

## Abstracts

International Journal of Obesity Supplements (2011) 1, S6–S28; doi:10.1038/ijosup.2011.3

### 1. THE IDEFICS STUDY – UPDATED INSIGHT INTO A MULTILEVEL EUROPEAN INTERVENTION STUDY IN CHILDREN – Invited Lecture

Ahrens, W<sup>1</sup>, Siani, A, Bammann, K, De Henauw, S, Iacoviello, I, Hebestreit, A, Mårild, S, Molnár, D, Moreno, LA, Reisch, L, Tornaritis, M, Veidebaum, T, Pigeot, I, on behalf of the IDEFICS Consortium

<sup>1</sup>BIPS, University Bremen, 28359 Bremen, Germany

The IDEFICS study has implemented and evaluated community-oriented obesity prevention programmes addressing diet, physical activity (PA) and stress-coping in a controlled design.

In 2007/08, 16,223 children (2–9 years) across Europe participated in an extensive protocol, parents reported socio-demographic, behavioural, medical and nutritional data. Examinations included anthropometry, blood pressure, PA (accelerometry), and biological markers. Two years later, 13,498 children participated in the follow-up to assess the effectiveness of the intervention modules. Adjusted odds ratios (OR; 95% confidence intervals) were estimated by multivariable logistic regression.

The prevalence of overweight/obesity ranges from >40% (south) to <10% (north). It is inversely associated with parental education (OR 0.81; 0.76–0.86), percent of moderate/vigorous PA/day (OR 0.66; 0.59–0.73) and hours of sleep/night (OR 0.83; 0.74–0.93). Positive associations were observed for maternal BMI (OR 1.11; 1.09–1.12), hours of screen-time/week (OR 1.02; 1.01–1.03), one-parent families (OR 1.22; 1.04–1.42) and migrants (OR 1.42; 1.10–1.83). The consumption frequency of fresh fruits and vegetables opposed the prevalence of overweight/obesity on country level, but not on individual level. Sensory preference for fat and sweet food was positively associated with higher prevalence of overweight/obesity. A first unadjusted analysis indicates a positive effect of the intervention on the development of overweight.

The influence of known obesity risk factors like parental overweight and social position is confirmed. Our data contribute to a better understanding of the role of sleep, sedentary time, PA and the impact of the built environment on overweight/obesity and metabolic disorders. Our intervention efforts contribute to the development of effective primary prevention measures.

**Funding:** EC FP 6, Contract No. 016181 (FOOD).

### 2. OBESITY AMONGST SURVIVORS OF STANDARD RISK ACUTE LYMPHOBLASTIC LEUKAEMIA IN SAUDI ARABIA – P

Aldhafiri, F<sup>1</sup>, Alnasser, A<sup>2</sup>, Al-Mutairi, H<sup>3</sup>, Reilly, J<sup>1,4</sup>

<sup>1</sup>University of Glasgow, Division of Developmental Medicine, Yorkhill Hospitals, Glasgow G3 8SJ; <sup>2</sup>King Faisal Specialist Hospital & Research Centre, Department of Pediatric Hematology/oncology, P.O. Box 3354, Riyadh 11211, Saudi Arabia; <sup>3</sup>King Faisal Specialist Hospital & Research Centre, Section of Clinical Nutrition, P.O. Box 3354, Riyadh 11211, Saudi Arabia; <sup>4</sup>Physical Activity for Health Research Group, School of Psychological Sciences and Health, University of Strathclyde, Glasgow G13 1PP

**Introduction:** Childhood Acute Lymphoblastic Leukaemia (ALL) survival rate has improved, but concern has

increased over 'late effects', including obesity. There is limited evidence on late effects outside the western world. This study examined weight status amongst Saudi survivors of standard risk acute lymphoblastic leukaemia (ALL).

**Method:** A cross-sectional study of 56 (6–20y old) ALL survivors diagnosed at King Faisal Specialised Hospital & Research Centre. We measured body composition by Dual Energy X Ray Absorptiometry (DEXA). Weight status was defined by BMI for age using Saudi, US Centers for Disease Control and Prevention (CDC), 2007 World Health Organisation (WHO), Cole *et al.* (2007) and International Obesity Task Force (IOTF) approaches.

**Results:** The mean age of survivors was 13.4 (SD 4.1) years (60.4% Male). According to international definitions based on BMI for age, around half of the sample had unhealthy weight status. Prevalence of overweight and obesity was lower when using the Saudi definition (prevalence 21.4%; 12/56 participants). Thinness was present in the sample, with prevalence varying differing slightly between the different definitions. All approaches based on BMI for age underestimated overfatness, present in 27/51 (53%) of the sample according to DEXA.

**Conclusion:** Unhealthy body weight and overfatness seem to be common amongst adolescent Saudi survivors of ALL. Defining weight status using BMI underestimates overfatness, and using Saudi population reference data produces substantial underestimation of overfatness. Future care of long term survivors of ALL should include assessment of weight status, should consider body composition measurement.

### 3. AD-EVA: INTERDISCIPLINARY TEST KIT FOR DIAGNOSTICS AND EVALUATION – O

Ardelt-Gattinger, E<sup>1,4</sup>, Meindl, M<sup>1</sup>, Neubauer, M<sup>4</sup>, Ring-Dimitriou, S<sup>1,5</sup>, Weghuber, D<sup>1,2</sup>

<sup>1</sup>Obesity Academy Austria; <sup>2</sup>Department of Pediatrics, Private Medical School Salzburg; <sup>3</sup>Surgical Department, Hallein Hospital; <sup>4</sup>Department of Psychology, University of Salzburg; <sup>5</sup>Department of Sport Science, University of Salzburg, all Austria

**Objectives:** State-of-the-art treatment of obesity is interdisciplinary. So far evaluations of interventions have predominantly included medical and quality of life outcome parameter but no interdisciplinary (psychology, nutrition and sports sciences) ones. Also, treatment-associated risks (i.e. eating disorder) are oftentimes not assessed.

**Methods:** The new interdisciplinary test kit AD-EVA was developed in a cohort of 4436 children/adolescents (age 8–18; all percentile groups). The test kit comprises medical, motor function, pathogenic and salutogenic eating behaviour, addiction to overeating, eating disorder, quality of life, sports motivation and food preference data. A quality assurance instrument (IQASO) was added.

**Results:** Internal consistencies (Cronbachs Alpha) range from 0.85 to 0.95. Retest-reliabilities were between 0.80 and 0.95. Validity of construct and criterion are given for each method. Single scores of the different questionnaires of the four disciplines can be added together. They can be translated into code which provides information of success or failure of interventions on a 7 point scale.

**Conclusion:** The AD-EVA allows for simple pre/post assessment both in the research setting and clinical practice. English version of the questionnaires is already existing, calculation norms for other english speaking populations is under preparation.

**Keywords:** childhood, obesity, diagnostics, evaluation, interdisciplinary.

4. BARIATRIC THERAPY OF OBESITY NORMALIZES CRAVING AND ADDICTION TO OVEREATING AND AFFECTS EATING DISORDERS – P  
Ardelt-Gattinger, E<sup>1,2</sup>, Meindl, M, Ring-Dimitriou, S<sup>1,3</sup>, Weghuber, D<sup>1,4</sup>, Miller, K<sup>4</sup>

<sup>1</sup>Obesity Academy Austria; <sup>2</sup>University Salzburg, Austria; <sup>3</sup>University Graz, Austria; <sup>4</sup>Private Medical School Salzburg, Austria

**Introduction:** Bariatric therapy of obesity is the only type of therapy that can obtain the necessary long term weight loss in order to avoid, improve or heal life threatening comorbidities. So far we know little about changes of the interdisciplinary (psychology, sport- and nutrition science) determinants.

**Method:** In this study we tested the development of severe psychological symptoms with the help of 60 pre and post bypass and gastric banding patients (24m/36w, 15–71; 10 adolescents; BMI M=44, 95, SD=6.91). We used the subscales “Restraint Eating”, “Addiction to Overeating”, “Bulimia” and “Binge Eating Disorder” from the test system AD-EVA. All indicate sufficient test quality and include norm values for the individual BMI-groups.

**Results:** “Craving and Addiction to Overeating” (t=11.15, p<.01) and “Binge Eating Disorder” scores (t=2.13, p<.05) of both groups of patients changed significantly in the desired direction. However there were significant differences between gastric banding (one third developed bulimia) and bypass (p < .01).

**Conclusion:** Further studies in particular in adolescents are urgently needed as due to its low perioperative morbidity rates gastric banding is the preferred method in this age group.

5. BODY IMAGE AND PRECLINICAL EATING DISORDERS IN ADIPOSITY – P  
Ardelt-Gattinger, E<sup>1,2</sup>, Fuchshofer, C<sup>1</sup>, Meindl, M<sup>2</sup>, Thun-Hohenstein, L<sup>1,4</sup>, Ring-Dimitriou, S<sup>1,3</sup>, Weghuber, D<sup>1,4</sup>

<sup>1</sup>Obesity Academy Austria; <sup>2</sup>Department of Psychology, University of Salzburg, Austria; <sup>3</sup>Department of Sport Science & Kinesiology, University of Salzburg, Austria; <sup>4</sup>Department of Pediatrics, Paracelsus Private Medical School Salzburg, Austria

**Introduction:** The relationship between weight, preclinical and clinical eating disorders in children and adolescents has far been poorly defined because of diagnostic problems.

**Method:** We included 4000 children and adolescents from a representative school based sample and employed specifically constructed questionnaires (FEV, FBEB, FEV-path, SKB).

**Results:** The prevalence of clinical ( $F_{(8/1216)}=27.86$ ,  $p=.01$ ,  $\eta^2=.16$ ), and preclinical eating ( $F_{(8,1756)}=112.96$ ,  $p<.01$ ;  $\eta^2=.34$ ) disorders differ significantly and substantially between 9 weight categories and gender ( $F_{(1/1224)}=10.11$ ,  $p<.01$ ,  $\eta^2=.07$  /  $F_{(1,1763)}=87.61$ ,  $p<.01$ ;  $\eta^2=.18$ ) in ANOVA. 30.5 % of the obese children from age 8–18 show a preclinical eating disorder, 9.1% a bulimia and 25.2% binge eating disorder. The ideal body as well as the ‘most beautiful body’ and the ‘most ugly body’ did not differ between the

9 weight classes. On a less positive note the selfimage and the image of the other differs significantly ( $\chi^2(8, N=4617) = 16.79$ ,  $p < .05$ ).

**Conclusion:** Differentiated diagnoses of eating disorders should be made for improving conservative and bariatric therapy with appropriateness of general preventive measures especially for girls.

6. WHAT IS IT THAT MAKES IT HARD FOR CHILDREN/ YOUTH TO CHANGE THEIR LIFESTYLE – P  
Ardelt-Gattinger, E<sup>1,2</sup>, Meindl, M<sup>2</sup>, Mangge, H<sup>1,3</sup>, Ring-Dimitriou, S<sup>1,2</sup>, Thun-Hohenstein, L<sup>1,4</sup>, Weghuber, D<sup>1,4</sup>  
<sup>1</sup>Obesity Academy Austria; <sup>2</sup>University Salzburg, Austria; <sup>3</sup>University Graz, Austria; <sup>4</sup>Private Medical School Salzburg, Austria

**Introduction:** Metaanalyses show, that a change of lifestyle through therapy and prevention in the hope of losing weight does not indicate any big changes. This is also partly true for the new paradigm “Health at any Size”.

**Method:** Twelve studies were carried out with the help of representative samples of a population of 4400 children/youth between the ages of 8–18 yrs. with valid and reliable questionnaires from the assessment tool AD-EVA.

**Results:** Obese show a very high degree of addiction to overeating which is additionally the strongest predictor for (bad) quality of life. They do not differ from adults in relation to comorbidity with Preclinical (30.1%) and Clinical Eating Disorders (BED: 25.2%, Bulimia: 9.2%). Obese children characterized by a high degree of cognitive control differed significantly in relation to their amount of saliva in comparison to the other group whose control was hindered by an experimental procedure.

**Conclusion:** First of all e need a better understanding of obese people who cannot be ‘dry’ when it comes to food in an excess-society. Second, eating disorders should be treated as soon as possible. Finally, counseling must take into account the ironic processes of high cognitive control.

7. IMPACT OF BODY WEIGHT ON HYPERTENSION IN ADOLESCENTS: DIFFERENT PATHOMECHANISMS OF PRIMARY AND OBESITY-ASSOCIATED HYPERTENSION? – P  
Baráth, Á<sup>1</sup>, Monostori, P<sup>1</sup>, Németh, I<sup>1</sup>, Bereczki, Cs<sup>1</sup>, Gellén, B<sup>1</sup>, Haszon, I<sup>1</sup>, Túri, S<sup>1</sup>

<sup>1</sup>Department of Pediatrics, University of Szeged, Szeged, Hungary

**Introduction:** Obesity-induced hypertension and primary hypertension in lean patients represent two different forms of hypertension. The main goal of this study was to test the hypothesis that differences in biochemical parameters might differentiate between the obesity-associated hypertension and the primary (normal weight) hypertension.

**Methods:** We have examined whether biochemical responses to before/after angiotensin converting enzyme inhibitor (ACEI) therapy might reveal properties of these two conditions that might further explain the differences in their clinical outcomes.

**Results:** We found endothelial dysfunction, oxidative stress and compromised antioxidant status in the obese, hypertensive and obese-hypertensive groups. The hypertensive group showed a rise in ACE activity ( $p < 0.05$ ), plasma malondialdehyde (MDA) concentration and malondialdehyde/nitric oxide (MDA/NO<sub>x</sub>) ratio ( $p < 0.05$ ), a fall in xanthine oxidase (XO) activity ( $p < 0.05$ ) and plasma nitric oxide (NO<sub>x</sub>) ( $p < 0.01$ ) before ACEI therapy. Before medication the plasma endothelin-1 (ET-1) level, plasma leptin and

leptin receptor concentrations were normal. Following the ACEI treatment ACE activity became normal. The obese-hypertensive group exhibited a rise in plasma ET-1 level ( $p < 0.05$ ), plasma leptin concentration ( $p < 0.01$ ), XO activity ( $p < 0.05$ ), plasma MDA concentration and MDA/NO<sub>x</sub> ratio ( $p < 0.05$ ), a fall in plasma NO<sub>x</sub> ( $p < 0.01$ ) and low leptin receptor level ( $p < 0.001$ ) before ACEI treatment. Following the medication the plasma NO<sub>x</sub> level, MDA/NO<sub>x</sub> ratio and XO activity returned to the normal level, while the ACE activity decreased ( $p < 0.001$ ).

**Conclusion:** In patients with primary hypertension the NO and the ACE activity, while in obesity-associated hypertension the hyperleptinemic effects, the NO, the endothelin-1 and the XO activity may be important in the pathology.

**Funding:** Research relating to this abstract was funded by Hungarian National Scientific Research Grant OTKA T037233.

#### 8. PREVALENCE OF THE METABOLIC SYNDROME AND IMPAIRED GLUCOSE TOLERANCE IN FLEMISH OBESE CHILDREN – P Bervoets, L<sup>1,2</sup>, Massa, G<sup>2</sup>

<sup>1</sup>Department of Biomedical Sciences, University of Hasselt, Diepenbeek, Belgium; <sup>2</sup>Department of Paediatrics, Jessa Hospital, Hasselt, Belgium

**Introduction:** Childhood obesity has reached epidemic levels worldwide and is associated with an increased likelihood for having the metabolic syndrome (MetS) and impaired glucose tolerance (IGT). We aimed to assess the prevalence of MetS and IGT in Flemish obese children and adolescents.

**Methods:** A total of 170 obese children aged 13.9±5.7 years (94 female and 76 male; BMI-SDS 2.8±0.5) who completed an oral glucose tolerance test between May 2004 and April 2011 were included in the study. Height and weight were measured. BMI and BMI-SDS were calculated based on Flemish growth charts. Fasting/2h glucose, HDL-cholesterol, triglycerides, systolic and diastolic blood pressure were measured. MetS was defined according to the IDF criteria.

**Results:** The prevalence of hypertension (68.8%) and low HDL-cholesterol (36.5%) was high compared to elevated triglyceride (17.1%) and increasing fasting plasma glucose concentrations (6.5%) in all subjects. The prevalence of abdominal obesity plus any one, two or three metabolic components was 47.1, 27.6, and 8.8%, respectively. Hence, 62 (36.5%) subjects were classified with MetS. BMI-SDS ( $F=3.78$ ;  $p < 0.02$ ) and age ( $F=2.69$ ;  $p < 0.05$ ) increased with the number of MetS criteria. IGT was detected in 25 (14.7%) subjects of which 10 (5.9%) also had MetS. Of all subjects, 52 (30.6%) had MetS without IGT.

**Conclusions:** MetS is highly prevalent in Flemish obese children and adolescents. It remains to be shown whether MetS or IGT has the highest risk for developing type II diabetes.

**Funding:** Research relating to this abstract was partly funded by Limburg Sterk Merk (LSM).

#### 9. RELATIONSHIP BETWEEN BLOOD-PRESSURE AND NUTRITIONAL STATUS IN CHILDREN – P Bodzsár, ÉB<sup>1</sup>, Zsákai, A<sup>1</sup>, Szántó, Sz<sup>1</sup>

<sup>1</sup>Department of Biological Anthropology, Eötvös Loránd University, Budapest, Hungary

**Objectives:** In present study the blood pressure of the subgroups of children with different nutritional status was compared along chronological age. The main goals were (1) to

establish the critical cut-off values of hypertony in childhood and puberty; (2) to compare the blood pressure of the subgroups of children with different nutritional status along chronological age.

**Subjects and Methods:** The study was carried out between 2003–2006 (Bodzsár and Zsákai 2008). The blood pressure parameters of children (3100 boys and 3300 girls, aged 7–18) was measured by Omron blood pressure device. Nutritional status was assessed by BMI, children were assigned to the nutritional status categories by using the age-dependent cut-off points (Cole *et al.*, 2002). Body components were estimated by the Drinkwater-Ross (1980) four-component anthropometric fractionation method. The rearrangements in total body mass were characterized by the changes taken place in the bone-, muscle- and fat mass components.

**Results:** Nutritional status was found to have significant influence on blood pressure in childhood and adolescence: blood pressure of overweight and obese children was higher than in children with normal nutritional status, while obese children's blood pressure was higher than blood pressure in overweight peers.

