Annals of Nutrition & Metabolism

Ann Nutr Metab 2018;73:310–322
DOI: 10.1159/000494676

Published online: November 13, 2018

28th Annual Congress of European Childhood Obesity Group (ECOG)

Porto, November 14–17, 2018

Selected Abstracts

Guest Editors
C. Rêgo, Congress President, Porto
D. Weghuber, ECOG President, Salzburg

KARGER Basel · Freiburg · Paris · London · New York · Chennai · New Delhi · Bangkok · Beijing · Shanghai · Tokyo · Kuala Lumpur · Singapore · Sydney

Annals of Nutrition & Metabolism

Metabolism

Trajectories of Overweight and Metabolic Syndrome in the IDEFICS/I.Family Cohort

Wolfgang Ahrens[1,2], *Claudia Börnhorst*[1], *Iris Pigeot*[1,2]

[1]Leibniz Institute for Prevention Research and Epidemiology – BIPS, Bremen, Germany; [2]Institute of Statistics, Bremen University, Bremen, Germany

Aims: To analyse weight trajectories and temporal changes of metabolic markers during the early life-course of children of the pan-European IDEFICS/I.Family cohort.

Methods: The baseline examination (T0) of 16,229 boys and girls aged 2 to 9.9 years from eight European countries took place in 2007/08. Two years later 11,041 of the T0 children plus 2,555 newly recruited children participated in a follow-up (T1) examination followed by a third one (T3) in 2014/15 including 7105 children from T0 and T1 plus 2512 newly recruited siblings. Examinations included questionnaires, anthropometry, blood pressure, heel ultrasonography, physical fitness, accelerometry, DNA from saliva and physiological markers in blood and urine.

Results: Children were 6.0, 7.9 and 10.9 years at T0, T1 and T3, respectively. BMI at birth, rates of BMI change during infancy (0 to <9 months), early childhood (9 months to <6 years) and later childhood (≥6 years), as well as current BMI z-score were associated with the metabolic syndrome (MetS) at follow-up. Rapid BMI growth between 9 months to <6 years increased metabolic risk in children. The 2-year incidence of overweight/obesity increased from 5.1% in 2–3 year olds to 10.9% in 6–7 year olds while the 2-year spontaneous remission rate of overweight/obesity decreased from 50% in the youngest age group to 10.1% in 7–8 year olds. The probability of metabolically healthy children at T0 to remain in the same group two years later was 86.6% while the probability of metabolically unhealthy children to remain metabolically unhealthy over the same period was 99.8%.

Conclusions: The age-dependent incidence and remission rates of overweight/obesity and metabolic syndrome indicate sensitive time windows and top priority targets for most effective primary prevention efforts.

Acknowledgements: The IDEFICS/I.Family cohort was funded by the European Commission within the Sixth (Contract No. 016181) and the Seventh (Contract No. 266044) RTD Framework Programmes.

Gas6 Protein in Adiposity and Metabolic Syndrome in Childhood Obesity

Pawel Matusik[1], *Olimpia Zajdel-Cwynar*[1], *Magdalena Olszanecka-Glinianowicz*[2], *Ewa Malecka-Tendera*[1]

[1]Department of Pediatrics and Pediatric Endocrinology, Faculty of Medicine in Katowice, Medical University of Silesia, Poland; [2]Department of Pathophysiology, Faculty of Medicine in Katowice, Medical Univeristy of Silesia, Poland

Aims: Growth arrest-specific 6 (Gas6) is a vitamin K-dependent protein may be involved in the pathogenesis of systemic inflammation and insulin resistance. However, little is known about the clinical significance of the Gas6 system in childhood obesity. The aim of the study was to determine the potential association of circulating Gas6 with anthropometrical and metabolic status of obese children and adolescents.

