management recognises the role of community weight management services to enhance access to support¹. However, there is little data on the effectiveness of community lifestyle programmes outside of NHS referral schemes. This study examined weight outcomes in self-referring, fee-paying participants of Slimming World (SW) in different BMI groups.

Methods: Attendance and weekly weight measures were collated from electronic records of 1,211,294 SW members joining between January

2010 and April 2012, during their first 3mths attendance. Data were analysed by regression using the R statistical program. Those attending only week 1, where no weight change data were available (n=145,247) were not included in this analysis.

Results: Mean (SD) joining BMI was 32.6 kg/m² (6.3), age 42.5 years (13.6), 5% were male. Members were categorised by BMI groups <30 kg/m², 30–34.9 kg/m², 35–39.9 kg/m² and ≥40 kg/m².

Weight Outcomes at 3 months

	n	Percentage of sample	Mean weight change in kg (SD)	Percent weight change (SD)
<30kg/m ²	478,956	39.5	-3.3 (2.7)	-4.5 (3.5)
30-34.9kg/m ²	373,648	30.8	-4.2 (3.3)	-4.7 (3.7)
35-39.9kg/m ²	210,185	17.4	-4.8 (3.9)	-4.7 (3.8)
≥40kg/m ²	148,505	12.3	-5.7 (4.7)	-4.7 (3.7)

After adjusting for age and gender, relative to the <30 kg/m² group, absolute weight losses were 0.9, 1.5 and 2.4 kg more for the 30–34.9 kg/m², 35–39.9 kg/m² and ≥40 kg/m² groups respectively (all p<0.001) resulting in similar percent weight losses across BMI groups.

Conclusion: Slimming World's lifestyle programme is effective for people with high BMIs as well as those who are moderately overweight.

Reference

¹NICE Obesity Guidance 2006.

1. Conflict of Interest: All authors except GH work for Slimming World. GH consults for SW.

2. Funding: This work was funded by Slimming World.

T3T4:P.030

Tackling obesity in England – the Government's approach

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The prevalence of overweight and obesity in England is among the highest in Europe, and the Government has set out its national ambitions for a downward trend in overweight and obesity by 2020.

The Government's overall approach to tackling obesity in England is based on the Foresight analysis of 2007, and includes:

- a lifecourse approach, involving action across all age groups
- a focus on population-wide measures matched by action to support individuals
- recognition of the importance of providing information to underpin choice and transforming the environment to make the healthier choice the easier choice
- a commitment to stimulating activity across a wide range of partners
- a focus on local-level action, to ensure interventions are tailored to the needs of local communities

The Government is committed to a number of national-level initiatives, including:

- the Change4Life social marketing campaign
- the National Child Measurement Programme
- NHS Health Checks, aimed at 40 – 74 year olds
- working with industry and other partners through the Public Health Responsibility Deal

The Government is also reforming the public health system, and from April 2013:

- local authorities will have new responsibilities for public health, supported for the first time by a ring-fenced grant
- Public Health England will be established, as a new national body with a key role in protecting and improving the nation's health and wellbeing, and reducing inequalities.

Progress towards the ambitions is reviewed annually using data from the Health Survey for England and the NCMP.

T3T4:P.031

Evaluation of NHS referral to a commercial, community-based lifestyle modification programme in Scotland

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Introduction: Despite unhealthy weight affecting 64.3% of the adult population in Scotland, widely available community-based lifestyle modification programmes delivered by commercial organisations that follow SIGN (2010) guidance and have been proven to be consistently effective in the NHS in England (Ahern et al 2011), are not commonly used by NHS Scotland. This abstract evaluates an NHS referral pilot in Scotland.

Methods: Health professionals in NHS Tayside offered overweight and obese patients (N=141,15M:126W) a community-based lifestyle modification programme (Weight Watchers®), which included; a hypocaloric diet, activity plan, behavioural skill development and support through meetings led by a trained, successful role model. Participants received vouchers to attend 12 weekly meetings, combined with access to online and mobile tools. Data was collected by group leaders, relayed to a central database (weight was measured in meetings on calibrated scales).

Results: Median age was 37 years (IQR 33-54), with a median starting BMI of 35.4 kg/m² (IQR 32.6 - 40.0). Mean weight change (Intention-to-Treat, Baseline Observation Carried Forward) was -4.63 kg (SD 4.47) representing -4.82% (SD 4.66) of initial weight. Completer (classed as 75% engagement, achieved by 64.5%) mean weight change was -7.2 kg (SD 3.51), representing -7.46% (SD 3.71) of initial weight. Achievement of ≥5% weight loss was 78% for completers and 50.4% for all participants.

Conclusion: This community-based lifestyle modification programme, that has been proven effective in other countries, may also be appropriate for use within the NHS in Scotland.

Reference

Ahern A et al (2011) *BMC Public Health*, 11, 434.

1. Conflict of Interest: Payment received from Weight Watchers UK Ltd to Robert Gordon University (WW and HW).

2. Funding: Research relating to this abstract was funded by Weight Watchers UK Ltd.

T3T4:P.032

Promoting physical activity and healthy diet: How do we learn from our mistakes?

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Background: There is a need to improve the evidence base for the effectiveness of interventions to prevent obesity. This requires pragmatic evaluations of on-going prevention programmes in addition to formal academic research. To improve the quality and consistency of evaluations the National Obesity Observatory (NOO) developed a Standard Evaluation Framework (SEF) for weight management interventions. This has been widely used and has been considered a mandatory requirement by some commissioners.

Objectives: We aimed to improve the evaluation of both physical activity and dietary interventions, through the development of two specific SEFs that could be used to help evaluators collect standardised data to allow comparison between similar programmes.

Methods: The SEFs for diet and physical activity were developed in conjunction with leading academics and public health practitioners, to ensure that the document was evidence-based and suitable for practical application by public health practitioners.

Results: The two new frameworks set standards for key essential criteria for data collection, and give clear guidance on issues such as objective setting; agreeing outcomes; and measurement. Further 'desirable' criteria are also listed that would improve the quality of any evaluation. The new frameworks have been integrated into NOO's training programme on evaluation.

Conclusions: The new frameworks provide guidance on a systematic approach to the evaluation of physical activity and diet interventions. However, some significant challenges remain, including the lack of validated tools to measure diet and physical activity; a lack of resources being allocated for evaluation; and an ongoing need for practical evaluation support for practitioners.

T3T4:P.033

Minimal Level of Participation Associated with Significant Weight Loss in a Commercially Available Weight Loss Program

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Introduction: Weight loss has been associated with high levels of participation in interventions; however, less attention has been given to the minimal level of participation needed to reach clinically significant weight loss. This study examined the level of participation associated with a 5% or 10% weight loss in a community-based, intensive behavioural counselling program, Weight Watchers PointsPlus® (WW), that included three modes of access (i.e., meeting attendance, WW website, and WW mobile application).

Methods: A total of 292 participants were randomized to a WW (n=147) or a self-help condition (n=145). Measured heights and weights were obtained at baseline and 6 months, and weekly participation was measured by tracking the use of the three modes of access. In order to assess the impact of participation, only participants in the WW condition were included in the following analyses.

Results: Analyses showed that meeting attendance was the strongest predictor of weight outcomes (F Change = 52.8, $p < .0001$). In order to determine the minimal level of attendance associated with clinically significant weight loss, Receiver Operating Characteristic Curve analyses were conducted. Attending 13 or more and 15 or more out of a possible 24 weekly meetings significantly predicted the likelihood of achieving a weight loss of 5% and 10% (AUC=.806, $p < .001$, AUC=.826, $p < .001$, respectively).

Conclusion: Attendance at slightly more than 50% of meetings was satisfactory to achieve at least a 5% weight loss. These results are important to help patients and treatment providers set realistic goals for participation in treatment.

T3T4:P.034

Prevalence of weight control attempts and behavioral strategies among Portuguese adults: A cross-national survey

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Introduction: In Portugal, there are no representative data on how many people are actively trying to lose (or avoid gaining) weight. This study evaluated, in a nationally representative sample, age- and gender-specific prevalence of attempts to lose/maintain weight, and weight control motives and behaviors.

Methods: Cross-sectional survey of a random sample of 1098 Portuguese adults (18-65y). Demographic information and weight loss/weight maintenance motivations and behaviors were assessed by telephone questionnaire.

Results: The prevalence of attempting to lose or avoid gaining weight was 17.9% (18-40 y: 20.3%; 41-65 y: 15.2%) and 16.8% (18-40 y: 15.5%; 41-65 y: 18.2%) among men and 31.1% (18-40 y: 26.3%; 41-65 y: 36.0%) and 22.1% (18-40 y: 22.9%; 41-65 y: 21.3%) among women, respectively. The most frequently adopted strategies to control weight among men and women were eating vegetables (86.2%) and

soup (71.8%) regularly and drinking water instead of other beverages (76.4%). In both genders, key strategies to lose were similar to those used to maintain weight. In women, but not in men, weight loss attempts were significantly more associated with consulting with weight loss experts and taking drugs/supplements (compared to weight maintenance strategies). The most prevalent motives to control weight were to improve health and prevent disease, to improve appearance, and to preserve self-esteem (>80%).

Conclusion: This study indicates that nearly one in every two adults in Portugal is currently trying to control weight. Importantly, weight maintenance behaviors appear not to differ markedly from weight loss strategies in both genders. Weight control motivations that involve appearance and self-esteem are highly prevalent, which could influence normative well-being and help shape obesity interventions.

1. Conflict of Interest: None Disclosed.

2. Funding: Research relating to this abstract was funded by the Portuguese Science and Technology Foundation (SFRH/BD/80739/2011 to Inês Santos).

T3T4:P.035

A longitudinal qualitative study of Jamie's Ministry of Food Australia program

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Introduction: In Australia, the Jamie Oliver Ministry of Food Program (JMoF) has been implemented in Ipswich, Queensland. It is a community-based cooking skills program consisting of ten weekly 90-minute classes. This presentation will highlight the methods and initial findings from the program's qualitative evaluation.

Methods: Using a longitudinal qualitative design, program participants were purposively selected to attend semi-structured 30-minute interviews. Each participant will be interviewed three times. The first interviews were conducted in September 2012 before participants started the program. Repeat interviews will be held in December 2012, directly after program completion, and follow-up interviews six months later. Thematic analyses will be assisted using NVivo, drawing upon a social constructivist approach to generate themes and ideas from the data.

Results: Analysis of pre and post interview data will be presented. Findings from round one of interviews (n=15) highlighted key motivations underlying participants' enrolment in the program. Key motivations included: a desire to increase cooking confidence and enjoyment by acquiring the skills to prepare healthy, quick, cheap meals from scratch; family members' food attitudes, recommendations by friends and low cost of admittance. The second interview, to be conducted in December 2012, will facilitate exploration of behaviour change over time and participants' program experience.

Conclusions: Findings will inform future policy and program development and will add to the evidence on community based cooking interventions.

1. Conflict of Interest: The authors wish to declare that the evaluation has been commissioned by the good foundation.

2. Funding: research relating to this abstract was funded by The Good Foundation

T3T4:P.036

Effects of workplace-based dietary and/or physical activity interventions targeting health professionals: A systematic review with meta-analyses of randomised controlled trials

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Introduction: There is growing interest in the workplace as an environment to deliver obesity interventions. Of particular concern is prevalence of high levels of overweight and obesity amongst healthcare

professionals. This review examines the characteristics of workplace-based diet and/or physical activity interventions aimed at health professionals and their effects on weight-related and dietary and physical activity behaviour outcomes.

Methods: Studies were identified by systematically searching seven databases. Randomized controlled trials comparing dietary and/or physical activity interventions to usual care or other interventions were included. Where appropriate meta-analyses was conducted, studies were grouped according to length of follow-up (Short <12months and long ≥12months) and behavioural target (ie diet only, physical activity only or diet and physical activity)

Results: 13 studies were included in the analyses. We failed to find any association with interventions targeting diet or physical activity in isolation with any weight related measures (BMI, weight change, % body fat or waist measurement). In contrast, a significant association was found for interventions which targeted both diet and physical activity in body weight (−3.74 kg [95% CI −4.57/−2.91], body mass index (−1.23 kg/m² [95% CI −1.91/−0.56]) and body fat percentage (−1.94 % [95% CI −2.55/−1.33]) parameters at short term follow-up. These effects were not maintained at long term follow-up.

Conclusions: The available evidence suggests that, in the short term, combined dietary and physical activity interventions are effective for decreasing body weight, BMI and body fat percentage among healthcare professionals. Nevertheless, their long-term impact is unknown.

1. Conflict of Interest: None to disclose

2. Funding: Research relating to this abstract was funded by a Medical Research Council doctoral training award.

T3T4:P.038

Exploring how social networks influence weight behavior's in socially deprived communities

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Background: Obesity levels amongst the UK population present a major challenge for policymakers and public health intervention planners. Research demonstrates that social networks strongly influence health outcomes, and in particular weight behaviour. Although studies report significant associations between friends body weight, most are unable to establish the mechanisms by which social networks influence weight behaviours. Furthermore, existing empirical studies focus on data from adolescents, with limited information on other ages. Therefore the aim of this study was to explore the mechanisms by which social networks influence weight behaviours in adult women living in socially deprived communities.

Study Design: Taking a qualitative approach, biographical narrative interviews were utilised over two stages to interview participants. 16 female participants aged 18–64 years were recruited from the Clifton and St Ann's areas of Nottingham City; areas identified as having high levels of social deprivation. Interviews were recorded, transcribed and analysed using a data analysis group, offering different perspectives on the data to triangulate emerging analyses.

Results: Findings indicate that social networks influence weight-related behaviours', such as food choice, eating and physical activity. Pathways of the mechanism include intergenerational and familial relationships, cultural background and situational factors such as income and environment.

Conclusion: Findings provide useful information for designing obesity interventions which can exploit social networks. Interventions which target family units, close social networks or specific cultural groups rather than individuals, may provide stronger established pathways to enact long term behaviour change. Further research is required to test this hypothesis in an intervention setting.

T3T4:P.039

A novel community-based program for childhood obesity prevention: The NUTRIBUS project

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Introduction: Childhood obesity has reached pandemic proportions in all westernized countries. Obese children are also at risk for the development of correlated diseases, such as type-2 diabetes and non-alcoholic fatty liver disease. In Italy, 34% of children aged 6-10 are overweight or obese, more than any other country in the EU. This alarming public health issue prompted the Bambino Gesù Children's Hospital and Research Institute to devise concrete actions to tackle it successfully.

Methods: The "Nutribus" project is a comprehensive, socio-ecological, population-based program, which targets motivational and behavioral barriers preventing children's healthy eating and physical activity. The project has a multilevel design, including all sectors of society and stakeholders (schools and community institutions, private industries, the media sector etc.). The project is divided in 4 areas of activity: *Nutri-web*, comprising all digital strategies to reach families and the wider community; *Nutri-talk*, a coordinated action to build a public-private joint effort; *Nutri-science*, including all scientific research on children's nutrition; *Nutri-move*, aiming at reaching the wider population through local community events; *Nutri-ria*, promoting families' awareness and the access to the Hospital's nutrition services; *Nutri-BLUD*, promoting breast-feeding and early healthy feeding strategies.

Results: The project is in its initial phase and the first data and a detailed description of the NUTRIBUS model will be presented.

Conclusion: Prevention of childhood obesity can be effective by implementing multilevel strategies that make children's healthy eating and active lifestyle easier, socially acceptable and self-reinforcing.

T3T4:P.040

'Shape Up-LD': A pilot randomised controlled trial of a manualised weight management programme for adults with mild-moderate learning disabilities

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Background: Obesity is a particularly important health issue for people with learning disabilities (LD) who are already confronted by health and social inequalities. To ensure equality of treatment for people with LD, healthcare services must be accessible to this population. This pilot study aims to evaluate a manualised weight management programme adapted for overweight and obese adults with LD (Shape Up-LD).

Methods: 60 overweight and obese (BMI ≥ 25) adults (age ≥ 18) with mild-moderate LD will be randomised to receive either the "Shape Up-LD" intervention or usual care. The intervention involves 12 weekly group sessions led by trained facilitators, including advice on healthy eating, physical activity and behaviour change techniques. Communication is aided through the use of pictorial handouts specially designed for people with LD. Where applicable, carers of the participants will attend the sessions and will receive training on how to support participants with their weight management.

Results: Physical, clinical and behavioural assessments will be conducted at baseline, 12 weeks and six months. Qualitative interviews on the experience of Shape Up-LD will be conducted at 12 weeks. Feasibility assessments will include recruitment rates, loss to follow up, compliance rates, completion rates, and a cost-effectiveness analysis.

Conclusion: This study will inform our preparation for a definitive randomised controlled trial to test the efficacy of the programme with respect to weight loss. The programme could contribute to a more equitable service for overweight adults with LD and help to fill the current gap in weight management services for this population.

1. Conflict of Interest: None disclosed

2. Funding: Research related to this abstract is funded by the National Institute for Health Research (NIHR) UK - Research for Patient Benefit (RfPB).

T3T4:P.041

EPHE (EPODE for the Promotion of Health Equity), a 3 years European project to promote healthier lifestyles and reduce obesity-related health inequalities

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Introduction: As indicated by WHO in the European Charter on counteracting obesity, "Overweight and obesity most affect people in lower socioeconomic groups, and this in turn contributes to a widening of health and other inequalities". EPHE is a European project designed to evaluate how Community-Based Programmes (CBPs) can reduce health inequalities linked to diet and physical activity.

Methodology: This 3 year project will conduct a pilot-life testing in 7 communities around Europe implementing the EPODE methodology with CBPs (Belgium, Bulgaria, France, Greece, Portugal, Romania, The Netherlands). They will implement 2 years whole of population interventions enhancing the deprived population around 5 themes: improve diet variety, fruits and vegetables consumption, sleep duration and water consumption and decrease sedentary lifestyle. The evaluation will be conducted on each of these 5 themes and a quartile analysis of income will be done to compare results from the highest and lowest quartiles within and in-between communities. Each CBPs will be evaluated with the WHO Good Practice Appraisal tools.

Results: 7 Communities-Based Programmes together with 8 European Universities are involved in this project and the results of the first survey will be presented during the ECO.

Conclusion: This project will lead to produce concrete guidelines and best-practices for policy makers, health promotion services to implement sustainable and focused strategies among communities to reduce health inequalities linked to diet and physical activity.

1. Conflict of Interest: No disclosed

2. Funding: Co-funded by the European Commission, Ferrero, Danone, Mars and Orangina-Schweppes.

T3T4:P.042

Strengths and Weaknesses of Community-Based Programmes for obesity prevention

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Introduction: The EPODE International Network (EIN) is a non-governmental organisation which has been created to support Community-Based Programmes (CBPs) aimed at preventing obesity. Today, 25 CBPs are member of this network (9 in Europe, 11 in America and 5 in Asia-Pacific region). The objective of this study was to identify the strengths and weaknesses and the needs of these programmes in terms of scientific and strategic expertise, evaluation processes, political and institutional commitment, Public-Private Partnerships (PPP), programme visibility and communication strategy.

Methodology: The programme managers were interviewed around three topics: Network Functioning, Strengths and weaknesses, experience sharing. The aim of the first part was to identify the four main expectations of the CBPs towards the three network supporting platforms (Scientific, PPP and Political). The second part was dedicated to explore the strengths and weaknesses of the CBPs (self-reported) and the last one to identify their global needs.

Results: In total, 19 out of 25 CBPs members of the EIN answered the questionnaire (76% response). The main expectations reported by the CBPs are the need of a methodological support within their monitoring and evaluation process, a sustainable funding and a guidance for building and managing PPP. The strengths and weaknesses will be presented during ECO. One of the aspects that emerge is the need of a greater link between the field and the scientific community.

Conclusion: Based on this study the EIN will suggest a pragmatic methodology to improve the functioning and sustainability of the CBPs aimed at preventing obesity.

1. Conflict of Interest: No disclosed

2. Funding: No funding relating to this abstract

T3T4:P.043

OPEN (Obesity Prevention through European Network), strengthening and up scaling the implementation of Community-Based Programmes at European level

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Introduction: Building on the EPODE European Network (EEN) project (2008-2011) and according to the needs of the Community-based Programmes (CBPs) OPEN is a project supported by the European Commission (DG SANCO), aims to scale-up a minimum of 12 European Community-Based Programmes/Initiatives (CBPs/Is) that involve communities, in terms of quality and amount of actions developed and in term of increased diversity of the target groups reached. This, in order to reduce overweight and obesity among children and adolescents, including socially deprived groups.

Methodology: During 3 years, OPEN will base its childhood obesity prevention approach on the EEN recommendations and recent EU-funded researches (ENERGY, SPOTLIGHT, TEMPEST, IDEFICS). The CBPs progress will be measured according to the WHO Good Practice Appraisal tool. An OPEN Coordination team will assess the needs of 12 CBPs from 17 European countries willing to strengthen their methodology and improve their interventions. A scientific committee will gather, disseminate and facilitate practical application on the field of evidence and practice-based findings.

Results: A network of 7 universities and scientific partners interested in the issue of 9 Community/School-Based Programmes and 2 European health promotion boards to develop coordinated research plans in health-related diet and physical activity behaviours in the future was created with the support of DG Sanco.

Conclusion: OPEN will focus on increasing amount and efficiency of local actions developed among various target groups and facilitate implementation of innovative actions and dissemination through a best practice database to support the development and the efficiency of CBPs.

1. Conflict of Interest: No disclosed

2. Funding: Co-funded by the European Commission and Proteines.

T3T4:P.044

Development of an Obesity Care Pathway: An example of Collaborative Working in Cambridgeshire

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Introduction: An obesity care pathway is imperative to ensure that patients receive the right care, at the right time, in the right place and by the right person and it was the aim of two existing services within Cambridge to work together to develop the level 2 and 3 tiers of a new Obesity Care Pathway for local patients.

Methods: Following discussions with commissioners who had identified local needs, a gap analysis was undertaken. Both services worked together and utilising the latest evidence, an adult obesity care pathway was successfully developed. Using a standardised form, referrals from GPs were triaged by level 2 into the different services based on an agreed set of standards reflecting clinical complexity.

Results: Monthly meetings between both teams allow for discussions around referrals, ensuring patients seamlessly transfer between both tiers. The meetings also provide an opportunity for senior medical colleagues to provide clinical support to the community team and to enhance the way the two tiers work together. The teams are now beginning work on shared care guidelines for some of the treatment options.

The single largest challenges have been obtaining completed referrals and a lack of shared IT facilities

Conclusion: We have shown that by working together in the planning, development, implementation and evaluation phases we have created a pathway that is an effective and helpful tool for managing the care of obese patients within Cambridgeshire.

1. **Conflict of Interest:** None disclosed
2. **Funding:** No funding

T3T4:P.046

PREVIEW: PREvention of diabetes through lifestyle Intervention and population studies in Europe and around the World.

On behalf of the PREVIEW consortium

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Introduction: PREVIEW is a new 5-y EU project (2013–2017) under the FP7, KBBE programme. The primary goal is to identify the most efficient lifestyle pattern for the prevention of type-2 diabetes in a population of pre-diabetic overweight or obese individuals.

Methods: The project comprises two distinct lines of evidence, both embracing European and overseas countries:

1) A multicentre, clinical randomized intervention trial (3 years) with a total of 2,500 pre-diabetic participants, including children, adolescents, adults and elderly. The impact of a high-protein, low-GI diet vs the officially recommended diet in combination with moderate or high intensity physical activity on the incidence of type-2 diabetes will be investigated. The trial will be performed in 8 centres.

2) Large population studies using data from all age groups in European and overseas countries (estimated persons included = 170.000). Modelling strategies will be used.

Focus in both lines of evidence will be on specific diet (protein, GI) and intensity of physical activity, their interaction with the lifestyle factors: habitual stress and sleeping pattern as well as behavioral, environmental, cultural, and socioeconomic variables

Partners: PREVIEW includes 12 European and 3 overseas partners: Raben, University of Copenhagen. Fogelholm, University of Helsinki. Feskens, Wageningen University. Westerterp-Plantenga, Maastricht University. MacDonald, University of Nottingham. Martinez, University of Navarra. Handijev, Medical University Sofia. Stratton, Swansea University. Schlicht, University of Stuttgart. Meyers Madhus, Copenhagen. Lam, NetUnion, Lausanne. Sundvall, THL, Helsinki. Brand-Miller, University of Sydney, AUS. Poppitt, University of Auckland, NZ. Tremblay, Laval University, CAN.

T3T4:P.047

BMI, BMI change and future drug expenditures in German adults

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Objective: The evidence on the long-term economic effects of obesity is still scarce. This study aims to analyse the association of body mass index (BMI) and BMI change with future pharmaceutical utilisation and expenditures.

Methods: Based on data from 2,962 participants in a German population-based health survey (MONICA/KORA, 1994/95) and the follow-up

study (2004/05), drug intake and expenditures were estimated using a bottom-up approach. Generalized linear regression methods were applied to compare drug utilisation and expenditures after 10 years for the different baseline BMI groups. Additionally, the association of changes in the BMI within the 10-year period with utilisation and expenditures was examined.

Results: After adjusting for confounders moderately and severely obese people have significantly higher odds of drug utilisation compared with normal weight participants (OR 1.8 and 4.0, respectively). Regarding those who reported pharmaceutical intake, expenditures were more than 40% higher for the obese groups. Higher drug expenditures were especially noticeable for those pharmaceutical groups targeting the alimentary tract and metabolism (ATC-group A) and the cardiovascular system (ATC-group C). A 1-point BMI-gain in 10 years was, on average, associated with almost 6% higher expenditures compared to a constant BMI.

Conclusion: The results suggest that obesity as well as BMI-gain are strong predictors of future drug utilisation and associated expenditures in adults, and thus highlight the necessity of timely and effective intervention and prevention programmes. This study complements the existing literature and provides important information on the relevance of obesity as a health problem.

T3T4:P.048

Evaluating the cost-effectiveness of new interventions in the management and treatment of obesity – lessons for good practice evaluations from the ROMEO Project

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Introduction: Demonstrating cost-effectiveness of interventions is a key requirement for decision making bodies such as NICE and analyses should be conducted using best practice methods.

Methods: Results from quality assessment (Phillips criteria for economic modelling studies) of five studies included in the ROMEO cost-effectiveness review are used to describe key requirements for future economic evaluations in obesity management of men.

Results: Included studies evaluated lifestyle interventions, Orlistat, and GP or dietician advice. Methodological quality was variable, with limited transparency for a male only subgroup. Study heterogeneity prevented cross-study comparisons. The most common methodological issues arising in the studies include, but are not limited to:

- 1) Risk of progressing to future health states (e.g. diabetes) should be incorporated within a Markov decision model.
- 2) Downstream costs associated with reduced risk of obesity related disease should be included.
- 3) Assumptions should be clearly described and tested in sensitivity analysis, particularly in relation to weight regain post-intervention.
- 4) The model time horizon should be sufficient to capture all relevant costs and health outcomes; discounting should be applied to future events as appropriate.
- 5) Where possible, outcomes should be measured in QALYs with transparent calculation of utility weights and mortality risk within the model.

Conclusions: Robust conclusions could not be drawn from the study results. Future studies should address the methodological limitations outlined and will thus improve the quality of the advice given to health care policy makers.

1. **Conflict of Interest:** None

2. **Funding:** National Institute of Health Research, Health Technology Assessment programme

T3T4:P.049

A 5% weight loss improves productivity – a literature review on the relationship between weight loss and sick leave

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Introduction: The aim of this systemic literature review was to study if there is a causal relationship between a minimum 5% body weight loss and improvement in work productivity.

Method: A systematic literature review was carried out in Medline, Cochrane, NHS EED and EMBASE to retrieve articles published in peer-reviewed journals or Health Technology Assessments containing information on weight loss and work productivity from 1990 to March 2012.