**Keywords:** nutritional status, body composition, body fatness, blood pressure.

**Acknowledgement:** This study was supported by the Hungarian National Foundation for Science (OTKA grant K 76849).

#### 10. THE CONFORMATION OF BODY IMAGE IN CHILDREN – P

Böröndi-Fülöp, N<sup>1</sup>, Soós, M<sup>1</sup>, Lelovics, Zs<sup>1</sup>, Szakály, Z<sup>1</sup>

<sup>1</sup>Faculty of Economic Science, Kaposvár University, Kaposvár

Read by title.

#### 11. EFFECT OF INTRAUTERINE & EARLY CHILDHOOD NUTRITION ON FUTURE HEALTH: INTRODUCTION, POLICY PRINCIPLES – Invited Lecture

Breda, J<sup>1</sup>

<sup>1</sup>World Health Organization, Regional Office for Europe

Abstract has not been received till the deadline.

#### 12. COMPLEMENTARY FEEDING PATTERNS IN EUROPE – Invited Lecture

Caroli, M<sup>1</sup>

<sup>1</sup>Nutrition Unit, Department of Prevention, Azienda Sanitaria Locale Brindisi, Italy

An European survey showed that, WHO standard definition, at one year of age the 14.3% of infants in Italy is at risk of developing obesity, in Spain the 9.2% is overweight, and the 7.6% of infants is obese. Early nutrition is one of the factors causing it.

At 6 completed months of age a survey, performed in 5 European countries, shows that around the 95% of formula fed and the 87% of breastfed infants have already introduced solid foods.

Formula fed children have a higher consumption of commercial foods than breast-fed ones. Regardless the kind of foods used, complementary feeding patterns often cause an excess of protein intake and a low fat intake.

National guidelines on complementary feeding are scarce, but web sites and e-forum hold by baby food companies and

mothers' groups and journalists are numerous. In the latter sites advices and recipes on CF, that often do not accomplish with the official nutritional recommendations on CF, are suggested.

Focus groups with mothers of infants and toddlers show that mothers are more worried about the amount of food consumed by their children than the quality.

Researches to clarify gap of knowledge on actual nutrient and food intake as well as long term consequences of these CF patterns and reasons of such behaviours are needed.

**Funding:** Abstract funded by Region of Puglia in the frame of DIFE 2010-2012.

### 13. PILOT EUROPEAN REGIONAL INTERVENTIONS FOR SMART CHILDHOOD OBESITY PREVENTION IN EARLY AGE (PERISCOPE) – Invited Lecture Caroli, M<sup>1</sup>, Malecka-Tendera, E<sup>2</sup>, Mikkelsen, BE<sup>3</sup>

<sup>1</sup>Azienda Sanitaria Locale Brindisi, Italy; <sup>2</sup>Medical University of Silesia, Katowice, Poland; <sup>3</sup>Aalborg University, Ballerup, Denmark

Specific objectives of PERISCOPE, performed in Denmark, Italy, and Poland are:

To collect information on: parents' beliefs, behaviours, and feeding style toward their children; on children's habits on food, TV watching, and physical activity; on teachers' beliefs to promote children's health; and kindergarten environment role in promoting/hindering children's physical activity.

To design and implement pilot methodologies to develop positive health behaviours, in preschool children.

Tools developed and used: protocols to perform focus groups and "tasteshop" with preschool children; a two-sides book on healthy eating and physical activity. The PA side highlights the importance of active play for an adequate physical and psychological development and instructions to perform old active street games. The nutrition side consists of tales on foods and forms with nutritional information.

Children in the intervention groups in the 3 countries increased their PA levels and motor abilities and their healthy foods intake as compared with control children.

PERISCOPE approach can be an effective tool to promote healthy life style in preschool children in countries with different social-cultural backgrounds.

**Funding:** This paper is a result of the project Periscope, which has received funding from the EU, in the framework of the Public Health Programme through the EAHC.

### 14. DECREASE OBESITY IN CHILDREN WITH NEUROFEEDBACK TRAINING (DOC-NET) – P Chiriță-Emandi, A<sup>1</sup>

<sup>1</sup>"Louis Turcanu" Emergency Hospital for Children, Timisoara, Romania

**Premises:** Obesity in children has reached epidemic levels and it is rising. Current treatment was proven to have limited results. Psychological problems associated with obesity may increase energy intake and reduce motivation for physical activity. Appropriate management of these problems is needed. Neurofeedback training (NFT) is a biofeedback technique for training the brain. It can influence appetite regulation, anxiety and depression, which result in comfort eating. If attention to these factors is combined with sound nutrition, recovery may be significantly improved.

**Objectives:** To evaluate the effectiveness of NFT combined with classic nutritional and activity recommendations, in improving appetite regulation and comfort eating.

**Methods:** 40 overweight and obese children aged 6–18 years will be randomized to the intervention group (NFT + classic recommendations) and control group (recommendations only). The intervention group will have 20 NFT sessions (30 minute) over 12 weeks. Both intervention and control group will receive information and continuous support through the website: [www.crestemsanatos.ro](http://www.crestemsanatos.ro). The study is ongoing starting February 2011 in the "Louis Turcanu" Hospital for Children Timisoara and has the hospital's ethics committee approval. Patient evaluation will include: anthropometric measures, complete history, "KINDLR quality of life questionnaire" obesity module and "Three factors eating questionnaire". Reevaluations will be performed at 3 and 6 months. The equipment is provided by BEE Medic GmbH/EEG Info.

**Results** will be published in the following year.

**Conclusions:** If the NFT will prove to be efficient in improving weight loss and to have stable results, this could mean a breakthrough in obesity treatment.

**Funding:** The equipment for this research is provided by BEE Medic GmbH/EEG Info.

### 15. THEY KNOW IT BUT PROBABLY THEY DON'T DO IT. KNOWLEDGE OF MEDITERRANEAN DIET IN OBESE CHILDREN – P

Colombo, RR<sup>1</sup>, Vania, A<sup>2</sup>, Bergamaschi, MG<sup>1</sup>, Angrisano, A<sup>1</sup>, Martelli, AG<sup>1</sup>

<sup>1</sup>Bollate Hospital – Childhood Dietetic Service, A.O. G. Salvini Garbagnate M.se, MI, Italy; <sup>2</sup>University of Rome – Childhood Dietetic Service, La Sapienza, Rome, Italy

**Introduction:** In our Dietetic Service we approach young population following obese and meeting children at primary school of II degree for educational lessons. Last year we presented the results of our investigation about knowledge of Mediterranean Diet (MD). 79 children (aged between 10 and 15 years), evaluated at school, showed to recognize anyway MD in 35% of cases.

**Methods:** We subscribed the same test to 71 children (aged between 9 and 16 years) asking "you are the director of the stage in which mother and father with their sons, are eating; they live in the fifties at the seaside and the father is a fisherman; they are around the table of their kitchen: write what we have to put on the table; explain also what kind of foods do you can see in pantry and refrigerator".

**Results:** 90% described a very credible MD (fish, bread, vegetables, fruit and spaghetti with tomatoes; water and red wine). In pantries and refrigerators they put legumes and dry fruits; 52% put on the table fish; over 50% named also oregano, red pepper, garlic and 73% spinach, zucchini, carrot, fennel, cucumber, eggplant, radish. 66% plum, peach, apricot, cherry, melon. None of them named salt, ketchup, mayonnaise! Only 7 named chocolate and milk, cheese and meat.

**Conclusion:** Obese children know MD that we strongly encourage much more better than coetaneous attending at public school. They describe a diet rich of good and simple, home made foods. Now they don't seem to do at all what they know! "Why?" is an interesting question, we think. (to continue...)

### 16. BODY IMAGE PERCEPTION IN ADOLESCENTS WITH DIFFERENT LEVELS OF PHYSICAL ACTIVITY – P Coelho, E<sup>1</sup>, Oliveira, L<sup>1</sup>, Mourão, I<sup>1</sup>

<sup>1</sup>CIDESD, University of Trás-os-Montes e Alto Douro, Portugal

**Introduction:** The aim of this study was to compare body image perception and dissatisfaction with body image in adolescents with different levels of physical activity.

**Methods:** The sample consisted of 353 adolescents (186 boys and 157 girls) from 13 to 19 years of age ( $16.25 \pm 1.36$ ). Stunkard's silhouettes was used to assess the actual and ideal body image (dissatisfaction=actual-ideal). We applied the Baecke Physical Activity Questionnaire to divide the sample according to level of physical activity: active ( $n=119$ ), moderately active ( $n=120$ ) and very active ( $n=119$ ). We used the chi-square test to compare groups.

**Results:** The results revealed no significant differences in body image perception ( $p=0.71$ ) and the dissatisfaction ( $p=0.08$ ) among adolescents with different levels of physical activity.

**Conclusion:** Adolescence is considered a period when occur somatic, psychological and social changes, the results of this study demonstrate that there was no effect of physical activity on body image perception.

#### 17. COMMON POLYMORPHISMS OF THE UCP-2 GENE ARE ASSOCIATED WITH OBESITY IN HUNGARIAN CHILDREN – O

Csernus, K<sup>1</sup>, Pauler, G<sup>2</sup>, Erhardt, É<sup>1</sup>, Lányi, É<sup>1</sup>, Molnár, D<sup>1</sup>

<sup>1</sup>Department of Pediatrics, Medical Faculty, University of Pécs, Pécs, Hungary; <sup>2</sup>Department of Information Technology, Faculty of Science, University of Pécs, Pécs, Hungary

**Background:** The uncoupling proteins (UCPs) are membrane transporters that may uncouple the transport of protons across the inner mitochondrial membrane from ATP synthesis, thereby dissipating energy as heat and affecting metabolic efficiency. Although its physiological role remains to be established UCP-2 is considered a candidate gene for obesity.

**Objective:** We investigated the effects of genetic variations in the UCP-2 gene on risk of common childhood obesity.

**Methods:** 709 overweight/obese and 637 normal weight children (age 6–17 years) were included. Anthropometric measurements were carried out and we genotyped the children for the common UCP-2 –866 G/A and 45 bp exon 8 del/ins polymorphisms.

**Results:** Frequency of the A allele for the UCP-2 –866 G/A polymorphism was significantly lower (0.35 vs. 0.39;  $p=0.024$ ) and that of the ins allele for the exon 8 del/ins UCP-2 polymorphism significantly higher (0.31 vs. 0.27;  $p=0.016$ ) among overweight/obese children compared with controls. On multivariate regression analysis adjusted for age, height and gender heterozygosity and homozygosity for the –866 A variant was associated with an odds ratio (OR) for obesity of 0.69 (95% CI: 0.52–0.92;  $p=0.013$ ) and 0.50 (95% CI: 0.32–0.79;  $p=0.003$ ) respectively, compared with G/G homozygotes. Heterozygotes and homozygotes for the exon 8 ins allele had an OR for obesity of 1.66 (95% CI: 1.24–2.23;  $p=0.001$ ) and 2.12 (95% CI: 1.23–3.63;  $p=0.006$ ) respectively, compared with del/del homozygotes.

**Conclusion:** The exon 8 45 bp ins variant of UCP-2 might be a risk allele, while the –866 A variant of UCP-2 a non-risk allele for common obesity in Hungarian children.

#### 18. EFFECTS OF EARLY NUTRITION ON LATER HEALTH: ASPECTS DISCUSSED IN RECENT COMMENTS OF THE COMMITTEE ON NUTRITION OF THE EUROPEAN SOCIETY FOR PAEDIATRIC GASTROENTEROLOGY, HEPATOLOGY AND NUTRITION – Invited Lecture

Decsi, T<sup>1</sup>

<sup>1</sup>Department of Paediatrics, University of Pécs, Pécs, Hungary

The Committee on Nutrition of the European Society for Paediatric Gastroenterology, Hepatology and Nutrition

(ESPGHAN CoN) recently reviewed available evidence on the role of nutrition-related factors on early obesity prevention [*J Pediatr Gastroenterol Nutr* 52: 662–669, 2011]. No single nutrient has been unequivocally associated with the development of obesity; however, dietary proteins and specific amino acids have been shown to stimulate the somatotrophic axis and may thereby influence body composition. In a large randomised controlled trial significant effects of a lower protein intake from infant formula on weight, weight-for-length, and BMI were demonstrated in the first two years of life [*Am J Clin Nutr* 89: 1836–1845, 2009]. However, a positive correlation between high protein intake and later obesity occurs mainly in populations with protein intake higher than 15% to 16% of total energy intake [*Int J Obes (Lond)* 29: S8–S13, 2005]. The analysis of data from the German DONALD study suggested that animal but not vegetable protein intakes in early childhood may play a role in later overweight and adiposity [*Am J Clin Nutr* 85: 1626–33, 2007]. In contrast, in a cohort of healthy Danish girls, a high protein intake was associated with a decrease in body fat and an increase in fat-free mass, depending on the available amounts and combinations of arginine and lysine [*Clin Nutr* 28: 684–8, 2009]. Methodological limitations in study design and the complex nature of obesity must be taken into account when interpreting the association with reported dietary factors.

#### 19. MACRO- AND MICRONUTRIENT INTAKE OF HUNGRY OBESE CHILDREN – P

Deé, K<sup>1</sup>, Vági, Zs<sup>1</sup>, Lelovics, Zs<sup>1</sup>

<sup>1</sup>International Institute of Nutrition Research, Pécs, Hungary

Read by title.

#### 20. QUALITATIVE AND QUANTITATIVE ANALYSIS OF THE NUTRITION OF OBESE CHILDREN – P

Deé, K<sup>1</sup>, Vági, Zs<sup>1</sup>, Lelovics, Zs<sup>1</sup>

<sup>1</sup>International Institute of Nutrition Research, Pécs, Hungary

Read by title.

#### 21. HELENA—HEALTHY LIFESTYLE IN EUROPE BY NUTRITION IN ADOLESCENCE – Invited Lecture

De Henauw, S<sup>1</sup>, on behalf of the HELENA Study Group

<sup>1</sup>Ghent University, Belgium

The HELENA Project—Healthy Lifestyle in Europe by Nutrition in Adolescence—is a European collaborative research project financed by the EU Sixth Framework Program.

The basic objective of the HELENA project was to obtain reliable and comparable data from a random sample of European adolescents (boys and girls aged 13–16 years) on a broad battery of relevant nutrition and health-related parameters: dietary intake, food choices and preferences, anthropometry, serum indicators of lipid metabolism and glucose metabolism, vitamin and mineral status, immunological markers, physical activity, fitness and genetic markers.

In total, more than 3,000 individuals aged 13 to 16 years were randomly recruited in ten European cities in the period 2006–2007. A subsample of about 1,000 individuals was also selected for analysis of a broad set of biomarkers. Well trained field workers collected a large battery of data using standardized methods and validated instruments, some

of them developed specifically for the context of HELENA (methods published in the *International Journal of Obesity*, 2008; 32 (5)).

The prevalence of overweight in HELENA was 19.5% in boys and 16.3% in girls. Obesity prevalence was 7.6% in boys and 4.4% in girls. The highest overweight and obesity prevalence was observed in the younger age group. Overweight and obesity prevalence was higher in males than in females and was higher in the Mediterranean area as compared to the north of Europe.

The main findings of the HELENA project raise concern regarding nutritional status and nutrition related behaviour in European adolescents, although major variation exists in many of the parameters under study. Dietary patterns, physical activity and physical fitness patterns and several biochemical indicators of nutritional status and cardiovascular risk show that there is a large potential for improvement of the health of this future generation of European adults. More information can be found at [www.helenastudy.com](http://www.helenastudy.com)

## 22. ELEVATED BLOOD PRESSURE IN RELATION WITH WEIGHT AND METABOLIC STATUS IN HIGH RISK ROMANIAN CHILDREN – P

Duncescu, C<sup>1</sup>, Mărăzan, M<sup>1,2</sup>, Chiriță-Emandi, A<sup>1</sup>, Craioveanu, T<sup>2</sup>, Sabău, I<sup>2</sup>, Micle, I<sup>1,2</sup>

<sup>1</sup>“Louis Țurcanu” Emergency Hospital for Children, Timișoara; <sup>2</sup>“Victor Babeș” University of Medicine and Pharmacy, 1<sup>st</sup> Pediatric Clinic, Timișoara

Read by title.

## 23. ASSOCIATION OF THE FTO VARIANT RS9939609 WITH METABOLIC SYNDROME IN OVERWEIGHT/OBESE AND REPRESENTATIVE COHORTS OF CZECH ADOLESCENTS – O

Dusatkova, L<sup>1</sup>, Zamrazilova, H<sup>1</sup>, Sedlackova, B<sup>1</sup>, Vcelak, J<sup>1</sup>, Hlavaty, P<sup>1</sup>, Bendlova, B<sup>1</sup>, Kunesova, M<sup>1</sup>, Hainer, V<sup>1</sup>

<sup>1</sup>Institute of Endocrinology, Prague, Czech Republic

**Introduction:** Fat mass and obesity associated (FTO) gene is associated with obesity, however an association of the FTO variants with metabolic syndrome (MetS) has not been clearly demonstrated. We investigated the effect of the FTO variant rs9939609 on parameters of MetS in adolescents.

**Methods:** Genotyping was performed in 542 overweight/obese adolescents and the control group recruited from the randomly selected Czech adolescent population (n=1078). Anthropometric and biochemical parameters were assessed in all subjects. MetS was defined according to the International Diabetes Federation (IDF).

**Results:** The risk A-allele of rs9939609 was significantly associated with overweight/obesity (OR = 1.25; 95% CI 1.08–1.45). MetS was revealed in 16.6% overweight/obese adolescents, but there were no associations with FTO variants. However, overweight/obese girls – carrying the A-allele exhibited significantly increased values of intraabdominal fat, triglycerides and decreased levels of HDL cholesterol compared to the non-carriers (p < 0.05). Boys in the control group – A-allele carriers – were characterized by increased values of BMI, total body fat, trunk and intraabdominal fat (p < 0.05).

**Conclusion:** We confirmed the association of the A-allele of rs9939609 with obesity in the Czech adolescent population. In spite of its role in the development of abdominal obesity, no association of this FTO variant with MetS was observed.

**Funding:** Research related to this abstract was supported by grant 7F08077 from MSM/7F, by project Advanced education of own staff in clinical and molecular endocrinology (CZ.2.17/1.1.00/32386) and by grant CZ0123 from Norway through the Norwegian Financial Mechanisms.