Methods: In 74 obese children in the mean age of 13.92 ± 3.14 years growth arrest-specific 6 (Gas6), glucose and insulin fasting and in oral glucose tolerance test (OGTT), HOMA-IR index and lipid profile were determined. Anthropometric parameters expressed as BMI Z-score, WHR, W/HtR and body composition was evaluated such as fat mass (FAT), fat-free mass (FMM), and total body water (TBW). Gas6 level was then correlated to the all anthropometrical and metabolic parameters. Patients were divided into two groups: with (26%) and without metabolic syndrome (MS), which were then compared for Gas6 level. The association for the Gas6 level and specific MS criteria was also assessed.

Results: Gas6 was significantly higher in MS patients (20.87 ng/ml vs. 13.64 ng/ml; $p < 0.05$). There was also significant positive relationship with number of MS criteria reached, and Gas6 level based on the ANOVA test ($p < 0.05$). Gas6 was also significantly higher in patients with abnormal triglycerides and HDL cholesterol levels ($p < 0.01$ and $p < 0.05$ respectively). Gas6 correlated significantly (positive) with BMI Z-score, FAT% ($p < 0.05$). There were also a negative significant correlation with FFM% and TBW% ($p < 0.05$). No significant associations were found with glucose and insulin metabolism parameters.

Conclusions: Circulating Gas6 levels are significantly associated with body composition (especially adiposity level) and is also related to the risk of metabolic syndrome development in obese pediatric population. The potential role of Gas6 signalling in the pathogenesis of childhood obesity and its complications requires further investigation.

E-Mail karger@karger.com
www.karger.com/anm

Adipocytokines and Attained Height in Adolescence: A Longitudinal Analysis

Rafaela Rosário[1], *César Agostinis-Sobrinho*[2], *Luis Lopes*[3], *Carla Moreira*[3], *Sandra Abreu*[3], *Jorge Mota*[3], *Rute Santos*[3,4,5]

[1]Health Sciences Research Unit: Nursing (UICISA: E), Nursing School of Coimbra (ESEnfC), Portugal; [2]Faculty of health Sciences – Klaipeda University – Lithuania; [3]Research Centre in Physical Activity, Health and Leisure, Faculty of Sport, University of Porto, Portugal; [4]Universidade Lusófona de Humanidades e Tecnologia, Lisboa, Portugal; [5]Early Start Research Institute, Faculty of Social Sciences, School of Education, University of Wollongong, Australia

Aims: To investigate the associations between adipocytokines and attained height over a two-year period in healthy adolescents.

Methods: 529 Portuguese adolescents (267 girls) aged 12–18 years-old participated in this longitudinal study; of those 495 (93.8%) were reevaluated one-year later (T2) and 406 (76.9%) subjects two years later (T3). Blood samples were collected to analyze leptin and adiponectin levels. Height was measured according to standardized procedures, socioeconomic status, pubertal stage and lifestyles determinants were gathered and used as confounders. Prospective associations between adipocytokines (leptin, adiponectin and leptin/adiponectin ratio – L/AR) and height were examined using generalized linear models.

Results: After adjusting for confounders, leptin was positively associated with boys' height at T1 [b(95% CI), 0.005 (0.002; 0.009), p = 0.001] and negatively associated with girls' attained height in T3 [b = –0.001 (–0.001; –0.00004), p = 0.036]. Furthermore, stratifying data by tertiles (low, mid and high) of adipocytokines, we found that at T1, boys in high leptin and high L/AR group showed a significantly greater height of 3.4 and 3.5 cm, respectively compared with those from the low leptin and L/AR group. Longitudinal analyses showed that girls in mid and high leptin group at T1 exhibited a lower attained height of 0.8 and 0.7 cm at T2 and 1.1 and 1.2 cm at T3, respectively. In addition, girls in high adiponectin group at T1 had a lower attained height of 0.5 cm at T2 [b = –0.005 (–0.010; –0.00005), p = 0.047) and girls in high L/AR group had a significantly lower attained height of 0.9 cm at T3 [b = –0.009 (–0.017; –0.001), p = 0.035].