Result: Seventeen articles met the inclusion criteria; ten reporting results from worksite lifestyle/ behavioral interventions, five on surgical interventions, and two described models estimating the effect of weight loss on work productivity. Among the work site interventions, two demonstrated a statistically significant effect of weight loss on reduced sick days. Both these studies included individuals with baseline BMI >30 kg/m² and between 4–8 % decrease in body weight. Two of the work site intervention studies did not present baseline BMI and the remaining four included normal weight or slightly overweight populations at baseline. All five studies on surgical interventions demonstrated a weight loss of more than 20% of body weight and all studies demonstrated a statistically significant increase in work productivity after the intervention. This effect was especially significant 1–3 years after the interventions, but decreased after more than four years.

Conclusion: This literature review demonstrated that 5% weight loss increases work productivity in terms of reduced sick leave among obese individuals with BMI >30 kg/m². The literature published today does not support an effect of weight loss on work productivity in populations with a BMI <30 kg/m²

T3T4:P.050

Preventing obesity: Is it worth it?

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Background: Action on obesity is constrained by a very limited evidence base of effective interventions, and a smaller set of demonstrably cost-effective interventions. However, there is growing pressure within an increasingly financially constrained health system to demonstrate that activities demonstrate value for money. We set out to develop an economic modeling tool that would allow commissioners and others to make objective judgments about interventions for which robust data on effectiveness are lacking.

Methods: We consulted with commissioners and identified the need for a practical tool to estimate the cost-effectiveness and cost/economic impact of interventions. We developed a draft tool based on promising approaches identified in a review of the literature, and tested this with an advisory group of commissioners and academics before finalizing and disseminating the tool.

Findings: Our approach enables evidence-based judgments to be made on the value of plausible interventions even in the absence of robust evidence of effectiveness or cost-effectiveness. Where effectiveness evidence exists, it enables users to estimate the likely economic benefits and cost-benefits of an intervention. In the absence of such evidence, it allows the user to estimate how effective the intervention would need to be to be economically viable. This allows commissioners to make more informed decisions on the funding of obesity interventions.

Interpretation: This approach is evidence-based but provides a pragmatic approach to the commissioning of obesity interventions even in the absence of robust evidence.

T3T4:P.051

Evaluating the Validity of the "Categories Method": A New Method for Self-report Assessment of Daily Calorie Intake: A pilot study

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Weight loss is mainly the result of reduction in daily caloric intake. Hence many people are interested in counting and tracking their daily caloric intake however, studies show that in fact only ~10% can accurately estimate the number of calories they eat. We suggest a new self-assessment method for calorie intake called the "categories method": a single categorical estimation per meal set of five categories. The aim of this study was to evaluate the validity of this new method in comparison with the 24 hours diary recall.

Methods: This was a cross-sectional study of 29 participants (2 men) aged 44.2±11.4 years. All were interviewed face to face on 1 occasion to obtain self-category estimation and 24 hours diary recall using the USDA "4 pass" interview method. The Categories method included: Category "1" less than 200 kcal, Category "2" 200–500 kcal, Category "3" 501–800 kcal, Category "4" 801–1200 kcal and Category "5" above 1200 kcal. Displaying the average value of each category (e.g., category 3: 500–800 Avg = 650 kcal), patients and professionals can sum up meals and estimate the total daily calorie intake.

Results: BMI was 25.9±8.7 kg/m². Reliability rate in selecting the right categories was 81.5%. The total calculate calories intake and estimate by the "categories method" were not significantly different (1671±600 vs. 1584±556 kcal/day) and the correlation was high (r=0.73, p<0.05).

Conclusions: The "categories method" was shown to be reliable and accurate and might simplify the process of counting calories, especially with assembled or cooked meal.

T3T4:P.052

Developing an NHS weight management intervention for obese adults to involve family members

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Introduction: Research evidence (SIGN, 2010), suggests involving family members in behavioural intervention for obesity, is more effective for weight loss than targeting the individual alone. However, SIGN (2010) gives no clear recommendations on how family members should be involved. The study aimed to gather views from users of NHS Glasgow Weight Management Service, family members and NHS staff to enhance the existing weight management intervention with the inclusion of family members in some way.

Methods: Qualitative research methods were used. Participants were recruited via weight loss groups, and data were gathered using focus groups and individual interviews. Transcriptions were analysed using content and thematic analysis. Frequencies of themes within and across groups were calculated.

Results: 10 service users, 7 family members, and 2 staff were interviewed (Age range: 45–68 years). An information session for family members was ranked as the preferred intervention format. Providing family members with information on how to give encouragement, praise and support was deemed the most important component. The importance of family members supporting self-efficacy and self-motivation in the service user was identified by all groups.

Conclusions: The qualitative research in this study provides clear guidance on how to incorporate family members into the existing weight management intervention without impinging on the service user's autonomy.

Reference

Scottish Intercollegiate Guidelines Network (2006) Management of Obesity. Edinburgh, SIGN.

1. **Conflict of Interest:** None disclosed
2. **Funding:** Research Grant provided by the National Obesity Forum in partnership with Weight Watchers UK.

T3T4:P.053

Impact evaluation of a child obesity prevention RCT: Maternal feeding practices

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Introduction: Early feeding practices lay the foundation for child food preferences and eating behaviour and may contribute to future obesity risk. The NOURISH RCT evaluated the impact on maternal feeding and parenting practices of a universal feeding intervention which commenced in infancy and aimed to prevent childhood obesity

Methods: At baseline 698 first-time mothers (mean age 30.1 years, SD=5.3) with healthy term infants (51% female) aged 4.3 (SD=1.0) months were enrolled. Mothers were randomly allocated to self-directed access to usual care or to attend two 6-session group education modules that provided anticipatory guidance on early feeding practices. Impact outcomes were when the children were aged two years using self-reported validated questionnaires and study-developed items. Australian and New Zealand Clinical Trials Registry Number 12608000056392.

Results: Retention at follow up was 78%. Mothers in the intervention group reported using responsive feeding more frequently on 6/9 subscales and 8/8 items ($P \leq .03$) and overall less 'controlling feeding practices' ($P < .001$). They also more frequently used feeding practices likely to enhance food acceptance on 3/4 items ($P < .01$).

Conclusion: Impact evaluation of NOURISH at child age two years found that anticipatory guidance on the 'when', 'what' and 'how' of complementary feeding, tailored to developmental stage, increased use by first-time mothers of 'protective' feeding practices that potentially support the development of healthy eating and growth patterns in young children.

1. **Conflict of Interest:** None.
2. **Funding:** NOURISH was funded 2008-2010 by the Australian National Health and Medical Research Council (grant 426704). Additional funding was provided by HJ Heinz, Meat & Livestock Australia, Department of Health South Australia, Food Standards Australia New Zealand, Queensland University of Technology, and NHMRC Career Development Award 390136 (JMN).

T3T4:P.054

The imbalance within fat component of overweight and obese students' diet as a risk factor of metabolic syndrome development

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Objective: The study aimed to estimate fat component (including fat-soluble vitamins) of overweight and obese students' diet and analyze it from a perspective of its adverse effects on metabolic status.

Methods: Participants were 103 students of medical university aged 20–22. Two 24-h dietary recalls were used for the assessment of students' diet and its nutrient content was estimated using the food composition data base.

Results: 14 people were overweight and 6 people were estimated as obese (BMI 31–34). Despite the energy value of the diet didn't exceed the RDA and in average amounted to 1662±329 kcal in overweight students and 2249±423 kcal in those with obesity, substantial imbalance in the lipid component was found. While the percentage of energy from total fat and SFA was higher than recommended (38–44% and 13–14.5% respectively), the proportion of MFA was low (12.5%) and the deficiency

of long chain n-3 PUFAs (EPA+DHA) was evident (0.09±0.02 g). As far as fat-soluble vitamins are concerned, the significant deficiency has been shown: an average content of vitamin A is 0.48±0.11 mg, vitamin D – 2.8±0.12 µg, vitamin E – 7.9±5.3 mg and vitamin K – 66±15 µg which is equal to 53%, 56%, 53% and 55% of these substances' RDA respectively.

Conclusion: 20 students were estimate as overweight and obese (19.4% of the target group). The imbalance revealed within fat component along with deficiency of fat-soluble vitamins may contribute to further weight gain and result in metabolic syndrome development in the future.

1. **Conflict of Interest:** None Disclosed
2. **Funding:** No Funding

T3T4:P.055

Evidence for effective male weight loss programmes. A systematic review of long-term weight loss randomised trials for obese men: The ROMEO project

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Background: Men in the UK are failing to recognise that they are overweight or obese, less likely to consider their body weight a risk for health, and less likely to try to manage their weight. Despite gendered differences in attitudes and behaviours associated with weight loss and maintenance, weight loss programmes have focused on women or have failed to consider men as a separate group. We systematically reviewed the evidence for effectiveness of weight management interventions in men only.

Methods: A systematic review of randomised controlled trials (RCTs) of weight loss or weight maintenance interventions with obese men only, with BMI of $\geq 30 \text{ kg/m}^2$ (or with BMI $\geq 28 \text{ kg/m}^2$ with cardiac risk factors based on orlistat guidance) with follow up of at least one year.

Results: Only eleven RCTs with men only were identified as eligible for inclusion: nine investigating weight loss interventions; two investigating interventions for weight maintenance. Very few authors consulted men during the intervention design stage. Results indicate that a programme comprising a reducing diet, a physical activity programme and behaviour change counselling produces favourable weight loss and improves cardiovascular risk factors and erectile function. Programmes including physical activity are particularly enjoyed by men. While individual tailoring of programmes to suit individual lifestyle and educational needs is important, men also perform well in group settings. Behavioural support was also shown to be important for weight maintenance.

Conclusion: RCT evidence for the long-term effectiveness of interventions for obese men is sparse, and needs to incorporate their perspectives.

1. **Conflict of Interest:** None
2. **Funding:** National Institute of Health Research, Health Technology Assessment programme

T3T4:P.056

The Healthy Eating and Lifestyle in Pregnancy (HELP) Study: Design, Baseline Data and Qualitative Findings

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Introduction: Approximately 1 in 4 pregnant women in the UK are obese. Obesity is linked to pregnancy and birth complications and excess weight gain during pregnancy may also lead to long-term obesity. The aim of the study is to assess whether a theory based weight management intervention for obese pregnant women, which targets physical activity and healthy eating, is effective in reducing women's BMI at 12 months from giving birth and at what cost.

Methods: The study is a cluster RCT. We recruited 598 obese pregnant women. The primary outcome is BMI at 1 year postpartum. Secondary outcomes include pregnancy weight gain, quality of life, mental health, waist-hip ratio, child weight centile, diet, physical activity, pregnancy and birth complications, social support and self efficacy. A health economic and process evaluation will also be conducted.

Results: Baseline characteristics demonstrate that women recruited to both arms of the trial are broadly similar in terms of demographics as well as the outcomes of interest. Most women were concerned about obesity and had tried to do something about their weight before they were pregnant. Scores on the GHQ indicated many women recruited may have mental health problems. The results of the qualitative interviews with participants and those involved in delivering the intervention, which will be completed by the time of the conference will also be presented.

Conclusions: If successful this intervention could significantly reduce health risks for the women, as well as NHS healthcare costs.

1. Conflict of Interest: None

2. Funding: NIHR-HTA

T3T4:P.057

Balanced nutrition at work: the European programme FOOD (Fighting Obesity through Offer and Demand)

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Background and Objectives: Designated by the WHO as one of the greatest public health challenge of our century, obesity is responsible 10–13% of deaths in the European region.

Companies are an important setting and information channel for promoting health to their employees.

Method: The two main objectives of the European programme FOOD are to improve:

1. the nutritional habits of employees
2. the nutritional quality of the food on offer in restaurants

In 2008, Edenred proposed to health experts to join the project as partners in Belgium, Czech Republic, France, Italy, Spain and Sweden.

To meet the objectives, a five-step methodology was followed:

1. Research and knowledge phase with an Inventory of existing programmes, a quantitative questionnaire (52,000 employees and 5,000 restaurants) and a qualitative study (60 interviews in restaurants)
2. Recommendations made by the partners, after the results and analysis of step 1
3. Adapted tools developed and piloted in the restaurants and the companies
4. Pilots evaluated
5. Following the evaluation, tools adapted and best practices disseminated

Results: The 102 communication tools reached around 4.2 million employees and 352,000 restaurants. A network of restaurants applying the FOOD recommendations has been created, thus connecting the offer and the demand sides of balanced nutrition.

Conclusions: After the project period, the partners have decided to take advantage of the actions and results of the project and created a long-term programme. The Slovak Republic and Portugal already joined the programme and more countries are expected.

T3T4:P.058

Regional Platform for Health and Wellbeing pilot study: Provision of weight management support via the workplace

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Introduction: The East Midlands *Platform for Health and Wellbeing* is a network of private, public and voluntary sector organisations working to improve health and reduce obesity through the collective actions of

members. As part of Slimming World's (SW) commitment to the platform, this pilot assessed the merits of providing weight management support via the workplace at two large regional employers.

Methods: 278 British Gas and Nottingham Hospitals employees were offered 12 weeks' support at either a workplace or community-based SW group. Weight change was recorded weekly. Dietary and physical activity behaviours, along with aspects of psychological health were assessed by questionnaire pre- and post-programme. Data were analysed using independent and dependent t-tests or non-parametric procedures where relevant.

Results: 121 employees (meeting inclusion criteria) joined a workplace-based group and 114 community-based. Mean joining BMI was 32.4 kg/m². There was a significant ($p < .001$) reduction in weight 87.4 kg (± 17.8) to 84.1 kg (± 17.8). 138 (59%) completed the programme (attended within final 4 weeks). Participants who completed both questionnaires ($n=87$), reported positive changes in dietary and physical activity behaviours (all $p < .001$), and psychological health (mental wellbeing, self-worth and self-esteem, all $p < .05$). There were no significant differences between worksite and community intervention groups for any outcomes.

Conclusion: Workplace weight management support significantly reduced weight (3.9%). Completer analysis also revealed positive changes in psychological health and behavioural outcomes. The SW programme works efficiently with both workplace and community-based provision when employees are recruited via the workplace.

Funding: This work was funded by Slimming World

T3T4:P.059

Tacking Obesity Using a Managed Network Approach – The Northern Area Managed Obesity Network (MON)

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Introduction: The purpose of the MON is to provide a framework to co-ordinate and quality assure programmes of care aimed at weight management. The MON encourages organisations to work together, improve the appropriateness, quality and accessibility of services across the life course. The MON model is derived from the Managed Clinical Network model.

Methods: In 2009–10 a mapping exercise was carried out throughout the Trust area (population > 440,000). Everyone delivering activities, providing information or training relevant to weight management was invited to complete a questionnaire. Information was gathered face to face, by telephone, email or post. All information received was evaluated against the National Obesity Observatory standard evaluation framework.

Results Over 200 submissions were received. The collection and evaluation exercise highlighted a lack of an evidence-based approach to weight management and none of the submissions could provide objective evidence of having achieved any weight loss. Following these results a joined up strategic approach has helped develop a better understanding of the key components of an effective weight management programme; a joint needs assessment addressing prevention and intervention has helped direct resources more effectively. A range of successful community and hospital based behavioural programmes and training packages have been delivered, having a positive impact on weight loss ($p < .001$).

Conclusion: The MON is an organisational approach that offers a structure that facilitates best use of expertise and resources. A network approach promotes a focus on objective evidence of effectiveness for weight management.

T3T4:P.060

Routines for referrals of overweight or obese children might be an inappropriate practice that might cause false expectation or increased dropout rate

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Introduction: The “Healthy future” project explores the routines of health professionals in meeting overweight children and their families.

Methods: Focus group discussions in health professionals were carried out with public health nurses, general practitioners, hospital staff from pediatric and child and adolescents mental health units. Data was analyzed by content analysis.

Results: Health professional felt uncertain in handling overweight problems in children. They experienced lack of tools, time and effective methods. Public health professionals would refer the children to specialist health care, while the hospital staff points to the public health nurses and GP's as important resources in helping children and families to a healthier lifestyle. GP's felt they were not in the best position.

Conclusion: In one region in Norway the routines of referring overweight children to other level of healthcare service was widespread, even if there was no suspicion of underlying somatic or mental health difficulties. This practice might cause false expectation within the family and might increase the dropout rate because it might give the impression that no effective treatment is available.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded by The Norwegian Health Directorate, The Norwegian Nursing Association.

T3T4:P.061

Evolution of initiatives aimed at improving food choices among children in Mazovia, Poland

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Introduction: The prevalence of overweight and obesity among children and adolescents depends on an aggregate of socio-demographic factors, which include place of living. In Poland's Mazovian voivodship almost 19% of children and adolescents are overweight or obese, which is more than in any other of the 16 Polish voivodships. Additionally boys (especially those living in urban areas) are significantly more often at risk of excessive weight than girls. In order to combat these inequalities local initiatives have to be undertaken focusing on creation healthy food behaviour including healthy food choice and meal preparation.

Methods: In the framework of the EU-funded project AFRESH a Joint Action Plan was set up for participating regions. Partners from Mazovia selected the “children and young people” group as one of the main priorities in developing a program of innovative scientific research, products and services.

Results: The developed research program will give in-depth information on how children and young people relate to food and physical activity and will identify the mechanisms for behaviour and food pattern change leading to healthier choices. The set of innovative products or services for children should cover new ICT technologies or resources to create dynamic and funny methods of healthy lifestyle education, which engage also older generations.

Conclusion: The creation of the Joint Action Plan and study visits which took place during AFRESH inspired the AFRESH Mazovia business partner to introduce an innovative nutrition education project aimed at children called “School on a fork” in Warsaw kindergartens and schools.

T3T4:P.062

An overview of national clinical guidelines for the management of childhood obesity in primary care

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Study Design: Review of clinical guidelines.

Background: Most national clinical guidelines for the management of childhood obesity in primary care were only recently published. It is unknown whether there is international consensus concerning the diagnosis and management of childhood obesity.

Objective: To present an overview of available guidelines for the management of childhood obesity in primary care

Methods: Guidelines were included if they met the following criteria: (1) the guideline makes recommendations concerning the management of childhood obesity, (2) the target group consists of primary care health practitioners, (3) the guideline is available in English or Dutch. Quality of included guidelines was assessed with the AGREE tool.

Results: Clinical guidelines from six different countries published from 2003 until 2010 met the selection criteria and were included in this review. The recommendations of the guidelines regarding the management of childhood obesity appeared to be quite similar. A consistent feature was the recommended combined intervention, with diet, physical activity and counselling being the three most important elements. In general the guidelines fail to inform about specific diet plans or an approach for counselling. There were discrepancies between the guidelines for recommendations regarding diagnostic classification criteria for childhood obesity.

Conclusion: The present review shows that there is international consensus regarding the recommendations for management of childhood obesity, although these recommendations often lack clarity. There is less international consensus regarding the diagnostic classification of childhood obesity.

T3T4:P.063

Obesity prevention: Dividing responsibilities for action

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Introduction: Given its adverse health consequences and the lack of effective remedies, obesity prevention remains a key priority. However, it is challenging to divide responsibility for this between different actors, such as individuals, companies, and states.

Central Argument: There are two major difficulties involved in deciding who should bear what responsibilities to prevent obesity. First, apart from specialist associations concerned with obesity, all actors have many other responsibilities to fulfill. If we think that they should also take responsibility to prevent obesity, we must ask how far this is compatible with their other responsibilities. Food companies, for example, have legal obligations as regards profitability that are – in the absence of regulation – not readily compatible with a preventative role. Second, even where a responsibility to prevent is compatible with an actor's existing responsibilities, there remains a difficult question of priorities. Both governments, and parents, for example, have many tasks already and there is no simple answer to the priority they should give to obesity prevention.

Conclusion: Obesity experts rightly regard obesity prevention as a high priority. For the above reasons, however, it does not look this way to many other actors. Failures to prevent obesity often result not from ignorance or ill-will, but rather from the variety of other tasks actors bear. A key public health responsibility is to look for preventative options for different actors that will combine most readily with their existing responsibilities and priorities.

Note on Method: This is a theoretical paper; empirical methods are not used.

T3T4:P.064

Beliefs about the causes of obesity and attitudes towards policy initiatives

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Background: There is public debate about the role of government in preventing and treating obesity, with some support but also objections to public expenditure on conditions perceived to be 'self-inflicted'. We hypothesised that environmental or genetic causal attributions for obesity would be associated with higher support for policy initiatives, while willpower attributions would be associated with lower support.

Methods: In a population-representative sample, British adults (N=1986) indicated their agreement (5-point scales: strongly disagree – strongly agree) to three potential causes of obesity (environment, genes, willpower) and five policies (free weight-loss treatment, taxing unhealthy foods, healthy lifestyle campaigns, food labelling, advertising restrictions).

Results: More people attributed overweight to the food environment (61%) and lack of willpower (57%) than genes (45%). Policy support was highest for healthy lifestyle campaigns (71%) and food labelling (66%), and lowest for taxing unhealthy foods (32%).

Food environment attributions were associated with higher support for all policies ($P<.001$). Genetic attributions were associated with higher support for free weight-loss treatments and healthy lifestyle campaigns ($P<.001$), but not other policies. Attributions to lack of willpower were not associated with lower support for any policies ($P>.01$).

Conclusion: Belief that overweight is caused either by the food environment or genes – both seen as outside individual control – was associated with greater support for government policies to prevent and treat obesity. Improving awareness of the multiple causes of obesity could facilitate acceptance of policy action to reduce obesity prevalence.

1. Conflict of Interest: None disclosed

2. Funding: Research relating to this abstract was funded by Cancer Research UK.

T3T4:P.065

4 years cantonal intervention programs (CIP) in Switzerland – an effective way of tackling childhood obesity

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Introduction: After 4 years of implementing the CIP "healthy weight" in Switzerland, an extensive evaluation reveals where to find the successes and difficulties of this program and how to shape the future of childhood obesity prevention in the Swiss cantons.

Method: The CIP is a collaboration between the cantonal and federal level. The program is designed to target children from 0 to 16 years old within their daily settings and is also aiming to change behavior. Therefore the program is built on four levels including interventions, policy measures, communication and networking. An evaluation has been done in 22 out of 26 cantons in Switzerland over all four levels.

Results: Thanks to the 22 cantons participating in a CIP, 96% of all children between 0 and 16 years old can be reached with this model. A significant increase in the number of interventions considering the most vulnerable (35% of all interventions) has been measured, as well as a higher quality within the interventions. The network in the field of physical activity and nutrition between the cantons has become tighter and claims for a healthy lifestyle could be harmonized.

Conclusion: The CIP "healthy weight" is a flagship program in the field of health promotion in Switzerland. The experiences made and now the results of the evaluation will help this program as well as others to be better shaped for future challenges.

T3T4:P.066

Towards Best Practice Healthy Eating and Exercise Education in Early Childhood

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Introduction: Early childhood teachers report being increasingly concerned about the changing nature of children's play and the extent to which children bring high calorie foods associated with popular culture characters to early childhood settings; teachers also report difficulties responding to these concerns so that children are not at risk of obesity and ill health. The aim of this study was to create an early childhood pedagogical communication strategy for supporting young children and their families to realise the connections between obesity prevention, the use of digital technologies, children's active play experiences, and environmental sustainability.

Method: Qualitative research was undertaken with 16 preschool children (aged 4–5 years), 18 primary school children (aged 5–6 years), the mothers of the children, and six early years teachers (3 = preschool and 3 = primary school).

Results: The qualitative findings were used to create a pedagogical communication strategy titled 'Generating New Knowledge in Early Childhood Education: Aligning Contemporary Health, Wellbeing and Sustainability Issues with Research into Children's Play'. The strategy discusses the complex relationship between children's digital media viewing, obesity prevention, issues of sustainability and play. It connects these issues with three key Learning Outcomes in the Australian Early Years Learning Framework and provides suggestions for teacher planning.

Conclusion: The development of an educational statement aimed at supporting teacher thinking about the relationship between healthy eating and physical activity, digital media/technology use and sustainability in early childhood education suggests potential for helping teachers create stronger links between these contemporary concerns and the early childhood curriculum.

T3T4:P.067

Fun, Fit Tayside: A primary school based intervention aimed at promoting healthy weight and an active lifestyle

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Introduction: Fun, Fit Tayside is a school based healthy lifestyle programme aimed at preventing childhood obesity. It is delivered in primary schools with the aim to improve children's knowledge of a healthy lifestyle, the importance of eating a healthy balanced diet, reducing sedentary behaviour and increasing physical activity. The intervention has been designed in accordance to Scottish Government's Child Healthy Weight targets.

This 8 session teacher-led programme is linked to the Scottish Government Curriculum for Excellence (CfE) 2nd level Health and Wellbeing experiences and outcomes. The programme focuses on the following health behaviours, i) reduction of screen time to two hours per day, ii) increasing physical activity to one hour per day and iii) consumption of 3 healthy, balanced meals per day in the context of increasing overall healthy behaviours and an active lifestyle.

Methods: Measures included body mass index (BMI), BMI standard deviations (SD) from baseline to intervention end, pupil attendance, demographics and the teacher's experience of the programme.

Results: 30 teachers completed compulsory training with 888 primary school children completing the programme (a minimum of 75% programme attendance) from 36 schools. For the primary outcome, BMI results showed that 240 pupils (23%) were overweight $\geq 91^{\text{st}}$ centile or obese ($\geq 98^{\text{th}}$ centile).

Analysis of the teacher evaluations showed that the programme was well received and an improvement in teacher knowledge.

Conclusions: Teachers describe this programme as being positive, with pupils engaging well. We are currently evaluating the programme for translation into behaviour changes.

No conflicts of interest and or funding.

T3T4:P.068

Obesity and Nutrition Habits Among School Children and Students in Central Serbia

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Introduction: Nutrition habits among children and youth in Serbia are characterized by irregularity in daily meals, consuming small amount of fruit and vegetables, and consuming large amount of food with high energy density. As consequence of bad nutrition habits in Serbia there is an increase of fat children, 18% of children age 7–19 is pre-fat and 5–8% is fat, with simultaneous significant presence of micronutrition deficit.

Methods: A special questionnaire was used in the project “Health condition, health needs and health protection of population in Republic of Serbia” in 2006. A section study on the specimen of 980 pupils and students from Kragujevac was performed in 2010. For statistical analysis was used uni and multivariation correlation and regression, ANOVA test.

Results: On the basis of research results, it is noticeable that there is statistical significance of distinctions from sex in case of lunch and breakfast habits, consuming milk and milk products, pork meat, fish, nuts, vegetables, sweets, white bread and different kinds of pastries and oils. Also, there is a significant distinction between consuming coffee, tea, alcohol and soft drinks. Overweight were 9,82 % of tested pupils and 6,97% of tested students. With underweight there were 3, 26% of pupils and 2,49% of students. This study gives no statistically significant distinction in other nutrition habits, although there is discreet occurrence in some cases.

Conclusion: Information about nutrition habits with pupils and students, are necessary to establish needs for sanitary and educational intervention directed to proper nutrition.

T3T4:P.069

Using systems thinking to develop community led obesity prevention interventions

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Introduction: This paper describes a new, community led, participatory approach to developing action plans for whole-of-system obesity prevention.

Methods: Key stakeholders (students, principals, teachers and welfare workers) from three secondary schools in the Australian Capital Territory as well as representatives from relevant government departments and external agencies participated in a two-day systems intervention planning workshop. A group-based participatory approach was used to identify potential interventions in different action areas including policy, curriculum, social marketing, programs, events and environments. Interventions were refined using the WHO system ‘building blocks’ framework: leadership, information, financing/resources, partnerships and workforce development.

Results: A nutrition objective generic to each school was developed; to develop, implement and evaluate a comprehensive “Food at School” policy. One other school-specific objective was developed: to increase mental wellbeing through promotion of healthy eating and physical activity systems; to increase the time adolescents spend in physical activity at school; to increase the proportion of adolescents using active transport to and from school. The draft action plans that were initiated for each school have subsequently been finalised and strategies commenced.

Conclusion: This process provided a flexible and efficient way of achieving an agreed plan for obesity prevention among different schools. The participation of representatives from external agencies (e.g. Nutrition Australia) comprised an important shift in the dynamics of each system including the development of new networks and increased capacity for change within each school. The resulting action plans have provided the basis for acting ‘on’ systems and ‘within systems’ to elicit healthful change.