## 24. OBESITY AND DIABETES IN CHILDHOOD, A CLINICAL OVERVIEW – Invited Lecture Erhardt, E<sup>1</sup>

<sup>1</sup>Department of Paediatrics, University of Pécs, Pécs, Hungary

**Introduction:** Although well documented epidemiological data are lacking, particularly in Europe, about the prevalence of type 2 diabetes mellitus (T2DM) in children and adolescents, but increasing rates can be seen parallel to the worldwide increase of obesity. Because of the increasing rates of T2DM, screening for obese children and adolescents is recommended, especially in children with substantial risk for the development of type 2 diabetes.

**Aims:** To determine the prevalence of impaired glucose tolerance (IGT) and T2DM among obese children and to provide a brief clinical overview about T2DM and special forms of diabetes with some case reports.

**Methods:** At our Department oral glucose tolerance test was performed in 289 obese (mean BMI±SD: 31.1±4.6 kg/m<sup>2</sup>, mean age±SD: 12.9±2.7 years) adolescents.

**Results:** Impaired glucose tolerance was found in 17.3% (n=50) and T2DM in 1.9% (n=5) of children. HbA<sub>1c</sub> levels were normal.

**Conclusions:** T2DM in children frequently goes undiagnosed because patients are asymptomatic, and/or the type 1 diabetic children may have clinical presentations indistinguishable from those of patients with T2DM. Furthermore, atypical presentations with classic features of both forms of diabetes may appear in some obese children. Although T2DM, maturity onset diabetes in the young and syndromic forms of diabetes are rare, altogether these make considerable challenge for diabetologists.

**Acknowledgement:** Developing Competitiveness of Universities in the South Transdanubian Region (SROP-4.2.1.B-20/2/KONV-2010-2012).

## 25. PHYSICAL ACTIVITY AND CARDIOVASCULAR DISEASES IN OBESE CHILDREN NJ Farpour-Lambert, M.D.<sup>1</sup>

<sup>1</sup>Pediatric Sports Medicine and Obesity Care Program, University Hospital of Geneva, Switzerland

**Background:** The appearance of pediatric forms of chronic diseases such as hypertension and early signs of atherosclerosis associated with obesity contribute to increased risks in adult life. The aim of this presentation is to review the methods of assessment and effects of interventions on early signs of cardiovascular diseases (CVD) in childhood obesity.

**Methods:** Non-invasive measurements of arterial geometry (intima-media thickness- IMT) can be performed with a real time B-mode ultrasound imager in the right common carotid artery. The measure of the peripheral arterial flow-mediated dilation (FMD) can be used to study the endothelial dysfunction in children from 6 years of age. Assessment of arterial stiffness can also be performed by determining the pulse wave using applanation tonometry.

**Results:** Only few authors investigated the impact of exercise alone on CVD risk factors in obese adolescents and reported significant changes in body fat or visceral fat, endothelial function, IMT, parasympathetic nervous

activity, lipids profile and insulin resistance indices. In pre-pubertal obese children, physical activity during 3 months reduced blood pressure, abdominal and whole body fat, and increased fat-free mass and VO<sub>2</sub> max. A significant decrease in arterial stiffness as well as stabilization of the arterial IMT was observed after 6 months.

**Conclusion:** Exercise training alone, or combined to dietary/behavioral interventions, results in beneficial changes on pressure and early signs of atherosclerosis in obese youth. As cardiovascular diseases track from childhood to adulthood, physical activity should be encouraged in young obese children to prevent the premature development of CVD.

## 26. 'MORBID OBESITY: AGGRESSIVE V. CONSERVATIVE APPROACH' THE TRADITIONAL APPROACH

– Invited Lecture

Frelut, ML<sup>1</sup>

<sup>1</sup>APHP, Hôpital de Bicêtre. Service d'endocrinologie-nutrition pédiatrique 94270 Le Kremlin-Bicêtre- France

The conservative approach of morbidity covers a wide range of treatments that all include three components: dietetics, psychology and enhanced physical activity. Different techniques allow using these tools: individual vs. group approach, behavioral vs. other psychological techniques, parents alone vs. child and family care, external vs. indoor cares, etc. Results are in as much difficult to reach as the degree of obesity is high. Relapses are frequent. This is why other therapeutic approaches are under investigation.

The causes of failure are seldom analyzed. Very few study report a systematic investigation of depressive symptoms, sleep apnea, learning disorders etc. Very few study report a combination of treatment. The failure of traditional treatment may therefore actually be due to both late and inadequate treatment.

Other approaches are needed but won't allow escaping this mandatory analysis phase. Drug treatment has been so far little successful. This is indicative of the urgent need of a rationale for drug prescription. Obesity is a genetic disorder. Several drugs will be needed that will improve different genetic defects. A drug should not withdraw because of its lack of efficiency in a majority of patients. A significant improvement in a subgroup should be sufficient to keep it as was the case for leptin. Obesity is a both a disease and a symptom which need much keener approach and use of classical tools than usually reported.

## 27. PARENTS PERCEPTION OF OVERWEIGHT 3–10 YEARS OLD PORTUGUESE CHILDREN – P

Gama, A<sup>1,2</sup>, Mourão, I<sup>3</sup>, Nogueira, H<sup>4</sup>, Rosado-Marques, V<sup>2,5</sup>, Padez, C<sup>2,6</sup>

<sup>1</sup>Faculty of Sciences, University of Lisbon, Lisbon, Portugal; <sup>2</sup>Research Centre for Anthropology and Health, University of Coimbra, Coimbra, Portugal; <sup>3</sup>University of Trás-os-Montes e Alto Douro, Vila Real, Portugal; <sup>4</sup>Department of Geography, University of Coimbra, Coimbra, Portugal; <sup>5</sup>Tropical Research Institute, Lisbon, Portugal; <sup>6</sup>Department of Life Sciences, University of Coimbra, Coimbra, Portugal

**Introduction:** Portuguese children denote high values of prevalence of overweight. The purpose of this study was examine whether parents of Portuguese children perceives their children overweight and examine in overweight children the parent's concern about weight status.

**Methods:** A Portuguese National cross-sectional survey was done during 2009–2010. The sample analyzed were of 16,645 Portuguese children 3–10 years old, whose parents

answer to the question: "How do you describe actual child weight". Height and weight were measured and BMI (Kg/m<sup>2</sup>) was calculated. The International obesity TaskForce (IOTF) cut-off points to define overweight and obesity were used. A self-administered questionnaire for parents was sent home.

**Results:** Among all children 17.4% of parent failure to perceive their children weight status and 66.3% weren't worry about actual weight child. Considering all overweight children (4,625), 60.11% of parents doesn't perceived their children as overweight and 40.3% of parents failure all at once perceived their children's weight and weren't worry about their actual weight. The logistic regression analysis denotes that children's age and parental concern of the actual weight of children's were the main factors related with parent's perception of overweight of their children's.

**Conclusion:** The majority of parents of overweight children did not recognize their children are as overweight and weren't concerned about the overweight of their children particularly for ages under five years old. To prevent the increasing of children obesity is determinant that parent of overweight children recognize the weight status of their children in early ages.

**Funding:** Research relating to this abstract was funded by the Portuguese Foundation for Science and Technology.

## 28. TACKLING CHILDHOOD OBESITY – A CARE PATHWAY APPROACH – Invited Lecture

Gately, P<sup>1</sup>

<sup>1</sup>Leeds Met University and Carnegie Weight Management

Childhood obesity is recognised as a major public health challenge. In response to widespread calls for action, public health investment has predominantly focused upon large scale prevention initiatives. From 2005–2010, for example, UK public spending on obesity prevention activities was approximately £1bn per annum (Public Spending Review), compared to £30m spent on treatment interventions over the same period (some 0.003% of the overall investment).

Since 2000, we have been developing a systems-based approach to treating overweight and obese children which considers the operational framework – including capacity, training and marketing – in addition to current evidence base. To date, these interventions have been delivered to approximately 3000 children. Here, we report on the outcomes of a specific cohort study involving 120 obese children and their parents. The programme included Residential (parents involved-not in residence, weeks 0–6); Community (parents and children, weeks 6–18) and Online Support (parents and children-specific, weeks 6–52). All children were assessed on height, weight, BMI, waist circumference, % body fat (pre and post intervention). Significant improvements were found in all variables at week 52, with an average relative weight loss of 23% (BMI SDS). 92% of participants had a lower relative weight compared to baseline.

These data demonstrate the effectiveness of a systems-based approach – providing a scalable model for public health investment which focuses upon those that need the interventions most, and where return on investment is more likely.

## 29. CHILDCARE ARRANGEMENTS AND OVERWEIGHT AND OBESITY OVER 10 YEARS OF FOLLOW-UP IN CHILDHOOD – O

Geoffroy, MC<sup>1</sup>, Power, C<sup>1</sup>, Touchette, E<sup>2</sup>, Dubois, L<sup>3,4</sup>, Giguère, CE<sup>5,6</sup>, Boivin, M<sup>7</sup>, Séguin, JR<sup>6,8</sup>, Tremblay, RE<sup>6,9,10</sup>, Côté, SM<sup>6,9,11</sup>

<sup>1</sup>MRC Center of Epidemiology for Child Health, Centre for Paediatric Epidemiology & Biostatistics, Institute

of Child Health, University College London; <sup>2</sup>INSERM U669, Université Paris-Sud and Université Paris Descartes, UMR-S0669, Paris, France; <sup>3</sup>Department of Epidemiology and Community Medicine, University of Ottawa; <sup>4</sup>Institute of Population Health, Ottawa, Canada; <sup>5</sup>Department of Mathematics, University of Montreal, Canada; <sup>6</sup>Ste-Justine Hospital Research Center; University of Montreal, Canada; <sup>7</sup>School of Psychology, Laval University, Canada; <sup>8</sup>Department of Psychiatry, University of Montreal, Canada; <sup>9</sup>International Laboratory for Child and Adolescent Mental Health, University of Montreal, Canada and INSERM U669, France; <sup>10</sup>School of Public Health and Population Science, University College Dublin; <sup>11</sup>Department of Social and Preventive Medicine, University of Montreal

**Introduction:** This study examines whether childcare arrangements were associated with overweight and obesity in childhood.

**Method:** A representative sample ( $n=2,120$ ) of children born in the Canadian Province of Quebec in 1997–1998 was selected through birth registry and followed over 10y. Children attending childcare (center/home-based/relative) from 1.5 to 4y were distinguished from those in parental care. Overweight and obesity were calculated from direct heights and weights measurements at 4, 6, 7, 8, and 10y based on the International Obesity Task-Force cut-offs.

**Results:** Compared to parental care, children who attended childcare centre were at greater risk of being overweight or obese at ages 4 ([OR]: 1.62; 95% confidence intervals [CI]: 1.03–2.54,  $p=.036$ ), 6 (OR: 1.98, CI: 1.21–3.25,  $p=.007$ ), 7 (OR: 1.67, CI: 1.09–2.54,  $p=.018$ ), and 8 (OR: 1.59, CI: 1.10–2.30,  $p=.013$ ). Additionally, we found that children receiving relative care had higher risks of being overweight or obese (versus parental care) at ages 6 (OR: 1.81, CI: 1.07–3.06,  $p=.028$ ), and 7 (OR: 1.81, CI: 1.12–2.93,  $p=.016$ ). By 10 years of age, childcare was no longer associated with BMI groups. These associations were adjusted for key covariates including sex, birth weight, duration of breastfeeding, child's non-western ethnicity, maternal smoking during pregnancy, maternal BMI groups and parental socioeconomic status. The pattern of results was identical when using total weekly number of hours in center/relative/home-based as a measure of childcare exposure.

**Conclusion:** Our results show a modest association between childcare and overweight and obesity before and at school entry. These associations generally disappear over time, during the elementary school years.

**Funding:** Research relating to this abstract was funded by the Ministère de la santé et des services sociaux du Québec (Québec Government's Ministry of Health and social services), the Fonds de recherche en santé du Québec (FRSQ) with a fellowship to MCG, the Canadian Institutes of Health Research (CIHR) with fellowships to both MCG and ET.

### 30. DEPRESSIVE SYMPTOMS AND BMI: DIRECTION OF ASSOCIATIONS OVER THE LIFE-COURSE – P Geoffroy, MC<sup>1</sup>, Li, L<sup>1</sup>, Power, C<sup>1</sup>

<sup>1</sup>University College London

**Introduction:** To examine bidirectional associations of BMI with depressive symptoms, in men and women, and across life-course.

**Methods:** 1958 British Birth Cohort ( $n=18,558$ ); a prospective birth cohort followed-up over 50y. Depressive symptoms were assessed with age-appropriate instruments: teacher-rated Bristol Social Adjustment (7–11y) and Rutter (16y); Malaise Inventory (23–50y); and Clinical Interview

Schedule (45y). BMI groups were calculated from measured (7–16, 33, 45y) and reported (23, 42, 50y) heights and weights based on the World Health Organization cut-offs. We applied a multivariate multinomial response model to BMI groups at the seven follow-ups (11–50y) on depressive symptoms at a prior age (7–45y), while accounting for prior BMI groups (analysis 1). Using a similar procedure, we assessed the direction of associations from BMI groups to depressive symptoms (analysis 2).

**Results:** In analysis 1, we found that in women (not in men), baseline depressive symptoms were associated with subsequent obesity from 16y (OR: 3.7) and thereafter (23–50y, ORs: 1.3–2.0). In addition, baseline depressive symptoms were associated with subsequent underweight in both sexes (11–45y, ORs: 1.2–6.3). In analysis 2, we found that obesity in women did not generally increase the risk of depressive symptoms, except at 16y (OR: 2.5) and at 45–50y (ORs: 1.5). Associations were little altered with adjustments for sociodemographic covariates.

**Conclusion:** The relationship between mental and weight disorders was U-shaped, whereby depressive symptoms were longitudinally associated with underweight in men and women and obesity in women.

**Funding:** Research relating to this abstract was funded by the Fonds de recherche en santé du Québec (FRSQ) and the Canadian Institutes of Health Research (CIHR) with fellowships to MCG.

### 31. THE ROLE OF SUGAR IN OBESITY AND METABOLIC DISEASE RISK IN CHILDREN – FROM GENES TO POLICY – Plenary Lecture Goran, M<sup>1</sup>

<sup>1</sup>Preventive Medicine (Division of Health Behavior Research), University of Southern California

Abstract has not been received till the deadline.

### 32. POLYUNSATURATED FATTY ACID STATUS IN OBESITY: A SYSTEMATIC REVIEW OF THE LITERATURE – P

Györei, E<sup>1</sup>, Fekete, K<sup>1</sup>, Verduci, E<sup>2</sup>, Agostoni, C<sup>3</sup>, Decsi, T<sup>1</sup>

<sup>1</sup>Department of Paediatrics, University of Pécs, Pécs, Hungary; <sup>2</sup>Department of Paediatrics, San Paolo Hospital University of Milan, Italy; <sup>3</sup>Fondazione IRCCS, Cà Granda, Milan, Italy

**Objectives:** N-6 polyunsaturated fatty acids (PUFAs) have been recently related to the pathogenesis of obesity. We systematically reviewed data on n-6 PUFA status in obesity.

**Methods:** The Ovid MEDLINE, Scopus and Cochrane Library CENTRAL databases were searched from inception to September 2010 for trials, without restriction in study design, which included observational and intervention studies on obesity. We used formal inclusion/exclusion criteria and applied standard operation procedures for data extraction, validity assessment and meta-analysis.

**Results:** We found 11 relevant studies (1 randomised controlled trial and 10 case-control studies) comparing fatty acid composition of plasma phospholipids (PL, 6) and total plasma fatty acids (tFA, 5). Five of the studies were carried out in children ( $n=406$ ), 4 in adults ( $n=978$ ) and 2 in adolescents ( $n=145$ ). Values of linoleic acid (LA, C18:2n-6) were significantly lower in the obese group compared to normal weight controls in one study referring PL data, and in 3 studies referring tFA data. The pooled values of LA were significantly lower in tFA and PL in obese compared to normal weight subjects. The pooled effect size of alpha linolenic acid (ALA, C18:3n-3) and eicosapentaenoic acid

(EPA, C20:5n-3) in tFA were significantly higher in obese compared to normal weight subjects.

**Conclusion:** Systematic review of fatty acid compositional data in obese as compared to normal weight subjects does not appear to support the concept of the pathogenic role of n-6 PUFA in obesity.

Supported by the European Communities 7th Framework Programme (NUTRIMENTHE “Grant agreement number”: 212652).

### 33. NUTRITIONAL STATUS OF CHILDREN FROM CHILDREN'S HOMES – P

Hartmann, E<sup>1</sup>, Deé, K<sup>1</sup>, Lelovics, Zs<sup>1</sup>

<sup>1</sup>International Institute of Nutrition Research, Pécs, Hungary

**Introduction:** In long-term residential institutions 510 children live in Hungary, about their nutritional status and nutrition has not been done a referenced survey.

**Methods:** According to representativeness (10%) from three long-term residential institutions, examine the nutritional status of 54 students with measured parameters and a questionnaire compiled by the authors. The mean age of the 35 boys and 19 girls were 12.8+/-4.1 years.

**Results:** The distribution of BMI percentile show malnutrition and weight deficit (< 3) 19 person (35.8%), 5 people have 3 percentile (9.4%); 25 have optimal (10–75 percentile); 4 people have 75 or bigger percentile (7.5%). There were no significant differences between the two sexes. Before the survey (3–6 months) 8 children had large-scale involuntary body weight loss, they lost an average 8.3+/-4.8% of their body weight, one child was on tube feeding. All overweight and obese children were mentally retarded (IQ<70)—this was the reason of their institutional placement. The regular consumption of additional drinking formulas was 22.2%, in malnourished children 37.5%.

**Conclusion:** From the small number of overweight and obese children we could not make general conclusions, but we have to consider the percentiles that refer to weight deficit, we have to check that the regular intake of adequate quality and quantity of food is provided or not. The change of children's nutritional status has to be checked regularly. People live in institutions with disabilities have a high risk for malnutrition.

The physical conditions of the survey were supported by Nestlé HealthCare Nutrition.

### 34. OBESITY AND TYPE 2 DIABETES GENES, COMMON PATHWAYS? – Invited Lecture

Hermann, R<sup>1,2</sup>

<sup>1</sup>Department of Paediatrics, University of Pécs;

<sup>2</sup>Immunogenetics Laboratory, University of Turku

**Introduction:** Both type 2 diabetes and obesity lead to increased morbidity, early mortality, and represent severe burden to the patients and to the society. These conditions, that occur together frequently, display an increasing incidence in childhood on most ethnic groups. Both have a genetic component, that is important to define to better understand disease pathomechanism and to identify disease subphenotypes and tailored therapies. In this brief overview key points of type 2 diabetes and obesity genetics will be presented.