Conclusions: Adipocytokines early in adolescence are associated with girls' attained height over time. Further research is needed to better understand the role of adipocytokines in attained height in youth.

Is Vitamin D Deficiency in Obese Youngsters a Risk Factor for Less Weight Loss?

Karolien Van De Maele[1], *Inge Gies*[1], *Jesse Vanbesien*[1], *Monique Van Helvoirt*[2], *Nicole Rom*[2], *Bettina Würth*[2], *Hilde Franckx*[2], *Ann De Guchtenaere*[2], *Jean De Schepper*[1]

[1]Department of Pediatrics, Division of Pediatric Endocrinology, University Hospital Brussels, Jette, Belgium; [2]Zeepreventorium, De Haan, Belgium

Aims: To investigate the predictive value of the vitamin D status in body fat loss in obese adolescents during a residential weight loss program.

Methods: Ninety-five (36 male) obese (BMI z-score >1.8) adolescents aged between 10.6 and 19 years started a 12 month residential weight loss program in July 2012. Fasting serum 25-OH vitamin D (25OHD), insulin, glucose and lipid parameters were measured by standard laboratory methods. Body composition was assessed by DXA. No vitamin D supplementation was given.

Results: Baseline median (range) serum 25OHD level was 17.5 µg/L (3.8–41.8) and 57 (60 %) had a serum 25OHD below 20 µg/L. Fasting hyperinsulinemia (>115.4 pmol/L) was present in 47.4% and metabolic syndrome defined by the IDF standards in 51.6% of the adolescents. Median decrease in body weight, BMI SDS and body fat percentage after 12 months (n = 65) were respectively –24.1 kg (–55.2 to –8.2); –1.1 SDS (–2.3–0) and –12.6% (–38.2–0.5). In 31 of the 57 adolescents with a low baseline 25OHD (<20 µg/l) the median increase in serum 25OHD was 2.4 µg/L (–4.2–7.2), resulting in normal 25OHD levels in 7 (22.6%) adolescents. The change in serum 25OHD was not related with the changes in serum insulin, BMI z-score or body fat percentage. Obese adolescents with a low 25OHD at start had similar baseline serum insulin concentrations (110.1 vs 99.3 pmol/L) and a similar change in weight (–24.4 vs –23.5 kg), BMI SDS (–1.1 vs –1.3 SDS) and body fat percentage (–11.2 vs –14.9%) than those with a normal vitamin D status.

Conclusions: Vitamin D status was not predictive of changes in fat mass during a residential weight loss program, but did ameliorate after weight loss.

Adiponectin Status in Different Metabolic Phenotypes on Insulin Resistance

Cesar Agostinis-Sobrinho[1], *Sofia Emanuelle De Castro Ferreira Vicente*[2], *Carla Moreira*[2], *Luís Lopes*[3], *Ana Raimunda Dâmaso*[2], *Rafaela Rosário*[4], *Raquel Munhoz Da Silveira Campos*[5], *Jorge Mota*[3], *Rute Santos*[3,6,7]

[1]Faculty of Health Sciences, Klaipeda University – Klaipeda – Lithuania; [2]Post Graduated Program of Nutrition Paulista Medicine School, Universidade Federal de São Paulo (UNIFESP), São Paulo, Brazil; [3]Research Centre in Physical Activity, Health and Leisure, Faculty of Sport, University of Porto, Porto – Portugal; [4]Health Sciences Research Unit: Nursing (UICISA: E), Nursing School of Coimbra (ESEnfC), School of Nursing, University of Minho, Braga – Portugal; [5]Department of Physiotherapy, Therapeutic Resources Laboratory, Universidade Federal de São Carlos (UFSCar), Brazil; [6]Universidade Lusófona de Humanidades e Tecnologia, Lisboa – Portugal; [7]Early Start Research Institute, Faculty of Social Sciences, School of Education. University of Wollongong, Wollongong – Australia

Aims: To examine a) differences in the insulin resistance levels across different metabolic phenotypes and b) whether high levels of adiponectin attenuated the adverse effects of obesity and unhealthy metabolic phenotype on insulin resistance.