1. Conflict of Interest: None Disclosed

2. Funding: This program is a joint Australian, State and Territory Government initiative under the National Partnership Agreement on Preventive Health

T3T4:069A

The TeesCAKE intervention

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Introduction: The development of effective, affordable, and sustainable interventions to prevent childhood obesity is a public health priority in many countries.

Methods: The TeesCAKE intervention was assessed by conducting an exploratory RCT. Four schools were recruited, and matched on demographics. By the toss of a coin, two schools received the intervention, and two acted as controls. Only children in one school year (aged 9–10 years) were recruited (284 intervention; 264 control). The intervention consisted of three (one per school term) eight week programmes delivered by local public providers, working in partnership, over one school year; football, dance, and food preparation. Primary outcome was BMI at 18 months. Secondary outcomes included waist circumference. Measurements were taken at six, 12 and 18 months.

Statistical Analysis: Analysis was based on complete cases and primary outcome measures were adjusted for sex and baseline values. The results are based on individual level analysis, not accounting for any potential cluster effect due to schools being the unit of randomisation. There were too few clusters to conduct the appropriate linear mixed (multilevel) model.

Results: Significant positive effects for BMI at 6 (-0.19, 95% CI -0.35 to -0.03) and 18 months (-0.26, 95% CI -0.48 to -0.04), and waist circumference at 18 months (-1.2; 95% CI -2.0 to -0.4), in favour of the intervention, were found.

Conclusion: The TeesCAKE intervention shows promise as a relatively cheap and sustainable intervention.

1. Conflict of Interest: none

2. Funding: World Cancer Research Fund

T3T4:P.070

Defining obesity or constructing otherness: A discourse analytic study of student nurse talk

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Introduction: Student nurses understanding of obesity and the language they use to construct accounts of experience in clinical practice, was examined through the intellectual lens of discourse analysis.

Methods: Participants were recruited from one University Department. Semi-structured interviews were conducted with five student nurses in their third year of training. Interviews were recorded, transcribed and analysed using discourse analytic techniques to search for patterns and tensions in talk.

Results: Participant talk associated ‘obesity’ and ‘bariatric’ with those at the extreme end of the body mass index [BMI] scale, and extreme examples were used to describe these patients. Consequently, individuals who conformed to a discriminatory discourse, which included the need for specialist equipment, were ascribed the descriptor of ‘obese’ or ‘bariatric’.

Participants understanding, and use of the term ‘bariatric’, were consistent with evidence presented in the academic literature, where assessment criteria are variable. Nurse accounts identified dominant public and government discourse, but also evidenced degrees of dissonance. In the context of a ‘pseudo-diagnosis’, nurse talk shifted from a professional to a pejorative discourse legitimating the othering of a specific patient population.

Conclusion: The accepted definition of obesity, as a BMI of greater than 30, does not have an agreed clinical meaning for student nurses working on the wards. Patients are perceived to be obese or bariatric only if they are at the larger end of this scale or require specialist equipment. The study findings have significant implications for practice in terms of referral to specialist services and access to appropriate care.

1. Conflict of Interest: None

2. Funding: This study forms part of the researchers NIHR funded MRes.

T3T4:P.071

Perceived and objectively measured physical environmental factors related to obesity: A systematic review within the SPOTLIGHT project

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Introduction: Understanding how the physical environment influences obesogenic behaviours is a public health research priority. Following socio-ecological models, interventions to prevent obesity are more likely to be effective if they target both individual-level and environmental-level determinants. However, objective measures of the environment often differ from those based on perceptions reported by individuals. Therefore, objective and perceived measures of the environment may have different relations to obesity. The aim of this systematic review was to assess which –and to what extent– perceived and objectively measured physical environmental factors are associated with obesity.

Methods: A systematic search was carried out in PubMed, Web of Science, Embase and the Cochrane Library for studies relating a physical environmental factor to (measures of) weight status. Studies from 1995 up to October 2012 were considered. Two reviewers independently screened titles and abstracts for eligibility, rated methodological quality, and extracted data. Results of objectively and perceived environments were presented separately, as were studies from Europe, Australasia and the United States.

Results: The initial search generated 6200 titles and abstracts. Over 70 articles were included in the review after examining full text articles. More than half of the studies were conducted in the US and around 80% of the studies used an objective measure of the environment. Results will be available at the time of the ECO conference.

Conclusion: This review contributes to the evidence base for the association between physical environmental factors and obesity, and may provide entry points for more tailored intervention approaches.

T3T4:P.073

Lack of compliance with a Healthy Lunch in Mexico

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Introduction: Recently, the Mexican Government issued guidelines for foods permitted (FP) at schools and established criteria for what constitutes an adequate lunch pack (LP). The aim of this study was to assess the content of lunches, packed at home, among elementary school children.

Methods: The sample was drawn from a school district in a Mexican city, a total of 496 LPs from randomly selected children were reviewed. “Healthy LP” was assigned to those that included water and fruits or vegetables and that did not contain foods containing higher than recommended amounts of fat, salt or sugar. LPs were classified as “Adequate LP” if they included at least one food portion from the three food groups recommended by the Health Ministry.

Results: None of the LPs met the “Healthy LP” criteria. Ninety-one per cent contained processed foods with high contents of fat or sugar and salt. 44% of the LP contained sweetened beverages, and 22% contained dairy products with added sugars. Eight per cent of the LPs included water in addition to fruits or vegetables. More girls than boys had fruit and vegetables in their LPs. Only 4% of LPs met the criteria of “Adequate LP”, and this was reduced to 1.4% when we assessed if water was included in the LP.

Conclusions: None of the LPs met the “Healthy LP” criteria and only 1.4% met the “Adequate LP” criteria. We suggest that only one comprehensive criterion be established along with adequate monitoring to ensure enforcement.

T3T4:P.074

Body size perception and body size dissatisfaction among young Chinese children: A cross sectional study

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Introduction: Body size dissatisfaction has been associated with anxiety, low self-esteem, disordered eating, and increased risk of future weight gain in adolescents. Recent research suggests that body size awareness and dissatisfaction may develop before adolescence.

Objectives: To determine the extent and potential predictors of body size perception and dissatisfaction in pre-adolescent Hong Kong Chinese children.

Study Design: Cross-sectional study of 620 Chinese children (53% boys, aged 6.1–12.9 yrs) from a primary school in Hong Kong.

Method: Height and weight were measured. Weight status was defined according to IOTF criteria. The Child’s Body Image Scale was used to measure size perception (actual minus perceived size) and dissatisfaction (perceived minus ideal). Predictors of body size perception and dissatisfaction were examined by logistic regression.

Results: Overall, only 25% of children were satisfied with their body size. Girls (adjusted OR: 1.91, (95% CI: 1.32, 2.76)), children >8yrs (adjusted ORs: 2.62 (1.65, 4.16) and 2.16 (1.38, 3.38), for 8–10 yr and >10yr, respectively), and those with higher weight status (adjusted ORs: 6.23 (3.66, 10.60) and 19.04 (5.64, 64.32) for overweight and obese, respectively) were more likely to desire a thinner body. Size misperception was a strong predictor of body size dissatisfaction, irrespective of actual weight status.

Conclusion: Body size dissatisfaction is prevalent among Hong Kong Chinese children as young as 6 years. Female gender, age, overweight, obesity, and overestimation of body size are associated with increased desire to be thinner. These findings emphasise the importance of understanding and preventing body image issues from an early age.

T3T4:P.075

Body shape trajectories throughout life and type II diabetes risk in the E3N cohort

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Background: It has already been indicated that a lean body shape at birth or childhood and a large body shape at adulthood were independent risk factors of type II diabetes (T2D) at adulthood, but no study has analyzed the association between evolution of body shape throughout life and T2D risk.

Material & Methods: A total of 80,110 women from the E3N cohort reported which drawings in a series of Sørensen's body shapes best described their body shape at the age of 8, at menarche, at ages 20–25 years, and at ages 35–40 years. A latent class growth modeling (Proc TRAJ, SAS 9.2) was used to build 6 distinct trajectories of body shape. They were then studied in relation with T2D risk in multivariate Cox regression models.

Results: A total of 2,045 validated T2D cases were analyzed. Compared to women constantly lean all over the years, women who were lean at age 8 and then experienced a strong increase in body shape at menarche were particularly at risk of T2D risk at adulthood (HR=1.86 [1.53–2.27]). Women constantly with a large body shape were also at increased risk, but with a lower magnitude (HR=1.34 [1.11–1.63]). Women with a mid-range body shape value all over the years were associated with a significant decreased risk (HR=0.61 [0.52–0.72]). Other trajectories were not associated with T2D risk.

Conclusion: From a public health perspective for T2D prevention, lean women at childhood should be especially warned against weight gain.

T3T4:P.076

Body shape throughout life and incidence of self-reported hypertension in the E3N-EPIC cohort

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Introduction: A lean body shape at birth or in childhood and a large adult body shape might be related to risk of adult hypertension, but no study has ever analyzed the association between trajectories of body shape throughout life and risk of hypertension.

Methods: A total of 50,321 women from the E3N-EPIC cohort reported which drawing in a series of Sørensen's silhouettes best described their body shape at the age of 8, at menarche, at ages 20–25 years, and at ages 35–40 years. A latent class growth modeling (Proc TRAJ, SAS 9.2) was used to build seven distinct trajectories of body shape. They were then studied in relation with hypertension risk in multivariate Cox regression models.

Results: A total of 9,422 cases of hypertension were self-reported during the follow-up (1993–2008). Compared to women who always had a normal body shape, the four trajectories where women experienced an increase in body shape throughout life (whatever their body shape at age 8) were significantly at increased risk of hypertension; especially those who had a large increase in body shape at puberty (HR=1.30 [1.15–1.48]). Women who constantly had a large body shape were also at increased risk (HR=1.34 [1.20–1.50]). Finally, women who had a decrease in body shape after puberty were not at risk of hypertension (HR=1.05 [0.96–1.15]).

Conclusion: From a public health perspective, women lean in childhood who experienced a large increase in body shape throughout their life should be warned about hypertension risk.

T3T4:P.077

A pilot study comparing the physical activity levels of children at independent and state schools in Sheffield, United Kingdom

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Background: A significant number of children are insufficiently active for good health. The school that children attend affects their physical activity level. No research has looked to determine a difference in physical activity levels of children at independent and state schools in the UK.

Methods: Three schools in Sheffield were recruited. Data were collected from 189 children on their physical activity and sedentary behaviours over the past week using the Youth Physical Activity Questionnaire. Data were analysed using linear regression models and further stratified for gender and residential deprivation score.

Results: Independent school children were more active ($p = 0.002$) and more likely to meet the government guidelines for physical activity than their state school counterparts, 87% and 71% respectively ($p = 0.017$). Children's total MET-minutes per week were significantly predicted by school type ($p = 0.004$) but not by residential deprivation score or gender.

Independent school children reported more minutes of sedentary behaviour than state school children ($p < 0.001$). Children's total sedentary minutes per week were significantly predicted by school type ($p = 0.001$) but not by residential deprivation score or gender.

Conclusions: Independent school children were more active than their state school counterparts, recorded more sedentary minutes per week and were more likely to meet the government's physical activity guidelines. School type, but not residential deprivation score or gender, significantly predicted children's total MET-minutes and total sedentary minutes per week. The results have the potential to influence current childhood inactivity and obesity management strategies.

T3T4:P.078

Trends in incidence and determinants of overweight among 9–11-year-old children – Kiel Obesity Prevention Study (KOPS)

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Introduction: Recent studies reported that the prevalence of childhood overweight is plateauing. Since, the prevalence depends on incidence and persistence, it is necessary to determine trends in incidence and persistence. Moreover, it is unknown whether the determinants of childhood overweight have changed over time.

Methods: Anthropometric measurements were conducted among German 9–11-year-old children within two cross-sectional studies (Cohort I: 2000–2005, $n=3707$; Cohort II: 2010–2012, $n=1224$). Overweight was defined using IOTF-cut-offs. A subpopulation of each cohort had been already measured at age 5–7 y, which allowed calculating incidence and persistence (Subpopulation I: $n=1393$; Subpopulation II: $n=757$). Data of socioeconomic status, nationality, lifestyle and parental nutritional status were collected by questionnaire.

Results: Prevalence (22.3% vs. 22.2%), incidence (13.2% vs. 10.9%) and persistence (82.8% vs. 75.9%) did not differ significantly between cohorts. Body fat slightly increased ($\Delta 0.45\%$; $p<0.05$), but waist circumference ($\Delta -1.42$; $p<0.001$) declined. Regarding determinants, the comparison of both cohorts showed that today's children have a higher risk of being overweight if they have a low/middle socioeconomic status or migration background and if their mother was overweight or their parents were heavy smokers.

Conclusion: In 9–11-year-old children, prevalence, incidence and persistence of overweight had stabilised at a high level. Overweight

prevention should particularly target families with low/middle SES and should take into account cultural differences due to the increased influence of these determinants.

1. Conflict of Interest: None disclosed

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T3T4:P.080

Severe Paediatric Obesity in England: Findings from the National Child Measurement Programme

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Introduction: Body Mass Index (BMI) distribution has shifted markedly in the UK since the 1980s, resulting in a sharp rise in the prevalence of obesity. In England nearly 20% of 10–11 year olds and 10% of 4–5 year olds are currently obese. International evidence shows that severe obesity results in an increased risk of ill health, and may require more specialised weight management strategies, yet there's a lack of data on the extent of this problem.

Methods: The National Child Measurement Programme (NCMP) was established in 2006 to annually weigh and measure all children aged 4–5 and 10–11 years, from every maintained school across England. NCMP data from school years 2006/07–2011/12 were analysed. This study examines the prevalence of severely obese children defined as having a BMI falling on or above the 99.6th centile of the UK90 growth charts.

Results: In 2010/11, severe obesity was found in 1.9% of girls and 2.5% of boys aged 4–5 years, and 2.9% of girls and 4.0% of boys aged 10–11 years. Severe obesity prevalence varies between local authorities and has increased over time in the older age group.

Conclusion: Prevalence of severe obesity in English school children has reached worrying levels. These children are likely to have appreciable need for top tier clinical services, and require serious consideration by those with commissioning responsibilities. These data will help to plan and deliver appropriate services and strategies to: 1) effectively treat severely obese children; and 2) reduce the incidence of severe obesity in the future.

1. Conflict of Interest: None Disclosed.

2. Funding: No Funding

T3T4:P.081

The KIDMEX Index (Mediterranean Diet Quality Index for Children and Adolescents) and the Adolescents of the Italian Region of Lazio

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Introduction: The many health benefits of the Mediterranean diet have been documented by numerous studies worldwide, among them a protective effect of this dietary pattern on weight gain. Nevertheless, to our knowledge, still few are the studies concerning the level of adherence to the Mediterranean diet in children and adolescents.

Methods: A cluster sample of 373 adolescents, aged around 15 years, in the second class of secondary school in the Italian region of Lazio was investigated. Body weight and height were measured. The level of adherence to the Mediterranean diet was assessed by the KIDMED index.

Results: 17.2% 'high' adherers of MD, 61.1% 'average' and 21.7% 'poor'. The low adherence and poor diet quality derived from reduced consumption of key Mediterranean foods like fruit, vegetables, legumes and fish. 72.1% of the sample took a fruit/juice every day and only 30.0% had a second serving of fruit; only 63.5% had vegetables once a

day and a scarce 21.4% >once a day; pulses were eaten >once a week by no more than 48.3% of the subjects. The regular consumption of dried fruit was very low (11.0%). 31.6% of the sample skipped breakfast and 59.8% of those who did not, ate commercially baked goods rather than cereals or grains (50.4%).

Conclusions: Both Italian children (the ZOOM8 project) and adolescents showed a very low adherence to the Mediterranean dietary patterns. It is necessary to introduce healthy changes in their eating habits, in particular with the fundamental involvement and action of families.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded by the Italian Ministry of agricultural, food and forestry policies

T3T4:P.082

Disease-related cut-offs for fat mass in children and adolescents

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Introduction: There are no disease-related cut-offs for overweight in children and adolescents. Cole et al. (BMJ 2000) extrapolated BMI-values reaching 25 at age 18 years to younger age groups to develop disease-related cut-offs. We here applied this approach to fat mass (FM).

Methods: Percentiles (P) of %FM (by bioelectrical impedance analysis), FM-index, waist circumference (WC) and sum of four skinfolds (sumSF) (TSF, BSF, SSF, SIF) were fitted by LMS method based on pooled data of 4 German-wide studies on 32400 children and adolescents aged 3–18 years (Plachta-Danielzik et al. obesity facts 2012). The approach of Cole was applied to representative German BMI percentiles (KiGGS); P76.7 (boys) and P80.1 (girls) correspond to BMI 25 at age 18 years (Schaffrath Rosario et al. Eu J Clin Nutr 2010). In age-adjusted regression analyses, FM, FMI, WC and sumSF were used as independent variables whereas BMI was the dependent variable. For each half-year age group the BMI values on KiGGS percentiles were used to calculate the respective value of FM using the regression equation.

Results: Disease-related cut-offs for %FM and FMI varied according to age from P70–P86 and P75–P82 in boys and P73–P94 and P77–P86 in girls. WC cut-offs remained at P80 from age 7 years in boys and varied between P78 and P89 in girls. SumSF cut-offs showed the lowest variation: P78–P84 in boys and P81–P85 in girls.

Conclusions: The use of P90 of FM is not sensitive to detect children at risk and lower percentiles have to be used as cut-offs.

1. Conflict of Interest: None disclosed.

2. Funding: This work was supported by the „Kompetenznetz Adipositas (Competence Network Obesity)“ funded by the Federal Ministry of Education and Research (FKZ: 01GI1121A).

T3T4:P.083

Wanting to lose weight and trying to lose weight: Findings from a population-based survey of UK adults

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Introduction: Weight loss is recommended for all obese adults.¹ Desire to lose weight is widespread, but it is unclear whether most obese people are actively trying to lose weight. This study examined predictors of desire for, and attempts at, weight loss in UK adults.

Methods: Data were from a UK-representative survey of non-underweight (BMI ≥ 18.5 kg/m²) adults (n=1,509). Desired weight loss was indexed by reporting an ideal weight ≤ 95% of current weight. Weight loss attempts were indexed with 'Are you currently trying to lose weight?' Multivariable logistic regression examined associations with demographics, weight status, perceived overweight, and doctor recommendation.

Results: Overall, 47% wanted to weigh less (normal-weight 22%, overweight 57%, obese 89%), and 30% were currently trying to lose weight (13%, 37%, 60%). Perceived overweight was the strongest predictor of both wanting (odds ratio [OR]=17.15, 95% confidence interval [CI] 11.78–24.97) and attempting weight loss (OR=14.79, 95% CI 10.19–21.74). Actual weight status was independently associated with desire to weigh less (overweight OR=2.97, 95% CI 2.06–4.29; obese OR=9.87, 95% CI 5.15–18.93), but not with attempting weight loss. Being younger, female and reporting doctor recommendation to lose weight were also associated with increased odds of wanting to and attempting to lose weight (P s<0.02).

Conclusion: A substantial proportion of UK adults report wanting and trying to lose weight. While prevalence increases with increasing BMI, perceived rather than actual weight status best predicts both wanting to, and trying to, lose weight. Interventions focusing on improving accuracy of weight self-perceptions could increase weight loss attempts among obese adults.

Reference

1. Moyer, V. A. Screening for and Management of Obesity in Adults: U.S. Preventive Services Task Force Recommendation Statement. *Ann Intern Med* (2012) at <<http://annals.org/article.aspx?articleid=1200996>>

1. Conflict of Interest: None disclosed.

2. Funding: Research relating to this abstract was funded by Cancer Research UK.

T3T4:P.084

Waist-to-Height Ratio in Asian and European children and adolescents

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Objective: The Waist-to-Height Ratio (WHtR) is considered as a simple age and gender independent measure of Abdominal Obesity (AO). Little is known regarding the usefulness of WHtR in different ethnic groups.

Aims: 1/ to analyze ethnic difference in WHtR between Asian (HKSAR: Hong – Kong Special Administrative Region) and European (LD: the city of Lodz – Poland) children and adolescents, 2/ to compare in both groups the threshold values of WHtR.

Subjects and Methods: Two cross - sectional surveys of children and adolescents aged 7–19 y: LD (n=13,179; 6,558 boys and 6,621 girls) and HKSAR (n=14,582; 7,337 boys and 7,245 girls). Height (Ht), body mass and Waist Circumference (WC) were measured in all study subjects. Polynomial regression was used to describe the relationship between the WHtR values and the z-scores for BMI. The WHtR values corresponding to BMI definitions of overweight (85th percentile) and obesity (95th percentile) were analyzed.

Results: The threshold values of WHtR were higher in Polish children (WHtR corresponding to overweight: LD - 0.473 and 0.455 and HKSAR - 0.459 and 0.435 for boys and girls respectively; WHtR corresponding to I⁰ of obesity: LD - 0.511 and 0.490 and HKSAR - 0.507 and 0.471 for boys and girls respectively). For HKSAR boys the WHtR showed more strongly associations with z score of BMI compare to boys from LD.

Conclusions: Results indicate the significant dominance of European boys and girls in terms of WHtR in comparison to their Asian peers as well as the needed for used in clinical practice of age, gender as well as race/ethnic adapted references for WHtR.

1. Conflict of Interest: None Disclosed

2. Funding: No Funding

T3T4:P.087

“From growth in height to growth in breadth”: The change of body dimensions in Swiss and Germany conscripts since 1950 and its impact for epidemiological obesity research

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Compulsory conscription data yield a year-by-year picture of cumulative growth of young men at a proscribed age. The analysis of long-termed trends in body height, weight and BMI based on an unchanged data source can be informative about evolving health status over time. Additionally, information about occupation and origin open the door for epidemiological research. We present the most recent, individually accessible, measured annual data from the Swiss Armed Forces 1992–2011 (N>400,000, universal conscription, representing ca. 90% of the 19-year-old Swiss men) and from the German Armed Forces 1984–99 and 2008–10 (N>18Mio, representing ca. 50% of the 19-year-old German men). By following aggregated long-term trends since 1950 we also add historic context to identify the onset of the current overweight pandemic.

In both countries the secular height trend slows down with the conscripts measured around 1990. At the same time the historically unrivalled increase in BMI in the last 20 years started by a two-step increase in weight at the end of the 1980s and again since 2000. In 2010, 25% of the Swiss and 28% of the German conscripts were overweight. The Swiss data allows the identification of groups at risks down to the level of the 160 districts, providing valuable starting points for intervention. In 2010, conscripts living in eastern Germany caught up in terms of BMI with the level of Westerners since the reunification in 1990. Overall, a complex of genetic, epigenetic, and environmental factors are at work that both limit height growth and promote overweight today.

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T3T4:P.088

Weight Perceptions and Weight Aspirations: Changes among the obese population of the United Kingdom 1999–2012

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Introduction: Social comparison and social norms are recognised as important influences on weight perceptions. Changing levels of adiposity in the population can contribute to weight perception ‘inflation’ making it difficult for obese individuals to accurately judge their own weight status. Data from population survey series in the United States demonstrate that ideal weight perceptions have moved in tandem with population mean body weight.

Methods: Repeated cross-sectional surveys offer the potential to examine associations between changes in obesity prevalence, and attitudinal and behavioural changes. This study uses data from three population surveys carried out in the United Kingdom over a period of thirteen years to examine changes in weight perceptions, attitudes and behaviours over time among obese respondents.

Results: There is an increasing trend for obese people to be unaware of their weight status, with particular reductions acknowledging that they are ‘very overweight’ or ‘obese’. The number aspiring to a healthy body weight has also declined in the period to the most recent survey. These trends are seen in both men and women, and such misperceptions are associated with less desire to lose weight and fewer self-monitoring and weight control behaviours.

Conclusions: Changing weight norms in the UK and US may be having a beneficial effect on body image distress among the obese, but may also be acting as a barrier to their recognition of the health risks associated with their body weight. This could affect motivation to seek the healthy lifestyle changes, which contribute to weight loss.

T3T4:P.089

Childhood nutritional behaviour, a project of prevention of obesity in adults

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Introduction: The prevalence of obesity is increasing in the adults and in childhood. In Italy the prevalence/incidence in adults is 3/10 overweight and 1/10 obese (PASSI Study); 23% overweight and 11% obese (OKKIO alla salute Study) in children of age between 8-10.

Aim of this study was to determine if changes in the nutritional behaviour can modify the distribution of obesity in a group of Italian children.

Methods: We submitted to 206 children between 8 and 10 years a questionnaire concerning the distribution of food among the day. We especially focused on junk and good food intake. We also investigate the use of sugary drinks, physical activity and on the other hand sedentary.

Results: 163 children were taking breakfast. 152/144 were taking a morning and afternoon snack respectively, 94 were drinking sugared drinks. 115/101 were eating fruit and vegetables respectively. 61 spent more than 2 hours a day in front of TV/PC. The awareness of the importance of food quality was not so high: 55 think that food quality is not important for health and growth. 49 think that unhealthy food does not exist.

Conclusion: Considering that the number of adult obese afferent to our ambulatory is increasing, we believe that an educational project on school nutritional program can lead to a decrease in the number of adult obese. Thus we plan to follow this population for 3 years to improve the awareness of food importance and study if that can decrease the prevalence of obesity in adults.

T3T4:P.090

Parental obesity and metabolic risk factors in their children the Early Stockholm Obesity Prevention Project (Early STOPP)

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Background: Parental obesity is a risk factor for childhood obesity. The associations between obese parents and children's glucose homeostasis and the developing metabolic risk factors in young children are unclear. The aim was to evaluate the association between glucose, cholesterol and C-reactive protein (CRP) in obese parents and their one year old children compared with a control group of families with normal weight.

Method: Baseline data for parent and children participating in the Early STOPP obesity prevention project were used (n=205). Fasting glucose, cholesterol and CRP were analyzed using standard technique at age of 1 of the child.

The levels of the obese parents and their children (n=263 and n=107 respectively) were analyzed and compared with a control group of normal weight parents and their children (n= 107 and 44 respectively). A comparison between children with obese parents (n=107) and children with normal weight parents (n=44) was also performed.

Results: All children with obese parents had significant lower levels of glucose, cholesterol and CRP compared to their parents ($p<0.01$, 0.001 and 0.001 respectively). No such differences were seen between normal weighed parents and their children. When comparing children with obese parents to children with normal weight parents no differences were seen.

Conclusion: Increased levels of glucose, cholesterol and CRP in obese parents had no impact on their children's levels at age of 1 year.

T3T4:P.091

Clinical example of the children with obesity and severe sleep apnea

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Introduction: The patients with obesity can suffer from sleep disorder like apnea. The "gold standard" for the investigations of reasons of them is the polisomnogram (PSG).

Methods: Patient G., 6 years old, BMI 22.4. The main complaint was the frequent and long apnea during sleep, which began more often last month. He was treated by a laryngologist and went into surgery (adenotomy, subtotal tonsilotomy). The doctors began to think about central apnea or about apnea due to obesity. EEG was recommended him. During EEG he slept and we could see the disorder of the breathing. We fast took the decision to perform PSG (Embla 4000, USA).

Results: The result of PSG showed 964 periods of apnea-hypopnea for 234,5 minutes. Index apnea-hypopnea was 117,3 per hour, average duration of the apnea-hypopnea was 14,6 s, with the longest duration 52,2 sec. The less saturation was 34%, the average level of the saturation was 79%. Average frequency of heart beat was 107 per min. The breathing was with sings of the obstructive disordering. After additional investigations, the laryngologist took the decision to perform next operation and during the procedure, they discovered a hypertrophic tissue deep in the throat which made the breathing during night sleep almost impossible. The repetition of the PSG showed the normal breathing.

Conclusion: The PSG shows the objective reason of the disordering of the breathing during night sleep and sometimes it helps to save patient's life.

1. **Conflict of Interest:** None Disclosed

2. **Funding:** No

T3T4:P.91A

Association between regional adiposity markers and anaerobic performance in children and adolescents

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Introduction: Abdominal obesity is strongly associated with increased risk of metabolic disease in children and adolescents. However, it is less known if anaerobic performance is affected by abdominal adiposity independently of the weight and total fat effects. Our purpose was to analyze associations of different regional adiposity markers with anaerobic performance in children and adolescents.