**Methods:** We will discuss, how the latest whole genome association studies improved our understanding on these conditions, and how pleiotropic gene effects may function. Finally, we aim to contextualise this knowledge from the clinics point of view.

**Results:** Recent genome-wide association studies (GWAS) and subsequent meta-analyses have identified more than 40

T2D genetic loci, that account only for 10% of the observed familial clustering. Progress in understanding obesity etiology has been similarly slow, with findings largely restricted to monogenic forms of obesity. Latest GWAS studies have detected more than 20 obesity susceptibility loci. These genes appear to be involved in the regulation of food intake through action in the central nervous system as well as in adipocyte function.

**Conclusion:** Results of the genome-wide association and expression studies, revealed a number of biological pathways that harbour new potential drug targets and biomarkers for T2D and obesity. Distinct gene patterns appear to separate molecular subphenotypes. It is becoming obvious that molecular profiling will enable better diagnostics and therapies in the future.

**Funding:** Academy of Finland, Sigrid Juselius Foundation, Finland, TAMOP 4.2.1.B Grant, Hungary.

### 35. MISALIGNMENT OF THE DISTAL EXTREMITIES IN OBESE CHILDREN AND ADOLESCENTS – P

Huber, G<sup>1</sup>, Landauer, F<sup>2</sup>, Weghuber, D<sup>1</sup>

<sup>1</sup>Department of Pediatrics, Paracelsus Private Medical School, Salzburg, Austria; <sup>2</sup>Department of Orthopedics, Paracelsus Private Medical School, Salzburg, Austria

**Introduction:** With the rapidly rising numbers in childhood obesity the likelihood of associated medical conditions also increases. In addition to metabolic, psychological or cardiovascular problems, orthopedic complications especially affecting the lower extremities play a major role. We therefore assessed the prevalence of genu varum (GVR) and genu valgum (GVL) misalignment.

**Methods:** 31 overweight and obese children (16 males, 15 females, mean age (years) 13,87±0,47, mean body length (cm) 162,29±2,72, mean weight (kg) 90,62±4,97, mean body mass index (BMI=kg/m<sup>2</sup>) 33,82±1,23) were clinically examined using the Mikulicz line in order to assess load distribution on the knee joint. 21 participants received a whole leg x-ray because of suspicious clinical presentation and the Mikulicz line not passing centrally through the patella.

**Results:** 14/62 (22,58%) legs examined were diagnosed with genu valgum, 1 (1,61%) with genu varum and 47 (75,81%) did not show any misalignment of the knee joint. The majority of genu valgum presentation was due to femoral misalignment (8/14) (57,14%), 1/14 (7,14%) showed misalignment in the tibia and 5/14 (35,71%) could not be classified. Of the participants without misalignment 12/47 (25,53%) showed abduction setting of the leg and 2/47 (4,25%) showed adduction of the leg.

**Conclusion:** GVR and GVL misalignments of the distal extremities can be observed in overweight and obese children and adolescents, GVL being highly prevalent. It is thus important to screen obese children prior to closure of the epiphyseal plate and further differentiate between femoral and tibial misalignment as this might have immanent therapeutic implications (epiphyseodesis).

### 36. COMBINED IN- AND OUTPATIENT MULTI-COMPONENT INTERVENTION ON MODERATE/ SEVERE OBESE CHILDREN – P

Iaccarino Idelson, P<sup>1</sup>, Zito, E<sup>1</sup>, Mozzillo, E<sup>1</sup>, Mobilia, S<sup>1</sup>, Galdi, S<sup>1</sup>, Quaglia, G<sup>1</sup>, Franzese, A<sup>1</sup>

<sup>1</sup>Dipartimento di Pediatria, Università degli Studi di Napoli Federico II, Italia

**Aim:** From May 2009 to May 2011 50 children (33M) were treated with a multicomponent combined inpatient (6 days) – outpatients (12 months) approach. The aim was

to evaluate the effectiveness of the treatment in terms of hours spent in the therapy, dropout ratio (DR) and weight loss (WL).

**Methods:** In the initial 6 days were performed: 1) diagnostic evaluations (blood pressure, glycemia, insulin, cholesterol, tryglicerids, transaminases); 2) nutritional, psychological, and lifestyle assessments; 3) instrumental exams: bioimpedentiometry, abdomen ecography, electrocardiogram; 4) educational therapy sessions: 2 meetings with the nutritionist, 2 meetings with the psychologist, physical activity prescribed, and a pedometer delivered.

Follow ups by a nutritionist and a psychologist was performed every 15 days during 1 year. After 6 months subjects who had initially altered clinical parameters were re-evaluated in Day Hospital.

**Results:** Mean age was  $11,69 \pm 3,16$ , mean BMI z-score  $2.6 \pm 0,4$ ; mean WL: BMI z-score  $-0,22$ , BMI  $-4,06$  at 6 months, and BMI z-score  $-0,37$ ; BMI  $-5,6$  at 12 months. DR at 6 months was 43,9% and 60,7% at 12 months. 1 hour/month was spent for each subject by the nutritionist and 1 hour/month by the psychologist. Time spent by the pediatrician during the initial 6 days and the Day Hospital was not calculated.

**Conclusions:** the efficacy and the effectiveness in terms of DR and WL can be achieved by dedicating a great amount of time to each subject with a multicomponent approach.

### 37. METABOLIC SYNDROME DETECTED BY A MULTICOMPONENT HOSPITALIZATION PROGRAMME FOR MODERATE/SEVERE OBESE CHILDREN – P

Iaccarino Idelson, P<sup>1</sup>, Zito, E<sup>1</sup>, Mozzillo, E<sup>1</sup>, Quaglia, G<sup>1</sup>, Cerrato, C<sup>1</sup>, Mobilia, S<sup>1</sup>, Franzese, A<sup>1</sup>

<sup>1</sup>Dipartimento di Pediatria, Università degli Studi di Napoli Federico II, Italia

**Introduction:** Childhood obesity is a major problem of public health in all Europe, with the highest rate found in Campania Region, Italy. Importance has to be paid on the identification of the possible complications (mainly the metabolic syndrome, MS), in order to better understand the dimension of the phenomenon and to better address effective strategies to combat it.

**Aim:** Underlying the importance of a multicomponent hospitalization programme for moderate/severe obese children for the identification and treatment of MS.

**Methods:** 103 children (63 M) were hospitalized for 6 days, to evaluate the complications of obesity and to start a multicomponent treatment based on educational integrated therapy (nutritionist and psychologist) addressed to modify behaviours and habits which caused and/or nourished the complications. 1 year integrated follow up (nutritionist and psychologist) was addressed to all patients, while blood tests were repeated after 6 months only to the subjects affected by MS.

**Results:** Mean age of the population was  $11,5 \pm 2,7$ , mean BMI z-score  $2.6 \pm 0,4$ . The 41,7% (N = 43) of the population was affected by MS. After 6 months mean BMI z-score was  $2.2 \pm 0,4$  and only 7,7% of the sample was still affected by MS.

**Conclusions:** The big reduction of MS ( $-34\%$ ) after 6 months of therapy show that the multicomponent hospitalization treatment is important to: 1).

### 38. GENETICS AND DISEASE MECHANISM OF TYPE 1 DIABETES – Invited Lecture Ilonen, J<sup>1</sup>

<sup>1</sup>Immunogenetics Laboratory, University of Turku

Abstract has not been received till the deadline.

### 39. EATING BEHAVIOURS AND EMOTIONAL SYMPTOMS IN CHILD OBESITY – P

Isnard, P<sup>1,2,3</sup>, d'Autume, C<sup>4</sup>, Musher-Eizenman, D<sup>5</sup>, Frelut, ML<sup>6</sup>

<sup>1</sup>AP-HP, Hôpital Robert Debré, Service de psychopathologie de l'enfant, Paris; <sup>2</sup>AP-HP, Hôpital Bichat, Service de Psychopathologie de l'Enfant et de l'Adolescent, Paris; <sup>3</sup>Unité INSERM 669 et Universités Paris-Sud et Paris Descartes, UMR-S0669, Paris, France; <sup>4</sup>AP-HP, Hôpital Avicenne, Service de Psychopathologie de l'Enfant et de l'Adolescent, Bobigny, France; <sup>5</sup>Department of Psychology, Bowling Green State University, Bowling Green, Ohio, USA; <sup>6</sup>AP-HP, Hôpital Bicêtre, Service d'endocrinologie pédiatrique, Kremlin-Bicêtre, France

**Objectives:** The main objective is to assess emotional symptoms (anxiety and depression) and to describe eating behaviours in a child and adolescent population in an outpatient paediatric department. The second objective is to examine interactions between these parameters.

**Methods:** A cross-sectional exploratory study including self-report questionnaires in obese children of both sexes aged 7 to 15 years old: CDI (Child Depression Inventory), state scale of the STAIC (State-Trait Anxiety Inventory for Children), BES (Binge Eating Scale) adapted for children, DEBQ (Dutch Eating Behaviour Questionnaire) adapted for children.

**Results:** Nearly half of the children and adolescents had significant anxiety, nearly one third had depressive symptoms above the cut-off score and 15% had severe binge eating symptoms. Binge eating symptoms were independently associated with emotional eating, anxiety and depression.

**Discussion:** Emotional symptoms and eating behaviours are strongly associated in child and adolescent obese population in an outpatient paediatric department. The implications and the direction of this association are discussed.

**Conclusion:** It is necessary to assess emotional symptoms and eating behaviours in obese children and adolescents in order to implement multidisciplinary treatment. identify MS (otherwise not surely identified); 2) address specific treatments; 3) modify unhealthy behaviours.

### 40. ASSOCIATIONS OF BREASTFEEDING WITH BODY COMPOSITION AND BODY FAT DISTRIBUTION IN YOUNG ADULTHOOD – P

Joslowski, G<sup>1</sup>, Günther, ALB<sup>2</sup>, Cheng, G<sup>1</sup>, Bolzenius, K<sup>1</sup>, Remer, T<sup>1</sup>, Buyken, AE<sup>1</sup>, Kroke, A<sup>2</sup>

<sup>1</sup>Forschungsinstitut für Kinderernährung Dortmund, Deutschland; <sup>2</sup>Fulda University of Applied Sciences, Department of Nutritional Food and Consumer Sciences

**Aim:** This study examined whether beneficial associations previously observed between breastfeeding and childhood body composition extend to body composition and body fat distribution in young adulthood.

**Methods:** This analysis included 304 DONALD participants with data on breastfeeding and anthropometric measurements in young adulthood (18–25 years). Breastfeeding categories were defined as “Not fully breastfed” (not, partially or fully breastfed >2 weeks) “fully breastfed” (fully breastfed >2 weeks). Additionally, “short” and “long duration” of full breastfeeding was considered (3–17 weeks and >17 weeks, respectively). Multivariate linear regression analyses were performed to analyse associations with fat mass- and fat free mass index (FMI and FFMI, in kg/m<sup>2</sup>) and waist circum-

ference (WC, in cm) and with waist-to-height-ratio (WHR) as indicators of body fat distribution in young adulthood. WC measurements were only available for 222 participants. Early life and socio-economic factors, maternal overweight and parental education were considered as potentially confounding factors.

**Results:** Fully breastfed participants had a 15% lower FMI and a 3% lower FFMI (adjusted means (95% CI) FMI: 4.8(4.5–5.1) vs. 5.5(5.1–6.0) kg/m<sup>2</sup>,  $p=0.01$ ; FFMI: 17.2(17.0–17.5) vs. 17.7(17.3–18.0) kg/m<sup>2</sup>,  $p=0.03$ ). Full breastfeeding was accompanied with a lower WC in young adulthood (adjusted means (95% CI) 72.5(70.8–74.3) vs. 79.5(76.6–82.6) cm,  $p<0.0001$ ). Similar results were obtained for WHR. Anthropometric measures did not differ between participants fully breastfed for a short or long duration ( $p>0.1$ ).

**Conclusion:** This study suggests that full breastfeeding beneficially influences body composition and body fat distribution over the long-term. No clear evidence of a dose-response relationship was found.

**Funding:** Research relating to this abstract was funded by the World Cancer Research Fund International (grant no. 2010/248). The DONALD study is supported by the Ministry of Science and Research of North Rhine Westphalia, Germany.

#### 41. PROSPECTIVE ASSOCIATIONS OF DIETARY INSULIN INDEX, GLYCEMIC INDEX, AND GLYCEMIC LOAD DURING PUBERTY WITH BODY COMPOSITION IN YOUNG ADULTHOOD – O

Joslowski, G<sup>1</sup>, Goletzke, J<sup>1</sup>, Cheng, G<sup>1</sup>, Günther, ALB<sup>2</sup>, Bao, J<sup>3</sup>, Brand-Miller, JC<sup>3</sup>, Buyken, AE<sup>1</sup>

<sup>1</sup>Forschungsinstitut für Kinderernährung Dortmund, Deutschland; <sup>2</sup>Fulda University of Applied Sciences, Department of Nutritional Food and Consumer Sciences; <sup>3</sup>The Boden Institute of Obesity, Nutrition & Exercise and the School of Molecular Biosciences, University of Sydney, Sydney, Australia

**Background:** Puberty is a so-called critical period for overweight development and characterized by physiological insulin resistance during mid-puberty. This study addressed the hypothesis that habitual consumption of a diet inducing higher levels of postprandial glycemia or insulinemia during puberty may have an unfavorable effect on body composition in young adulthood.

**Methods:** Multivariate regression analysis were performed on 262 DONALD participants with at least two 3-day weighed dietary records during puberty (baseline: girls 9–14 years; boys 10–15 years) and anthropometric measurements in young adulthood (18–25 years). A published dietary glycemic index was assigned to each carbohydrate containing food. Similarly, each food was assigned a food insulin index (insulinemic response to a 1MJ portion of food relative to 1MJ of glucose) using 121 values measured at Sydney University.

**Results:** Dietary glycemic index or glycemic load during puberty were not related to body composition in young adulthood. In contrast, a higher dietary insulin index (II) during puberty was associated with higher levels of percentage of body fat (%BF) in young adulthood, even after adjustment for early life, socioeconomic and nutritional factors; %BF in energy-adjusted tertiles of dietary II were 22.9 (95% CI: 21.6, 24.1), 24.5 (23.2, 25.7), 24.7 (23.5, 25.9)%,  $p_{\text{for trend}}=0.01$ . Adjustment for baseline %BF attenuated this relationship ( $p_{\text{for trend}}=0.1$ ). Dietary II was not related to BMI.

**Conclusion:** This study suggests a prospective adverse influence of dietary II during puberty on %BF in young adulthood. Postprandial increases in insulinemia rather

than increases in glycemia appear to be implicated in an unfavorable development of body composition.

**Funding:** The DONALD study is supported by the Ministry of Science and Research of North Rhine Westphalia, Germany, and this analysis was partially funded by the World Cancer Research Fund International (grant no. 2010/248).

#### 42. THE RELATIONSHIP BETWEEN NEONATAL AND CHILDHOOD NUTRITIONAL STATUS – Invited Lecture

Joubert, K<sup>1</sup>, Zsákai, A<sup>2</sup>, Molnár, D<sup>3</sup>, Gyenis, G<sup>2</sup>

<sup>1</sup>Demographic Research Institute, Hungarian Central Statistical Office, Budapest, Hungary; <sup>2</sup>Department of Biological Anthropology, Faculty of Science, Eötvös Loránd University, Budapest, Hungary; <sup>3</sup>Department of Pediatrics, University of Pécs, Pécs, Hungary

**Objective:** The main purpose of the analysis was to study the relationship between neonatal and childhood nutritional status.

The subjects were examined in a representative longitudinal growth study in Hungary, which was started with a 2% sample of newborns of 1980–1983. Children were measured regularly from birth until the age of 18. Altogether 1753 children were randomly selected for the present longitudinal analysis.

**Methods:** Neonatal nutritional status was assessed by birth weight for gestational age (SGA, AGA, LGA subgroups). Childhood nutritional status was assessed by some natural body dimensions and by body mass index. The Reed-Asefa model was fitted to the subject's serial data of BMI. Subjects were divided into normal, overweight and obese subgroups by using the age-dependent BMI cut-off points.

**Results:** Neonatal nutritional status was found to be a good predictor of childhood nutritional status by analyzing both the natural body dimensions as well as body mass index as estimators of nutritional status: the better neonatal nutritional status, the bigger abdominal circumference, skin-fold thicknesses and BMI were found in childhood. Although the BMI of the neonatal developmental subgroups differed consistently from birth in both genders, but the timing of BMI wave events (adiposity peak and rebound) of SGA, AGA and LGA children happened at the same age.

**Conclusion:** The relationship between neonatal and childhood nutritional status was studied by using BMI for nutritional status assessment in our former analysis. By considering abdominal circumference as well as skin-fold thicknesses could provide more information on the tracking of nutritional status.

#### 43. NUTRITIONAL STATUS AND SELF-ESTEEM IN HUNGARIAN ADOLESCENTS – P

Karkus, Zs<sup>1</sup>, Zsákai, A<sup>1</sup>, Bodzsár, ÉB<sup>1</sup>

<sup>1</sup>Eötvös Loránd University, Department of Biological Anthropology, Budapest, Hungary

**Objectives:** The aim of the present study were to compare 1) the age changes in the body fatness of adolescents belonging to different self-concept subgroups; and 2) the level of self-esteem (body image, moral, individual, family and social self-concept) of adolescents grouped by their nutritional status.

**Subjects and Methods:** The subjects (1701 boys, 1708 girls; aged 11–18) formed a subsample of the 2<sup>nd</sup> Hungarian National Growth Study (Bodzsár and Zsákai 2007). Nutritional status was estimated by BMI using the cut-off points recommended by Cole and his colleagues (Cole *et al.* 2000), skinfold thicknesses, as well as the relative fat frac-

tion of body composition components (Drinkwater and Ross 1980). The self-esteem was assessed by the Tennessee scale (Fitts 1964, Dévai and Sipos 1986).

**Results:** The better the body image, the smaller the fatness was found in both sexes. In obese and overweight adolescents the body image was significantly more negative than in their age-peers with normal nutritional status, however the differences in the other self-esteem components (moral, individual, family and social self-concept) were not significant.