Methods: This is a pooled cross-sectional study including data from two projects [588 adolescents aged 12–18 years]. Participants were classified by metabolic phenotype based on age- and sex-specific cut-off points for body mass index, (nonoverweight and overweight) systole blood pressure, triglycerides, HDL-cholesterol, glucose in four different phenotypes: metabolically healthy nonoverweight (MHN); metabolically unhealthy (abnormal) nonoverweight (MUN); metabolically healthy overweight (MHO); and metabolically unhealthy overweight (MUO). The metabolically unhealthy and unhealthy phenotypes were categorized following the Jolliffe and Janssen criteria.

Results: ANCOVA shows that insulin resistance rose linearly throughout the BMI categories and metabolic phenotypes ($p < 0.05$). Two-way ANCOVA shows that those obese adolescents who presented high Adiponectin levels, had 0.6 SD lower HOMA-IR ($p = 0.01$) than their Low Adiponectin group counterparts. Adolescents classified as Overweight had on average 0.7 SD lower HOMA-IR than their Low Adiponectin group counterparts ($P = 0.03$). In addition, adolescents who presented high Adiponectin levels for MHO, or MUO groups had lower insulin resistance levels (0.5 and 0.8 SD HOMA-IR z-score) than their Low Adiponectin group counterparts after adjustments for potential confounders ($P > 0.04$ for all).

Conclusions: Our data suggest that high adiponectin concentration may attenuates the insulin resistance levels, particularly in participants within the highest BMI categories (overweight and obese) and MHO and MUO. These results have public health and clinical implications, since adolescence has been reported as the period of life where changes in adiposity, behavior, and metabolic status, are likely to occur. Evidence from prospective and randomized clinical investigations is needed to examine whether high levels of adiponectin may attenuate the adverse effects of obesity and unhealthy metabolic phenotype on insulin resistance in adolescents.

Nutrition

Early Feeding Practices and Its Determinants in Portuguese Population

Sara Silva[1], *Daniela Correia*[2], *Milton Severo*[2], *Andreia Oliveira*[2], *Duarte Torres*[3], *Carla Lopes*[2]

[1]EPIUnit-Institute of Public Health University of Porto, Porto, Portugal; [2]Faculty of Medicine/EPIUNIT-ISPUP, University of Porto, Porto, Portugal; [3]Faculty of Nutrition and Food Sciences/ EPIUNIT-ISPUP, University of Porto, Porto, Portugal

Aims: To characterize the breastfeeding practice and the complementary feeding of a representative sample of Portuguese children, and to evaluate their association with sociodemographic indicators.

Methods: The study includes a representative sample of 904 children from 3–36 months evaluated in the National Food, Nutrition and Physical Activity Survey (IAN-AF, 2015–2016), selected by multistage sampling. A questionnaire was applied to parents, by an interviewer asking feeding practices during the first years of life. Anthropometrics were objectively measured. Survival analysis was used to estimate proportions. Multiple Linear regression analysis was used to estimate associations.

Results: The proportion of children never breastfed was around 6%, 30% stopped breastfeeding before 4 months and 64.9% before 12 months. The breastfeeding duration was higher in older, less educated and unemployed mothers. Only 3.3% referred start complementary feeding before 4 months and 63.2% before 6 months. The first food eaten was vegetable soup in 66% of infants, followed by cereals (25.8%). At least 7% of children consumed cow's milk before completion of 12 months of age and the likelihood of early consumption was increased in infants living with brothers (HR = 1.32, 95% CI: 1.06; 1.64) and from less educated and unemployed mothers. Children assisted by a family doctor had a higher likelihood of early introduction of cow's milk in comparison with the paediatrician (HR = 1.70, 95% CI: 1.26; 2.29) but no differences were found regarding the time of complementary feeding.