Methods: One-hundred and forty-three healthy participants (64 girls and 79 boys) were included in the analysis (14.4±1.6 years; 26.9±7.3 fat mass percentage). Whole body fat mass (BF) was estimated by a multifrequency-BIA; abdominal adiposity was assessed (AbF) by bioimpedance (Viscan[®]), and trunk fat (TF) was estimated also by bioimpedance (TGF310, Tanita-BIA). Waist circumference was measured with a tape (WC). Handgrip strength was measured with a dynamometer. Counter-movement vertical jump tests were used to evaluate lower limb explosive strength. Speed of movement was assessed by 30-m sprint test. Bivariate and partial correlations controlled for BF and weight were carried out to analysis associations between variables of fat and anaerobic performance.

Results: The best associations were found on simple correlation between time in 30m (s) and AbF (0.639, $P<0.001$); and speed in 15-30m and AbF (-0.875; $P<0.001$) after control for weight; speed in 15-30m and WC (0.446; $P<0.001$) when controlling for BF. Except for TF, all

abdominal adiposity markers (WC and AbF) were significantly associated with anaerobic performance after control for both weight and BF.

Conclusion: Our results suggest that regional adiposity markers influenced anaerobic performance negatively, which was independent of the effect of BF and weight.

1. Conflict of Interest: None Disclosed.

2. Funding: This study was funded by Ministry of Science and Innovation of Spain (grant: DEP2011-30565).

T3T4:P.92A

Prevalence of obesity, by specialty, amongst inpatients in the South of England

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Introduction: Rates of obesity, defined by Body Mass Index (BMI) $\geq 30 \text{ kg/m}^2$, are rising in the United Kingdom. The prevalence, by specialty, of obesity amongst inpatients has not been well studied.

Methods: A multicentre, hospital-wide audit across three Trusts in the South of England was performed on a single day. Patients were classified by specialty (medical, surgical, orthopaedic, intensive care) and allocated a BMI category based on guidelines (1).

Results: 1163 patients were audited (575 male). 778 were medical patients, 222 surgical, 130 orthopaedic, and 33 intensive care. Mean age was 69.3 with a significant mean age difference between specialties (medical > surgical > orthopaedic > intensive care) and independent of the hospital studied. 260 patients (22%) had a BMI $\geq 30 \text{ kg/m}^2$, of which 103 (9%) had a BMI $\geq 35 \text{ kg/m}^2$. A significant difference in this latter group was observed between specialties (orthopaedic 18%, intensive care 9%, surgical 9%, medical 7% ($p < 0.001$)). No effect of gender was observed but there was an independent effect of increasing age and higher BMI.

Conclusion: Approximately one quarter of inpatients in our multicentre audit were obese according to BMI criteria with 9% significantly obese (BMI $\geq 35 \text{ kg/m}^2$). Higher BMI were observed in orthopaedic and intensive care specialties than in medical and surgical. Doctors, nurses and managers should be aware of this variation for training and resource allocation purposes.

Reference

Obesity: the prevention, identification, assessment and management of overweight and obesity in adults and children. National Institute for Health and Clinical Excellence. December 2006.

1. Conflict of Interest: None disclosed

2. Funding: No funding

T3T4:P.092

Betel nut chewing is inversely associated with weight change in male Chinese-Taichung Community Health Study

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Introduction: Betel nut chewing has been reported to increase the risk of cardiovascular disease and all-cause mortality. The reason is unclear. In this study, we investigated the association between betel nut chewing and future weight/waist circumference change in male Chinese.

Methods: A total of 1049 male subjects, aged 40 years and above, were recruited from Taichung city in Taiwan in 2004. Among these, 739 subjects were followed up with a mean 2.8 years. The relationships between betel nut chewing and weight (body mass index (BMI)/waist circumference (WC)) change were analyzed by multiple logistic regres-

sion analyses. Weight change was categorized as weight gain and weight loss. Betel nut chewing status was divided as none, low, and high according to their cumulative quids/years of betel nut chewing at baseline.

Results: The mean follow-up duration is 2.8 years. Adjusted for baseline age, calorie intake, smoking, alcohol drinking, and physical activity level, the relative risks (95% CIs) of weight change (BMI, weight gain vs. weight loss) and WC change (WC increase vs. WC decrease) among the lower consumption of betel nut chewers were 0.53(0.29, 0.96) and 0.61(0.34, 1.07), respectively, compared to 0.63(0.35, 1.12) and 0.04(0.55, 0.97), respectively among higher consumption chewers compared to individuals who had never chewed betel.

Conclusion: Betel nut chewing is inversely associated with weight change in male Chinese.

1. Conflict of Interest: None Disclosed

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T3T4:P.093

Reviews on sugar-sweetened beverage and body weight: Determinants of their quality and conclusions

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Background: The role of sugar-sweetened beverages (SSBs) on the increasing prevalence of obesity is a matter of great interest. In recent years, reviews have been published on this topic with very different conclusions.

Objectives: To identify which characteristics of reviews were associated with the authors' position on evidence supporting a causal relationship between SSBs and body weight.

Methods: A systematic search of reviews published in English in peer-reviewed journals during the 2006-2011 period was performed. Their methodological quality was assessed by two judges using two scoring systems: A Measurement Tool to Assess Systematic Reviews (AMSTAR) and the American Dietetic Association Quality Criteria Checklist (ADA-QCC). The authors' final position was blindly assessed by 11 experts using a Likert scale ranging from 0='no evidence of a causal relationship' to 5='strong evidence of a causal relationship'.

Results: A total of 17 reviews were identified: 3 meta-analyses, 3 qualitative systematic reviews and 11 qualitative non-systematic reviews. Four reviews were funded by the food industry. Quality scores were not correlated with the source of funding. However, reviews funded by the industry concluded that evidence supporting a causal relationship was weak (mean position score = 1.78) whereas evidence was generally considered to be well founded in the other reviews (mean position score = 3.29; $p = 0.01$).

Conclusion: Results support the hypothesis of master plan developed by the food industry to instil doubt regarding the adverse effects of SBB and to prevent the implementation of public health interventions and policies aiming to reduce their consumption

T3T4:P.094

Short nocturnal sleep associates with obesity among Finnish adolescents

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Introduction: Short sleep is a potential risk factor for obesity. We explored the association between duration of nocturnal sleep and obesity in Finnish adolescents.

Methods: In 2005, 6503 (response rate 66%, boys 46%) 12-, 14-, 16- and 18-year-old adolescents responded to the mailed questionnaire of the nationwide Adolescent Health and Lifestyle Survey. Among other questions, the adolescents were asked to report their bedtime and wake-up time on ordinary schooldays/workdays (precision of half an hour), as well as height (centimetres) and weight (kilograms). The association between nocturnal sleep duration (categorized as < 7 h, 7–9:15 h (reference category), and ≥ 9:30 h) and obesity (defined according to the BMI criteria by the International Obesity TaskForce) was analysed by logistic regression. The analyses were adjusted for age, perceived health, depressive mood, intensity of weekly physical activity, daily TV time, family structure, and maternal and paternal educations.

Results: Of the respondents, 4% were obese, and 7% slept less than 7 hours per night. Shorter than 7 hours' nocturnal sleep associated with increased odds of obesity, as compared to 7–9:15 hours, also after adjusting for all potential confounding factors (odds ratio 2.4 in boys and 2.2 in girls).

Conclusion: Shorter than 7 hours' nocturnal sleep associated with increased odds of obesity in 12- to 18-year-old Finnish adolescents. This relationship was not explained by the potential confounding factors representing versatile aspects of socio-demography, lifestyle and health.

Note: The study will be published in Finnish in *Sosiaalilääketieteellinen Aikakauslehti* (Journal of Social Medicine) during the spring 2013.

1. Conflict of Interest: None disclosed

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T3T4:P.095

The clinical characteristics and prevalence of comorbidities in overweight children

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Introduction: Overweight children may be considering being healthy, both by pediatricians and parents. However children of this group may have the same metabolic disturbances as obese patients.

Methods: We had analyzed results of examination of 174 patients. Overweight was diagnosed in 74 children (BMI=85-94 percentile, age 13.47±0.29 [6–17] years old, girls - 86.5%), obesity in 100 children (BMI≥95 percentile, age 12.31±0.27 [4–17] years old, girls – 56.0%). The examination included anthropometry, body composition analysis, evaluation of serum lipid profile, glucose tolerance, insulin resistance (HOMA-IR).

Results: The beginning of excessive weight gain in overweight children were observed at a later time than in obese children (8.88±0.41 years old vs. 5.80±0.30 years old, p<0.001). Prevalence of cardiovascular pathology in family history was similar to obese group: hypertension in 54.1% and 48.0%, ischemic heart disease in 14.9% and 10.0%, respectively, p>0.05. Waist circumference > 90 percentile was revealed in 16.2% of overweight children. Dyslipidaemia was detected in 35.1% of overweight children; and prevalence of increased level of serum cholesterol was higher in overweight group (22.9% vs 15.0%, p<0.05). The prevalence of glucose intolerance and insulin resistance in overweight children were 14.9% and 20.3% respectively; in obese children – 18.0%

(p>0.05) and 60.0% (p<0.001) respectively. Hypertension and NAFLD in overweight children were sporadic.

Conclusion: Overweight children may have abdominal obesity, dyslipidaemia and disturbances of carbohydrate metabolism. This group of children needs an active intervention to prevent obesity and its comorbidities.

1. Conflict of Interest: Non disclosed

2. Funding: No funding

T3T4:P.096

Associations between reported alcohol consumption and body composition in Scottish adults

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Introduction: Alcohol intake could contribute to excess body fatness; however evidence is inconsistent. We have investigated associations between reported alcohol consumption and body composition from a representative in National Survey in a high alcohol-consuming country with high obesity prevalence.

Methods: Secondary analysis of 35,833 adults aged 18–64 years old from the cross-sectional Scottish Health Surveys (1995–2010). Reported alcohol drinking frequency was divided into 5 groups, from 'non-frequent drinking' (reference) to 'almost every day' and weekly alcohol consumption into 7 groups: from '1–7 to 50+ units/week'. Regression models against BMI and waist circumference (WC) were adjusted for age, physical activity, income, deprivation category and economic status.

Results: Greater frequency of alcohol consumption was associated with lower BMI and WC, but greater quantity of alcohol consumed was associated with higher BMI and WC. In men, daily drinking was associated with lower BMI [−2.2 kg/m² (95% CI: −2.7, −1.6)] and lower WC [−3cm (95% CI: −5.3, −0.6)] than less-frequent drinking. Drinking 21–28 units/week was associated with higher BMI [+1.3 kg/m² (95% CI: 0.8, 1.7)], and higher WC [+3.6cm (95% CI: 1.4, 5.7)] than drinking 1–7 units/week. Similar associations were found for women. Weekly alcohol consumption was associated positively, but drinking frequency inversely, with body fatness measures in adults. Unexplained variances in BMI and WC are large.

Conclusions: Drinking a little and often, is associated with the lowest BMI and WC among drinkers. Alcohol is not a dominant factor in the obesity epidemic.

1. Conflict of Interest: None Disclosed.

2. Funding: University of Glasgow.

T3T4:P.097

A disadvantageous shift in energy balance is primarily expressed in high-quality sleepers after a decline in quality sleep due to disturbance

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Background: Epidemiological studies show an inverse or U-shaped relationship between sleep duration and BMI. Moreover, recently associations between energy balance (EB) and characteristics of quality sleep(QS) have been reported.

Objective: To assess the relation between total energy expenditure (TEE) respectively substrate oxidation and QS after disturbed vs. non-disturbed sleep in EB.

Methods: Fifteen healthy male subjects (BMI: 24.1±1.9 kg/m², age: 23.7±3.5 years) were included in a randomized, crossover study in which TEE and substrate oxidation were measured twice for 48 hrs in a respiration chamber while being monitored by electroencephalography (EEG) to determine slow-wave sleep(SWS), rapid eye movement(REM)-sleep, total sleeping time(TST), and QS([SWS+REM])

/TST*100%). During two nights, sleep (23.30–07.30hrs) was either disturbed or non-disturbed.

Results: During the non-disturbed condition positive correlations were found for TEE, activity-induced energy expenditure corrected for body mass (AEE/BM), RQ and carbohydrate oxidation with QS and SWS. Fat oxidation was inversely related with QS and SWS. Also, RQ and carbohydrate oxidation were inversely related with REM. During the disturbed condition, in which SWS, REM and TST were reduced, positive correlations were found between TEE and AEE/BM with QS. The shift in QS, that was most present in high-quality sleepers, led to increases in energy intake (EI), TEE and EB.

Conclusion: Sleep disturbance did not affect the usual relationships between QS and TEE respectively AEE/BM due to preserved QS. However, the relations between SWS respectively REM and substrate oxidation were unfavorably affected. For subjects with the highest percentage QS, QS was affected most due to the fragmentation leading to unfavorable shifts in EI, TEE and EB.

1. Conflict of Interest: None Disclosed

2. Funding: Nutrim

T3T4:P.098

Sleep architecture during circadian misalignment and associations with insulin sensitivity

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Introduction: The study aimed to establish if previously shown metabolic consequences of circadian misalignment are connected with its potential effects on sleep architecture. Therefore, intra-individual effects of circadian misalignment on sleep architecture and inter-individual relationships between different sleep stages and hypothalamic-pituitary-adrenal (HPA) axis activity related cortisol levels and insulin sensitivity were examined.

Methods: Thirteen subjects (age: 24.3±2.5 yrs; BMI: 23.6±1.7 kg/m²) stayed in a time blinded respiration chamber during three light-entrained circadian cycles (3x21 h and 3x27 h) resulting in a phase advance and a phase delay. Sleep was polysomnographically recorded. Blood and salivary samples were collected to determine glucose, insulin and cortisol concentrations. Insulin resistance was estimated using the homeostatic model assessment (HOMA) method.

Results: Intra-individually, a phase advance decreased Rapid-Eye Movement sleep (REM, P<0.01) and Slow-Wave Sleep (SWS, P<0.05), increased time awake (P<0.05), decreased sleep and REM sleep latency (P<0.05) compared to the 24h cycle. A phase delay increased REM sleep (P<0.001), decreased stage 2 sleep (P<0.05), increased time awake (P<0.05), decreased sleep and REM sleep latency (P<0.001) compared to the 24h cycle. Moreover, circadian misalignment changed REM sleep distribution with a relatively shorter REM sleep during the second part of the night. Inter-individually, REM sleep was inversely associated with cortisol levels (R²=0.4, P<0.05) and HOMA-IR index (R²=0.4, P<0.05).

Conclusion: The main effect of circadian misalignment, both a phase advance and a phase delay, is a significant change in sleep architecture; especially a shift in REM sleep which was associated with dysregulation of the HPA-axis and reduced insulin sensitivity.

1. Conflict of Interest: None Disclosed

2. Funding: NUTRIM

T3T4:P.100

Are having a spouse and children risk factors for obesity development?

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Objective: Socio-economic factors, such as low education level and low income are well known risk factors for overweight and obesity development. The aim of the study was to assess the relationship between family status and nutritional status.

Material and Methods: 744 subjects (452 women and 292 men aged 17–76 yrs.) were enrolled into study. In addition to anthropometric measurements on the basis of interview the family status of study participants was assessed.

Results: Overweight was diagnosed in 29.7% (23.9% women and 38.6% men), obesity in 23.7% (23.9% women and 23.3% men). 51.2% study subjects having a spouse, 6.4% was divorced, 2.2% was widowed and 40.2% was never married. The prevalence of overweight and obesity was significantly higher among married participants, while the obesity among widowed ($\chi^2 = 61.57$; $p < 0.001$). 54.2% of all study subjects were having children. The prevalence of overweight and obesity was significantly higher among participants having children ($\chi^2 = 45.77$; $p < 0.001$). 43.6% participants with normal weight, 53.9% overweight and 75.8% obese were having children.

Conclusions: Having spouse and children are risk factors for the development of obesity.

1. Conflict of Interest: None Disclosed

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T3T4:P.101

Socio-demographic and lifestyle determinants of general and central adiposity in Chinese adults: Results from China Kadoorie Biobank of 0.5 million people

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Background: Relatively little is known about determinants of adiposity in China.

Methods: 511,344 people aged 30–79 were surveyed during 2004–08 in 10 areas of China. Information on socio-demographic and lifestyle factors was collected by questionnaire. Weight, height and waist circumference (WC) were measured by staff. Mean body-mass index (BMI) and WC in different categories were estimated by general-linear models, adjusting for confounders (including age, area, tobacco, alcohol, socio-economic factors, physical activity and dietary variables).

Results: Mean BMI was 23.4 kg/m² in males and 23.8 kg/m² in females; for WC, the corresponding values were 82.0 cm and 79.1 cm. After adjustment for confounders, area was the strongest independent determinant of both BMI and WC. Across the 10 areas, mean BMI ranged from 22.3 to 25.1 kg/m² in males, and from 22.6 to 25.8 kg/m² in females; mean WC ranged from 78.5 to 86.9 cm, and from 75.3 to 83.8 cm (all P-values for heterogeneity <0.0001). The other strong determinants were age and education. BMI peaked at age 40–49 in both sexes, as did WC in males, but in females, WC peaked at 60–69. More education was associated with higher BMI and WC in males, but with lower BMI and WC in females (all P-values for trend <0.0001). Weaker determinants included household income (associated positively with BMI and WC in both sexes) and smoking (overall, ~0.8 kg/m² higher BMI, and ~2.2 cm greater WC, in ex-smokers than in current smokers).

Conclusion: After allowing for other independent determinants of BMI and WC, there were large, unexplained, regional differences in general and central adiposity.

T3T4:P.102

Aspects of Metabolic Disorders in Obesity

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Introduction: study of the correlation relationship of BMI and metabolic markers.

Methods: The study included 25 people with median BMI 35.07 [32.3–37.4] kg/m² and 20 healthy people with median BMI 22.3 [20.1–23.42] kg/m². In fasting venous blood determining the level of insulin, C-peptide, leptin, adiponectin produced using kits «Elisa» (Germany). Glucose, total cholesterol, very low density lipoproteins (VLDL) was performed on biochemical multichannel analyzer «Express 550» company «Ciba-Corning» (UK).

Results: In the group of patients with obesity was found a positive correlation between the level of insulin and leptin ($r = 0,757$; $p < 0,05$), a negative correlation between adiponectin and VLDL ($r = -0,593$; $p < 0,05$). In the second group was found a positive correlation between insulin and leptin ($r = 0,758$; $p < 0,05$), leptin and HOMA-IR ($r = 0,650$; $p < 0,05$), insulin and total cholesterol ($r = 0,475$; $p < 0,05$), the negative correlation between BMI and glucose levels ($r = -0,786$; $p < 0,05$).

In patients with obesity median of total cholesterol was 4.0 [3,79–4,77] mmol / L, which was significantly higher than in the control group 2.13 [1.6–2.2] mmol / L, and the median of adiponectin in the study group was 42.8 [19,3–68,12] µg/ml, which was significantly lower than in patients without obesity 73.65 [70,0–84,0] µg/ml.

Conclusion: Insulin, leptin was positively correlated with BMI in patients with obesity, with or without him. As the progression of obesity is reduced adiponectin levels, accompanied by an increase in the level of total cholesterol.

T3T4:P.103

A causative role of adenovirus type 9 and 37 in development of obesity in the Polish population

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Introduction: Alongside the traditionally recognized causes of obesity, since 1992y attention of scientists has been focused on adenoviral (AdV) infections. Due to worldwide distribution of AdVs they seem to be the important candidates for evaluating their causative role in human obesity. The main aim of this study was to establish a causative relationship between AdV9 and 37 and obesity in the Polish adults and evaluation of association with BMI, anthropometric measures and serum lipids.

Methods: The study included 102 adults, both obese and nonobese. SN was used to assess the presence of anti-AdV antibodies and routine serum chemistry, leptin, CRP were evaluated.

Results: 24.5% of subjects were positive (N=26) for AdV9 and 7.8% (N=8) for AdV37; 74.5% and 92.1% were negative (N=76, N=94), respectively. Significant association of obesity and anti-AdV9, 37 antibodies was observed. Higher body weights (88.4 vs 75.0; 92.4 vs 75.6), BMIs (32.4 vs 24.3; 32.2 vs 25.9) and WHRs (0.93 vs 0.85; 0.95 vs 0.86), $p < 0.05$, were found in infected versus uninfected. All AdV-positive subjects had visceral fat distribution. Increased total cholesterol,

LDL and lower triglycerides, HDL were observed in AdV9-infected vs uninfected. AdV37-positive subjects had only elevated triglycerides and decreased HDL in comparison to their negative counterparts. Neither elevated CRP nor decreased leptin levels were the basis of infectobesity.

Conclusion: Infections of AdV9 and AdV37 are associated with obesity in Polish population. Further investigation is needed to explain underlying mechanism.

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T3T4:P.104

Comparisons of children's weight status, eating behavior and parental education levels at one year of age in high and low obesity risk families – Early STOPP Study, China

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Introduction: Parental overweight increases childhood obesity risk 6–10 times. Eating patterns, physical activity and sleep are thought to be factors involved in early obesity development. The aim of the Early STOPP (Early Stockholm obesity prevention program) is to explore children's diets, physical activity and sleeping patterns longitudinally from 1 to 6 years old among families with normal weight and overweight parents and evaluate the effectiveness of early obesity prevention. In this study, we aim to compare weight status, eating behaviors, and parental education in different parental weight groups based on the corresponding collected Chinese data. We also aim to compare the differences of all the variables with Sweden.

Methods: Families with at least one obese or two overweight parents (high risk group, n=95), two normal weight parents or one normal weight, the other overweight parent (low risk group n=79) and their one year old child are recruited. The questionnaires were brought to the families before consent of participating in the study.

Results: Weight at one year was associated with birth weight ($p = 0.006$). Children's weight differed significantly between high and low risk groups ($p = 0.001$). More educated parents are in the high risk group than in the low risk group which is opposite with Swedish result though with no significance. Food responsiveness differed in the two risk groups.

Conclusion: There is a difference between China and Sweden regarding parental weight influence on children's weight. Parental weight can also affect children's eating behaviors. Country-specific preventive strategies should be considered.

T3T4:P.105

Obesity and the Microvasculature: A Systematic Review and Meta-Analysis

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Introduction: Overweight and obesity are thought to significantly influence a person's risk of cardiovascular disease, possibly via its effect on the microvasculature. Retinal vascular caliber is a surrogate marker of microvascular disease and a predictor of cardiovascular events. The aim of this systematic review and meta-analysis was to determine the association between body mass index (BMI) and retinal vascular caliber.

Methods: Relevant studies were identified by searches of the MEDLINE and EMBASE databases from 1966 to August 2011. Standardized forms were used for data extraction.

Results: Among over 44,000 individuals, obese had narrower arteriolar and wider venular calibers when compared with normal weight subjects, independent of conventional cardiovascular risk factors. In adults, a 1 kg/m² increase in BMI was associated with a difference of - 0.07 µm [95% CI: -0.08; -0.06] in arteriolar caliber and 0.22 µm [95% CI: 0.21; 0.23] in venular caliber. Similar results were found for children.

Conclusion: Greater BMI is associated with narrower retinal arteriolar and wider venular calibers. Previous studies found an association between changes in retinal microcirculation and cardiovascular outcomes. Further prospective studies are needed to conclude to a causative relationship between BMI and retinal microcirculation and to suggest using retinal photography as a non-invasive routine preventive tool for cardiovascular diseases in obese/overweight individuals.

T3T4:P.106

Obesity in gouty patients in the Republic of Sakha

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Introduction: A research project has been initiated to determine the incidence and characteristics of gout in Yakutia from 2007–2012. Patients hospitalized in the department of rheumatology of Yakut City Hospital with gouty arthritis were studied.

Methods: Patients are being studied by means of a questionnaire developed by the Institute of Rheumatology (Moscow), which includes questions on anamnesis, form of gout, and specifics of treatment. Data also being collected include: laboratory measures, radiographic assessment of feet and wrists; ultrasound of kidneys.

Results: In 2006–2011 years 44 patients were registered, including 42 men and 2 women. Median age of the subjects is 56 years [35; 76]. Secondary forms of gout and relapses of disease are common. Average BMI is 32 [24; 49]. Accompanying pathology includes: AH in 22 patients, CAD in 7 patient, type 2 DM in 4 patients, glucose intolerance + obesity in 1 patient, metabolic syndrome + obesity in 1 patient, uncomplicated obesity in 1 patient, metabolic syndrome without obesity in 1 patient, chronic renal insufficiency in 1 patient, and cardiovascular accidents in 3 patients.

Conclusion: Thus, we observed gout in both elderly patients, predominantly men, and some young men, among them there were repeated hospitalizations and multiple risk factors. The research proceeds. Results will be used for characterization of the incidence and diagnostic features of gout in the Republic of Sakha (Yakutia) with the goal of standardizing guidelines for diagnosis and treatment of gout, assuring optimal care for these patients, especially among young patients with accompanying metabolic abnormalities.

T3T4:P.107

Presence of multiple comorbidities and use of obesogenic medications amongst inpatients in the South of England

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Introduction: Obesity is an increasing public health problem with approximately one quarter of the United Kingdom population obese in 2009 (1). It is associated with comorbidities such as diabetes mellitus, ischaemic heart disease, and osteoarthritis. It is reasonable to infer that obese inpatients are more likely to have multiple comorbidities requiring simultaneous management in hospital but further data on this are lacking including the use of certain drug classes which may predispose to obesity.

Methods: We conducted a multi-centre, hospital-wide audit (n=1163 patients) on a single day across three Trusts in the South of England to ascertain the comorbidity characteristics of inpatients with significant obesity as defined by a Body Mass Index (BMI) ≥ 35 kg/m².

Results: 103 patients had a BMI ≥ 35 kg/m² (36 male) with a maximum BMI of 52.5 kg/m², and a mean of 39.1 kg/m². 95 patients (91%) demonstrated at least one obesity-related comorbidity commonly hypertension (21%), type 2 diabetes mellitus (12%), osteoarthritis (11%) and gastro-oesophageal reflux disease (9%). 20% of patients had five or more obesity-related comorbidities. 60 patients (58%) were taking at least one obesogenic medication (commonly beta-blockers, sulphonylureas, and tricyclic antidepressants) but there was no significant relationship between number of obesogenic medications and increasing BMI (p=0.449).

Conclusion: Inpatients with significant obesity have multiple obesity-related comorbidities, often more than five, and frequently receive medications which predispose to weight gain.

Reference

- (1) Statistics on obesity, physical activity and diet: England, 2011. The Health and Social Care Information Centre

1. **Conflict of Interest:** None disclosed

2. **Funding:** No funding

T3T4:P.108

Does increased BMI result in longer lengths of stay? An audit of one hospital in the South of England

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Introduction: The prevalence of obesity (Body Mass Index (BMI) ≥ 30 kg/m²) amongst inpatients is 22% based on an audit we recently conducted across the South of England. We also demonstrated multiple comorbidities in this group. It would be reasonable to expect a longer length of stay for this group than those without obesity although this has not been well studied in the United Kingdom.

Methods: As part of a multi-centre audit, we ascertained the range of inpatients' BMI at the Royal Berkshire Hospital, Reading, United Kingdom dividing patients into BMI categories according to national guidelines (1) (<18.5, 18.5–24.9, 25–29.9, 30–34.9, 35–39.9, >40). Data were ascertained on total duration of admission for all patients audited and then analysed in relation to BMI.

Results: A total of 460 patients were audited for which data on length of stay was obtained for 451. Statistical analysis demonstrated that length of stay was shorter in patients with a higher BMI (p<0.001, r=0.179) which remained significant after correction for age, gender, and ward type (medical, surgical, orthopaedic, intensive care).

Conclusion: Length of stay for obese patients may be less than the non-obese. This may illustrate the obesity paradox where obese patients may be slightly "healthier" or in an earlier stage with respect to their underlying illness than their normal/underweight counterparts.