**Conclusions:** The presumed fact that obesity is not popular in adolescence has been confirmed by this study. Pubertal overweight and obesity, the discrepancy between the ideal and actual body image in adolescence could have an important influence on the adult mental health.

**Acknowledgement:** This study was supported by the Hungarian National Foundation for Science (OTKA grant K 76849).

#### 44. SOCIO-ECONOMIC STATUS IN RELATION TO ENERGY BALANCE BEHAVIOURS AND ADHERENCE TO THE MEDITERRANEAN DIET IN GREEK ADOLESCENTS – P

Konstantopoulou, A<sup>1</sup>, Costarelli, V<sup>1</sup>, Sdrali, D<sup>1</sup>

<sup>1</sup>Human Ecology Laboratory, Department of Home Economics and Ecology, Harokopio University, 70 El. Venizelou Ave, 176 71 Kallithea, Athens, Greece

**Introduction:** Socioeconomic inequality and its impact on health is a growing concern in the European public health debate. A growing number of studies suggest that children in lower-income families in developed countries are particularly vulnerable to becoming obese. The study explores the effect of socioeconomic status (SES) on energy balance behaviours and adherence to the Mediterranean Diet (MD), in Greek adolescents.

**Methods:** A total of 391 students (179 boys and 212 girls), 14–16 years old, have been recruited from 2 public high schools located in low SES areas of Athens and 2 private high schools from higher SES areas. Students completed a specifically designed energy balance behaviours questionnaire together with the KIDMED index, which evaluates the degree of adherence to the MD. Body weight and height were also recorded.

**Results:** Adolescents of low SES reported lower adherence to the MD ( $P<0.05$ ), higher consumption of soft drinks ( $P<0.001$ ), lower breakfast consumption ( $P<0.01$ ), fewer meals per day consumed with parents ( $P<0.01$ ), lower physical activity levels ( $P<0.01$ ) and more TV viewing hours ( $P<0.001$ ) in comparison to adolescents of higher SES. Prevalence of overweight and obesity was 24.9% for low SES and 9.7% for high SES students.

**Conclusion:** Lower SES is associated with energy balance behaviours, which increase the risk of obesity in adolescents.

#### 45. HEALTH-RELATED QUALITY OF LIFE IN GREEK ADOLESCENTS: THE ROLE OF THE MEDITERRANEAN DIET – P

Koretsi, E<sup>1</sup>, Costarelli, V<sup>1</sup>, Georgitsogianni E<sup>1</sup>

<sup>1</sup>Human Ecology Laboratory, Department of Home Economics and Ecology, Harokopio University, 70 El. Venizelou Ave, 176 71 Kallithea, Athens, Greece

**Introduction:** Health-related quality of life (HRQOL) refers to an individual's perception and subjective evaluation of their health and well-being within their unique cultural environment. HRQOL in relation to adherence to the Mediterranean Diet (MD) in adolescents has not been adequately investigated in the past. The purpose of the study

was to explore possible links between adherence to the Mediterranean Diet (MD), excess body weight and HRQOL.

**Methods:** A total of 359 students (166 boys; 193 girls), 13–16 years old, were recruited from 13 high schools in the area of Athens and the Dodecanese. Standard anthropometric measurements were taken and obesity was assessed using the International Obesity Task Force (IOTF) cut off points. Students completed the KIDMED index, which evaluates the degree of adherence to the MD. Perceived HRQOL was assessed by the KIDSCREEN-27 questionnaire for children and adolescents.

**Results:** Results indicate significant differences in HRQOL with regard to the level of adherence to the MD. Adolescents with good adherence to the MD scored significantly higher in total HRQOL ( $P<0.001$ ) and in the following subscales of the KIDSCREEN-27 questionnaire: physical well-being ( $P<0.001$ ), psychological well-being ( $P=0.01$ ), autonomy and parents ( $P<0.05$ ) and school environment ( $P<0.001$ ). Obese adolescents scored lower in physical well-being ( $P<0.001$ ), peers and social support ( $P<0.05$ ) and school environment ( $P=0.08$ ).

**Conclusions:** Poor adherence to the MD and obesity seem to negatively affect important components of HRQOL in adolescents.

#### 46. SECONDARY PREVENTION OF OVERWEIGHT AND OBESITY IN 5 TO 9 YEAR OLD CHILDREN – P

Larsen, LM<sup>1</sup>, Hertel, T<sup>1</sup>, Mølgaard, C<sup>1</sup>, Christensen, RDP<sup>2</sup>, Husby, S<sup>1</sup>, Jarbøl, DE<sup>2</sup>

<sup>1</sup>Hans Christian Andersen Children's Hospital; <sup>2</sup>Research Unit of General Practice, Univ. Southern Denmark

**Objective:** To evaluate the effect of two secondary prevention modalities in overweight and obese children in general practice.

**Subjects:** Overweight or obese children, identified by IOTF criteria, at the age of 5–9 year.

**Design:** A prospective randomized trial performed in 60 general practices in Denmark between August 2007 and November 2010. Children were allocated to a Model 1 with preventive health consultations in general practice during a two year period or to a more complex Model 2 including an educational program for the children and their families in addition to the consultations.

**Outcome Measures:** Change in mean BMI z score and change in waist-height-ratio.

**Results:** 80 children were recruited with 35 and 45 children allocated to Model 1 and 2, respectively. No significant differences were found in mean-BMI z score change between the two groups, but a significant decrease in mean-BMI z score was detected within both groups ( $p<0.04$ ). Evaluation of waist-height-ratio showed a tendency in favour of the “noncomplex” intervention. The majority of the participants (2/3) stayed in the study for more than one year.

**Conclusion:** In this particular setting the two intervention strategies did not differ significantly. The BMI z scores were significantly lowered during follow-up in both groups.

#### 47. MAIN CHARACTERISTICS OF OVERWEIGHT AND OBESE ETHNIC (GIPSY) STUDENTS – P

Lelovics, Zs<sup>1</sup>, Vági, Zs<sup>1</sup>, Deé, K<sup>1</sup>, Csáki, I<sup>2</sup>

<sup>1</sup>International Institute of Nutrition Research, Pécs, Hungary; <sup>2</sup>“Dancs Lajos” Musical Primary School, Nagyecséd, Hungary

**Introduction:** One of the key issues of today's education is integration, the difficulties of the education and health

education of gypsy children. Authors found 17% of the gypsy students overweight and obese, and examined the eating habits of them.

**Methods:** From 7 schools, 81 overweight or obese gypsy students (age between 11 and 16; percentile >75; 65.4% boy, 34.6% girl; average age 13.0+/-1.3 years) completed voluntarily and anonymously the questionnaire (21 questions) about their eating habits, with the help of the teachers. To analyse data we applied two-sample t-test, and 95% confidence interval comparison. To determine the gypsy origin the question "Do you confess yourself gypsy?" was applied.

**Results:** The gypsy overweight and obese girls significantly ( $p < 0.05$ ) not or less often do sports (53.6%) than the boys (35.8%). Girls significantly more often have no breakfast (3.6%) than boys (1.9%). 35.8% of the participants have breakfast every day. 3.7% never have lunch (girls significantly often do not have lunch than boys), 11.1% eat only once a day, 3.7% eat twice a day. In every day from three students only two have lunch (67.9%), only one third of them have five meals (healthy) a day (30.9%); 23.5% of them eat fruits never or rarely.

**Conclusions:** The base of successful integration is to prepare children as subjective-biological conditions and permit it. To recognise the lifestyle of children from different cultures, and the health promotion based on it can play a basic role in the elimination of the school failures of gypsy ethnic group.

#### 48. FOOD REWARD, BODY WEIGHT REGULATION AND ADDICTION – Plenary Lecture Lénárd, L<sup>1</sup>, Karádi, Z<sup>1</sup>

<sup>1</sup>Institute of Physiology and Neurophysiology Research Group of the Hungarian Academy of Sciences, Pécs University Medical School, H-7624 Pécs, Hungary

Eating is a highly motivated and reinforced behavior that not only provides nutrients but also induces feelings of gratification and pleasure. The sight, smell and taste of foods can evoke feeding, or – under certain circumstances – can stop feeding even in hungry individuals. We propose a new model explaining hunger motivated behavior and food rewarded learning. The central core of this model is the glucose monitoring (GM) network. GM neurons located in the hypothalamus and different limbic structures are specific chemosensory cells monitoring neurochemicals of the local brain milieu and they receive humoral and viscerosensory information. The central representation of taste and odor is highly overlapped with the GM network. Hypothalamic and limbic forebrain areas are responsible for evaluation of reward quality and related emotions. They are innervated by the mesolimbic dopaminergic (DA) system (MLDS) and GM neurons are influenced by DA. MLDS plays an essential role in reinforcing processes and DA has a rewarding-reinforcing value. Via DA release eating acts as a psychostimulant and DA release during eating can explain bulimic symptoms. Enhancement of reward quality by sweet taste and DA release can contribute to the development of childhood obesity in which emotional and cognitive deficits have been detected. Supported by NKTH-OTKA K 68431 and the HAS.

#### 49. N-TERMINAL PRO-B-TYPE NATRIURETIC PEPTIDE IN EARLY AND ADVANCED PHASES OF OBESITY – O Mangge, H<sup>1</sup>, Almer, G<sup>1</sup>, Zelzer, S<sup>1</sup>, Vasan, R<sup>2</sup>, Kraigher-Krainer, E<sup>3</sup>, Gasser, R<sup>3</sup>, Schnedl, W<sup>3</sup>, Ille, R<sup>4</sup>, Wallner, S<sup>6</sup>, Möller, R<sup>7</sup>, Horejsi, R<sup>7</sup>, Weghuber, D<sup>8</sup>

<sup>1</sup>Clinical Institute of Medical and Chemical Laboratory Diagnosis, Medical University of Graz; <sup>2</sup>Department of Medicine, Boston University School of Medicine,

The Framingham Heart Study USA; <sup>3</sup>Department of Cardiology, Medical University of Graz, Austria; <sup>4</sup>Institute for Psychology, Karl-Franzens University of Graz; <sup>6</sup>Institute of Pathophysiology & Immunology, Center for Molecular Medicine, Medical University of Graz; <sup>7</sup>Institute of Physiological Chemistry, Center of Physiological Medicine, Graz; <sup>8</sup>Department of Pediatrics, Paracelsus Private Medical School Salzburg, Austria

**Background:** Increased plasma amino-terminal-cleavage-fragment of NP (NT-proBNP) is an established indicator for heart failure. Moreover, obese adults had low circulating NT-proBNP suggesting an obesity-related dysregulation (natriuretic handicap). Secretion and/or clearance of NT-proBNP were discussed to be impaired in obesity. As only older adults were investigated so far, it remains unclear when during the evolution of obesity the state of a natriuretic handicap develops, and whether NT-proBNP may still serve as a relevant cardiac marker in obese juveniles.

**Methods:** We analysed NT-proBNP in juvenile (n=274, 10–18 years) and middle-aged (n=277, 18–50 years) normal weight (n=213) and obese (n=338) probands together with complex anthropometry, carotis sonography, clinical, and lab parameters.

**Results:** NT-proBNP showed a significant sex and age interaction. Adult females had significant higher NT-proBNP than adult males, and higher levels than juvenile females. Adult males had lower levels than juvenile males. Only a weak age and weight interaction was seen with obese juveniles which showed higher NT-proBNP than obese adults. Moreover, normal weight probands had higher NT-proBNP than overweight and obese. In a multiple regression including all probands, gender, creatinine and uric acid were the best predictors for NT-proBNP. In adults, female gender is the strongest driver for increased NT-proBNP.

**Conclusions:** These results argue against an essential influence of obesity to B-type cardiac natriuretic hormone system regulation in the absence of heart failure, and suggest NT-proBNP as a useful cardiac marker irrespective of age and obesity.

**Funding:** This work was funded by the "Zukunftsfond Steiermark" Project "STYJOBS". Furthermore, the Austrian Nano-Initiative co-financed this work as part of the Nano-Health project (no. 0200), the sub-project NANO-PLAQUE being financed by the Austrian FWF (Fonds zur Förderung der Wissenschaftlichen Forschung, Project no. N212-NAN).

#### 50. RS9939609 VARIANT OF THE FAT MASS AND OBESITY-ASSOCIATED GENE AND TRUNK OBESITY IN ADOLESCENTS – P

Mangge, H<sup>1</sup>, Renner, W<sup>1</sup>, Almer, G<sup>1</sup>, Weghuber, D<sup>2</sup>, Möller, R<sup>3</sup>, Horejsi, R<sup>3</sup>

<sup>1</sup>Clinical Institute of Medical and Chemical Laboratory Diagnostics, Medical University of Graz, Graz, Austria;

<sup>2</sup>Department of Pediatrics, Paracelsus Private Medical University Salzburg, Salzburg, Austria; <sup>3</sup>Institute of Physiological Chemistry, Center of Physiological Medicine, Medical University of Graz, Graz, Austria

**Introduction:** A common T/A polymorphism (rs9939609) in the fat mass and obesity associated (FTO) gene was found associated with early-onset and severe obesity in both adults and children. However, recent observations failed to find associations of FTO with obesity.

**Methods:** To investigate the genetic background of early obesity, we analysed the single nucleotide polymorphism (SNP) rs9939609 of FTO in 371 styrian adolescents towards degree of obesity, subcutaneous adipose tissue (SAT)-distribution determined by lipometry, early metabolic and preatherosclerotic symptoms.

**Results:** The percentage of AA homozygotes for the rs9939609 SNP of FTO was significantly increased in the obese adolescents. Compared to the TT wildtype, AA homozygotes showed significantly elevated values of SAT thickness at the trunk-located lipometer measure points neck and frontal chest, body weight, body mass index, waist, and hip circumference. No associations were found with carotis communis intima media thickness, systolic, diastolic blood pressure, ultrasensitive C-reactive protein (US-CRP), homocystein, total cholesterol, triglycerides, HDL cholesterol, oxidized LDL, fasted glucose, insulin, HOMA-index, liver transaminases, uric acid, and adipokines like resistin, leptin, and adiponectin.

**Conclusion:** Taken together, to the best of our knowledge we are the first to report that the rs9939609 FTO SNP is associated with trunk weighted obesity as early as in adolescence.

**Funding:** This work was funded by the "Zukunftsfond Steiermark" Project "STYJOBS". Furthermore, the Austrian Nano-Initiative co-financed this work as part of the Nano-Health project (no. 0200), the sub-project NANO-PLAQUE being financed by the Austrian FWF (Fonds zur Förderung der Wissenschaftlichen Forschung, Project no. N212-NAN).

#### 51. BARIATRIC AND METABOLIC SURGERY IN ADOLESCENTS AND CHILDREN – Invited Lecture

Miller, K<sup>1</sup>, Silberhumer, GR<sup>2</sup>, Kriwanek, S<sup>3</sup>, Widhalm, K<sup>4</sup>, Prager, G<sup>2</sup>, Ardelit-Gattinger, E<sup>5</sup>, Weghuber, D<sup>6</sup>

<sup>1</sup>Hospital Hallein, Department of Surgery, Hallein;

<sup>2</sup>Medical University Department of Surgery, Vienna;

<sup>3</sup>Hospital Rudolfstiftung, Department of Surgery, Vienna;

<sup>4</sup>Medical University Vienna, Department of Pediatrics, Vienna;

<sup>5</sup>Department of Psychology, University Salzburg;

<sup>6</sup>Department of Pediatrics SALK, Paracelsus Medizinische Privatuniversität Salzburg

**Background:** Morbid obesity is a raising problem in adolescents in the industrial nations. Up to 25% of children have a body mass index (BMI) higher than the 85<sup>th</sup> age and sex adjusted percentile. Obesity in the youth is associated with increased risk for morbidity and mortality in adulthood. In addition these patients suffer from psychological problems and decreased quality of life. Bariatric procedures have shown effective long-term results in adults, but they are still discussed controversially in adolescent patients.

**Methods:** Between 1998 and 2004 50 adolescent patients with a mean age of 17.1±2.2 years (range 9 to 19 years) underwent laparoscopic adjustable gastric banding (LAGB) in Austria and follow up until 2011. The psychological changes were analysed by the Moorehead-Ardelt/BAROS questionnaire.

**Results:** The mean BMI decreased from 45.2±7.6 kg/m<sup>2</sup> at time of surgery to 32.6±6.8 kg/m<sup>2</sup> after a mean follow up of 34.7±17.5 months. The mean excessive weight loss was 61.4±35.5%. Most of the adolescents showed remarkable improvements in their quality of life: The outcome was regarded as "excellent or very good" in 32 patients, "good" in 12 patients and "fair" in 5 patients. Only one patient remarked no alterations after surgery. Two thirds of the preoperative comorbidities resolved, one third improved during follow up. Except one port dislocation, no peri- and postoperative complications arose.

**Conclusion:** Laparoscopic adjustable gastric banding is an effective and attractive treatment option in very carefully selected obese adolescents, due to its adjustability and the preservation of the gastrointestinal passage. The majority of patients showed a remarkable improvement of their quality of life.

#### 52. CONSEQUENCES OF CHILDHOOD OBESITY: DOES METABOLIC SYNDROME EXIST IN CHILDREN?

– Invited Lecture

Molnár, D<sup>1</sup>

<sup>1</sup>Department of Pediatrics, University of Pécs, Hungary

**Objectives:** To review the magnitude, characteristics and public health importance of childhood obesity and obesity-related pathology with special emphasis on the metabolic syndrome (MS).

**Results:** Obesity is the most prevalent nutritional disorder among children and adolescents in the majority of developed and also developing countries. Recent epidemiologic studies from three countries reported that the increasing trend in the prevalence of childhood obesity had reached a plateau or reversed. The significance of childhood obesity, beside its high prevalence, is underlined by the followings:

- In extreme cases it can be a life threatening condition during childhood.
- Obesity-related complications can develop during childhood.
- Obesity is associated with hypertension, dyslipidemia, type 2 diabetes mellitus, MS, systemic inflammation and oxidative stress.
- Obesity tracks from childhood into adult life.

The prevalence of MS highly depends on the definition and cut-off points used. Unfortunately there is no consensus concerning the definition of MS in childhood. The deeper analysis of Ms and uncertainties concerning the definitions, the stability of the diagnosis will be discussed in detail.

**Conclusion:** The health burdens of obesity are already considerable during childhood. The high level of diagnostic inconsistency through childhood suggests that MS classification may not be valuable method for risk identification in pediatric age group.

These limitations suggest that prevention and treatment in childhood and adolescence should better focus on established risk factors rather than the diagnosis of MS.