Conclusions: Among Portuguese children early feeding practices seemed to be globally according to recommendations. Early stop breastfeeding is more frequent in higher educated and active worker's women. Other practices that could compromise children's growth such as early introduction of cow's milk are more frequent in socio-economic disadvantage people.

Acknowledgments: IAN-AF funding: EEA Grants Program, Public Health Initiatives (PT06-000088SI3); Institutional support: General Directorate of Health-DGS, Regional Health Administration Departments and the Central Administration of the Health System-ACSS.

Does the Association Between SSB and Inflammation Differ by Weight Status?

Sandra Abreu[1,2], *Rafaela Rosário*[3], *Carla Moreira*[1], *Luís Lopes*[1,4], *César Agostinis*[5], *José Oliveira-Santos*[1], *Jorge Mota*[1], *Rute Santos*[1,6]

[1]Research Center in Physical Activity Health and Leisure, Faculty of Sport, University of Porto, Porto, Portugal; [2]Faculty of Psychology, Education and Sports, Lusófona University of Porto, Porto, Portugal; [3]School of Nursing, University of Minho, Braga, Portugal; [4]Research Centre on Child Studies (CIEC), Institute of Education, University of Minho, Braga, Portugal; [5]Faculty of Health Sciences, Klaipeda University, Litany; [6]Early Start Research Institute, Faculty of Social Sciences, School of Education, University of Wollongong, Australia

Aims: To investigate whether the association between sugar-sweetened beverages (SSB) intake and inflammation in adolescents differs by weight status.

Methods: A cross-sectional study was conducted from 2011 to 2012 with 412 Portuguese adolescents (52.4% girls) aged 12 to 18 years old. Weight and height were evaluated by standard procedures. World Health Organization's cut-points were used to categorize non-overweight (NW), overweight and obesity (OB). Blood samples were collected to analyze interleukin-6 (IL-6), complement component 3 (C3) and 4 (C4). An inflammatory score (IS) was computed by summing up the sex- and age-adjusted z-scores of IL-6, complements C3 and C4. SSB intake was evaluated using a food frequency questionnaire and measured as grams per 1000 kcal per day. The association between SSB and IS was evaluated using separate linear regression for each category of weight status, and adjusted for potential confounders (pubertal stage, energy intake, moderate-to-vigorous physical activity and socioeconomic status).

Results: The majority of adolescents were NW (NW: 67.2%; OW: 21.6%; OB: 11.2%). NW adolescents had lower IS than their counterparts (NW: –0.78 [–1.80, 0.79]; OW: 0.21 [–1.03, 1.97]; OB: 1.31 [–0.07, 2.72], $p > 0.05$). No significant difference was seen in SSB intake by weight status (NW: 77.0 [37.4, 160.0] g/1000 kcal; OW: 80.5 [42.1, 173.5] g/1000 kcal; OB: 74.4 [27.2, 150.5] g/1000 kcal, $p > 0.05$). In NW adolescents, SSB intake was positively associated with inflammatory score (B = 0.003, 95% CI: 0.001–0.005, $p = 0.005$). No significant association was found between SSB intake and IS in OW and obese adolescents.

Conclusions: Our results suggest that the association between SSB intake and IS differ according to weight status, a positive association was only found in NW adolescents. Evidence from prospective and randomized clinical investigations is needed to examine the effects of long-term consumption of SSB and inflammatory biomarkers.