Reference

- (1) Obesity: the prevention, identification, assessment and management of overweight and obesity in adults and children. National Institute for Health and Clinical Excellence. December 2006.

1. **Conflict of Interest:** None disclosed

2. **Funding:** No funding

T3T4:P.109

Clinical Outcomes for the Obese Hospital InpatientRobertson H², Galindo H², Brook E¹, Hakendorf P³, Wittert G¹, Thompson CH¹¹University of Adelaide, Adelaide, Australia, ²Workforce Health SA, Adelaide, Australia, ³Flinders Medical Centre, Adelaide, Australia

Introduction: The prevalence of obesity presents a burden for Australian health care. The aim was to determine whether obese hospital inpatients have worse outcomes.

Methods: Data were recorded from all adult patients admitted to two Australian tertiary hospitals between February 2008 and February 2012. Outcomes included length of stay (LOS), ICU admission, mortality and re-admission within 28 days. We adjusted for obvious confounders.

Results: Of 120,872 admitted patients, 2.3% were identified as significantly obese by nursing staff (ie >120 kg) or coding staff (ie obesity associated comorbidity). These obese patients were younger (54.4 cf 56.7 years; $p < 0.001$) but had a higher Charlson index (1.3 cf 0.8; $p < 0.001$) and were more likely to be admitted electively (30.0% cf 20.2%; $p < 0.001$). Overall, admissions in obese, compared to non-obese, patients were: more frequent (2.45 times cf 1.64 times; $p < 0.001$); longer (8.7 days cf 5.2 days; $p < 0.001$); more likely to be admitted to ICU (17.2% cf 7.6%; $p < 0.001$) and be readmitted to hospital (8.1% cf 5.4%; $p < 0.001$). In-hospital mortality was not increased in the obese group. During elective admissions, obesity had less effect on LOS (10% increase; $p = 0.011$) and ICU admission rate (51% increase; $p < 0.001$) than in emergency admissions.

Conclusions: Following emergency or elective hospital admission, obese patients consume more resources than non-obese patients. The reasons for these poorer outcomes require further study and we must develop and trial strategies to improve them.

T3T4:P.110

Statistical analysis to establish the burden of disease associated with severe and complicated obesity

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Introduction: Burden of disease studies typically classify individuals with a body mass index (BMI) $\geq 40 \text{ kg/m}^2$ as a single group ("morbidly obese") despite suggestions that burden increases with increasing BMI beyond this level. Our aim was to establish the burden of co-morbidities by BMI groupings beyond 40 kg/m^2 .

Methods: We undertook analysis of data on all GP referrals to Glasgow and Clyde Weight Management Services, a specialist service for adults served by the NHS, over a three year period (starting May 2009). We examined the prevalence of heart disease, stroke, hypertension and diabetes associated with BMI bands $50\text{--}60 \text{ kg/m}^2$, $60\text{--}70 \text{ kg/m}^2$ and $>70 \text{ kg/m}^2$. Chi-square tests were used to investigate the relationships between disease prevalence and BMI, gender and age groups. We also compared the odds ratios of diseases between severe and normal weight BMI groups using logistic regression.

Results: Gender and age were found to significantly affect the odds of experiencing co-morbidities with the odds of heart disease, hypertension and diabetes in men being 2.4, 1.6 and 1.5 times respectively the odds in women (all significant at p value < 0.05). However, we found no consistent gradient across BMI categories. The demographic profile showed 51% to be living in the most deprived quintile and predominantly female (75% falling to 64% $> \text{BMI } 70 \text{ kg/m}^2$).

Conclusion: Although no consistent gradient was found associated with increasing BMI $>50 \text{ kg/m}^2$, the demographic profile is important, as obesity-related co-morbidities are not distributed homogeneously across age, gender and socio-economic status.

1. Conflict of Interest: None disclosed

2. Funding: We acknowledge the donation of unencumbered funds from Cambridge Weight Plan.

T3T4:P.112

Relationship between Central Obesity and Erosive Esophagitis in a Non-obese Taiwanese PopulationChin PC¹, Yang YC^{1,2}, Wu JS^{1,2}, Lu FH^{1,2}, Chang CJ^{1,2}¹Department of Family Medicine, National Cheng Kung University Hospital, Tainan City, Taiwan (Province of China), ²Department of Family Medicine, College of Medicine, National Cheng Kung University, Tainan City, Taiwan (Province of China)

Objective: To investigate whether central obesity/overweight is associated with erosive esophagitis (EE) in a non-obese Taiwanese population.

Design: Cross-sectional study considering risk factors of EE in non-obese Taiwanese subjects.

Subjects: 5 826 non-obese subjects (body mass index (BMI) $< 27 \text{ kg/m}^2$) enrolled from a health examination center at National Cheng Kung University Hospital.

Measurements: Waist circumference (WC) and BMI by anthropometry, lifestyle factors, blood pressure, uric acid, creatinine, lipid profile, fasting plasma glucose and upper esophagogastrroduodenoscopy finding of EE, hiatus hernia.

Results: A total of 1 096 (18.8%) subjects had erosive esophagitis. Compared with subjects without EE, those with EE were likely to be male, and had higher BMI, WC, diastolic blood pressure, fasting plasma glucose, uric acid, creatinine, and triglyceride, and higher prevalence of hiatus hernia, overweight, central obesity, hypertriglyceridemia, current tea drinking, smoking, and alcohol drinking. Multivariate regression analyses revealed the significantly associated factors of erosive esophagitis were central obesity (odds ratio (OR), 1.19; 95% confidence interval (CI), 1.01-1.41), hypertriglyceridemia, hiatus hernia and current alcohol drinking. After substituting central obesity with overweight as an independent variable, overweight (OR, 1.24; 95% CI, 1.07-1.44) remained a significantly positive association with erosive esophagitis.

Conclusion: Non-obese subjects with either overweight or central obesity exhibit increased risk of EE. In addition, male gender, hiatal herniation, hypertriglyceridemia and alcohol consumption were also associated with the risk of EE.

T3T4:P.113

In childhood excessive weight is already associated with various musculoskeletal complaints: A systematic review of the literature

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Introduction: Adult overweight has been associated with a higher prevalence of musculoskeletal complaints (MSC). It is unclear if this relationship already exists in childhood. Therefore, the primary aim of this systematic review was to examine the association and potential risk of overweight with various MSC in children.

Methods: Electronic databases (Medline, Embase, Web of Science and Cochrane) were searched. Studies had to fulfil the following criteria: (1) Body Mass Index or weight status had to be subject of study of direct association with MSC (2) investigated individuals had to be children between 0-18 years of age and without systemic disorders (3) the study design had to be cross-sectional or longitudinal with a non-MSC comparison group. Data were extracted and pooled, risk of bias was assessed and level of evidence was graded (GRADE) by two independent reviewers.

Results 32 studies were included. Pooled data show moderate quality of evidence that overweight in childhood is associated with musculoskeletal pain in general (RR 1.42; 95%CI: 1.07-1.88) as well as with low back pain (RR 1.60; 95%CI: 1.18-2.17). Acute MSC, like injuries and traumas, were not associated with overweight, however there was moderate quality of evidence for a small but significant association with obesity in childhood. Finally, there was very low quality of evidence for a significant increased risk of football injuries in overweight youth.

Conclusion There is moderate quality of evidence that excessive weight is already in childhood related with various musculoskeletal complaints. More high quality prospective cohort studies are needed to study the nature of this relationship.

T3T4:P.114

Association between Metabolic Syndrome and GB Polyp in Healthy Korean Adults

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Background: These days, prevalence rate of metabolic syndrome is increasing, and this increases cardio-vascular system complications and death rate, along with all kinds of cancer. We intended to find out the association between GB polyp and metabolic syndrome, on which not many studies have been done.

Method: Among male and female adults who had physical examination in a health screening center of a general hospital in 2008, 5685 people were the subjects of this study, excluding subjects without waist circumference, BMI, and muscle mass, subjects who had a cholecystectomy or GB stone, and subject without HBsAg result, and 485 out of them were in GB polyp group. The definition of metabolic syndrome followed the diagnosis standard suggested by American Heart Association (AHA)/National Heart, Lung and Blood Institute (NHLBI) ATP III 2005, and the abdominal obesity item followed the standard of Korea Society for Study of Obesity. To find out the association between metabolic syndrome and GB polyp, age and gender were adjusted, and biphasic logistic regression was performed.

Result: Independent factors related to GB polyp were male (OR = 1.493, 95% CI, 1.11–2.00, P-value = 0.007) and HBsAg positive (OR = 1.591, 95% CI, 1.06–2.38, P-value = 0.02), and each element of metabolic syndrome such as waist circumference, neutral fat, HDL cholesterol, blood pressure and fasting glucose were found not to be associated to GB polyp. However, metabolic syndrome group had higher comparative risk of 1.31 (95% CI, 1.01–1.69) compared to the group without metabolic syndrome.

Conclusion: HBsAg positive and male increased GB polyp and presence of metabolic syndrome increased the risk of GB polyp.

T3T4:P.115

Trends in obesity and its association with diabetes, hypertension and psychiatric symptoms: 1973–2007

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Introduction: Studies demonstrated that obese individuals have much higher risk for all causes of morbidity. The prevalence of obesity has increased worldwide in parallel with the growing burden of chronic diseases and mental disorders. Reliable information on these trends are lacking for Austria. This study aims to characterize long-term trends in obesity and their association with some important chronic diseases and psychiatric symptoms.

Methods: Self-reported data of Austrian adults aged 20 years and older (mean age: 47.7, range: 20–99 years) from 5 health surveys, collected between 1973 and 2007, were used (n = 178,818). An adjustment of self-reported BMI was performed. Main outcome measures were BMI, diabetes mellitus, hypertension, sleep disorder, depression and headache.

Results: In 35 years, the age-standardized prevalence of obesity increased from 11.5 to 15.0% among women and 9.5 to 13.8% among men, with a higher absolute change in men (p < 0.001). There was also an increase in the age-standardized prevalence of the investigated diseases and mental disorders. The highest increase was found for sleeping disorder with a comparatively high prevalence among obese women. In total obesity was significantly more frequent in individuals with the selected diseases and symptoms. Analyses showed associations of BMI with the prevalence of self-reported diseases and conditions.

Conclusion: Between 1973 and 2007 there was an increase in the prevalence of obesity and in all analysed chronic diseases and psychiatric symptoms. Prevalence of obesity and comorbidity with different chronic diseases and psychiatric symptoms are growing public health problems in Austria.

1. Conflict of Interest: None Disclosed

2. Funding: No Funding.

T3T4:P.116

Metabolic syndrome, body composition and physical activity in treatment seeking severely obese children and adolescents

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Introduction: Childhood obesity is associated with increased risk of cardiometabolic disease. Physical activity might reduce this risk substantially. We aimed to compare physical activity/inactivity levels, anthropometric measures and insulin sensitivity in severely obese children/adolescents with and without metabolic syndrome (MetS).

Methods: Severely obese children/adolescents aged 4–18 years admitted to the Morbid Obesity Centre were consecutively included in the Vestfold Registry of Obese Children. MetS was defined as presence of ≥3 MetS-components: triglycerides ≥ 1.24 mmol/L, HDL-cholesterol ≤ 1.03 mmol/L, fasting blood glucose ≥ 5.6 mmol/L, systolic or diastolic blood pressure ≥ 90th percentile or elevated waist circumference (all). Activity/inactivity levels were measured using a validated questionnaire.

Results: MetS was present in 32% of 208 patients (49% male, mean (SD) age 12.8 (3.5) years). Variables which differed significantly between groups are highlighted (bold) in the table.

	MetS (no)	MetS (yes)	p-value
n(%)	142(68)	66(32)	
Age (years)	12.1(3.8)	13.6(2.7)	0.002
Number of boys (%)	64(45.1)	38(57.6)	0.126
Waist circumference (cm)	104.5(16.6)	113.8(14.8)	< 0.001
Waist-to-height ratio	0.67(0.63)	0.69(0.66)	0.035
FatPercentage(%)	43.7	43.6	0.945
BMI (kg/m ²)	35.3(6.6)	39.2(6.5)	< 0.001
HOMA-IR	4.1(3.1)	5.2(2.7)	0.017
Physical Activity(times/month)	3.9(1.7)	3.7(1.7)	0.656
Physical Activity(hours/week)	2.7(1.5)	2.9(1.6)	0.330
Screen Time(hours/day)	4.7(1.1)	4.9(1.0)	0.310

Data shown as mean (SD) or percentage. Independent samples t-test or Chi square-test.

Conclusion: Severely obese children/adolescents with MetS had significantly higher age, waist circumference, waist-to-height ratio, BMI and HOMA-IR compared to those without MetS. Surprisingly, the amount of physical activity/inactivity did not differ significantly between groups. The latter findings need verification and should be interpreted with caution.

1. Conflict of Interest: None Disclosed.

2. Funding: No Funding.

T3T4:P.117

The association of serum LDL-cholesterol/HDL-cholesterol ratio with insulin resistance

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Introduction: Insulin resistance is the strongest predictor of type 2 diabetes mellitus. Dyslipidemia is nearly always associated with the insulin resistance. The aim of the present study is to examine how lipids profiles (especially, LDL-cholesterol/HDL-cholesterol ratio) are associated insulin resistance in Korean adults.

Methods: The subjects of this cross-sectional study were 2323 Korean adults above 20 years old who involved the fifth Korea National Health

and Nutrition Examination Survey 2010. All subjects underwent physical examination and serum total cholesterol, high density lipoprotein (HDL)-cholesterol, low density lipoprotein (LDL)-cholesterol, fasting glucose and insulin levels were measured. Insulin resistance was defined by homestasis model assessment of insulin resistance (HOMA-IR).

Results: Median age of total participants was 40.01 ± 17.73 years, 49.4% was male. HOMA-IR showed a positive correlation with body weight, BMI, LDL-cholesterol/HDL-cholesterol ratio, LDL-cholesterol and triglyceride while showing a negative correlation with HDL-cholesterol by the Pearson's rank correlation analysis. A simple linear regression analysis showed a positive correlation between LDL-cholesterol/HDL-cholesterol ratio and log-transformed HOMA-IR (R^2 0.04, P -value < 0.01). They were divided into 4 groups on the basis of the LDL-cholesterol/HDL-cholesterol ratio. Analysis of covariance generated significant differences in HOMA-IR among LDL-cholesterol/HDL-cholesterol ratio quartiles (P -value < 0.01).

Conclusion: There is a positive association between LDL-cholesterol/HDL-cholesterol ratio and HOMA-IR. LDL-cholesterol/HDL-cholesterol ratio is a useful and reliable marker for the detection of insulin resistance.

T3T4:P.118

Screening for impaired glucose tolerance in obese children and adolescents: A validation and implementation study

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Objectives: We aimed to validate fasting triglycerides > 1.17 mmol/L, a criterion recently proposed for selecting obese children at risk of impaired glucose tolerance (IGT), and to assess whether the accuracy of triglycerides (TG) can be improved by the use of other variables.

Methods: We studied an Italian cohort of 817 obese children and adolescents (8–18.4 years) who underwent clinical examination, fasting blood analysis and the oral glucose tolerance test (OGTT). The discriminative properties of $TG > 1.17$ mmol/L were assessed and compared with those observed in a Canadian cohort from which this criterion was derived: 71.4 [57.8–85.1]% sensitivity and 64.1 [57.7–70.4]% specificity. The possible contribution of other variables was evaluated by assessing the net reclassification improvement (NRI), i.e., the net increase in the percentage of subjects correctly classified.

Results: Thirty-nine children (4.7%) had IGT. The 1.17 mmol/L TG threshold showed 66.6 [51.8–81.4]% sensitivity and 68.2 [64.9–71.5]% specificity, thus successfully validated. Fasting plasma glucose (FPG) was independently associated with IGT (OR=3.86 [2.09–7.14], $p < 0.001$), besides TG. The bivariate criterion of $TG \geq 1.13$ mmol/L plus $FPG \geq 4.44$ mmol/L had a 69.2 [54.7–83.7]% sensitivity and a 78.2 [76.8–79.6]% specificity, thus displaying a 12.6% NRI ($p < 0.001$) compared with $TG > 1.17$ mmol/L.

Conclusions: $TG > 1.17$ mmol/L is a useful criterion to detect roughly 66% of obese children with IGT through OGTT performed in about 33% of all obese children. However, the “ $TG \geq 1.13$ mmol/L plus $FPG \geq 4.44$ mmol/L” criterion improved discrimination accuracy, leading to the possibility of detecting even more than 66% of obese children with IGT though limiting OGTT to just 25% of all obese children.

T3T4:P.119

The association of glucose and insulin concentrations with hand osteoarthritis: The NEO study

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Introduction: Obesity is an important risk factor for osteoarthritis (OA), but underlying causal pathways are unknown. We investigated whether glucose and insulin were associated with OA of the hands, being non-weight bearing joints.

Methods: In the population-based Netherlands Epidemiology of Obesity (NEO) cohort, individuals aged 45–65 years were studied. Hand OA was defined using American College of Rheumatology criteria. Fat mass was assessed using bioelectrical impedance analysis. The association of BMI, fasting glucose, HbA1c (early stage glycation product), insulin and HOMA2-IR with hand OA was investigated using logistic regression analyses per standard deviation, stratified for sex and adjusted for age.

Results: After exclusion of participants using glucose lowering medication ($n=304$), 4980 participants were analyzed (age (mean \pm SD) 56 ± 6 years, BMI 30.4 ± 4.7 kg/m², glucose 5.62 ± 0.80 mmol/L, HbA1c $5.40 \pm 0.39\%$; insulin (median (IQR)) $6.17(2.47–10.70)$ mU/L, HOMA2-IR $0.83(0.33–1.43)$; 54% women). Hand OA was present in 7% of men and 19% of women.

BMI was associated with OA in men; OR1.19 (95% CI 1.03–1.38), and women; OR1.11 (1.01–1.23). Glucose was associated with OA in men only; OR1.22 (1.08–1.37). Insulin and HOMA2-IR were also positively associated with hand OA in men. HbA1c showed an OR of 1.17 (1.04–1.31) in men. Remarkably, HbA1c was also associated with OA in women; OR1.12 (1.02–1.23). The associations of glucose, HOMA2-IR and HbA1c with OA remained significant after adjustment for fat mass.

Conclusion: In men, glucose, insulin and HOMA2-IR were associated with hand OA. HbA1c was associated with OA in both sexes, suggesting involvement of non-enzymatic glycation in the development of hand OA.

T3T4:P.120

Diet composition and glucose dysregulation after oral glucose load in obese children

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Introduction: The aim of this study was to explore the scarcely investigated relationship between diet composition and glucose metabolism after glucose load in a sample of obese children.

Methods: 100 obese children (M/F: 0.9; age: 11.7 ± 2.4 yrs; BMI z score: 2.5 ± 0.5) were recruited. Anthropometry, body composition (BIA), diet (weighted dietary record), and metabolic variables (blood lipid profile, ALT, OGTT) were measured. The area under the curve of glucose (AUC_{Gluc}) and insulin (AUC_{Ins}), HOMA-IR, Matsuda Index (WBISI), insulinogenic index (IGI), and Disposition Index (DI) were also calculated.

Results: Two percent of children had impaired fasting glucose and 9% had impaired glucose tolerance. The AUC_{Gluc} correlated with BMI z score ($r=0.24$, $p < 0.05$), waist/height ratio (W/Ht: $r=0.29$, $p < 0.05$), fasting glucose ($r=0.26$, $p < 0.05$), 2h glucose ($r=0.8$, $p < 0.001$), AUC_{Ins} ($r=0.43$, $p < 0.01$), WBISI ($r=-0.47$, $p < 0.01$), IGI ($r=-0.28$, $p < 0.019$), DI ($r=-0.75$, $p < 0.001$) and carbohydrate intake (% energy intake) ($r=-0.22$, $p < 0.05$). However, fasting glucose, WBISI, IGI, and carbohydrate intake (CHO_{int}) were the only variables contributing to explain the interindividual variability of the AUC_{Gluc} ($R^2=0.62$, $p < 0.001$). Logistic regression analysis showed that WBISI (OR 0.50; c.i.: 0.30–0.83, $p < 0.01$) and CHO_{int} (OR 0.88; c.i.: 0.78–0.99, $P=0.04$) were able to predict high 2h glycaemia (IV quartile vs I-III quartile of 2h glucose).

Conclusions: the carbohydrate content of the diet was inversely associated with blood glucose profile after glucose load, independently from

body size and fat distribution, suggesting that diet composition may play a role in glucose metabolism regulation in obese children.

T3T4:P.121

Motion of the Paediatric Foot during Gait: Associations with Obesity

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Introduction: Childhood obesity is associated with altered gait characteristics. However, little is understood about the impact of obesity on three-dimensional motion of the paediatric foot. The aim of this study was to examine the associations between foot motion over the gait cycle with obesity in 7 to 11 year boys.

Methods: Fifty-five boys (mean age 9.56 ± 1.13 years) were recruited into the research. Each participant was measured for percentage body fat (%BF) by air displacement plethysmography (mean %BF $23.78 \pm 9.33\%$, range 9.57–42.06%). Three-dimensional foot motion during gait was measured by 10-camera motion capture system recording retro-reflective markers attached to foot. Principle component analysis was used to group foot motion measures at gait cycle events and peaks through the stance and swing phases. These components were then analysed for associations with %BF by multilevel linear regression (significance set at $p < 0.05$).

Results: Significant associations were found between rearfoot and midfoot motion with %BF. Participants with higher %BF demonstrated; greater rearfoot abduction throughout the gait cycle, midfoot dorsiflexion in late stance and swing; and, midfoot eversion in early stance.

Conclusion: Findings from this study support the view that obesity is associated with altered motion of the foot during gait. Data from this study suggests obese children have a pronated foot type, a possible precursor to altered function and pathology in later years. Further work is required to understand the long term impact of altered foot motion during gait associated with childhood obesity.

T3T4:P.122

Retinal Vascular changes in patients with obesity and non-alcoholic fatty liver disease and its association with C Reactive Protein

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Introduction: Some recent studies demonstrate retinal vascular changes (RVC) in patients with obesity without diabetes or hypertension. There hasn't been a study in patients with non-alcoholic fatty liver disease (NAFLD), obesity and its association with RVC and C Reactive Protein (CRP).

Methods: 152 subjects without hypertension or diabetes were divided in 4 unbalance groups: BMI < 25 with and without NAFLD and BMI > 30 with and without NAFLD. They underwent retinal fundus photography and hepatic ultrasonography for NAFLD determination. Crude odds ratio (OR), 2K factorial analysis (NAFLD, obesity and RVC as factors; CRP as association variable), and ANCOVA was calculated.

Results: The OR of RVC in obesity was 17.54 ($p < 0.01$) and 11 for RVC in NAFLD ($p < 0.01$). 2K factorial analysis demonstrated more CRP concentration in patients with obesity, NAFLD and RVC: 7.228 pg/ml (5.94, 8.52); then in obese, non-NAFLD with RVC patients: 5.659 pg/ml (3.83, 7.49) and in third place non obese with NAFLD and RVC: 2.499 pg/ml (0.21, 4.79) (FIGURE1). Matsuda insulin resistance index was not significantly related with RVC ($p = 0.295$).

Conclusion: RVC are associated with obesity and NAFLD. CRP as low inflammation marker could explain this relation. More studies that explain the physiopathological mechanisms are need.

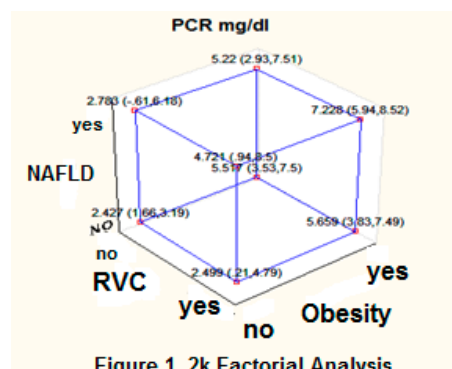


Figure 1. 2k Factorial Analysis

References

- Hanssens: Atherosclerosis 2012; 221: 242–248.
- Win Wong: Ophthalmol Vis Sci 2006; 47: 2341–50.

1. **Conflict of Interest:** None Disclosed

2. **Funding:** Hospital Federal resources.

T3T4:P.123

Anaemia and iron status in severe obesity: Influence of inflammation and diabetes status

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Introduction: Obesity and type 2 diabetes (T2D) are associated with a relatively high prevalence of anaemia; the cause is unknown. We aimed to determine the prevalence of iron deficiency (ID) and anaemia in a severely obese cohort of patients seeking bariatric surgery, and explore underlying associations with markers of nutrition, inflammation, and T2D.

Methods: Of 703 consecutive patients assessed for bariatric surgery, 656 were evaluated after exclusions for haemoglobinopathy and missing data. Definitions: anaemia: WHO criteria; ID: ≥ 2 abnormal measures of iron status; diabetes status: clinical history or American Diabetes Association A1c criteria (T2D: 33% of total, 50.9 ± 10.3 year, body mass index (BMI) 46.6 ± 7.7 kg/m², prediabetes: 35%, 44.4 ± 11.5 year, BMI 47.9 ± 7.4 kg/m², or no diabetes: 32%, 36.5 ± 12.2 year, BMI 46.5 ± 6.8 kg/m²). Statistical analyses: Stepwise regression with independent predictors of serum iron concentration: age, gender, BMI, body fat percentage, index of multiple deprivation, diabetes status, number of comorbidities, white cell count (WCC), folate, vitamin B₁₂, and use of multivitamins, metformin, insulin, non-steroidal anti-inflammatory drugs (NSAIDs) or proton pump inhibitors.

Results: Anaemia and ID were present in 9.9% and 11.4% of patients, respectively. Amongst the entire cohort, stepwise regression revealed a weak association of serum iron concentration with WCC, NSAIDs, gender, and diabetes status ($R^2 = 0.076$; $p < 0.001$). In patients with T2D, metformin use was significantly linked to reduced serum iron concentration.

Conclusion: Anaemia and ID are relatively common in severely obese individuals, with a multifactorial aetiology. For T2D patients, metformin use is associated with ID.

T3T4:P.124

Prevalence of Type 2 diabetes (T2D) and prediabetes are similar in severely obese women with and without polycystic ovary syndrome (PCOS)

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Introduction: PCOS is associated with an increased risk of impaired glucose tolerance and T2D. However, the prevalence of varying degrees of glucose intolerance in women with PCOS has not been extensively studied in the setting of severe obesity. Furthermore, the prevalence of prediabetes, using HbA1c diagnostic criteria as defined by the American Diabetes Association, has not previously been investigated in women with PCOS.

Methods: Prevalence of T2D and prediabetes was compared in obese women of reproductive age, with and without a diagnosis of PCOS, who attended a pre-operative bariatric surgery clinic between 2010 and 2011. PCOS status was documented on all patients.

Results: A total of 340 women of reproductive age were included in the analysis. 69 (20.3%) had been previously diagnosed with PCOS, mean age 33.8±7.3 years and body mass index (BMI) 46±6.3 kg/m², compared to mean age of 38.6±8.2 and BMI 47.4±7.5 kg/m² in non-PCOS women (n=271, 79.8%). The prevalence of T2D and prediabetes was 20.3% (n=14) and 33.3% (n=23) respectively in PCOS women compared to 20.3% (n=55) and 40.3% (n=109) respectively in non-PCOS women (p=0.97 for T2D, p=0.33 for prediabetes). However, HbA1c for 9 of 17 PCOS women without T2D, who were on metformin for treatment of PCOS, was in the prediabetes range.

Conclusions: Prevalence of T2D and prediabetes were similar in severely obese women with and without PCOS, suggesting that a diagnosis of PCOS does not confer an additive risk in women with severe obesity. The high prevalence of prediabetes in both groups is consistent with the high risk of T2D associated with severe obesity.