#### 53. EXAMINATION OF MICROVASCULAR FUNCTION IN LEAN AND OVERWEIGHT HYPERTENSIVE ADOLESCENTS – P

Monostori, P<sup>1</sup>, Baráth, Á<sup>1</sup>, Fazekas, I<sup>1</sup>, Hódi, E<sup>1</sup>, Máté, A<sup>1</sup>, Farkas, I<sup>1</sup>, Hracskó, Zs<sup>2</sup>, Varga, SI<sup>2</sup>, Sümegi, V<sup>1</sup>, Gellén, B<sup>1</sup>, Bereczki, Cs<sup>1</sup>, Túri, S<sup>1</sup>

<sup>1</sup>Department of Paediatrics, University of Szeged, Szeged, Hungary; <sup>2</sup>Department of Biochemistry and Molecular Biology, University of Szeged, Szeged, Hungary

**Introduction:** The aim of the present study was to examine (for the first time) the microvascular reactivities of primary hypertensive adolescents, either lean or overweight.

**Methods:** Twenty-three overweight hypertensive (OH) and 10 lean hypertensive (LH) adolescents, 11 haemodialysis (HD) patients and 19 healthy adolescent controls were enrolled. Blood samples were drawn for the enzymatic determination of the concentrations of oxidized and reduced glutathione (GSSG, GSH). Following a 15 min acclimatization, the microvascular reactivity on two sites of the volar side of the forearm was evaluated by means of laser Doppler flowmetry (LDF). An iontophoresis sequence, consisting of three consecutive, increasing doses of either acetylcholine (Ach) or sodium nitroprusside (SNP), and local heating to 44°C (maximal vasodilation) were performed.

**Results:** The respective blood perfusion responses to the three iontophoretic doses of Ach or SNP, as well as to local

heating to 44°C, showed a decreasing trend in both hypertensive groups, and were significantly attenuated in the HD patients as compared with the controls. The whole blood ratios GSSG/GSH were increased in all patient groups, to the largest extent in the HD group.

**Conclusion:** Microvascular reactivity was similar in the OH and LH adolescents, and markedly attenuated in the HD patients as compared with the controls. This suggests that an impairment of the endothelium-dependent microvascular reactivity, a characteristic alteration in adult hypertension, is more likely to follow, rather than precede the elevation of the blood pressure in juvenile primary hypertension.

**Funding:** Research relating to this abstract was funded by Hungarian National Scientific Research Grant OTKA K67895.

#### 54. BODY MASS INDEX AS AN INDICATOR OF BODY FATNESS FOR BOYS AND GIRLS – P

Mourão-Carvalho, I<sup>1</sup>, Gama, A<sup>2</sup>, Nogueira, H<sup>3</sup>, Rosado, V<sup>4</sup>, Padez, C<sup>4,5</sup>

<sup>1</sup>Department of Sports Sciences, Exercise and Health, University of Trás-os-Montes Alto Douro, Vila Real, Portugal, CIDESD; <sup>2</sup>Faculty of Sciences, University of Lisbon and Research Centre for Anthropology and Health, University of Coimbra; <sup>3</sup>Department of Geography, University of Coimbra; <sup>4</sup>Instituto Investigação Científica Tropical and Research Centre for Anthropology and Health, University of Coimbra; <sup>5</sup>Department of Life Sciences, and Research Centre for Anthropology and Health, University of Coimbra

Read by title.

#### 55. RELATIONSHIP BETWEEN ADIPOSITY REBOUND, EARLY WEIGHT GAIN, ANTHROPOMETRIC PARAMETERS IN THE HUNGARIAN SAMPLE OF THE IDEFICS STUDY: PRELIMINARY RESULTS – P

Nagy, P<sup>1</sup>, Tornaritis, M<sup>2</sup>, Siani, A<sup>3</sup>, De Henauw, S<sup>4</sup>, Kovacs, E<sup>1</sup>, Molnar, D<sup>1</sup>

<sup>1</sup>Department of Paediatrics, University of Pécs, Hungary; <sup>2</sup>Research and Education Institute of Child Health, Strovolos, Cyprus; <sup>3</sup>Institute of Food Sciences, National Research Council, Avellino, Italy; <sup>4</sup>University of Ghent, Department of Public Health, Ghent, Belgium

**Aim:** To give preliminary evaluation on the relationship between adiposity rebound (AR), early weight gain, anthropometric parameters.

**Methods:** Weight and height of 304 children (110 boys, mean±SD age: 7.14±1.69, age range 3–9 years, BMI: 16.3±2.76) at 0; 1; 2; 3; 4; 6 months, later yearly were collected from General Practitioners. Age and sex specific z-scores (Cole) of waist circumference and BMI at the time of the survey were used. Data were analyzed by Pearson's correlation with SPSS 15.0 software.

**Preliminary Results:** Average age of AR was: 5.1±1.54 yr, 4.7±1.86 yr and 5.0±2.14 yr in normal, overweight and obese children, respectively. The most significant correlations were found between weight gain during the first year of life and: 1) waist circumference ( $r=0.336$   $p<0.0001$ ) and 2) BMI z-scores ( $r=0.308$   $p<0.0001$ ). No correlations were found between AR age and investigated anthropometric parameters.

**Conclusion:** Our results confirm that early weight gain has an effect on anthropometric parameters of children at later

age. Nevertheless, the investigation of the whole IDEFICS sample is needed to clarify the exact relationships.

**Acknowledgement:** This work was done as part of the IDEFICS Study ([www.idefics.eu](http://www.idefics.eu)). We gratefully acknowledge the financial support of the European Community within the Sixth RTD Framework Programme Contract No. 016181 (FOOD), and co-funded by ETT (Hungarian Scientific Council) Contract No. 276/2009.

#### 56. HABEAT: UNDERSTANDING CRITICAL PERIODS AND CRITICAL FACTORS OF THE FORMATION AND OF THE MODIFICATION OF FOOD HABITS – Invited Lecture

Nicklaus, S<sup>1</sup>, Issanchou, S<sup>1</sup>

<sup>1</sup>Centre des Sciences du Goût et de l'Alimentation, UMR6265 CNRS, UMR1324 INRA, Université de Bourgogne, Dijon, France

**Introduction:** Diets of young children in many European countries are not ideal (too many lipids; not enough fruit and vegetables). Early nutrition may have an impact on health in later life (diabetes, obesity, heart problems) and the first two years of life are of crucial importance in the acquisition of food habits. The HabEat project aims at understanding better of how food habits are formed and can be changed, in infants and children (< 5 years).

**Methods:** With 11 beneficiaries from 6 European countries, HabEat (2010–2013) is based on a multidisciplinary approach (epidemiology, nutrition, behavioural science, psychology and sensory science). On one hand, in order to identify critical periods and critical factors in the formation of food habits, the epidemiological approach is exploiting existing data from 4 cohorts (Eden, France; ALSPAC, UK; GenerationXXI, Portugal; EuroPrevall, Greece). On the other hand, the experimental approach is focusing on key learning mechanisms (in 6mo–3y children) and on new strategies for changing from poor to healthy habits (in 3–5y children).

**Results:** All workpackages of the HabEat project are ongoing. This research will increase understanding of the critical periods when food habits and eating patterns form and to support effective intervention strategies for habit-breaking and behavioural change directed towards making healthier food choices.

**Conclusion:** By 2013, the results from HabEat should lead to recommendations in parental practices for feeding infants and children, of particular use to early childhood professionals, paediatricians and policy makers responsible for drafting feeding guidelines and also to the baby food industry.

**Funding:** Research relating to this abstract was funded by the European Community's Seventh Framework Programme (FP7/2007–2013) under the grant agreement 245012HabEat.

#### 57. NAFLD IN CHILDREN: AN UPDATE – Invited Lecture

Nobili, V<sup>1</sup>, Comparcola, D<sup>1</sup>

<sup>1</sup>Bambino Gesù' Children Hospital Rome – Italy

Non-alcoholic fatty liver disease (NAFLD) encompasses a spectrum of disease from asymptomatic steatosis, with or without elevated aminotransferases, to cirrhosis with relative complications and hepatocellular.

**Carcinoma:** The histological appearance ranges from simple steatosis (non-alcoholic fatty liver (NAFL) to hepatocellular damage coupled with inflammation (ie, non-alcoholic steatohepatitis (NASH) and/or fibrosis).

NAFLD and NASH are closely linked to obesity and the metabolic syndrome. However, the presence of obesity is not absolutely required for the development of this condition. There are also a number of other clinical conditions such as the use of total parenteral nutrition and specific drugs such as tamoxifen which have been associated with NAFLD. It is now also clear that insulin resistance is causally related to the development of NAFLD and is not the consequence of chronic liver disease in this specific circumstance.

Owing to the increasing prevalence of NAFLD and the potential for NASH to progress to cirrhosis and liver-related mortality, more research has been focused on therapy of this important liver disease over the last two decades. Loss of weight and physical activity represent till now the cornerstone of treatment, limiting interventions to subjects at risk of disease progression, but the type of treatment remains a matter of debate.

#### 58. PERCEIVED NEIGHBOURHOOD ENVIRONMENTS, OBESITY AND PHYSICAL ACTIVITY ACCORDING TO SOCIOECONOMIC STATUS: CLEARING UP MODELS OF ENVIRONMENTAL INJUSTICE AMONG PORTUGUESE CHILDREN – O

Nogueira, H<sup>1</sup>, Gama, A<sup>2,3</sup>, Mourão, I<sup>4</sup>, Rosado, V<sup>2,5</sup>, Padez, C<sup>2,6</sup>

<sup>1</sup>Department of Geography, University of Coimbra, Coimbra, Portugal; <sup>2</sup>Research Centre for Anthropology and Health, University of Coimbra, Coimbra, Portugal; <sup>3</sup>Faculty of Sciences, University of Lisbon, Lisbon, Portugal; <sup>4</sup>University of Trás-os-Montes e Alto Douro, Vila Real, Portugal; <sup>5</sup>Instituto Investigação Científica Tropical, Lisboa, Portugal; <sup>6</sup>Department of Life Sciences, University of Coimbra, Portugal

**Introduction:** People from low socioeconomic status are more likely to live in disadvantaged neighbourhoods. The aim of this study was to analyse the associations between BMI, physical activity and parent's environmental perceptions with children socioeconomic status.

**Methods:** The sample included 1885 children, 3 to 10 y from Coimbra, Portugal. Weight and height were measured, overweight and obesity, using age- and sex-specific body mass index cut-off points defined by IOTF, were used. Questionnaires were used to describe PA levels, SES and parental perceived neighbourhoods. The independent association of SES with BMI, PA and perceived neighbourhood dimensions as dependent variables was analysed through ordered logistic regressions.

**Results:** Children in low (OR=1,86) and medium (OR=65) SES group were more likely to be obese than their high SES peers. Children from low (OR=7,4) and medium (OR=3,8) SES group were more likely to not have a formal PA besides school. Parents of children in medium SES group were less likely to have a positive perception of their built environment (OR=0,6). Lowest SES group was also associated with worse perception of the social organization and safety (OR=0,52).

**Conclusion:** Obesity increase and PA decrease among children from the bottom of SE ranking and they also live in higher perceived risk neighbourhoods. This suggest a model of environmental injustice, where the differential access to neighbourhood physical and social resources overlaps with socioeconomic disadvantage, shaping patterns that are detrimental to children's health and healthy living.

**Funding:** Research relating to this abstract was funded by "Fundação para Ciência e Tecnologia".

#### 59. QUALITY OF LIFE OF OBESE CHILDREN IN MALAYSIA – P

Nur Hana, H<sup>1</sup>, Ruzita, AT<sup>1</sup>, Nor Hidayah, A<sup>1</sup>, Nathirah, M<sup>1</sup>, Reilly, JJ<sup>2</sup>, Sharifah Wajihah Wafa, SSTW<sup>3</sup>

<sup>1</sup>Dept of Nutrition & Dietetics, Faculty of Allied Health Sciences, Universiti Kebangsaan Malaysia, Kuala Lumpur; <sup>2</sup>Physical Activity for Health, University of Strathclyde, Glasgow, Scotland; <sup>3</sup>University of Glasgow, Glasgow, Scotland

**Background:** Quality of life (QoL) is impaired in childhood obesity, but the literature on this is all from western countries.

**Aim:** To test for impairment of QoL in obese children in Malaysia, using parent-reported and child-reported QoL.

**Methods:** Health-related Quality of Life was measured using the Paediatric Quality of Life Inventory version 4.0. Comparison of QoL between a community sample of 90 obese children (as defined by US CDC and Cole-IOTF definitions), median age 9.5 y (IQR 8.6, 10.5 y) and 90 control children of healthy weight (BMI less than the 85<sup>th</sup> centile of US reference data), median 10 age 10.0 y (IQR 9.6, 10.5 y). Children were matched pair-wise for age, gender, and ethnic group, and controls were recruited from schools in the same area as obese participants.

**Results:** For child self-report, the healthy weight group had significantly higher QoL for the physical (median 82.9, IQR 65.7, 90.6), and psychosocial domains (median, 73.3, IQR 64.4, 83.3), and total QoL (median 76.1, IQR 64.1, 84.8) compared to the obese group (median 67.2, IQR 59.4, 81.3; median 62.5, IQR 53.3, 75.4; median 60.9, IQR 50.8, 73.9; all  $p < 0.001$ ). There were no significant differences between the obese and healthy weight group for parent-reported physical health, psychosocial health, or total QoL.

**Conclusions:** Obese children in Malaysia have markedly poorer QoL than their peers, but this is not evident when parent reports of QoL are used.

#### 60. HEALTH PROFESSIONALS NEED TO BE SPECIAL TRAINED TO HELP CHILDREN AND FAMILIES WITH OBESITY PROBLEM – O

Øen, G<sup>1</sup>, Stormark, KM<sup>2</sup>

<sup>1</sup>Haugesund/Stord University College, Stord, Norway; <sup>2</sup>UNI Health, Bergen, Norway

**Introduction:** For many years obesity among children and adolescents has increased worldwide, showing the fact that prevention and treatment has been insufficient. Health professionals often feel frustrated because of lack of progress. Here we address the question: Which factors are the most important for the professionals working with families in order to prevent and treat obesity in children?

**Methods:** A study of literature on the subject was carried out using the Cochrane Library, Medline, Pro Quest, Embase, PubMed and Evidence Based Nursing with keywords: Communication, Motivation, Obesity, Children, Treatment, Prevention, in different combinations. The data refer to articles and their related sources, analyzed by qualitative content analysis.

**Results:** The identified factors are divided into 8 main categories: 1) Alliance and therapeutic relation. 2) Empowerment. 3) Motivation. 4) Hope. 5) Communication techniques. 6) cooperation with the family. 7) Skills in behavior change techniques. 8) Energy balance.

**Conclusion:** The professionals who works with children and families with obesity need to be special trained for the job. Especially, they need to be trained to communicate in a

respectful way, even when the families are uncertain if they are motivated to do changes. The communication should be focused on empowering the families, increase their hope, and help them learn new methods for solving the problems. Professionals need to be skilled in techniques for behavior modification, and knowledge about healthy food and how to motivate for physical activity, and estimate the need of energy intake according to age and size.

**Funding:** Research relating to this abstract was funded by UNI Health, Norway and Norwegian Nursing Association.

#### 61. RESULTS FROM A POST-GRADUATE MULTIDISCIPLINARY TRAINING PROGRAM FOR HEALTH CARE PROFESSIONALS TREATING CHILDHOOD OVERWEIGHT – O Øen, G<sup>1</sup>, Stormark, KM<sup>2</sup>

<sup>1</sup>Haugesund/Stord University College, Stord, Norway;  
<sup>2</sup>UNI Health, Bergen, Norway

**Introduction:** There is a demand for increased training of community health workers in treating overweight in children. This training program aimed primarily at health care nurses is based on a psycho-educative, family-based empowerment approach to the overweight problem. The main themes in the program is: Understanding overweight, treatment approaches, establishing therapeutic alliance and motivational interviewing. During one half of the teaching program the students worked in multi-professional groups, in order to increase the cooperation skills in meeting the overweight child and his/her family as a coordinated team.

**Methods:** Forty multidisciplinary students attend the training program. 36 students filled in questionnaires about knowledge and attitudes about overweight in children, before and after taking part in the training program.

**Results:** The students reported a pronounced increase in both knowledge and competence in working with overweight issues in children and their families. Most pronounced was the increase in specific treatment methods and specifically in motivational interviewing. A clear majority of the students reported a marked increase in security and coping with overweight issues, and also that quality of the health services they provided had improved due to this training program.

**Conclusion:** This training program led to increased knowledge and competence about overweight issues in children and their families, especially on treatment perspectives and motivational interviewing. The students also reported that participation in the program was associated with improved services for the overweight child and their family.

**Funding:** Research relating to this abstract was funded by Centre for Child and Adolescent Mental Health, UNI Health, Norway.

#### 62. A COMPLEX LIPID MATRIX AS PART OF EARLY NUTRITION PROTECTS AGAINST EXCESS(IVE) BODY FAT ACCUMULATION IN ADULTHOOD – P Oosting, A<sup>1</sup>, Teller, IC<sup>1</sup>, Boehm, G<sup>3</sup>, Bert, J, van de Heijning, M<sup>1</sup>, Kegler, D<sup>1</sup>, Vereijken, C<sup>1</sup>, van der Beek, EM<sup>2</sup>

Danone Research – Centre for Specialised Nutrition, Wageningen; <sup>1</sup>The Netherlands; <sup>2</sup>Singapore; <sup>3</sup>Sophia Children's Hospital, Rotterdam, The Netherlands

Epidemiologic studies have reported that prolonged breast feeding has a small but significant protective effect on obes-

ity development in adults, thus indicating that early nutrition may play a role in the prevention of childhood obesity. The nutrient composition of human breast milk may be important in this regard.

One underestimated but essential nutrient in human milk is fat and its quality: Besides distinct fatty acid and triglyceride composition, packaging of lipids differs notably between human milk and infant formula: human milk lipid globules are larger and coated with a phospholipid membrane compared to lipid droplets in any current infant formula which are covered by milk protein molecules.