Dietary Restraint Affect Nutritional Responses to Weight Loss in Obese Young

Maud Miguet[1], *Julie Masurier*[2], *Jean Philippe Chaput*[3], *Bruno Pereira*[4], *Céline Lambert*[4], *Ana Raimunda Dâmaso*[6], *Martine Duclo*[5], *Daniel Courteix*[1], *Yves Boirie*[5], *David Thivel*[1]

[1]Clermont Auvergne University, EA 3533, Laboratory of the Metabolic Adaptations to Exercise under Physiological and Pathological Conditions (AME2P), Clermont-Ferrand, France; [2]UGECAM Nutrition Obesity Ambulatory Hospital, Clermont-Ferrand, France; [3]Healthy Active Living and Obesity Research Group, Children's Hospital of Eastern Ontario Research Institute, Ottawa, Ontario, Canada; [4]Clermont-Ferrand University hospital, Biostatistics unit (DRCI), Clermont-Ferrand, France; [5]CRNH-Auvergne, Clermont-Ferrand, France; [6]Post Graduate Program of Nutrition. Paulista Medicine School, Universidade Federal de São Paulo (UNIFESP), São Paulo, Brazil

Aims: Multidisciplinary interventions have shown some merits as anti-obesity strategies in youth; however, their impact on daily energy intake remains largely unknown. The aim of the present study was to evaluate the nutritional responses to a 10-month multidisciplinary intervention among adolescents with obesity, considering their eating behavior characteristics at baseline.

Methods: Thirty-five adolescents (mean age: 13.4 (1.2) years) with obesity took part in a 10-month residential multidisciplinary weight loss program. Anthropometric measurements, body composition, ad libitum energy intake, eating behaviors and appetite sensations were assessed before (T0), after 5 months (T1), and at the end of the 10-month program (T2).

Results: The adolescents lost 10.7 kg of body weight (12.0% of their initial weight) at T2. Weight loss was accompanied by an increase in ad libitum energy intake (+246 kcal, $p < 0.001$) and a decrease in emotional (–8.3%, $p < 0.05$) and external (–14.8%, $p < 0.001$) eating. Cognitive dietary restraint score at baseline was inversely correlated with the percentage of weight loss ($r = –0.44$, $p < 0.01$). The observed increased ad libitum energy intake was significantly higher in restrained (+492 kcal) compared to unrestrained (+115 kcal) eaters.

Conclusions: A 10-month non-restrictive multidisciplinary weight loss intervention induced an increase in ad libitum energy intake, especially in cognitively restrained eaters. These findings suggest that dietary restraint may be a useful eating behavior characteristic to consider as a screening tool for identifying adverse responders to weight loss interventions in youth.

Acknowledgments: The authors are grateful to all of the adolescents that participated in the program, and to the Nutrition Obesity Ambulatory Hospital (UGECAM) that provided their generous support. We also want to thank the Auvergne Regional Council for its help through its 2016 New Researcher Award.

Pediatric Obesity and Its Comorbidities: Results of 2 Years of Intervention

Joana Vanessa Silva[1], *Hernâni Gonçalves*[2], *Lúcia Gomes*[1], *Miguel Costa*[1], *Carla Rêgo*[2,3,4]

[1]Department of Pediatrics, Centro Hospitalar Entre Douro e Vouga, EPE, Portugal; [2]CINTESIS/MEDCIDS, Faculty of Medicine, University of Porto, Porto, Portugal; [3]ESB – Catolic University, Porto, Portugal; [4]CUF Porto Hospital, Porto, Portugal

Aims: Evaluate the success of 2 years intervention in the treatment of obesity on nutritional status and expression of its comorbidities.

Methods: Observational retrospective cohort study of overweight and obese children (2–18 years), followed at reference outpatient clinics in pediatric obesity, between 2012 and 2017. Anthropometric and biochemical parameters, blood pressure and abdominal ultrasonography were evaluated. Statistical significance was set at $p < 0.05$.

Results: A total of 223 children (60.1% female) with a mean age of 10.5 years (SD ± 3.4) were studied. The mean disease duration was 5.9 years (SD ± 3.6). 83.9% were obese at admission, with higher incidence among 6 and 10 years (39.6%) and 49.0% had no organized physical activity. The family history of obesity was positive in 45.7% and 84.2% of them had only one parent with obesity. 83.3% were "ever breastfeed" (41.0% between 1 and 5 months), and 6.0% and 3.6% were big and low-for-gestational age respectively.