T3T4:P.125

Abdominal bioimpedance device is a useful to detect pre-hypertension in middle-aged men

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Introduction: High blood pressure (BP) and regional obesity (visceral and total) have been closely related. Nevertheless, the level of abdominal adiposity above which blood pressure becomes a risk for health, has not been elucidated yet. It was our aim to explore cut-off values of total abdominal fat (TAF) and visceral adipose tissue (VAT) associated with pre-hypertension (preHT)

Methods: 77 Caucasian males participated in this study (age: 37.0 ± 9.7 years; weight: 84.8 ± 13.2 kg; 174.4 ± 7.5 cm; BMI, 27.8 ± 3.98 kg/m²). BP measurements were obtained in the right arm using a mercury sphygmomanometer and appropriately sized cuffs, following the classical protocol. Patients were classified as normal BP or preHT in accordance with the 7th JNC report. VAT and TAF were measured with bioimpedance (Viscan®). ROC analyses were performed to determine sensitivity and specificity to detect cut-off values of VAT and TAF associated with significant provability of preHT.

Results: Prevalence of systolic and diastolic preHT in this sample was 28 and 16%. VAT were different between groups: 16.8 ± 7.1 vs. 12.9 ± 5.9 (preHT and normal patients respectively, *P* = 0.019). Areas under curves (AUC) of VAT and TAF for systolic preHT as a classification variable were 0.66 ± 0.07 (95%CI: 0.55 to 0.77) and 0.64 ± 0.07 (95%CI: 0.52 to 0.75) respectively. AUCs for diastolic preHT for all variables were non significant.

Conclusion: This preliminary analysis highlighted VAT and FAT as a useful tool to diagnose systolic preHT in Caucasian middle-aged men. Suggesting a good validity of Viscan® device.

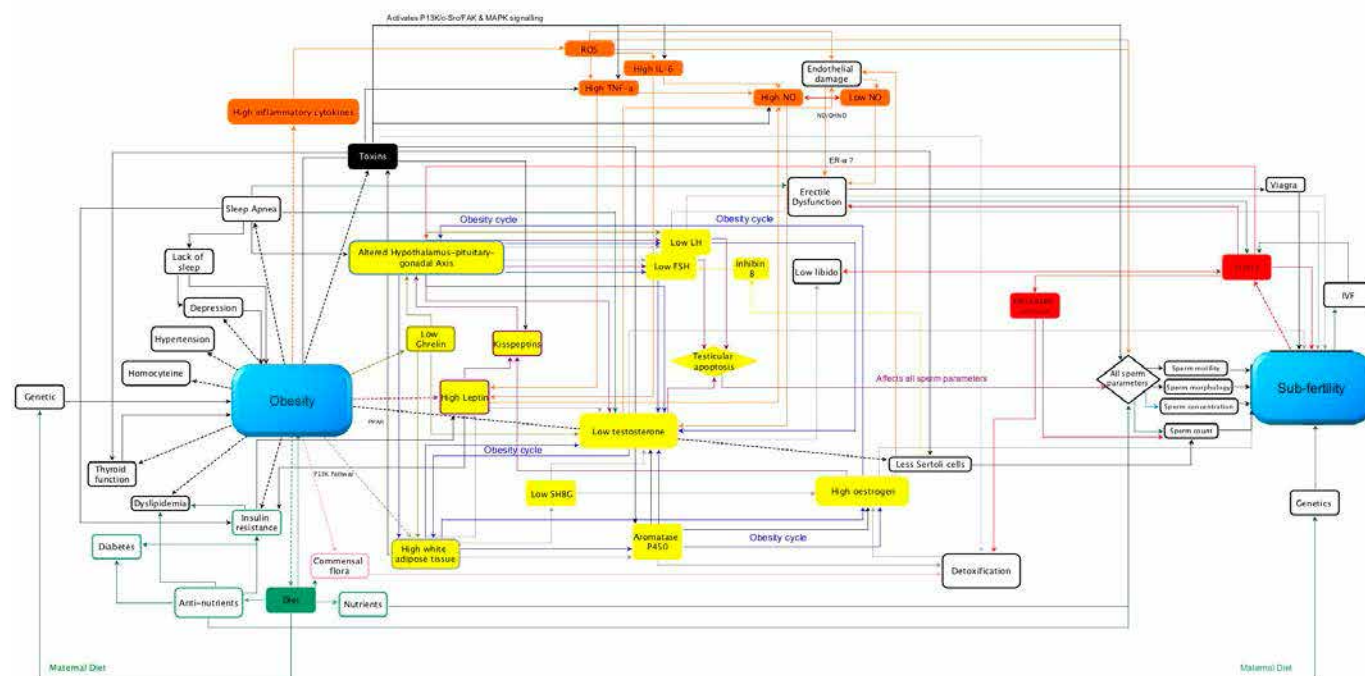
1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded by Sports Medicine School. University of Málaga.

T3T4:P.126

Obesity and male fertility – a mechanism review*Pearson NM^{1,2}, Neil JR¹*¹Centre for Nutrition Education & Lifestyle Management, Berkshire, United Kingdom, ²Middlesex University, London, United Kingdom**Introduction:** Evidence indicates that male obesity impacts negatively on reproductive potential. This mechanism review aimed to use emerging

scientific concepts to provide an understanding of the multiple underlying mechanisms involved in obesity and how this affects fertility in males.

Methods: Data was acquired by systematic searches of scientific literature, and relevant cross-references, based around three main focus areas. An inclusion and exclusion criteria was set. Studies were assessed using SIGN 50 or ARRIVE.**Results:****Conclusion:** Available data provides sufficient evidence that male obesity negatively impacts fertility via changes within the reproductive hormone profile. Altered inflammatory pathways affect sperm parameters and environmental factors influence both hormonal and immunological mechanisms. Obesity along with these factors should be considered as mechanisms for the etiology of subfertility/infertility.**1. Conflict of Interest:** None Disclosed**2. Funding:** No Funding

T3T4:P.127

Body mass index association with liver attenuation and tPAI-1*Skuja I^{1,3}, Krievina G², Stukena I^{1,4}, Tretjakovs P¹, Bahs G¹, Lejnies A^{1,4}*¹Riga Stradins University, Riga, Latvia, ²University of Latvia, Riga, Latvia, ³General practitioner's practice, Riga, Latvia, ⁴Riga Eastern Clinical University Hospital, Riga, Latvia**Introduction:** The incidence of overweight and obesity are increasing. There is growing evidence that fatty liver is associated with increased cardiovascular disease(CVD) risk. The aim of the study was to assess hepatic risk factors among overweight and obese patients.**Methods:** A total of 120 cases were included in this study. Different patient groups were defined according to body mass index(BMI)- normal-1, overweight-2, obese-3. Triglycerides(TG), bilirubin(Bi), aspartyl-aminotransferase(ALAT), alanine aminotransferase(ALT), gammaglutamyl-transpherase(GGT), alkaline phosphatase(AP) and total plasminogen activator inhibitor(tPAI-1) were estimated. tPAI-1 levels were measured by Luminex xMAP technology. Liver attenuation(LA) in Hounsfield units(HU) and liver spleen difference(L-Sd) were estimated by multi-slice spiral computed tomography.**Results:** We found significant correlation between BMI and LA($r = 0.50$; $p < 0.001$), L-Sd($r = -0.43$; $p < 0.001$), AP($r = 0.45$; $p < 0.001$), TG($r = 0.50$; $p < 0.001$), ALAT($r = -0.49$; $p < 0.001$), ASAT($r = -0.36$; $p < 0.001$), GGT($r = 0.44$; $p < 0.001$), t-PAI($r = 0.36$; $p < 0.001$) in the whole group. Comparing Group-1 and 2 ALAT($p = 0.01$), GGT($p = 0.01$), tPAI($p = 0.01$) were significantly increased in Group2. Comparing Group-1 and 3 ASAT($p = 0.01$), ALAT($p < 0.001$), GGT($p < 0.001$), AP($p = 0.01$), tPAI($p < 0.001$), LA($p < 0.001$) and L-Sd($p = 0.01$) were significantly increased in Group3.**Conclusion:** For patients who are overweight only part of hepatic biochemistry parameters are increasing. While in obese patients there are visual liver changes in abdominal unenhanced CT in addition. It is

important to reduce or maintain normal body weight. because weight gain is associated with fatty liver and following CVD risk.

T3T4:P.128

Gender obesity-related high-density lipoprotein level inequities in North African adults

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Introduction: North African countries are facing rapid increases in obesity, which is classified as a major modifiable risk factor for coronary artery disease (CAD). As the variation in high-density lipoprotein cholesterol (HDLc) levels is an important CAD risk factor in obese states, this study aimed at describing the magnitude of abnormal HDLc levels among Tunisian obese adults and exploring the relationship between these co-morbidities by gender.

Methods: Cross-sectional survey (2009) in the Great Tunis. Two-stage stratified random cluster sample: 2619 adults (20–49 y). Body Mass Index=weight/height² ≥30 kg/m² defined obesity; waist-to-height ratio ≥0.60 described abdominal adiposity. Recommended cut-offs of plasma HDLc levels defined low HDLc (<35 mg/dL for men and <40mg/dL for women); high HDLc (≥60 mg/dL for both genders). Adjusted associations for some confounding variables (area, age, profession, education, economic level, physical activity level, energy consumption and smoking) were assessed.

Results: In obese vs. non-obese women, prevalence of low HDLc was higher (18.7% [14.4–23.8] vs. 11.8% [9.0–15.3], p<0.0001) and high HDLc was lower (19.3% [15.5–23.8] vs. 30.9% [25.8–36.6], p<0.0001). In men, both low and high HDLc were not different between obese and non-obese (18.3% [11.6–27.5] vs. 19.1% [14.4–25.0]) and (5.2% [2.5–10.7] vs. 8.1% [6.1–10.8]), respectively. Similar gender differences were observed regarding abdominal adiposity. Multivariate analysis: only in women, obesity was positively related to low HDLc (OR=1.5 [1.1–2.1]; p=0.032) and both obesity and abdominal adiposity were negatively associated to high HDLc (OR=0.6 [0.4–0.8]; p=0.003 and OR=0.6 [0.5–0.8]; p=0.001, respectively).

Conclusion: It is necessary to elucidate the mechanisms underlying gender obesity-related lowering HDLc levels differences. This is particularly of concern as obesity is more prevalent in women than men.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded by the Corus 2 Programme (Project OBE-MAGHREB (2007-2011) Understanding the nutritional transition in the Maghreb to contribute to the prevention of obesity and non-communicable diseases, Contract Number: 6028), the Tunisian National Institute of Nutrition and Food Technology, and the Tunisian National Institute of Statistics.

T3T4:P.129

The role of adherence to treatment in patients with metabolic syndrome

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Introduction: Metabolic syndrome (MS) increases the likelihood of various diseases, especially liver fibrosis. Low adherence to treatment (AtT) in patients with MS is one of the greatest problems for the physicians.

Aim: To evaluate the AtT and to determine association between adherence and liver stiffness in patients with MS.

Methods: In cross-sectional study were examined 80 people with MS, mean age 42.56±9.8; 95% IC 39.91–45.21. Weight, height, body mass index (BMI), alcohol intake (g/day), a blood samples (ASAT/ALAT, GGT, total and free bilirubin, cholesterol and triglycerides, viral hepati-

tis B, C and HIV antibodies, thyrotrophic hormone) and liver stiffness measurement (LSM) were assessed at first, 12 and 36 months late. AtT was evaluated by questionnaire.

Results: The share of AtT people was 39.64%; subjects with high adherence had significantly lower liver stiffness (LS) – 6.12 kPa; 95% IC 6.01–6.23; p<0.03. Non-AtT patients had LS 7.83 kPa, 95% IC 7.56–7.99; p<0.021. LSM was correlated with AtT, gender, BMI and alcohol intake.

Conclusion: In this study some patients with MS had a low AtT, but those who lead clinical recommendations, had better liver stiffness, then others. After 3 year treatment AtT-people had reduction stage of liver fibrosis. New researches should be performed in different groups of patients with MS for assessment prognostic significance of adherence.

1. Conflict of Interest: None Disclosed

2. Funding: No Funding

T3T4:P.130

Obesity and 5-y risk of dementia in Chilean older people

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Introduction: Recent studies have shown obesity as an independent risk factor for future dementia

Objective. To study the 5y risk of dementia according prior obesity in community-living Chilean older adults

Methods: Alexandros is a cohort study designed to study disability related to obesity in Chilean older people. In 2004/2005 home interviews including history of chronic diseases, self-reported disability/functional limitations, screening test for dementia, physical performance, anthropometry, dynamometry and blood pressure were done in 1071 people from whose 886 were free of dementia. Available participants in 2010 were 554 (70.2% women), 100 were died and 234 were lost to follow up. From those, a subsample of 137 people had baseline leptin measurements. At baseline 35.9% of the participants had IMC ≥30 Kg/m² (26.7% of men and 37.6% of women). Dementia was defined with a test validated for Chile consisting in MMSE score<22 and a score >5 in the Pfeffer activities questionnaire.

Results: The 5y risk for dementia was 13.4% similar for both sex. Obesity at baseline was associated with the incidence of dementia 5y later in women (10.3% in non-obese vs 18.2% in obese, p<0.03) but not in men. After logistic regression adjustment the RR of having dementia was higher in obese than in non-obese (RR=1.67, 95%CI 1.003–2.772, p<0.05) and increased with age (RR=1.04, 95%CI 0.996–1.085; p=0.078). No association with gender neither diabetes nor hypertension was observed. No association of baseline plasma leptin with dementia was found.

Conclusion: The results allow for considering obesity as an independent risk factor for dementia

T3T4:P.131

Dissecting individual experiences to reach a more comprehensive understanding of weight regulation in Polycystic Ovary Syndrome

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Introduction: Polycystic Ovary Syndrome (PCOS) is an endocrinopathy affecting 5-10% of women worldwide. The PCOS symptomatology spectrum includes polycystic ovaries, infertility, irregular menstruation, acne and hirsutism, predominantly caused by excess androgen production. It is estimated up to 75% of the PCOS population are obese, this is a significant public health concern and could account for a significant portion of obesity prevalence in adult females. Females diagnosed with PCOS (irrelevant of their BMI) are at increased risk of developing characteristics of the metabolic syndrome (insulin resistance, dyslipidemia). PCOS symptomatology can be improved by modest weight loss, although achieving weight loss is challenging for many women.

The primary cause of weight gain thought to originate from a disturbance of normal endocrine function but it is essential to consider weight regulation from an individual behavioural and lifestyle perspective, with consideration given to symptomatology, quality of life and wellbeing in the context of PCOS.

Methods: Following a recent study examining female reproductive and metabolic health, follow up interviews were carried out with women diagnosed with PCOS to explore further detail their experience managing their weight, general wellbeing and how the syndrome may influence their control of energy balance. Key emerging themes are reported.

Conclusions: This research will contribute to our knowledge regarding the role of the individual in weight management in the context of PCOS. It will inform future intervention support strategies and resources for weight management applicable to both PCOS and the wider obese population.

1. Conflict of Interest: None.

2. Funding: Research relating to this abstract was partially funded by an Early Career Grant, Society for Endocrinology, UK.

T3T4:P.132

Body Mass Index Before Pregnancy and Weight Gain during Gestation Adversely Affect Maternal and Fetal Outcomes in Portuguese Women. Does it have the Same Impact after IADPGS Criteria?

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Introduction: Elevated maternal body mass index (BMI) and weight gain during pregnancy are well known risk factors for maternal and fetal adverse outcomes.

Aim: To investigate the effects of maternal pre-pregnancy BMI and weight gain during gestation on pregnancy outcomes in women with gestational diabetes (GD), before and after IADPGS criteria.

Methods: A cohort of pregnant women with GD was studied (n=1679, in 51.4% diagnosed with WHO criteria). Maternal weight and height before pregnancy, and weight gain during gestation were evaluated. Data related to maternal and fetal outcomes were collected. Independent-sample *t* and chi-square tests were used for statistical analysis.

Results: Women mean age at enrolment, IADPGS vs WHO criteria, was 32.8±5.0 vs 33.1±5.1 years and BMI before pregnancy 28.5±27.2 vs 35.2±54.5 Kg/m². Mean weight gain was 10.9±5.4 vs 9.9±5.4 Kg. Excess weight, or obesity, before pregnancy was associated with pregnancy-induced hypertension (1.2% vs 1.0%, *p*<0.001; 0.9% vs 0.3%, *p*<0.001) and increased birth weight (3165±541 vs 3001±524 g, *p*<0.001; 3281±530 vs 3096±438 g, *p*<0.001) in both groups and presence of hydramnios (1.5% vs 1.0%, *p*=0.004) and fetal death (0.3% vs 0%, *p*<0.001) in IADPGS group. Newborns of women with higher weight gain presented more neonatal infection when compared with newborns from women with stable BMI during pregnancy in both groups.

Conclusions: It seems increasingly important to manage weight gain during pregnancy in women with GD as it has been accounted for a risk factor for maternal and fetal complications independently of GD diagnostic criteria.

T3T4:P.133

Impact of parental BMI and educational level on infant growth during first year – the Early Stockholm Obesity Prevention Project (Early STOPP)

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Introduction: Parental obesity and educational level are known strong risk factors for child obesity. Early high weight and rapid growth in children have also been linked to obesity development. The aim was to examine the impact of parental body mass index (BMI) and educational level on infant growth in children at high and low risk for obesity.

Method: Baseline data for parent and child triads participating in the Early STOPP obesity prevention RCT were used (n=210). Child and parental weight and height were measured at 12 months, questionnaire data and growth records between birth and 12 months were collected. BMI SDS at 3, 6 and 12 months, change in BMI SDS 0-12 months and rapid growth 0-6 months were analyzed using multivariate linear and logistic regression, with parental BMI group and educational level group (low vs high risk) as primary independent variables, controlling for maternal gestational weight gain, maternal age, birth weight, length of exclusive breastfeeding and early introduction of solid food.

Results: The BMI SDS at 3, 6 and 12 months was positively weakly correlated to low parental education, but uncorrelated to parental BMI. A high birth weight predicted a higher BMI SDS at 3, 6 and 12 months as well as a slower growth up to 6 months.

Conclusion: Growth during the first year of life was correlated to parental education but not to parental BMI. Birth weight was the most important predictor for growth up to 12 months.

T3T4:P.134

Prenatal levels of endocrine disrupting chemicals and metabolic biomarkers of obesity at age 5 years. A study among Faroese children

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Introduction: Some studies have suggested that exposure to endocrine disrupting chemicals (EDCs) may lead to permanent changes in metabolic pathways that regulate body weight and lead to metabolic diseases, especially if exposure occur during prenatal life. The objective was to investigate whether prenatal PCB exposure was associated to the early biomarkers of obesity and metabolic diseases, c-peptide, insulin, glucagon and leptin, among children of 5 years of age.

Methods: The analysis was based on prospective data from a Faroese Birth Cohort (n=656), recruited between 1997 and 2000. PCB were measured in maternal serum and breast milk. Children were followed-up at the age of 5-years where a non-fasting blood sample was drawn and biomarkers such as c-peptide, glucagon, leptin and insulin were measured. Logistic regression was used to investigate the associations between prenatal PCB exposure and the biomarkers. Biomarkers were non-linear and transformed from continuous to binary variables, using the 75th percentile as a cut-off point.

Results: High prenatal PCB exposure was associated with high levels of c-peptide (OR=2.12, CI=1.17-3.82). Furthermore, PCB exposure was associated with high levels of glucagon, but only among the boys (OR=1.47, CI=1.00-2.15). PCB exposure was associated with low leptin levels (OR=0.74, CI=0.56-0.98). No significant associations were found in regards to insulin.

Conclusion: These results suggest that prenatal exposure to PCB may play a role for later development of metabolic disease including obesity, by affecting biomarker levels, particularly those of c-peptide, glucagon and leptin at the age of 5.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded by the Danish Council for Strategic Research, Program Commission on Health, Food and Welfare and the Kirsten and Freddy Johansens Fund (grant 95-103-72087); National Institute of Environmental Health Sciences, NIH (ES012199); and the Danish Environmental Protection Agency as part of the environmental support program DANCEA (Danish Cooperation for Environment in the Arctic).

T3T4:P.135

Breastfeeding and Overweight in Preschool Children

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Background: Scientific evidence shows that breastfeeding has a protective effect on the development of excess weight.

Objectives: To determine the effect of breastfeeding on overweight children.

Methods: Cross-sectional and observational study comprising 1424 preschool children, average age 4.58 years old (SD=0.990), residents in the centre/north region of Portugal. Children's anthropometric measurement was obtained and the classification was based on NCHS reference (CDC, 2000) and the birth weight classification on WHO (2001).

Results: A total of 1193 children were breastfed and 451 (37.9%) were overweight, i.e. breastfeeding proved to be protective in 60% of the cases. In the 451 children who were breastfed and overweight, the average age of the mother was 34.27 old (SD = 5.51) and the mean BMI was 25.03 (SD = 4.30). 23 mothers were diagnosed with gestational diabetes (5.1%) and at birth, 6.2% presented themselves quite large, 4.2% lightweight and 89.6% normal for gestational age. In these children, the duration of breastfeeding was ≤ 3 months in 34%, between 4-6 months in 30.70%, between 7-12 months in 20.4% and ≥ 13 months in 14.9%. Excess weight was higher in children with a breastfeeding duration of ≤ 3 months (KW OM = 244.43) and ≥ 13 months (KW OM = 249.39) ($\chi^2 = 19.180$, $p = 0.000$, $df = 3$). The period of lactation had an effect on the nutritional status of children, explaining 50.0% of its variance.

Conclusion: The results suggest significant effect of breastfeeding on the development of later overweight, justifying the creation favourable conditions for its promotion.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded by FCT Project reference PTDC/CPE-CED/103313/2008

T3T4:P.136

Birth weight and nutritional status in preschool children

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Background: The intrauterine period has been considered as a very sensitive period in which nutritional and/or hormone changes appear to play an essential role in the subsequent control of body weight.

Objectives: To classify the nutritional status of children, analyzing its relationship with birth weight.

Methods: Cross-sectional/observational study comprising 1424 pre-school children, average age 4.58 years old (SD=0.990), residents in the centre/north region of Portugal. The children's anthropometric measurement was obtained and the classification was based on the NCHS reference (CDC, 2000) and the birth weight classification on the WHO (2001).

Results: Globally 60.0% had normal weight, 38.2% were overweight (including 17.5% obesity) and 1.8% low-weight but the differences shown to be independent from age and gender. 89.0% of girls and 87.6% of boys were born with appropriate weight for gestational age while 7.8% and 4.0% were born respectively lightweight and large for gestational age.

The association between birth weight and overweight revealed that 11.5% of children with overweight were born large. The relationship was statistically significant ($\chi^2 = 15.265$; $p = 0.018$), implying that a higher birth weight was associated with increased risk of overweight in childhood with a probability greater than 2 times (OR = 2.001; 95% CI = 1.195 to 3.352) ($\chi^2 = 7.215$; $p = 0.007$).

Conclusion: The results suggest significant effect of birth weight on the development of later overweight. So, children born with high weight require further monitoring and promotion of an adequate dietary pattern, in order to control early its nutritional status.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded by FCT Project reference PTDC/CPE-CED/103313/2008

T3T4:P.137

Relationship between maternal and child overweight

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Introduction: It is recognized that overweight in childhood as a multifactorial etiology, and parent's obesity, particularly mother's obesity is actually known to be an important predictor of the development of obesity in their children.

Objectives: To classify the children's and the mother's BMI and assess the relationship between maternal and child overweight.

Methods: Cross-sectional and observational study comprising 1424 pre-school children, average age 4.58 years old (SD=0.990) and their mothers, average aged 34.46 years (SD= 5.29), living in centre/north of Portugal, 56.9% in rural area and 49.5% with their parents and siblings. The anthropometric evaluation and children's classification was based on the referential NCHS (CDC, 2000) and WHO (2001) reference for the mothers.

Results: In the sample 60.0% had normal weight, 38.2% were overweight (including 17.5% obesity) and 1.8% low-weight, but the differences shown to be independent from age and gender of children. In the mothers, 42.3% showed overweight, included 12.3% obesity. The probability of the child being overweight is 1.5 higher, when the mother has overweight (OR= 1.573; IC 95%= 1.229–2.012) and near twice higher, in mother/daughter relationship (OR= 1.946; IC 95%= 1.362–2.782).

Conclusion: Like in other studies, the inferences revealed that there was significant effect of BMI of mothers in the development of children's overweight, particularly in girls, so that, the prevention of children's obesity should consider health education aimed to the whole family, focused in the mother-daughter dyad, in order to be more effective in the interventions to the child.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded by FCT Project reference PTDC/CPE-CED/103313/2008

T3T4:P.138

Serum gamma glutamyl transferase and metabolic syndrome and its components in Chinese

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Introduction: To assess the associations between serum *gamma glutamyl transferase* (GGT) levels and the prevalence of metabolic syndrome and its components.

Methods: A total of 6091 people, aged 20 years and above, were recruited from a health examination center in a tertiary hospital in Taiwan from 2006 to 2008. 6073 subjects of these population had serum *gamma glutamyl transferase* data. Anthropometric index, questionnaire and laboratory assays were collected. Serum GGT levels were divided into two groups with cut off value of 50 mg/dL. Metabolic syndrome was defined by the AHA/NHLBI criteria. Multiple logistic regression analyses were used to estimate the odds ratios (ORs) and 95% confidence intervals for the prevalence of metabolic syndrome and its components in relation to GGT levels

Results: Serum GGT levels were correlated with fasting plasma glucose, triglycerides, systolic BP, diastolic BP, HDL-C, and waist circumference. After adjustment for age, sex, cigarette smoking, alcohol consumption, and physical activity, body mass index, serum glutamic pyruvic transaminase (SGPT), estimated glomerular filtration rate (eGFR), the ORs (95% CI) of having metabolic syndrome were 1.91(1.51–2.43) among subjects with high serum GGT levels compared to subjects with low serum GGT levels. After stratified by gender, serum GGT levels were significant associated with the prevalence of metabolic syndrome among men, but not among women. Besides, subjects with more factors of MeS had higher GGT levels, regardless of overall population, men, or women.

Conclusion: Elevated serum GGT level was independent associated with metabolic syndrome. The association, however, was not significant among women. Further study was necessary.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded from the National Science Council of Taiwan (NSC 100-2314-B-039-018) and from China Medical University Hospital (DMR-101-058).

T3T4:P.140

Validation and reliability of the Beliefs about the Causes of Obesity Questionnaire (BaCOBs)

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Introduction: It is necessary to investigate people's ideas about the causes of obesity because such ideas might be related to their eating habits and their attitudes towards obese individuals. The objective of this study was to design and analyze the structure and reliability of the Beliefs about the Causes of Obesity Questionnaire (BaCOBs).

Method: 497 high school students (249 women and 248 men) from Mexico City, with ages ranging between 15–22 years old ($M = 16.82$; $SD = 1.342$) took part in this study.

Results: Initial results (KMO = .826; Bartlett's Test of Sphericity: $\chi^2 = 2870.868$; $df = 300$; $p < .000$) suggested the use of factorial analysis. A Principal Components Analysis and Varimax rotation revealed a five-factor structure that explains the 54.74% of the total variance. In the end, the BaCOBs questionnaire was composed of 19 items (out of the original 34) and organized as follows: F1 *eating and exercising habits* ($\alpha = .672$); F2 *will power* ($\alpha = .798$); F3 *genetic factors* ($\alpha = .667$); F4 *environmental factors* ($\alpha = .630$) and F5 *family upbringing* ($\alpha = .663$).

Conclusions: The results show that the BaCOBs questionnaire is an adequate tool for the evaluation of individuals' ideas about the causes of obesity.

T3T4:P.141

Abdominal bioimpedance device is a useful to detect fasting blood glucose impairment in middle-aged men

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Introduction: Visceral abdominal adipose tissue (VAT) has been strongly associated with metabolic syndrome (MS) markers as fasting glycaemia. VAT measurement is a time-consuming and expensive and as consequence impractical for clinical and field settings. Recently, a new portable bioelectrical impedance device for abdominal region (Viscan[®]) has been developed, which estimates total abdominal fat (TAF) and VAT. However, there is a lack of cut-off values, which allow us to use Viscan[®] results as diagnostic tool. It was our aim to find cut-off values from Viscan[®] results for glycaemia impairment diagnostic.