To mimic this specific aspect of fat quality we developed an innovative complex lipid matrix (Nuturis®), which are larger lipid droplets that are covered by phospholipids, and investigated the long term effects of a Nuturis® containing infant formula on body composition development in mice. After weaning, male C57Bl/6j mice were fed a diet incorporating either Nuturis® infant formula (Nuturis®) or a standard infant formula (CTRL) from postnatal day (PN) 16 to 42, a time period corresponding to their infancy and childhood. After that, all mice were switched to an obesogenic environment and fed a moderate Western style diet (WSD, 10 w% fat) during their adolescence into adulthood until dissection at PN 126. Body composition and fat accumulation were monitored by dual x-ray absorptiometry throughout the experiment.

Body weight was comparable between groups. Body fat gain, however, was reduced and lean body mass increased significantly during the WSD challenge in adult mice raised on Nuturis® in early postnatal life compared to their CTRL raised peers.

We conclude that early life exposure to a high quality lipid diet with a lipid structure closer to that in human milk (Nuturis®) protects against excess(ive) fat accumulation in an obesogenic adult environment.

#### 63. ADIPOSITY, PHYSICAL ACTIVITY AND BLOOD LIPID PROFILE IN 13-YEAR-OLD MALE ADOLESCENTS – O

Ostojic, SM<sup>1</sup>, Jorga, J<sup>2</sup>, Stokic, E<sup>3</sup>, Stojanovic, M<sup>1</sup>

<sup>1</sup>Biomedical Sciences Dept., Faculty of Sport and Tourism, Metropolitan University, Serbia; <sup>2</sup>Dietetic Unit, Faculty of Medicine, University of Belgrade, Serbia; <sup>3</sup>Department of Endocrinology, Faculty of Medicine, University of Novi Sad, Serbia

The aim of this study was to determine the extent to which physical activity and adiposity are associated with blood cholesterol levels in adolescents. Anthropometric and physical fitness values were measured in all children. Body mass index (BMI) and physical activity index (PAI) were used to split participants into active overweight (ACO, N=29) and non-active normal-weight (NAN, N=29) groups. The cut-offs for the ACO group were BMI ≥ 22.6 kg/m<sup>2</sup> and PAI ≥ 3.5, and BMI < 20.0 kg/m<sup>2</sup> and PAI < 2.65 for the NAN group. In all, 28.8% of boys were overweight with 7.3% obese adolescents. ACO group showed significantly higher BMI and body fat as compared to their NAN counterparts (*p* < 0.05). Adolescents from ACO group attained superior score for PAI and aerobic fitness (*p* < 0.05). Most blood lipid variables were significantly lower in ACO group as compared to NAN (*p* < 0.05) while HDL-C was higher in ACO group (*p* < 0.05). There was significant correlation between HDL-C and PAI in ACO group (*r* = 0.38; *p* < 0.05). PAI explained the majority of variance in HDL-C for ACO group ( $\hat{a}$  = 0.513; *p* < 0.05). This study shows strong beneficial effects of moderate physical activity (PAI ≥ 3) on lipid profiles in active overweight boys.

64. TRENDS IN CHILDHOOD OVERWEIGHT AND OBESITY IN PORTUGAL FROM 2002 TO 2009. THE ROLE OF SOCIOECONOMIC FACTORS – P Padez, C<sup>1,2</sup>, Gama, A<sup>2,3</sup>, Mourão, I<sup>4</sup>, Nogueira, H<sup>6</sup>, Rosado, V<sup>2,5</sup>

<sup>1</sup>Department of Life Sciences, University of Coimbra, Coimbra, Portugal; <sup>2</sup>Research Centre for Anthropology and Health, University of Coimbra, Coimbra, Portugal; <sup>3</sup>Faculty of Sciences, University of Lisbon, Lisbon, Portugal; <sup>4</sup>University of Trás-os-Montes e Alto Douro, Vila Real, Portugal; <sup>5</sup>Instituto Investigação Científica Tropical, Lisboa, Portugal; <sup>6</sup>Department of Geography, University of Coimbra, Coimbra, Portugal

**Introduction:** The aim of this study was to examine the overweight and obesity prevalence trends between 2002 and 2009 and assess whether these trends relate to parental social class.

**Methods:** Two cross-sectional studies were conducted between 2002 and 2009 in Portugal in children aged 7–9 years. In 2002, 4511 children were examined and in 2009 4143 took part in the second study. Height and weight were measured and BMI (Kg/m<sup>2</sup>) was calculated. A family questionnaire was applied and the maternal and parental education were used to assess the social class of each family. Three categories were used: Primary school, Secondary school and University level. The International obesity TaskForce (IOTF) cutoffs to define overweight and obesity were used.

**Results:** The prevalence of overweight/obesity changed from 31.6% in 2002 to 30.4% in 2009. The odds ratio (OR) for overweight in 2009 compared to 2002 was 1.02 and for obesity OR=0.7. Compared to 2002 in 2009 age and sex adjusted OR for overweight was 1.12 in children with paternal education in the primary category, 1.03 in secondary category and 0.93 in university category. For obesity, OR in 2009 compared to 2002 were 0.82 in primary category, 0.73 in secondary category and 0.63 in university category.

**Conclusions:** These results showed that children from lower socio-economic strata showed an increased in overweight prevalence and decreased less in obesity percentage than children from upper socio-economic strata. This means that it is necessary to reduce socio-economic disparities in childhood overweight and obesity.

**Funding:** Research relating to this abstract was funded by “Fundação para Ciência e Tecnologia”.

65. ATTITUDES AND PRACTICES OF DUTCH GENERAL PRACTITIONERS AND BARRIERS THEY EXPERIENCE IN MANAGING CHILDHOOD OBESITY – O

Paulis, WD<sup>1</sup>, de Jong, A<sup>1</sup>, van Avendonk, M<sup>2</sup>, Boukes, F<sup>2</sup>, van der Wouden, J<sup>1</sup>, Vermaas, K<sup>1</sup>, van Middelkoop, M<sup>1</sup>

<sup>1</sup>Department of General Practice, Erasmus MC, University Medical Centre, Rotterdam, the Netherlands; <sup>2</sup>Department of Guideline Development, Dutch College of General Practitioners, Utrecht, the Netherlands

**Objective:** The aims of this study were 1) To investigate attitudes and practices of Dutch general practitioners (GPs) regarding the management of childhood obesity, and 2) to unravel barriers GPs experience in diagnosing and referring obese children.

**Method:** An online survey was sent to 1500 Dutch GPs, all members of the Dutch College of General Practitioners. The survey consisted of 25 multiple choice questions on attitude and practices regarding the management of child-

hood obesity. To unravel barriers GPs experience in diagnosing and referring obese children, a random sample of 104 GPs were telephonically approached and interviewed about their beliefs, behaviour and experienced barriers in obesity management.

**Results:** The response rate of the survey was 23% compared to 53% of the telephonic interviews. Over 90% of the GPs feel they should play a role in diagnosing obesity. However, they think it is hard to raise the issue of obesity to children and parents, especially if children consult them for non-weight related complaints. In 25% of the children GPs expect to be overweight, they measure the Body Mass Index and compare this with international cut-off points. Less than 5% of the GPs always refer children with obesity to intervention programs. Barriers GPs experience in referring obese children are lack of efficacy of existing interventions and the feeling that children and parents do not want to be referred.

**Conclusion:** GPs feel they should play a role in the management of childhood obesity, but they experience barriers in both diagnosing and referring obese children.

66. THE DOERAK COHORT STUDY DESIGN. DETERMINANTS OF (SUSTAINED) OVERWEIGHT AND COMPLAINTS; EPIDEMIOLOGICAL RESEARCH AMONG ADOLESCENTS AND KIDS IN GENERAL PRACTICE – P

Paulis, WD<sup>1</sup>, van Middelkoop, M<sup>1</sup>, Luijsterburg, P<sup>1</sup>, van der Wouden, J<sup>1</sup>, Koes, B<sup>1</sup>

<sup>1</sup>Department of General Practice, Erasmus MC, University Medical Centre, Rotterdam, the Netherlands

Read by title.

67. NON-INVASIVE CARDIOVASCULAR MONITORING IN CHILDREN – Invited Lecture Reusz, GYS<sup>1</sup>, Kiss, E<sup>1</sup>, Csepregál, O<sup>1</sup>

<sup>1</sup>First Department of Pediatrics, Semmelweis University, Budapest

Cardiovascular (CV) morbidity is one of the major life-threatening consequences of metabolic disturbances including obesity, metabolic syndrome and diabetes. As the process leading to the fatal consequences is relatively slow and the injury should be detected and characterized long before the hard end-points (such as myocardial infarction, stroke and death) are reached, we need non-invasive markers that describe the magnitude of the damage. These surrogate markers could be parameters of arterial stiffness and the carotid intima-media thickness.

One key element of this high CV burden appears to be arterial stiffness (Ast) as an expression of premature vascular aging. Ast can be characterized by measuring the pulse wave velocity (PWV) and/or intima-media thickness (IMT). The method of measuring the carotid-femoral PWV by applanation tonometry is the gold standard, as it has the largest amount of epidemiological evidence for its predictive value for CV events in adults. Increased intima-media thickness (IMT) of the large arteries is considered an early marker of athero-arteriosclerosis and a sensitive predictor of cardiovascular events in the general population. Normative values for IMT and for PWV are now available for children constituting suitable tools for longitudinal clinical studies assessing subgroups of children who are at long-term risk of cardiovascular disease.

The work was supported by grants from OTKA-071730, 100909, and ETT 06-123/2009.

**68. A FAIR AND VALID PHYSICAL FITNESS TEST BATTERY (PFTB) FOR NORMAL-WEIGHT TO OBESE CHILDREN – O**

Ring-Dimitriou, S<sup>1,4</sup>, Jell, R<sup>2,4</sup>, Ardel-Gattinger, E<sup>2,4</sup>, Meindl, M<sup>2,4</sup>, Weghuber, D<sup>3,4</sup>

<sup>1</sup>University of Salzburg, Department of Sport Science & Kinesiology, Salzburg, Austria; <sup>2</sup>University of Salzburg, Department of Psychology, Salzburg, Austria; <sup>3</sup>Department of Pediatrics, Paracelsus Private Medical School, Salzburg, Austria; <sup>4</sup>Obesity Academy Austria, Salzburg, Austria

**Introduction:** We aimed to develop a test battery that is reliable, valid and standardized for normal-weight NW (percentile P3-50), high-normal weight HW (P75), overweight OW (P90) and obese OB (P97-99) children aged 10–14 yrs.

**Methods:** 14 exercise tasks were assessed in a representative sample (n=1627). Based on frequency- (test difficulty  $sk$ ), item- (test discrimination power  $r_{it}$ ), reliability- (test-retest, inter-observer, internal consistency) and principle component-analysis (oblique rotation, promax,  $k=4$ ;  $EV > 1$ ,  $a_{ij} < .3$ ,  $FS = .93$ ,  $KMO > .6$ ) norm values for all sufficient subgroups were calculated.

**Results:** Finally, 415 boys and 355 girls (66% NW, 18% HW, 10% OW, 6% OB) aged  $12.4 \pm 1.3$  yr were analyzed. One factor including 20-m run, lateral jumping, chin-up sitting position, jump and reach, stand-broad jump, 6-min run, hurdle-bumerang run was extracted with 56% explained variance. The whole PFTB has a consistency of Cronbach's  $\alpha = .87$ , including easy to very difficult tasks ( $sk = -1.0 - 1.8$ ) with a  $r_{it}$  of .5–.7. Norm values separated for boys and girls were determined for chin-up and 6-min in NW, for all tests in HW, and for broad jump in OW. Except for lateral jumping HW-children exhibited significantly lower levels in the remaining exercise tasks compared to NW, or the same levels in 20m-run and broad jump as OW. OB-children exhibited the lowest levels.

**Conclusion:** This is the first reliable and valid PFTB that established norm values for overweight and obese children. Test difficulty was not different between BMI-categories.

**69. RISK FACTORS FOR OVERWEIGHT AND OBESITY IN PORTUGUESE PRESCHOOL CHILDREN – P**

Rosado Marques V<sup>1</sup>, Gama A<sup>2</sup>, Mourão A<sup>3</sup>, Maurício C<sup>4</sup>, Martins M do R<sup>4</sup>, Padez C<sup>5</sup>

<sup>1</sup>Tropical Research Institute, Lisboa and Research Centre for Anthropology and Health, University of Coimbra; <sup>2</sup>Faculdade de Ciências de Lisboa, Universidade de Lisboa and Research Centre for Anthropology and Health, University of Coimbra; <sup>3</sup>Departamento de Desporto, Universidade de Trás-os-Montes e Alto Douro; <sup>4</sup>Instituto de Higiene e Medicina Tropical, Universidade Nova de Lisboa; <sup>5</sup>Research Centre for Anthropology and Health, University of Coimbra and Department of Life Sciences, University of Coimbra

**Introduction:** Overweight/obesity in childhood is a serious public health problem worldwide, with consequences not only in childhood but during the adult life. The published data show an increase of overweight/obesity in Europe, with Portugal having one of the highest prevalence in 7–9 years children. The aim of this study is to know the prevalence of overweight in Portuguese children in preschool age and assess the associated risk factors.

**Methods:** A cross-sectional study was conducted in a sample of 5768 Portuguese children aged 3–5 years. Height and weight were measured and BMI was calculated. The IOTF cut-off points to define overweight and obesity were used. We used logistic regression to estimate the impact of each factor on overweight.

**Results:** The prevalence of overweight in this study was 22.9%, lower than the found in 2002–2003 study in Portuguese 7–9 years children (31.5%). The results showed that having parents with overweight/obesity is strongly associated with the children being overweight (mother OR=1.50; 95% CI: 1.27, 1.77 and father OR=1.72; 95% CI: 1.45, 2.03), while mother education seemed to have a protective role (OR=0.97; 95% CI: 0.95, 0.99). A boy has lower probability having overweight than a girl (OR=0.63; 95% CI: 0.54, 0.74). A high birth weight and mother smoking during pregnancy also seems to be associated with overweight at 3–5 years of age.

**Conclusion:** This study shows the importance of the factors present in early growth, during the development of overweight in childhood and highlights the importance for a targeted intervention as early as possible.

**Funding:** Research relating to this abstract was funded by Fundação para a Ciência e Tecnologia, Portugal.

**70. SERUM TESTOSTERONE AND SHBG LEVELS BEFORE AND AFTER WEIGHT LOSS IN OBESE ADOLESCENT BOYS AND THEIR RELATIONSHIP TO METABOLIC SYNDROME – P**

Sedlackova, B<sup>1</sup>, Zamrazilova, H<sup>1</sup>, Dusatkova, L<sup>1</sup>, Hlavaty, P<sup>1</sup>, Kunesova, M<sup>1</sup>, Hainer, V<sup>1</sup>

<sup>1</sup>Institute of Endocrinology, Obesity Management Centre, Prague, Czech Republic

**Introduction:** There is increasing evidence that androgens play a significant role in development of metabolic syndrome (MS); limited data are available in adolescent population. The study objectives were: (1) to compare androgen levels in normal weight (NW) and in overweight/obese (OW/OB) boys; (2) to investigate relationship of androgens to parameters of MS; (3) to analyze androgens changes in response to a 4-week spa reduction programme in OW/OB.

**Methods:** The studied cohort included 124 OW/OB (BMI  $\geq 90^{\text{th}}$  percentile) and 269 NW (BMI  $\geq 10 \leq 90^{\text{th}}$  percentile) boys aged 13, 14, 15 years. OW/OB boys were examined before and after reduction programme. Indexes of MS, BMI, total fat mass, trunk fat, total testosterone, free androgen index (FAI) and SHBG were investigated.

**Results:** OW/OB boys had lower testosterone and SHBG compared to NW. Short-term reduction programme led to increased testosterone and SHBG. Testosterone negatively correlated with insulin, HOMA, HDL cholesterol and total fat in both groups, while positively with systolic blood pressure. In NW were observed negative correlations with fat mass and trunk fat. FAI negatively correlated with HDL cholesterol and positively with waist circumference, BMI and systolic blood pressure in both groups.

**Conclusions:** Our findings support a predictive role of androgens with regard to the development of MS in adolescent boys.

**Funding:** Research related to this abstract was supported by grant 7F08077 from MSM/7F, by project Advanced education of own staff in clinical and molecular endocrinology (CZ.2.17/1.1.00/32386) and by grant CZ0123 from Norway through the Norwegian Financial Mechanisms.

## 71. IS OBJECTIVELY MEASURED PHYSICAL ACTIVITY RELATED TO ADIPOSITY IN PRESCHOOL CHILDREN: A REVIEW – P

Sijtsma, A<sup>1</sup>, Sauer, PJJ<sup>2</sup>, Stolk, RP<sup>1</sup>, Corpeleijn, E<sup>1</sup>

<sup>1</sup>Department of Epidemiology, University Medical Center Groningen, University of Groningen, Groningen, Netherlands; <sup>2</sup>Department of Pediatrics, University Medical Center Groningen, University of Groningen, Groningen, Netherlands

**Introduction:** Little is known about the association between physical activity and adiposity in preschool children. It is unclear if more activity should be stimulated in the prevention of overweight. A recent increase in studies using objective devices to assess physical activity is seen and advances in accelerometry and automated data processing. This review summarizes the association between objectively assessed physical activity and adiposity in preschool children.

**Methods:** Inclusion criteria: (i) objectively measured physical activity, (ii) adiposity measured as BMI, percentage body fat or fat mass as outcome measure, (iii) participants age: 1.5–6 years, (iv) published between 1999 and 2010, (v) cross-sectional or longitudinal design. Exclusion criteria: (i) participants with disabilities, (ii) non-English language, (iii) anthropometric measures reported by the parents.

**Results:** The association between physical activity and obesity depends on the outcome measure of adiposity. In 60% (3/5) of the studies using percentage body fat an inverse significant relationship with physical activity is found against 20% (2/10) of the studies that used body mass index as method to assess adiposity.

**Conclusion:** Physical activity is inversely related to percentage body fat in preschool children. The associations between physical activity and body mass index as a measure of adiposity in preschool children remain elusive. Further studies using objectively measured physical activity and percentage body fat to define adiposity are needed to draw more firm conclusions.

## 72. THE EPIDEMIOLOGY OF TYPE 1 AND TYPE 2 DIABETES IN CHILDREN – Invited Lecture

Soltész, Gy<sup>1</sup>

<sup>1</sup>Department of Pediatrics, University of Pécs, Pécs, Hungary

Type 1 diabetes is one of the most common endocrine and metabolic conditions in childhood. International collaborative projects, such as EURODIAB and DIAMOND provided reliable epidemiological data. There are large (up to 300 fold) geographical differences in the incidence and the incidence is increasing especially among the youngest children. The overall global annual increase is estimated to be around 3%. There is evidence that incidence is increasing more steeply in some of the low prevalence countries such as those in central and eastern Europe. In Hungary, the rate of increase over the last 20 years has been 4.4 %.