Comorbidities observed were dyslipidemia (41.2%), insulin resistance (22.0%), high systolic blood pressure (12.1%), hepatic steatosis (11.7%), hyperuricemia (6.6%) and elevation of alanine aminotransferase (ALT) (4.4%). Obesity vs overweight is associated with increased waist-to-height ratio ($p < 0.0001$), glycemic level ($p = 0.012$), insulin resistance (HOMA-IR) ($p = 0.035$), uric acid ($p = 0.027$) and ALT ($p < 0.0001$).

No significant decrease at 2 years of follow-up was observed regarding BMI. A statistically significant improvement in high-density lipoprotein levels ($p = 0.005$) and a worse blood-pressure profile ($p = 0.011$) were observed.

Conclusions: The tracking and chronicity of pediatric obesity and his comorbidities makes that prevention strategies and early and effective intervention become essential to fight against this world public-health disease.

Do Adolescents Resemble their Parents' and Peers' Snacking Behavior?

Nina Van Den Broek[1], *Junilla Larsen*[1], *Maaike Verhagen*[1], *Jacqueline Vink*[1]

[1]Behavioural Science Institute, Radboud University, Nijmegen, The Netherlands

Aims: To foster adolescents' healthy development, it is critical to identify factors that are associated with adolescents' (un)healthy snacking. Given the importance of the social environment in forming adolescent's consumption patterns, we first tested the role of parent and peer snacking in adolescent's snacking. Second, to assess potential modeling effects, we tested whether exposure to parent and peer snacking magnified similarities in snacking.

Methods: Dutch adolescents ($N = 667$, $M_{age} = 12.9$ years; 52.6% girls) and their mothers ($N = 396$) reported on how many days a week they consumed sugar-sweetened beverages, sweet snacks, savory snacks, and fruit and vegetables. Mothers were asked to report on how many days a week they consumed these snacks both in the presence and absence of their child. Moreover, adolescents were asked to identify their best friend in the classroom and to indicate how often they ate and drank together during school breaks. Their friends' snacking scores were used as the peer snacking measure ($N = 380$).

Results: First, we found resemblance in snacking among adolescents and their parents, but not among adolescents and their best friends. Second, we found that exposure to snacking increased snacking resemblance. Specifically, a higher proportion of mothers' snacking in the presence of their child increased mother-child resemblance in fruit and vegetables intake. Moreover, when friends ate and drank more often together during school breaks, friends' sweet and savory snacking was more similar.

Conclusions: First, our findings indicate the importance of mothers' snacking in forming adolescent's snacking behaviors. Second, the current study seems to underscore the importance of modeling in explaining similarities in mother-child healthy and friend-adolescent unhealthy snacking. However, these findings should be corroborated using longitudinal or experimental designs.

Acknowledgments: We would like to thank all the participating schools and their parents for their participation in this study.

Others

Non-Invasive Cardiovascular Risk Assessment in Prepubertal Children

Sarolta Stomfai[1], *Attila Gyenesei*[2], *Wolfgang Ahrens*[3], *Stefaan De Henauw*[4], *Kathrin Günther*[3], *Staffan Marild*[5], *Kirsten Mehlig*[6], *Luis A. Moreno*[7], *Alfonso Siani*[8], *Michael Tornaritis*[9], *Toomas Veidebaum*[10], *Dénes Molnár*[1]