Methods: 77 Caucasian males were enrolled [age: 37.0 ± 9.7 years; weight: 84.8 ± 13.2 kg; 174.4 ± 7.5 cm; 27.8 ± 3.98 kg/m²]. Fasting plasma blood glucose (FBG) was measured using glucose hexokinase methodology. VAT and TAF were measured with BIA (Viscan[®]). Two groups were created, subjects with glucose impairment (fasting glucose >110 mg/dl) and without. ROC analyses were performed to determine cut-off points to have glucose impairment.

Results: Areas under curves of VAT and TAF were 0.72 ± 0.10 (95%CI: 0.612 to 0.824) and 0.79 ± 0.11 (95%CI: 0.685 to 0.879) respectively. ROC analysis showed cut-off points of 12 and 37.2% for VAT and TAF.

Conclusion: The main finding of this analysis was VAT and FAT showed good sensitivity and specificity to diagnose impairment on FBG in Caucasian middle-aged men, hence it suggests Viscan[®] as a useful tool to perform MS screening. Nevertheless, the cut-offs values obtained must be confirmed on larger samples.

1. Conflict of Interest: None Disclosed

2. Funding: Research relating to this abstract was funded by Sports Medicine School. University of Málaga.

T3T4:P.142

Objective measurement of life-style behaviours in free-living conditions: Development and validation of a posture-recognition algorithm from triaxial accelerometer data

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Introduction: Developing methods to monitor physical activity (PA) in free-living conditions is essential to study the relationships between PA -or the lack of PA- and health. Accelerometers enable continuous measurements of PA levels over extended periods of times. However, they often underestimate PA levels associated to cycling and fail to capture low-intensity activities, two of the main targets of interventions aiming at preventing or treating obesity. In order to overcome these limitations we developed a classification algorithm capable of identifying 8 types of PA from triaxial accelerometer data.

Methods: Data from 63 subjects ($n=29$ with BMI <25 , $n=17$ with $25<\text{BMI}<30$; $n=17$ BMI >30) wearing a triaxial accelerometer (MotionPODTM, Movea) while performing standardised activities in the laboratory were used to calibrate the algorithm. First, advanced signal processing was used to determine the sensor orientation. Then, a machine learning approach based on hidden Markov models was applied to identify 8 types of PA (lying down, slumped, sitting, standing, pacing,

walking, running, cycling). The algorithm was then tested on data from another 20 subjects performing a set of predefined PA types in a real-life setting, at their own pace.

Results: Correct classification rates were: lying 97.1%, sitting 66.2%, slumped 69.5%, walking 77.9% (14% recognised as pacing), pacing 48.8%, running 94.8%, cycling 67.7 % (except downhill: 10.2%). The standing position rarely occurred.

Conclusion: This new tool opens the way to more detailed analysis of life-style behaviours, especially low intensity and sedentary behaviours. It will also be useful to improve PA energy expenditure calculations with activity-specific considerations.

1. Conflict of Interest: The accelerometer devices used in the study are prototypes from Movea, a company specialized in providing motion-processing technologies including software, embeddable solutions, and semiconductor IP. However data acquisition and performance-tests of the algorithm were conducted independently by researchers of the CRNH Rhône-Alpes with no conflict of interest for the research.

2. Funding: Research relating to this abstract was part of the SVELTE Project funded by the French National Research Agency (ANR) TECSCAN.

T3T4:P.143

Children's waist circumference percentiles equating to adult cut-offs at age 18 years

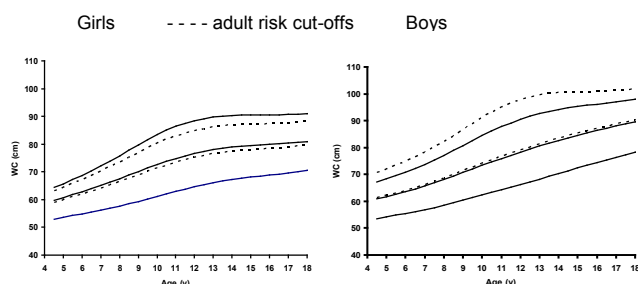
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Introduction: Waist circumference (WC) relates to abdominal adiposity and cardiometabolic disease risk⁽¹⁾. Adult WC cut-offs of 94 cm and 102 cm in men and 80 cm and 88 cm in women, equate to increased risk and greatly increased risk respectively. Fixed cut-offs cannot be used in children, hence the need for age-related percentile charts⁽²⁾. However it is possible to construct percentiles which pass through the adult cut-offs at age 18 years.

Methods: WC from 3080 Caucasian children residing in south east England aged 5 to 18 years were selected for this analysis. WC standard deviation scores (SDSs) were calculated separately for boys and girls using the LMS method. The SDSs equating to the adult WC cut-offs at age 18 years were identified and extrapolated down to age 5 years at 6-month intervals. The 50th, 91st and 98th percentiles were also calculated.

Results: Percentile cut-offs equating to the adults equivalent values at age 18 years are similar to the 91st percentiles but lower for girls and higher for boys than the 98th percentiles for this dataset.



Conclusion: WC percentile charts which equate to adult WC values at age 18 years can be developed. These cut-offs should relate more closely to morbidity than the current 91st and 98th percentiles but caution should be exercised if intending to use these cut-offs in children from different ethnic groups.

References

1. McCarthy HD (2006). *Proc Nutr Soc* **65**, 385–392.
2. McCarthy HD, Crawley HF and Jarrett KV (2001). *Eur J Clin Nutr* **55**, 902–907.

T3T4:P.144

Critical visceral adipose tissue measurement: Cut-off values for sagittal abdominal diameter

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It is well known that the risk of cardiovascular and metabolic disturbances is determined by specific distribution of the fat mass. Abdominal obesity is associated with dyslipidemia, impaired fasting glucose, insulin resistance and hypertension, which result in increased risk of cardiovascular disease. Computerized tomography and magnetic resonance are the most reliable methods for abdominal fat assessment, since they discriminate between the subcutaneous and the visceral fat. Anthropometric parameters are more suitable as they are inexpensive, non-invasive and simple. Besides, most of them show a strong correlation with visceral abdominal fat size.

External, anthropometric measurement of sagittal abdominal diameter (SAD), has been considered as more closely related to visceral fat mass than the other anthropometric measures because it is measured in a supine position, when a subcutaneous fat is moved to the sides of the waist.

Our study included 1334 subjects aged 43.49±10.43 years. Following parameters were analyzed: age, BMI, SAD, fat mass, systolic and diastolic blood pressure, total-, LDL- and HDL-cholesterol, triglycerides, fasting plasma glucose, fibrinogen, uric acid, and 10-year Framingham Risk Score. The experiments were conducted by software system *Rosetta - A Rough Set Toolkit for Analysis of Data*. SAD values ≥24.3 cm in overweight and obese subjects older than 41 years should correspond to increased risk, while values <24.3 cm in overweight subjects younger than 41 years could point to healthy metabolic profile.

SAD values ≥24.3cm corresponds with increased cardiovascular risk in overweight and obese individuals, but measurement of SAD is not enough for identification of cardiovascular risk in normal-weight individuals.

T3T4:P.145

The eating habits of primary school children – comparison of children with normal and excess weight/obesity

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Background: Childhood obesity is a serious public health concern worldwide. Dietary behaviour, physical activity and a sedentary lifestyle which includes television viewing, working or playing games on the computer are independent risk factors for increased BMI (increasing weight).

Methods: The aim of this study was to explore dietary habits, physical activity and lifestyle associated with overweight and obesity among children 8–14 years of age, in Hradec Králové, Liberec and Pardubice district. The target population (N = 2042) comprised elementary school children in the 2nd, 4th, 6th and 8th grade. All monitored parameters (skipping meals, total energy intake, food and beverage preferences ...) were evaluated by frequency (%) in the group, by gender and according to body weight.

Results: The majority of children are not meeting recommendations for energy intake. Much of this deficit is attributed to changing beverage consumption patterns, characterized by declining milk intakes and substantial increases in soft-drink consumption. On average children are not eating the recommended amount of fruits and vegetables. Overall, children consumed larger part of their total daily energy from fat. Boys

consumed higher portion of energy derived from fat and girls consumed more energy from carbohydrates.

Conclusions: In all monitored parameters overweight/obese children have worse results, although not always significantly, than children with normal weight. The biggest differences were found in compliance with liquid intake, overweight/obese children primarily drink sweetened beverages.

1. Conflict of Interest: None

2. Funding: Research relating to this abstract was funded by “Ministry of Health - Project of Health support no.9985”

T3T4:P.146

Reproducibility and validity of a FFQ to assess usual intakes of methyl-group donors

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Introduction: A novel food-frequency questionnaire (FFQ) was developed and validated to assess the daily intake of methyl-group donors (methionine, choline, betaine and folate) among Belgian women of reproductive age.

Methods: The relative validity of the FFQ was estimated by comparison with 7 day (d) estimated diet records (EDR, *n* 81 women) and its reproducibility was evaluated by repeated administrations 6 weeks apart (*n* 95 women). Wilcoxon signed rank tests were used to compare group means and Spearman correlations to investigate the ability of ranking individuals according to their methyl-group donor intakes. Deattenuated correlation coefficients were calculated between the test and reference method for methionine, folate, betaine and choline. The weighed kappa was calculated as measure of agreement. P-values <0.05 were considered as statistically significant.

Results: The questionnaire underestimates the intakes of methionine (1542.9 mg vs 1734 mg), choline (264 mg vs 284.5 mg) and the total intake of methyl-group donors (1967.7 mg vs 2165.1 mg) compared to the 7 d EDR, though it had a good ranking ability (*r* 0.404–0.662; weighted κ 0.25–0.36). Furthermore, the correlation between repeated administrations was high (*r* 0.59–0.81) with a maximal misclassification of 6% (weighted κ 0.44–0.64).

Conclusion: These results compare favorably with those reported in other validation studies and indicate that the FFQ is a reliable and valid instrument for ranking individuals according to their methyl-group donor intakes within this study population.

1. Conflict of Interest: None

2. Funding: SP is recipient of a doctoral research grant from the FWO Flanders and VITO (2011–2014).

T3T4:P.147

The role of carbohydrate quality in chronic low-grade inflammation – a systematic review on observational and intervention studies

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Background: Chronic low-grade inflammation is a likely intermediary between carbohydrate nutrition and type 2 diabetes risk. We conducted a systematic literature search to evaluate the relevance of carbohydrate quality on inflammatory markers in observational and intervention studies.

Methods: We searched MEDLINE, EMBASE and the Cochrane Library for studies on associations between glycemic index (GI), glycemic

load (GL), fiber and whole grain intake and high-sensitivity C-reactive protein (hs-CRP) and interleukin 6 (IL-6). Included studies needed to be studies on adults (healthy, overweight, with type 2 diabetes or features of the metabolic syndrome, but without inflammatory disease) with at least 20 participants and 3 weeks duration.

Results: In total, 22 of the 60 studies meeting our inclusion criteria examined GI or GL: 6 of 10 observational studies reported a direct association with hs-CRP or IL-6 and 6 of 12 intervention studies demonstrated a beneficial effect of a low GI/GL diet. Regarding fiber intake, the majority of the epidemiological studies (13 of 18) reported an inverse relationship with hs-CRP or IL-6, whereas most intervention studies (7 of 9) did not support an effect. Likewise, 5 of 7 observational studies on whole grain intake observed an inverse association with inflammatory markers, but only 2 of 7 intervention studies demonstrated a beneficial effect.

Conclusion: Currently available evidence supports a potential role of dietary GI or GL in chronic low-grade inflammation. By contrast, benefits of higher fiber and whole grain intakes suggested by observational studies are not supported by intervention studies, indicating that confounding is likely.

1. Conflict of Interest: J.C. Brand-Miller is the director of a not-for-profit GI-based food endorsement program in Australia and manages the University of Sydney Glycaemic Index testing service; J. Goletzke, A.E. Buyken, g. Joslowski, A. Felbick, G. Cheng, and C.Herder, no conflicts of interest.

2. Funding: BLE through BMELV

T3T4:P.148

Prevalence of malnutrition between Medical and Surgical Departments: A hospital based survey

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Introduction: The high prevalence of malnutrition in hospitalised patients is a serious problem affecting the morbidity of patients. No single method of nutritional screening has been established, being the subjective global assessment (SGA) a reliable, economical and easily reproducible tool. The aim of this study was to evaluate the prevalence of malnutrition using SGA and to assess the differences in prevalence and severity of malnutrition between medical and surgical departments, and the nutritional support therapy initiated.

Methods: Transversal, observational trial conducted in 197 adult patients admitted to different medical (*n*=110) and surgical departments (*n*=87). The number of patients included from each department was proportional to the percentage of inpatients at that ward during the previous year. Patients were assessed by SGA (method recommended by Detsky) and using anthropometric and laboratory parameters to evaluate their nutritional status.

Results: Malnutrition was more prevalent in medical (53%) than surgical (46%) departments using SGA (*p*<0.05). Although no differences between departments were found regarding total weight loss, when considering the severity of this parameter a greater weight loss was observed in surgical departments (> 10% weight loss: 28,7% vs 26,4%, *p*<0,05).

Conclusions: The prevalence of malnutrition in hospitalized patients is high, being even greater among non-surgical patients in our hospital. It should be emphasized the limited introduction of nutritional treatment mainly secondary to the underestimation of malnutrition. We consider routine screening necessary. SGA, a simple and efficient tool to identify patients with or at increased risk for malnutrition, should be introduced in daily clinical practice.

T3T4:P.149

Evidence for continuing body-fat accumulation into old age

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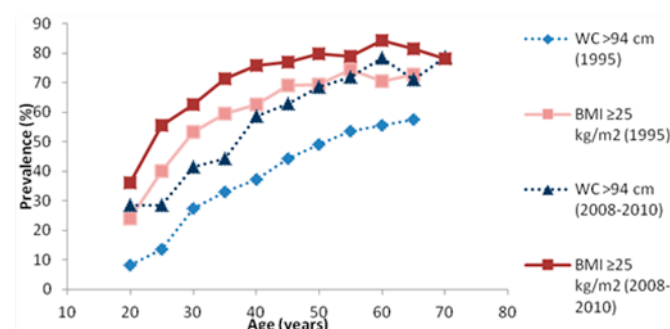
Introduction: This study documents changing patterns of BMI and waist circumference with age.

Methods: Adults aged 18–72 y in the Scottish Health Surveys of 1995 and 2008–2010 were divided into eleven 5-year age bands. Prevalence of overweight/obesity (using BMI cut-offs) and increased waist circumference were plotted against age, and peak prevalence recorded for each parameter and survey period.

Results: Over 15 years, age of peak-prevalence of BMI >25 in men was delayed 5 years (1995, 55 y; 2008–2010, 60 y) while peak prevalence increased by 10% (1995, 74.3%; 2008–2010, 84.3%). In women, age of peak-prevalence remained at 65 years, but peak prevalence of BMI >25 increased by approximately 9%. Elevated waist circumference was more prevalent among women (>80 cm, 91%) than men (>94 cm, 78.6%). Age at peak-prevalence for elevated waist was delayed 5 years in both men (1995, 65 y; 2008–2010, 70 y) and women (1995, 60; 2008–2010, 65 y). The increase in peak elevated waist circumference prevalence was greater in women (1995, 64.6%; 2008–2010, 91%) than in men (1995, 57.6%; 2008–2010, 78.6%). Although BMI decreased after peak-prevalence age in men, waist is continuing to increase with age.

Conclusion: Overweight and obesity are increasing as a problem of older people, and the more persistent rise in elevated waist circumference may present clinical hazards. Increase in waist circumference alongside a decline in BMI above 65 years could be indicative of sarcopenic obesity.

Figure 1. Prevalence of overweight and increased waist circumference in men at 1995 and 2008–2010.



1. **Conflict of Interest** None Disclosed

2. **Funding** The dataset were made available by the ESDS

T3T4:P.150

Fresh fruit consumption in relation to adiposity, blood pressure and blood glucose: Results from the China Kadoorie Biobank of 0.5 million adults

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Introduction: Little is known about the associations of fruit consumption with adiposity, blood pressure (BP) and blood glucose (BG) in China.

Methods: We analysed baseline data from 424,101 participants (mean age 50 years, 59% women) in the China Kadoorie Biobank (CKB) who had no prior history of chronic disease and were not on anti-

hypertensive or anti-diabetic treatment. Habitual frequency of fruit consumption (5 categories) was assessed by interviewer-administered questionnaire. BMI, waist circumference (WC), systolic BP (SBP) and random BG were measured following standard protocols, and body fat percentage (%BF) was estimated using bio-impedance. Multivariable linear regression analyses included adjustment for age, education, smoking, alcohol and dairy-product intake.

Results: A positive trend ($P < 0.0001$) was observed for each of the adiposity measures across categories of fruit consumption. Compared to never-consumers, daily-consumers (overall mean BMI 23.7 kg/m²) had 0.55 and 0.76 kg/m² higher BMI, 1.2 and 1.5 cm larger WC, and 0.7% and 1.5% higher %BF in men and women, respectively. But, SBP and BG were inversely related to fruit consumption (P for trend < 0.0001): compared to never-consumers, daily-consumers had 2.4 and 0.7 mmHg lower SBP in men and women, and 0.10 mmol/L lower BG in both sexes. These numbers increased to 3.3 and 1.7 mmHg, 0.12 and 0.13 mmol/L, respectively, after additionally adjusting for BMI and WC.

Conclusions: In the CKB, eating more fruit was associated with greater adiposity and lower levels of SBP and BG, despite SBP and BG usually, and also in this study, being positively associated with adiposity.

1. **Conflict of Interest:** None to be disclosed

2. **Funding:** The China Kadoorie Biobank was funded by the Kadoorie Charitable Foundation in Hong Kong, China, the Wellcome Trust in the UK, the UK Medical Research Council, the British Heart Foundation, Cancer Research UK, and the National Key Technology Research and Development Program in the 12th Five-Year Plan, Ministry of Science and Technology, People's Republic of China (Ref: 2011BAI09B01).

T3T4:P.151

Assessment of obesity, Body Composition and Dietary Habits of College Students

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Introduction: Qatar is experiencing an increase in the prevalence of non-communicable diseases such as obesity, diabetes and CVD. This increase is due to the rapid socio-economic development which has led to a change in traditional dietary habits and adoption of a sedentary behavior. The aim of the study was to assess prevalence of obesity, food consumption habits and body composition of college students.

Methods: A cross sectional study was carried among 341 college students (114 males and 227 females) aged between 17 and 32 years old. All participants completed a self-administered questionnaire containing information on demographic characteristics, food consumption pattern, and physical activity. A bioelectrical impedance analysis (BIA) was used to assess the body composition of the participants.

Results: The prevalence of overweight and obesity was 22.1% and 15.3%, respectively. The reported consumption of cereals, vegetables, fruits and dairy products was lower than the recommended for 69.3%, 55.8%, 61.4% and 50.1% students, respectively. 10.8% and 24.4% reported a daily consumption of fast food and soft drinks respectively. 44.3% of students said that they are taking 2 meals a day. The frequently skipped meal was breakfast. Mean percentage of body fat was higher among girls compared to boys (34.7% vs 21.5%) while % of free fat mass was higher among boys compared to girls (32.3% vs 20.5%).

Conclusion: High prevalence of obesity among college students accompanied by low consumption of fruits and vegetables high intake of fats food and soft drink.

T3T4:P.152

24h urinary sodium excretion and subsequent change in weight, waist circumference and body composition

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Background: Alongside the rapidly increasing obesity epidemic, there has been an increased consumption of highly processed foods with a high salt content, and some studies have suggested that a diet with a high salt content may be associated with obesity.

Objective: To investigate the association between 24h urinary sodium excretion and subsequent change in weight, waist circumference, body fat and fat free mass among adults.

Design: Complete information on 24h urinary sodium excretion along with repeated weight and body composition measures, as well as on potential confounders, was obtained from 215 subjects in 1987–1988 and 1993–1994. Linear regression was used to examine the association between urinary sodium and change in measures of weight, waist circumference, body fat and fat free mass.

Results: Neither the crude nor the adjusted models showed any statistically significant associations between sodium excretion and change in weight or waist circumference. However, after adjusting for potential baseline confounders and concurrent change in body weight, we found a significant increase in body fat of 0.24 kg ($P=0.015$, CI: 0.05 to 0.43) per 100 mmol increase in 24h urinary sodium excretion (equivalent to 6 g of salt), during the 6-year study period. Moreover, we found a significant association with change in fat free mass of -0.21 kg ($P=0.041$, CI: -0.40 to -0.01).

Conclusions: These results suggest that a diet with a high salt content may have a negative influence on development in body composition by expanding body fat and reducing fat free mass.

1. Conflict of Interest: None of the authors had any conflicts of interest in relation to this study.

2. Funding: This work is carried out as a part of the research program of Gene-diet interactions in obesity (GENDINO). GENDINO is supported by the Danish Council for Strategic Research (Grant 09-067111).

T3T4:P.154

Dietary glycaemic load, insulin load, and weight loss in obese and insulin resistant adolescents: RESIST study

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Background: The optimal dietary approach for weight loss and to improve insulin sensitivity in adolescents is unknown. The aim of this study was to explore the association between the macronutrient content, glycaemic load (GL) and insulin load (IL) of the diet and weight loss in obese, insulin resistant adolescents after a 3 month lifestyle/metformin intervention.

Methods: Secondary data analysis of 91 adolescents participating in an RCT (RESIST; ACTRN12608000416392). Participants had provided at least one 24hour dietary recall. Weight change between baseline and 3 months was measured by BMI expressed as percentage of the 95th centile (%BMI95). Whole body insulin sensitivity index (ISI) was determined by an oral glucose tolerance test. Linear regression analysis was used to examine the association between diet and %BMI95- and ISI-change.

Results: The median age of adolescents was 12.7 years (range 10.1–17.4) and median %BMI 95 at baseline was 126.5 (interquartile range (IR): 117.2, 142.2). Over 3 months the median change in %BMI 95 was -6.5 (IR: -9.7, -2.5). The macronutrient content of the diet was not associated with weight change. However, adolescents who consumed a diet with a lower GL or IL reported consuming less energy and lost more weight. Mean decreases in %BMI95 in tertiles of GL (lowest to highest) were -7.0 (95%CI: -8.7, -5.3), -7.6(-9.3, -5.9), -4.2 (-5.9, -2.5), $P_{trend}=0.01$ and mean decreases in %BMI 95 in tertiles of IL were -7.4(-9.1, -5.7), -7.5(-9.2, -5.9), -3.9 (-5.6, -2.2), $P_{trend}=0.03$. No associations were seen between dietary predictors and ISI.

Conclusion: A diet with a lower GL and IL may assist weight loss in obese, insulin resistant adolescents.

1. Conflict of Interest: None Disclosed

2. Funding: The project was funded by BUPA Foundation Australia Pty Limited (2008 to 2012), Diabetes Australia Research Trust (DART) 2008 and Heart Foundation, Australia (#G08S3758) 2009 to 2010. GJ received a 6 months' Endeavour Research Fellowship granted by the Australian Government. SPG is supported by an Early Career Research Fellowship, Cancer Institute NSW 10/ECF/2-11.

T3T4:P.155

Influence of nutritional factors on anthropometric parameters in Czech adolescents

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Introduction: Prevalence of overweight and obesity is increasing in children and adolescents. The aim of our study was to determine the effect of diet composition on anthropometric parameters in Czech adolescents.

Methods: The cohort included 400 subjects aged 14.0 to 17.9 years (205 girls, 199 boys) who participated in the epidemiological part of the project COPAT (Childhood Obesity Prevalence And Treatment). Anthropometric parameters were measured using standard methods according to the WHO recommendations; body composition was determined by bioimpedance analysis. Intake of individual nutrients was assessed by 3-day dietary records, which were evaluated by a computer program Nutrimaster.

Results: Mean BMI in the examined group was 23.1 (± 4.5) kg/m² and the mean daily energy intake was 9537 (± 3145) kJ ($x \pm SD$). Macronutrient composition of the diet was: 33% fat, 14% protein, and 53% carbohydrate. Average calcium intake was 796 mg per day and fiber intake was 11.7 g per day. Calcium (Ca) and fiber (F) intake negatively correlated with body fat mass (Ca: $r=-0.18$, $p<0.001$, F: $r=-0.19$, $p<0.0001$) and positively correlated with lean body mass (Ca: $r=0.18$, $p<0.001$, F: $r=0.16$, $p<0.01$).

Conclusion: The composition of diet in our cohort of Czech adolescents corresponded to the dietary recommendations; however fat intake was moderately increased. Our findings support the results of other studies that demonstrated an inverse relationship between calcium & fiber intake and the development of obesity.

1. Conflict of Interest: None Disclosed.

2. Funding: Research related to this abstract was funded by grants IGA MZCR NT/13792-4 and NT12342-5/2011, grant 7F08077 from MSM/7F and grant CZ0123 from Norway through the Norwegian Financial Mechanisms.

T3T4:P.156

Diet and obesity in adolescence*Albuquerque C¹, Bica I², Cunha M³, Rodrigues V⁴, Reis Santos M⁵, Costa P⁶*¹CI&DETES/Polytechnic Institute of Viseu - Health Superior School, Viseu, Portugal, ²Oporto University/ICBAS - College of Nursing, Porto, Portugal, ³UTAD - College of Nursing, Vila Real, Portugal, ⁴University of Beira Interior - Faculty of Health Sciences, Covilhã, Portugal**Introduction:** In adolescence, changes in eating habits, by excess, leads to obesity, so it is justified to study on dietary habits and body mass index (BMI) in adolescents. To identify the eating habits of adolescents, to evaluate the BMI index.**Methods:** A cross-sectional descriptive study on adolescent eating behaviors and BMI in a sample of 661 adolescents (56.3% girls and 43.7% boys) aged between 11 and 17 years, with a mean age of 13.22 years (SD = 1.139). The data collection was conducted through a questionnaire distributed to adolescents about eating habits. The procedure was also the assessment of BMI.**Results:** With regard to eating habits, the highest percentage of adolescents makes 5 meals per day (37.1%). 45.0% of adolescents reported eating sometimes sweets between meals, 15.7% eat sweets almost every day and 6.7% every day. The fluid intake by adolescents between meals is soft drinks (46.4%) and fruit juices (42.3%). The body mass index (BMI) ranging from 13.8 to 21.23. The girls have a higher BMI than boys. Adolescents who have a higher BMI have worse eating habits ($r = -0.140$, $p = 0.027$), accounting for 1.9% of the variance in BMI in adolescents. Regarding the consumption of sweets was associated inversely with BMI, ie, adolescents with a lower BMI consume less sweet, with a significant association ($r = -0.108$, $p = 0.041$).**Conclusion:** The results suggest that adolescents who have worse eating habits have a higher BMI.

T3T4:P.157

Ethnicity modifies the relationship of obesity with fresh fruits and vegetables in the homes of children and parents*Stevens J², Hales D², Vaughn A², Bryant M¹, Ward D²*¹University of Leeds, Leeds, United Kingdom, ²University of North Carolina, Chapel Hill, United States of America**Background:** The home environment may interact with culture to be an important determinant of diet, eating behaviour and obesity. Fresh fruits and vegetables are recognized as important components of a healthy diet that are often deficient.**Methods:** 129 Black and White American parents and 3–12 yo children were recruited into a study of the home environment (HomeSTEAD). Research staff conducted a checklist food inventory to assess presence (servings and variety) of fresh fruits and vegetables in the home. Child and parent height and weight were measured.**Results:** Analyses adjusted for age, gender, income, household size and shopping habits showed an ethnic interaction with servings of fresh vegetables ($p < 0.05$) indicating that households of white normal weight children had more servings of vegetables than those of white overweight/obese children (41 vs. 24 servings), but in households with black children the difference was smaller and the direction reversed (25 vs. 28). Similar results were seen in parents ($p < 0.05$). A trend toward effect modification by ethnicity was also seen for fresh fruits, but was not statistically significant.**Conclusion:** More work is needed to understand the cultural issues and relationships that underlie how foods in the home influence food intake and obesity status.