As the diagnosis of childhood type 2 diabetes is more elusive, the epidemiology of type 2 diabetes is less well mapped. Most studies are clinic-based, population-based studies using screening are scarce. Type 2 diabetes is clearly an obesity-related condition. Screening obese children using fasting blood glucose and OGTT in some European countries and US provided prevalence figures of impaired glucose tolerance of about 5 to 25 % and type 2 diabetes prevalence of 0.34 to 4 %. Prevalence of childhood type 2 diabetes has reached 'epidemic' proportions in the US, more than 20% of children between the ages of 2 and 5

## Abstracts

years being overweight or obese. The European situation, despite the increasing trend, is much less dramatic, as yet. In a recent Hungarian survey of children (mean age of 15.6 years) at high risk (overweight plus other risk factors), the prevalence of impaired fasting glucose was 1.4%, that of impaired glucose tolerance was 2.1% and the prevalence of type 2 diabetes was 0.35%.

Presently, there is no possibility to prevent type 1 diabetes, but ensuring a healthy lifestyle (nutrition and physical activity) for children in their early life could prevent most future cases of type 2 diabetes.

## 73. "TARGET SNACK": A PROJECT ON PRIMARY SCHOOLS TO PROMOTE HEALTHY FOODS – P

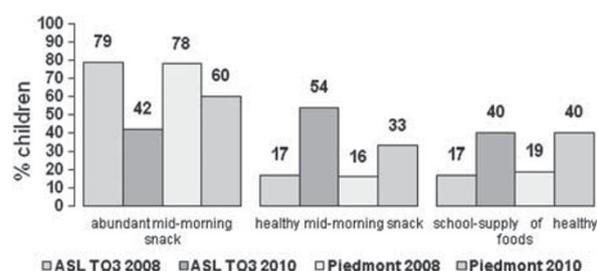
Spagnoli, TD<sup>1</sup>, Caputo, M<sup>2</sup>

<sup>1</sup>ASL TO3 Service of Nutrition and Food Hygiene, Collegno, Turin, Italy; <sup>2</sup>Piedmont Regional Department for Health Promotion, Turin, Italy

**Introduction:** Energy-dense snacks may promote childhood overweight (WHO). "Okkio alla salute", an Italian biennial Survey on primary-school eating habits, showed in 2008 a too large mid-morning snack in a lot of children: 82% in Italy, 78% in Piedmont (a Northern Region), 79% in ASL TO3 (a Piedmont District). So the aim of our study was to structure in ASL TO3 some effective strategies to improve the quality of food eaten by children of primary schools during the mid-morning break.

**Methods:** According to social marketing strategies, we selected our target (paediatricians/primary schools' teachers), assessed our target's needs (by focus-groups/medline-researches) then structured and validated (by focus-groups) appropriated tools (a teaching kit for educators and two different training stages for educators/paediatricians). In 2009 we randomly trained, in ASL TO3, 25% of paediatricians and 100% of teachers in schools sampled by "Okkio alla salute 2008". To check the efficacy, we decided to wait data from the same survey in 2010.

**Results:** Data from "Okkio alla salute" in ASL TO3 vs Piedmont, in 2008 and in 2010 are shown below:



**Conclusions:** A Ministerial campaign doubled school-supply of fruit in Piedmont and ASL TO3; nevertheless the increase of healthy mid-morning habits in ASL TO3 (from 17% to 54%) is significantly higher than in Piedmont, exceeding expectations related to environmental improvements. So the project "Target snack", performed in ASL TO3 to promote right skills among primary school children, seems to be effective at population level at medium-term (one-school-year) and shows better results than an environmental intervention alone.

**Funding:** Part of the research relating to this abstract was auto-funded by Piedmont Region; no other funding.

**Special thanks to** Lo Bartolo D., Suglia A., Lingua S., Tosco E., Bioletti L., Ropolo S., Spagna S., Cosola A., Gibilisco G.,

Tuliso S., Panfani L. (ASL TO 3), Croce M., Bellan (ASL TO 4) and to the Piedmont Regional Department for Health Promotion.

#### 74. SNACKING HABITS OF CHILDREN – P

Szakály, Z<sup>1</sup>, Böröndi-Fülöp, N<sup>1</sup>, Soós, M<sup>1</sup>, Lelovics, Zs<sup>1</sup>

<sup>1</sup>Faculty of Economic Science, Kaposvár University, Kaposvár

Read by title.

#### 75. ADVERTISEMENTS, CHILDREN AND OBESITY – P

Töttösi, A<sup>1</sup>, Lelovics, Zs<sup>1</sup>, Dobák, Z<sup>1</sup>, Tolnai, B<sup>1</sup>, Zombori, J<sup>2</sup>

<sup>1</sup>International Institute of Nutrition Research, Pécs, Hungary; <sup>2</sup>Faculty of Health Sciences, University Semmelweis, Budapest, Hungary

**Introduction:** Children became even more the targets of companies of food industry and also the media. The incremental generation had not yet been under the influence of the mass media, in such an amount that in our days. Till the age of 14<sup>th</sup> spend 18,000 hours in front of screens, until behind desks 14,000 hours. By the researches of the German ZAW, 38% of children between the age of four and six cannot make a distinction between advertisements and TV programs. They can be influenced the most easily because of their age. Attention is frequently aroused by showy and friendly cartoon characters to purchase a given product.

**Methods:** For mapping knowledge of brands and elements of marketing, focus consulting was carried out amongst toddlers (n=138, average age: 7.0+/-2.0 years).

**Results:** 76.7% of schoolchildren know given figures of brands, moreover products associated to figures and messages suggested by them. 55.6% of kindergarten kids know at least one concrete figure of a brand. Until the youngest in kindergartens could first characterize a figure by its externals, at the age of six know products and can associate them with animals or cartoon figures related to brands.

**Conclusion:** Food for kids can affect the eating behaviour of children in a negative way (for example: there are no vegetables or fruits in Hungarian TV programs). By the age, child can hardly make a distinction between good and bad things, useful and less useful information. That's why they should be taught for the behaviour of conscious consumers.

#### 76. RELATIONSHIP OF CHILDHOOD OBESITY AND THE NUTRIENT VALUES OF "FOOD FOR KIDS" – P

Töttösi, A<sup>1</sup>, Dobák, Z<sup>1</sup>, Lelovics, Zs<sup>1</sup>, Zombori, J<sup>2</sup>

<sup>1</sup>International Institute of Nutrition Research, Pécs, Hungary; <sup>2</sup>Faculty of Health Sciences, University Semmelweis, Budapest, Hungary

Read by title.

#### 77. COMPARISON OF BLOOD PRESSURE VALUES IN ADOLESCENTS AGED 11–16 YEARS – Invited Lecture

Túri, S<sup>1</sup>, Baráth, Á<sup>1</sup>, Boda, K, Tichy, M<sup>1</sup>, Károly, É

<sup>1</sup>Department of Pediatrics, University of Szeged, Szeged, Hungary

The present study comprised part of a larger cross-sectional survey performed in Hungary, which was designed to

reveal the representative age-, gender- and height-specific percentile values for the blood pressure in Hungarian children aged 11–16 years. Our aims were: to determine the prevalence of overweight and obesity and to compare our data with results from all over the world (Italy, Poland, India, Israeli Arab, China and Republic of Ghana), collected from the literature.

**Methods:** Analyses were performed on 14290 Hungarian children aged 11–16 years. All BP measurements were made with a validated, automated, digital device. Criteria recommended by international guidelines were used.

**Results:** The prevalence of overweight and obesity among the Hungarian children was found to be 23.4% (3347 adolescents; International Obesity Task Force criteria). Previous studies have reported that the strongest correlation is observed between the BP values and the weight, and our results are in accordance with this. Hungarian, Italian, Indian, Polish and Israeli Arab adolescents have higher BP levels, than Ghanaian and Chinese boys and girls. There were large variations in the prevalence of overweight and obesity (11.7–29.8).

**Conclusions:** As the prevalence of overweight and obesity is increasing worldwide, it is important that countries carefully monitor the weight and BP status of their children and adolescents.

#### 78. OBESITY, ADHERENCE TO THE MEDITERRANEAN DIET (MD) AND ENERGY BALANCE BEHAVIOURS, IN RELATION TO ACADEMIC PERFORMANCE IN PRIMARY SCHOOL CHILDREN – O

Vassiloudis, I<sup>1</sup>, Costarelli, V<sup>1</sup>, Yiannakouris, N<sup>1</sup>, Apostolopoulos, K<sup>1</sup>

<sup>1</sup>Human Ecology Laboratory, Department of Home Economics and Ecology, Harokopio University, 70 El. Venizelou Ave, 176 71 Kallithea, Athens, Greece

**Introduction:** A healthy diet is generally assumed to be important for good school performance; however, very few studies have examined the effect of diet quality and obesity on academic performance in children. The purpose of the study was to explore possible links between excess body weight, adherence to the Mediterranean Diet (MD), energy balance behaviours and academic performance in Greek primary school children.

**Methods:** A total of 528 students (256 boys; 272 girls), 10–12 years old, were recruited from 21 primary schools in the area of Athens, Greece. Standard anthropometric measurements were taken and obesity was assessed using the International Obesity Task Force (IOTF) cut off points. Students completed a specifically designed energy balance behaviours questionnaire together with the KIDMED index, which evaluates the degree of adherence to the MD. Academic performance was assessed through a specifically designed, 5-scale questionnaire, completed by the teacher.

**Results:** Multiple regression analysis revealed that obesity ( $\beta=-0.087$ ,  $P=0.009$ ), adherence to the MD ( $\beta=0.095$ ,  $P=0.009$ ), physical activity levels ( $\beta=0.254$ ,  $P=0.000$ ), hours of sleep ( $\beta=0.101$ ,  $P=0.002$ ), TV viewing ( $\beta=-0.07$ ,  $t=-2.039$ ,  $P=0.042$ ) and global self-esteem levels ( $\beta=0.127$ ,  $P=0.000$ ) are significant factors in predicting academic performance in primary school children.

**Conclusions:** Obesity, poor adherence to the MD and low levels of physical activity seem to negatively affect academic performance in young children. Understanding the above interrelationships could facilitate the formation of policies focused on improving children's academic achievement.

## 79. TEACHING THE LEARNERS OR THE TEACHERS?

### – Invited Lecture

Vania, A<sup>1</sup>

<sup>1</sup>ECOG President, Aggregate Professor of Paediatrics  
Sapienza University of Rome, Italy

While struggling paediatric obesity, school is the ideal field of intervention because of the contemporary presence of many young subjects, their reciprocal support and the reinforcement of positive concepts. However, while short-term results are generally good, medium- and long-term ones are not: teaching needs patience and reiteration, which cannot be done by health professionals, due to time and money constraints.

A different approach: educating the learners through the teachers. Teachers know the bases of education better, thus they only need to receive scientifically based healthy life habits information to convey to their students. The results will be more effective, if the whole school system (cafeterias, gyms, and so on) changes in a positive way. Such an approach is also cheaper than sending external experts once or several times, and with a better quality of spreading the information, which is also proposed to a much wider audience.

Nowadays, a variety of stakeholders are trying to be involved in this field of education: companies, NGO's, mass-medias, other professionals. All of them approach this issue owning a different standpoint. While apparently useful (the more, the better), this may increase the audience's confusion.

Therefore, it is now imperative that all the efforts become homogeneous: the wide and often contrasting range of approaches is probably one of the strongest obstacle we have to overcome in order to tackle efficiently the globesity.

**Results:** 2 main groups were indentified: in the first one (40%; N=22) obesity seemed to be caused by a low food and nutritional education level (probably due to a low socio-cultural environment). In the second one (60%; N=33), obesity seemed to be caused by psychological factors such as using food: A) by the parents to meet the emotional needs of the child or as a behavioral incentive; B) in response to traumatic experiences; C) as a symptom of a psychopathological syndrome.

Generalized tendency to passivity, dependence from the mother, presence of depressive feelings, high sensitivity to internal and external stimuli were found in 91% of the subjects.

**Conclusions:** These data confirm the important role of psychological factors in the framing and the treatment of moderate/severe childhood obesity.

## 80. PSYCHOLOGICAL FACTORS IN MODERATE/ SEVERE CHILDHOOD OBESITY – P

Zito, E<sup>1</sup>, Iaccarino Idelson, P, Mozzillo, E, Cerrato, C, Galdi, S, Quaglia, G, Franzese, A

<sup>1</sup>Dipartimento di Pediatria, Università degli Studi di Napoli Federico II, Italia

**Introduction:** Obesity is the main childhood nutritional disorder in industrialized countries and its prevalence is increasing, particularly in Italy. Obesity has a multifactorial etiopathogenesis: while biological and socio-environmental factors are well identified, psychological ones are often neglected.

**Aims and Methods:** The purpose of this study was to identify some psychological factors to obtain a clearer diagnosis and a proper treatment. 55 moderately/severely obese subjects (35 M; mean age 12.11±3.53; mean BMI z-score=2,6±0,4) were analysed by 3 clinical psychological interviews

during 6 days hospitalization based on a multicomponent approach.

**Results:** 2 main groups were indentified: in the first one (40%; N=22) obesity seemed to be caused by a low food and nutritional education level (probably due to a low socio-cultural environment). In the second one (60%; N=33), obesity seemed to be caused by psychological factors such as using food: A) by the parents to meet the emotional needs of the child or as a behavioral incentive; B) in response to traumatic experiences; C) as a symptom of a psychopathological syndrome.

Generalized tendency to passivity, dependence from the mother, presence of depressive feelings, high sensitivity to internal and external stimuli were found in 91% of the subjects.

**Conclusions:** These data confirm the important role of psychological factors in the framing and the treatment of moderate/severe childhood obesity.

## 81. NUTRITIONAL STATUS IN CHILDREN LIVING IN DIFFERENT SOCIO-ECONOMICAL CONDITIONS – P

Zsákai, A<sup>1</sup>, Hornyák, G<sup>1</sup>, Tausz, K<sup>2</sup>, Bodzsár, ÉB<sup>1</sup>

<sup>1</sup>Department of Biological Anthropology, Eötvös Loránd University, Budapest, Hungary; <sup>2</sup>Department of Social Work and Social Policy, Eötvös Loránd University, Budapest, Hungary

**Objectives:** The main goal of this study was to compare the nutritional status of children and adolescents living in different socio-economical backgrounds.

**Subjects and Methods:** The subjects (9079 boys and 8904 girls, aged between 3–18) of the present paper were examined in the 2nd Hungarian National Growth Survey 2003–2006 (Bodzsár and Zsákai 2008). Body components were estimated by the Drinkwater-Ross (1980) four-component (muscle, bone, fat and residual mass) anthropometric fractionation method. body composition. Nutritional status was assessed by using the age-dependent BMI cut off points (Cole *et al.* 2000).

**Results:** Significant differences were found in the nutritional status of children varying in the socio-economical background in both genders: (1) the prevalence of not normal nutritional status was higher in children living in deprived regions, (2) the better the socio-economical conditions the better the skeletal-muscular development and the lower relative fatness were found.

**Conclusions:** Differences that were found between the nutritional status of children living in different socio-economical backgrounds emphasize the importance of using reference growth values layered also to socio-economical strata for screening nutritional status in childhood and adolescence.

**Keywords:** Hungarian National Growth Survey 2003–2006, socio-economical status, nutritional status, body composition.

**Acknowledgement:** This study was supported by the Hungarian National Foundation for Science (OTKA grant K 76849).

## 82. THE CANALISATION OF NUTRITIONAL STATUS FROM BIRTH – P

Zsákai, A<sup>1</sup>, Joubert, K<sup>2</sup>, Molnár, D<sup>3</sup>, Berkő, P<sup>4</sup>, Gyenis, G<sup>1</sup>

<sup>1</sup>Department of Biological Anthropology, Faculty of Science, Eötvös Loránd University; <sup>2</sup>Demographic Research Institute, Hungarian Central Statistical Office, Budapest, Hungary; <sup>3</sup>Department of Pediatrics, University of Pécs, Pécs, Hungary; <sup>4</sup>Department of Obstetrics and Gynaecology, Borsod-A.-Z. County and University Teaching Hospital, Miskolc, Hungary

**Objectives:** The main purpose of the analysis was to check whether neonatal nutritional status could predict an increased risk of overweight/obesity in childhood.

The subjects were examined in a representative 2% sample of newborns of 1980–1983 in a longitudinal growth study in Hungary. Children were measured regularly from birth until the age of 18. 1753 children were randomly selected from the sample. Children were divided into subgroups by neonatal nutritional status (SGA, AGA, LGA).

**Methods:** Nutritional status was assessed by body mass index. The Reed-Asefa model was fitted to the subject's serial data of BMI. The centiles distribution of BMI was estimated by the LMS method. The 85<sup>th</sup> and 97<sup>th</sup> centiles values of the Hungarian national reference values of neonatal BMI were used as cut-off points for neonatal overweight and obesity. The stability of nutritional status (normal, overweight and obese) from birth through childhood was analyzed.

**Results:** Prenatal development and environment, which was assessed by neonatal nutritional status, seemed to programme subsequent overweight and obesity in childhood: children born with bigger body mass index than the 85<sup>th</sup> or 97<sup>th</sup> centiles of the Hungarian references had significantly higher risk for childhood overweightness and obesity. Our results confirmed that the BMI-based neonatal nutritional status is a stronger predictor of subsequent overweight/obesity than the estimation by the Battaglia-Lubchenco

method, which classification was based on birth weight for gestational age.

**Conclusions:** The better understanding of the relationship between prenatal and postnatal nutritional status assessed by BMI could help in childhood obesity prevention.

#### 83. EXPERIENCES OF COURSES COSPI AND TOOLTIPS

##### – Invited Lecture

Winklhofer-Roob, B<sup>1</sup>

<sup>1</sup>Human Nutrition & Metabolism Research and Training Center Institute of Molecular Biosciences, Karl Franzens University Graz

#### 84. MODUL INTERVENTION PROGRAM – Invited Lecture

Winklhofer-Roob, B<sup>1</sup>

<sup>1</sup>Human Nutrition & Metabolism Research and Training Center Institute of Molecular Biosciences, Karl Franzens University Graz

Abstract has not been received till the deadline.