T3T4:P.158

Validity of estimation of food portion sizes using photographs from population aged 10–74 years*Rangelova L, Petrova S, Duleva V*

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Introduction: The study was aimed to investigate errors due to the visual perception of food portions from photographs included in EPIC-Soft Picture book related to the type of food, age and gender of the population.**Methods:** Sample of 103 volunteers including 38 adolescents (10–17 years), 40 adults (18–64 years) and 25 elderly (65–74 years) were presented with 3 amounts of 8 food items selected from ES-Picture book (green salad, rice, soup, grapes, scrambled eggs, tomatoes, pasta, fish). Estimates of weighed amounts of foods presented alone on plates and in combinations were compared to the photographs.**Results:** Participants made 4017 comparisons between actual food portion sizes and photographs. Accuracy of estimation depended on the food, it was highest for the soup and lowest for the fish; it was better when foods were presented alone. At the group level, 69.2% of small portion sizes were overestimated (by 6.6–54% from the actual amounts), the tendency was the same in the both genders in all age groups. Underestimation was determined in 61.5% of large portion sizes (by 14.4–49.9% from the actual amounts) without differences in males/females but depended on age. The CV of the estimated portion sizes was $< 30\%$ for the most of participants. Wilcoxon-test didn't show significant differences between weighed and mean values of estimated food amounts.**Conclusion:** Despite of large variability in the individual's capability to assess food portion sizes by photographs, the errors at group level were acceptable. The data indicates that EPIC-Soft Picture book is useful tool for epidemiological studies.

T3T4:P.159

Relationship between body mass index and waist circumference with dietary intake and physical activity in schoolchildren aged 6 to 18 years*Petrova S¹, Duleva V¹, Rangelova L¹, Konstantinova M², Dimitrov P¹*¹National Center of Public health and Analyses, Sofia, Bulgaria, ²Clinic of Endocrinology, diabetes and genetics, University Pediatric Hospital, Sofia, Bulgaria**Introduction:** Study on the relationship between body mass index (BMI) and weight circumferences (WC) with food consumption/ physical activity (PA) level of schoolchildren in Bulgaria was carried out.**Methods:** In 2011 a cross-sectional survey on a nationally representative sample of 4360 schoolchildren aged 6–18 years was conducted. The height, weight and WC were measured. BMI were assessed by WHO Growth Reference (2007). Food consumption was examined by FFQ and PA level by IPAQ.**Results:** The prevalence of pre-obesity/obesity in schoolchildren was 17.5% / 12.7%. The relative rate of schoolchildren with WC > 90 th percentile was 9.1%; 95.7% of them were overweight (pre-obesity – 18.5%, obesity – 77.2%).

Statistically significant positive relationship between BMI and frequency of consumption of energy rich foods (white bread, bakery, pastry, fry potatoes, cheese, added fats, confectionary, soft drinks) was established, but a correlation between WC and food intakes was not determined.

There was an overall tendency for relationship between BMI/WC with PA level, but it was significant for some age groups. Statistically significant differences in obesity prevalence were revealed for boys aged 10–14 years with low PA (42.3%) comparing those with high PA (13.5%) and for girls aged 6–10 years (respectively 23.7%/15.8%). Significant negative relationship between WC and PA was obtained for girls of all age groups.

Conclusion: Physical activity level and consumption of energy rich foods are important risk factors for obesity, estimated by BMI in school-

children. Weight circumferences as indicator of abdominal obesity are influenced by PA but not from food intake.

T3T4:P.160

The impact of childhood and adult socioeconomic position on weight change: A Swedish cohort study

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Background: Low socioeconomic position in adulthood has been associated with overweight and obesity in high-income countries. However, little is known about the contribution of childhood SEP to weight change. Using a Swedish cohort, we aimed to investigate the correlations between childhood and adult SEP, BMI at baseline, and BMI change over five years follow-up.

Methods: The data was drawn from the Scania Public Health Cohort and included 4,244 individuals (1,816 males and 2,428 females) between the ages of 29 and 60, stratified by sex and age (29 to 39 and 40 to 60). General linear and logistic regression models were used to analyze the data.

Results: BMI at baseline was inversely correlated to adult SEP in males and older females. Childhood SEP showed no clear pattern regarding current BMI or the risk of being overweight at baseline, either in males or females. However, BMI increase between baseline and follow-up was greater in the highest adult SEP groups than in lowest ones for both males and females, although with a weaker association among females. High childhood SEP was also associated with a greater BMI increase in older males, but the pattern was the opposite in older females.

Conclusions: The overall pattern seems compatible with a shift over time in the link between SEP and BMI. The findings indicate two waves of socioeconomic weight gain patterns in the Swedish population: the first across generations and the second contemporary.

1. Conflict of Interest: No conflict of interest

2. Funding: Swedish Research Council for Working Life and Social Science

T3T4:P.162

Study of Obesity in Upper-Egypt Male Youth. Socio-demographic profile and morbidities

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Background: Obesity is a common health problem. Unfortunately, the prevalence of obesity is increasing with scarce data regarding prevalence in male gender. Body Mass Index (BMI) is the commonest index used for assessment of weight disorders.

Aim of the Work: To study socio demographic profile and some medical health problems associated with obesity in Upper-Egypt male youth. **Methods:** A cross-sectional study in Qena University Hospital recruited 500 males. All participants had to fill a predesigned questionnaire including: Personal, demographic and socioeconomic data in addition to family history of obesity. Thorough clinical examination, BMI and fasting plasma glucose level were done.

Results: The mean age was 25 ± 4.55 years. The studied sample distribution was 50% from Qena, 40% from Luxor and 10% from Al Bahar Alahmar governorates. 6.2% of the study sample was found to have BMI above 30.

69.6%, 63.2%, 45.2% and 42.1% of normal weights, overweight, obese and underweight, respectively were of moderate social class. On the other hand, 57.9% of the underweight and 41.9% of the obese were of low social class. 3.2% and 6.5% of obese persons were diabetics and hypertensive respectively with significant difference ($p < 0.001$) when compared to normal weight individuals. Young adults with family history of obesity were at more than five times increased risk of being obese than those without family history of obesity (OR=5.72, 95%CI: 1.05-32.43).

Conclusion: Obesity is associated with comorbid medical problems among young adult males in Upper Egypt. There is significant socio-demographic variability regarding the distribution of the study weight categories.

T3T4:P.163

Energy density and food costs as a possible mediator between poverty and obesity: Are there regional differences?

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Introduction: In high-income countries, a paradoxical link between poverty and obesity has been observed, and this has been suggested to be mediated, in part, by the low cost of energy-dense foods, which promote overconsumption. Accessibility to fresh produce and other healthy foods may differ between in urban and rural areas, in the former of which, the access may be more limited because they are located far from producing areas. In this study, we compared the relationships between energy density and food costs among cities of different population categories.

Methods: Energy costs of 144 food items in 167 cities and towns (Retail Price Survey 2010, Ministry of Internal Affairs and Communications) and their energy density (Standard Tables of Food Composition 2010, Ministry of Education, Culture, Sports, Science and Technology) were analyzed. The cities and towns were divided into four population categories, and the relationships between energy density and energy costs were compared.

Results: A significant negative correlation was found between energy costs (log[yen/kcal]) and energy density (kcal/g) ($r = -0.658$). The correlation was similar among cities of each population category: 1) Tokyo metropolitan wards (9 million people, $r = -0.653$), 2) 12 cities (one to 3.7 million people, $r = -0.656$), 3) 112 cities (50 thousand to <1 million people, $r = -0.659$), 4) 42 cities and towns (<50 thousand people, $r = -0.672$).

Conclusion: The inverse relationship between energy density and energy costs was observed independent of population size, possibly affecting unhealthy food choice among people with lower SES leading to obesity.

T3T4:P.164

Income and wealth – what should we be measuring? A comparison of the usefulness of household income versus equivalized household income in obesity research

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Introduction: Household income is commonly used as a representation of wealth, yet is not comparable across different household compositions. Equivalization accounts for these differences, but is seldom employed in obesity research. This study explores the potential benefits of equivalization, with an examination of adult BMI in the National Diet and Nutrition Survey (NDNS).

Methods: Household income category was obtained by interview. Equivalized income was derived from the midpoint of each category using the modified OECD scale, then categorised to match household income classifications. Cross-tabulation identified the impact of equivalization. Univariate analyses examined differences in BMI and obesity prevalence between income groups. For each income variable, adjusted regression examined its association with BMI, and logistic regression its relationship with obesity. Underweight participants were excluded.

Results: Following equivalization, 376 participants (42%) were categorised differently. Mean BMI was 27.7 kg/m^2 (SD 5.4, $n = 834$) and differed between equivalized ($p = 0.019$) but not household ($p = 0.065$) income categories. The proportion of the sample obese was 28%; this differed significantly between both equivalized ($p = 0.003$) and household ($p = 0.025$) income groups. Linear regression revealed no association.

Logistic regression found no overall association; however, the odds of being obese were significantly lower in the highest equivalized category compared to the lowest (OR 0.53, 95% CI 0.29, 0.97, $p < 0.05$).

Conclusions: In this study, equivalizing income clarified the contrast between income groups in a univariate comparison of BMI, and in logistic regression. In other analyses equalization did not confer additional insight. The reasons for this are unclear, and these findings invite further investigation.

1. Conflict of Interest: None

2. Funding: This research was undertaken as part of a Joint Interdisciplinary PhD studentship, funded by ESRC/MRC

T3T4:P.165

Sustained Effects of an Israeli Summer Camp Program for Overweight and Obese Children

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Introduction: Childhood obesity is associated with the increased risk of diseases (Reilly et al., 2003) and health-related quality of life of obese children has been shown to be lower than healthy weight children (Schwimmer et al., 2003). The prevalence of obesity amongst Israeli second and fifth graders has doubled in the last 20 years (Hureta et al., 2006). The following study explored the immediate and sustained effectiveness of an Israeli weight-loss summer-camp program.

Methods: Forty children (N=40) mean age 13.2±2.2 years participated in a three week residential weight-loss camp. Participants' meals were restricted (1500 Kcal per day) and all received four nutritional education sessions, physical activity sessions (4-6 hours per day) and 4 Psycho-dramatic workshops exploring body image. Weight, height and blood pressure were measured at week 0, week 3 and 6 months post camp (week 24). Body mass index (BMI) was calculated as kg/m².

Results: During the camp BMI significantly decreased from 31.1±5.2 to 29.9±5.1 kg/m². At week 24, mean weight was significantly higher than at week 3 (76.1±17.6 and 72.8±17.1 kg), yet BMI-Z score was significantly lower than at week 0 (1.89±0.42 and 2.06±0.32 respectively). High blood pressure was detected in 31% at week 0 compared to only 13.8% at week 24.

Conclusions: Residential summer weight-loss camps for obese children are an effective short term intervention for reducing weight. A sustained effect on measures of adiposity and blood pressure was seen 6 months post camp.

1. Conflict of Interest: None Disclosed.

2. Funding: No funding.

T3T4:P.166

Structured meal plan and eating behaviours in obese adolescents with insulin resistance: RESIST study

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Aim: To examine the effects of implementing a structured, low energy meal plan on eating behaviours in adolescents with clinical features of insulin resistance and its relation to self-reported energy intake and weight loss outcome.

Methods: 109 obese adolescents aged 13.1±1.9 (mean±SD) years with clinical features of insulin resistance participated in a 12 month RCT, RESIST¹, examining the effects of two diets on insulin sensitivity. This involved 6 months of intensive intervention using a structured, low energy meal plan and coaching model. At baseline, 3 and 6 months,

participants completed the Eating Pattern Inventory for Children², which measures external eating (hunger and responsiveness to food cues), emotional eating and dietary restraint.

Results: At baseline 18% reported consuming more in response to external eating cues frequently or always; this reduced to 3% ($p=0.001$) at 3 months and remained low (5%) at 6 months. Emotional eating and dietary restraint remained unchanged from 0-6 months. At 6 months BMI (expressed as percentage of the 95th centile) decreased by 8% (SD 8.2) from baseline. Regression analysis indicated that external eating ($\beta=0.46$, $P<0.001$) and dietary restraint ($\beta=-0.32$, $P=0.001$) were predictors of self-reported energy intake at 3 months. Change in external eating ($\beta=0.33$, $P<0.001$) predicted weight loss at 3 months, whereas change in dietary restraint ($\beta=0.26$, $P<0.013$) was a predictor at 6 months.

Conclusion: In the short-term, a structured meal plan may reduce risky eating behaviours in obese adolescents with insulin resistance. Change in eating behaviours can be used as a predictor of obesity treatment outcomes.

References

1 Garnett SP et al. BMC Public Health 2010;10:575.

2 Schacht M et al. J Clin Psychol 2006; 62:1259

T3T4:P.167

Body weight and eating behaviour in Czech adolescence

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Introduction: The Eating Inventory (EI) evaluates three items of eating behavior: restraint, disinhibition and hunger. An association of eating behavior with both the weight management outcome and occurrence of cardiometabolic health risks has been revealed.

The aims of our study conducted in a cohort of Czech adolescent were 1. to determine the differences in the items of EI between normal weight and overweight/obese subjects. 2. to investigate influence of EI items on the outcome of 4-wk in-patient weight management.

Methods: The cohort included 962 adolescents aged 15.0–17.9 years: 147 overweight/obese (BMI \geq 90th percentile) girls (n=95) and boys (n=52), 815 normal weight (BMI: 10–90th percentile) girls (n=431) and boys (n=384). Overweight/obese subjects underwent a 4-wk in-patient weight management program which included a diet with mean daily energy deficit of 2.5 MJ and supervised aerobic exercise. Eating attitudes were determined by the EI.

Results: Overweight/obese subjects had significantly higher restraint and disinhibition score compared to lean adolescents. Overweight/obese boys exhibited significantly higher hunger score in comparison with normal weight group. Dietary restraint positively correlated with the magnitude of weight loss ($r = 0.181$; $p < 0.05$), while hunger score was inversely related to the reductions in BMI ($r = -0.267$, $p < 0.05$), total body fat ($r = -0.226$, $p < 0.05$) and trunk fat ($r = -0.263$, $p < 0.05$).

Conclusion: The study conducted in Czech adolescents confirmed previously reported differences in the items of the EI between normal and overweight/obese subjects. Pretreatment values of dietary restraint and hunger score significantly affected the outcome of short-term weight management.

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T3T4:P.168

Effectiveness of interventions in young children with overweight or obesity: Systematic review and meta-analysis

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Introduction: Overweight (including obesity) is prevalent in children and has severe somatic and psychosocial consequences. Therefore, it is important to treat young overweight children. However, the effectiveness of treatment in young children is variable. Our objective is to determine the effectiveness at short term of (different kinds of) treatment programs targeting lifestyle in overweight children at early age. Furthermore, we want to examine what the characteristics are of effective treatment programs.

Methods: Systematic review and whenever possible meta-analysis. We included all articles describing the effects on weight or overweight of treatment programs in overweight (including obese) children aged 3 to 8 years. When change in BMI z-score and standard error were available the study was included in meta-analysis (random effects model). Heterogeneity was explored in relation to intensity of treatment and used components.

Results: The search (April 2012) identified 8871 articles (1691 duplicates) of which 26 were included. Ten studies, involving 19 treatments and 762 participants, were eligible for meta-analysis. The pooled intervention effect showed a change in BMI z-score of -0.25 (95% confidence interval -0.37 to -0.14), with high heterogeneity. Subgroup analysis did only partly explain observed heterogeneity. Overall, multicomponent treatment programs with moderate or high intensity showed the highest change in BMI z-score, which can be considered clinically relevant (a decrease of 0.5 or more).

Conclusion: Treatment of obesity in young (3 to 8 years old) children can give clinically relevant improvement of overweight. Multicomponent treatment programs with moderate to high intensity appeared to be the most effective.

T3T4:P.169

Putting the evidence into practice; delivering a specialist paediatric obesity service in the community

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Introduction: In 2009 NHS Tayside set up a specialist Paediatric Overweight Service (POST) including a clinical service, community weight management groups, and school preventative work. This study reports on the outcomes of the clinical service.

Trained practitioners deliver the family behavioural programmes SCOTT for those aged 8+ and SCOTTLite for those under 8. Three clinics are held weekly in community and leisure settings across Tayside. Children are offered concurrent physical activity sessions with local leisure partners. All families are asked to opt in to the service.

Methods: For evaluation the following data is collected - numbers opting in, weight, height, Body Mass Index (BMI), BMI standard deviation (SD), number of sessions attended.

Results: 530 children (278 girls and 252 boys) were referred to the POST service from May 2009 to June 2012. At referral mean decimal age 10.1 years (SD 3.4); mean BMI SD 3.32 (SD 0.68). Of the children referred 72% have opted-in to the service, with 57% completing the programmes.

For those who had completed by June 2011 SCOTTLite (n=39) 7 years change in BMI SD -0.15 (95% CI: -0.24, -0.09) P<0.001. SCOTT (n=75) change in BMI SD -0.10 (95% CI: -0.14, -0.54) P<0.001.

Conclusion: These results show that obese children and their families are prepared to attend a specialist childhood weight management clinic

in the community setting. Those completing the programmes have demonstrated a significant change in their BMI SD.

No conflict of interest or funding.

T3T4:P.170

Effects of long-term interdisciplinary therapy in obese adolescents: Individual prescription versus counseling approach

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Introduction: It has been demonstrated that effective long-term treatments for obese adolescents are related to increased physical activity levels, improved nutritional habits and a better management of psychological aspects. On the other hand, the outcomes of therapies based on individual prescription (IP) have not been compared to counseling (C) approaches. Then, the purpose of this trial was to compare the impact of both strategies.

Methods: 41 obese adolescents were allocated to the IP group and 27 to the C group. Body weight, body composition (by air displacement pletismography) and blood samples (total, HDL and LDL cholesterol, triglycerides and HOMA-IR) were analysed before and after an eight months intervention (12 volunteers in the IP group and six in the C group dropped out and were not re-evaluated). IP volunteers stayed in the research center three times a week/two hours per day, received individual prescription related to nutrition, psychology and physical exercise and trained under supervision (three times a week/one hour per day of aerobic and strength exercises). C volunteers stayed in the research center one time/two hours a week and received group counseling related to nutrition, psychology and physical exercise.

Results: Both groups had reduction in body weight of same magnitude, but IP induced better results in the percentages of lean and fat body mass (p=0,03). Interestingly, C resulted in increased decline of total cholesterol (p=0,01), LDL (p=0,06), triglycerides (p=0,07) and HOMA-IR (p=0,08).

Conclusion: Individual prescription and counseling approaches presented improved magnitude response in different outcomes in the obesity treatment.

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T3T4:P.171

Cardiotrophin-1 and Interleukin-6 serum and gene expression levels after a weight loss program in obese children

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Introduction: It is observed that several cytokines are increased in obese subjects, and successful weight loss (WL) interventions are able to lower their levels. Our aim was to evaluate changes in CT-1 and IL-6 serum and gene expression levels (GE) in peripheral blood mononuclear cells (PBMC) after a 10-week WL intervention in obese children.

Subjects and Methods: Forty-four children (11.5 years, BMI-SDS 4, 50% males) were involved in a 10-week intervention including a moderate calorie-restricted diet. Subjects were dichotomized at the median of BMI-SDS change as high (HR, n=22) and low responders (LR, n=22)

after the intervention. CT-1 and IL-6 GE levels were assessed by RT-PCR in PBMC.

Results: The HR group had a significant decrease in body fat and weight compared to the LR group after the intervention ($p=0.006$ and $p<0.001$, respectively). Moreover, in HR subjects there was a significant reduction in waist-to-hip ratio, serum cholesterol ($p<0.001$), LDL-cholesterol levels and HOMA-IR ($p=0.003$). Furthermore, serum IL-6 levels tend to decrease in the HR group ($p=0.068$) after the intervention; moreover IL-6 mRNA levels ($p=0.054$) were also slightly reduced. Serum CT-1 was significantly lower in the HR group after the program ($p=0.043$), although the GE levels in PBMC did not follow this pattern.

Conclusion: It appears that PBMC are a good source for serum IL-6. Interestingly, both serum and GE levels were reduced after a WL program.

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T3T4:P.172

Effects of lifestyle intervention on metabolic parameters in obese adolescents

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Introduction: Insulin resistance and NAFLD are highly prevalent in obese children. They are both associated with the metabolic syndrome. In this study we focus on the effects of lifestyle interventions on metabolic parameters and weight loss.

Methods: Consecutive obese adolescents were admitted for a multi-component treatment program, including moderate diet and increased physical activity before and after 4 to 6 months of weight loss therapy metabolic parameters and BMI were assessed.

Results: 209 adolescents were included. Age ranged from 10 to 18 years (median 15.5). Mean BMI standard deviation score (SDS) was 2.73 ± 0.03 . 3.4% ($n=7$) of the patients were diagnosed as having impaired fasting glucose, none were diagnosed as having diabetes mellitus and 46.8% ($n=66$) were diagnosed as having hyperinsulinemia. Mean BMISDS reduction was 0.85 ± 0.35 . All metabolic parameters, except glycemia, improved significantly. Insulin improvement was correlated with glucose ($r=0.36$, $p<0.001$) and triglyceride reduction ($r=0.42$, $p<0.001$). BMISDS reduction only mediated HDL improvement ($r=0.15$, $p=0.03$). Liver enzymes - ASAT and ALAT - strongly improved (respectively $p<0.001$ and $p<0.001$). These changes were not linked with any other improvements. After weight loss, 0.5% ($n=1$) of the patients were diagnosed as having impaired fasting glucose and only 17.9% ($n=25$) were diagnosed as having hyperinsulinemia.

Conclusion: Intensive lifestyle interventions are effective in improving weight and metabolic dysregulation.

1. Conflict of Interest: None Disclosed.

2. Funding: No Funding.

T3T4:P.173

Lifestyle interventions for improving school achievement in overweight or obese children and adolescents:

A Cochrane review

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Introduction: Childhood obesity is associated with lower cognitive and academic achievement [1, 2]. The aim of this review is to determine whether lifestyle interventions currently recommended for treatment of obesity also benefit cognitive function, school and later life achievements.

Methods: In March 2012 we searched all relevant electronic databases, grey literature, and ongoing trials. We included controlled and randomised controlled trials of lifestyle interventions in overweight or obese children aged 3–18 years. Studies in children with medical conditions known to affect weight status and academic achievement were excluded. Study selection, data extraction and risk of bias assessment were performed by two independent reviewers. Where possible meta-analyses were performed based on type of lifestyle intervention and outcome.

Results: Five studies are preliminarily included in this review; four physical activity interventions and one multi-component lifestyle intervention. Meta-analysis of two studies showed a significant positive effect of physical activity on cognitive (executive) function (Standardised Mean Difference 0.41; 95%CI 0.08–0.74; $I^2=0\%$) in 150 pupils aged 7–18 years.

Conclusion: A physical activity intervention delivered for childhood weight management may benefit cognitive function. Effects on school and later life achievements are unknown at this stage as there seem too few well-designed studies reporting suitable outcome measures.

References

- [1] Caird J et al. (2011) Childhood obesity and educational attainment: a systematic review. London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.
- [2] Yu ZB et al. Intelligence in relation to obesity: a systematic review and meta-analysis. *Obesity Review* 2010;11(9):656–70.

T3T4:P.174

Childhood retention and success within the Rotherham Institute for Obesity

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Introduction: The Rotherham Institute for Obesity (RIO) is a specialist weight management programme that provides a multi-disciplinary team approach, in both adult and child care pathways. Numbers of children referred to RIO are significantly lower than adult numbers, and it is therefore essential that any referrals are encouraged to stay engaged with the 6m programme.

Methods: An retrospective analysis was made to assess the numbers referred, success rates, which age group appeared to be most successful, and identifying those who did not complete the programme. We actively tried to contact non-completers to establish the reasons.

Results: During 2010-2011 there were 329 referrals, of which 132 children (40%) completed a full 6m programme and 90 (68% of completers) met their weight loss targets.

The most successful age group appeared to be the 11–14 yr old children. 185 non-completers were contacted but 38 (21%) were unobtainable.

Of the 147 contacted, the top reasons for not completing were:

- Loss of motivation 36 (24%)
- Not returning to RIO after summer residential weight loss camps 33 (22%)
- No longer eligible for the gym 23 (16%)
- Illness 11 (7%)

Conclusion: Child referrals to RIO do not reflect local prevalence. When children remain engaged with the RIO programme, it is success-

ful in helping to reach their weight targets, however a large percentage drop-out. It is reassuring that children do not drop out of RIO because they do not like the approach, however, we have made amendments to our practice to try and maintain engagement further.

T3T4:P.175

Cardiorespiratory fitness and BMI changes in adolescents after a 6-month obesity treatment intervention

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Introduction: This study examined cardiorespiratory fitness and BMI in obese adolescents after a 6 months intervention in the Treatment of Pediatric Obesity (TOP) program.

Methods: 21 obese adolescents, both genders participated in the study (15.05±0.97 ys; 33.39±4.09 Kg/m²). TOP program consists of one weekly session, involving a 30 minutes theoretical approach concerning healthy lifestyle and behavioral change, along with a 90 minutes exercise period, aiming at fun moderate to vigorous intensity activities. Cardiorespiratory fitness was assessed with the 20m shuttle run test. These are preliminary data from baseline and 6-month TOP's 1st cohort. 14 participants completed all evaluations.

Results: The Wilcoxon test revealed no significant changes in BMI ($Z=-1.412$, $p=0.158$), but a trend was noted towards an increase in $VO_2\text{max}$ ($Z=-1.887$, $p=0.059$). The intention-to-treat analysis, showed decreases in BMI ($Z=-2.635$, $p=0.008$), weight ($Z=-2.548$, $p=0.011$), and a marginally significant increase in cardiorespiratory fitness ($Z=-1.887$, $p=0.059$). After the 6-month, girls showed a decrease in BMI ($Z=-2.201$, $p=0.028$), weight ($Z=-2.062$, $p=0.039$), and a tendency towards the increase in aerobic capacity ($Z=-1.899$, $p=0.058$). Also at 6-month, the Mann-Whitney test showed higher $VO_2\text{max}$ in boys ($Z=-2.770$, $p=0.006$), and younger participants presented lower BMI ($Z=-2.313$, $p=0.021$) and weight ($Z=-2.061$, $p=0.039$).

Conclusions: In the current study, a trend toward a decrease in BMI and increased aerobic capacity was observed after a 6-month program obesity treatment. Boys, as well as younger participants, tend to present greater BMI and weight reductions, which might be associated with increased cardiorespiratory fitness. These are preliminary data of an ongoing research.

1. Conflict of Interest: None Disclosed

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T3/T4:P.176

What is the parents' part in long-term weight management of their obese child? Results from the EPOC study

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Introduction: Although there is a broad consensus on the relevance of parental inclusion into the treatment of obesity in children, controlled studies examining this influence are lacking. The EPOC- Study (Empowerment of parents of obese children) investigates how parental inclusion through a behavioral training influences the weight development of their children in inpatient treatment.

Methods: 523 families with obese children (age 7–13 years, BMI-SDS > 97th percentile (Kromeyer et al., 2001), duration of inpatient stay ≥ 4 weeks) were included in the RCT longitudinal study. Families were randomized and assigned to the intervention group (2 x 5 units of parental training) or the control group (written information). Besides psychosocial and behavioral factors (e.g. quality of life, self-efficacy, diet), objective child weight status was measured at the start (T1) and the end (T2) of treatment as well as at 6 months (T5) and 12 months (T6) follow-up. Longitudinal analyses (intention to treat; per protocol) are presented.

Results: A vast majority of children (91%) finished treatment successfully. Quality of life and self-efficacy increased significantly. However, the rate of successful weight loss drops to 62% at 6 months follow-up. Differences in weight development are reported between control and intervention group (BMI- SDS). Parental self-efficacy and stress are discussed as moderating factors.

Conclusion: Inpatient rehabilitation seems to be effective but the long-term results are not very satisfactory. Since not all parents profited from the parent training it is desirable to offer special programs for risk groups.

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