[1]Department of Paediatrics, Medical School, University of Pecs, 7623 Pécs, József A. u. 7., Hungary; [2]Szentágothai Research Centre, University of Pécs, 7624 Pécs, Ifjúság útja 20., Hungary; [3]Leibniz Institute for Prevention Research and Epidemiology – BIPS, 28 359 Bremen, Achterstrasse 30., Germany; [4]Department of Public Health/ Department of Movement and Sport Sciences, Ghent University, Faculty of Medicine and Health Sciences, UZ-Gent 2 Blok A, De Pintelaan 185, 9000 Ghent, Belgium; [5]Department of Pediatrics, The Queen Silvia Children's Hospital, Goteborg University, PO BOX 100, 405 30 Gothenburg, Sweden; [6]Department of Public Health and Community Medicine at Institute of Medicine, Goteborg University, BOX 414, 40530 Göteborg, Sweden; [7]Growth, Exercise, Nutrition and Development Research Group, University of Zaragoza, Domingo Miral s/n 50009 Zaragoza, Spain; [8]Institute of Food Sciences, Unit of Epidemiology & Population Genetics, National Research Council, Via Roma, 52 A/C, 83 100 Avellino, Italy; [9]Research and Education Institute of Child Health, 8 Attikis str, 2027 Stovolos, Cyprus; [10]National Institute for Health Development, Tervise Arengu Instituut, Hiiu 42, 11 619 Tallinn, Estonia

Aims: In spite of the fact that the development of cardiovascular diseases begins in childhood, there is no widely accepted tool for early risk assessment. The aim of the present investigation was to introduce a new, noninvasive risk estimation method for prepubertal children.

Methods: 4858 IDEFICS (Identification and prevention of Dietary- and lifestyle-induced health EFects In Children and infantS) children with a complete data set for this analysis (boys: 2513; age range: 2.1–9.9 years; body weight: [mean±SD] 24.41 ± 7.04 kg; BMI: 16.69 ± 2.34) of the total population (n = 16229) were selected. The input variables consisted of individual clinical (overweight/obesity, waist-to-height-ratio, hypertension, weight small/large for gestational age, breast feeding) and family history (early cardiovascular disease, diabetes type 2, hypertension and dyslipidemia) parameters. These factors were analyzed together and validated against the presence of pathological cardiometabolic laboratory parameters (fasting blood glucose, total cholesterol, HDL-cholesterol, triglyceride, HOMA-index, HbA1C and CRP). The laboratory parameters were categorized by using the cutoff point of the 90th percentile's of IDEFICS population taking age and gender into account (HDL indicates whether the variables is lower than the 10th percentile value).

Results: Children having more than three abnormal input variables had a significantly higher risk (OR >1.7 [CI: 1.4–2.0]) for having at least one pathological cardiometabolic laboratory parameter. It was also revealed that each input variable had different effect on the examined laboratory values.

Conclusions: Our results indicate that the developed simple, noninvasive tool can be applied to detect children with cardiovascular risk. The current results demonstrate that the presented method can be useful in primary care setting.

Acknowledgments: This work was done as part of the IDEFICS Study (www.idefics.eu), contract number: 016181.

It was also supported by the grant of EFOP-3.6.1.-16-2016-00004 Comprehensive Development for Implementing Smart Specialization Strategies at the University of Pécs.

Validity of Self-Reported Weight and Height Among Adolescent Girls

Anna Fijałkowska[1], *Anna Dzielska*[1], *Anna Obliacińska*[1], *Joanna Mazur*[1], *Wisława Ostręga*[1], *Maria Jodkowska*[1], *Magdalena Stalmach*[1], *Dorota Kleszczewska*[2]

[1]Institute of Mother and Child; [2]Foundation of the Institute of Mother and Child

Aims: To assess validity of self-reported weight and height as well as accuracy of underweight, normal weight and overweight or obesity prevalence among adolescent girls using objective and self-reported data.

Methods: Data derived from the intervention 'Healthy Me' program currently being conducted among adolescent girls (N-1173) from randomly selected 48 schools throughout the Poland. For the purpose of this analysis, a subsample of 857 girls at mean age 14.4 ± 0.4 with both self-reported and objective measured data collected was selected from the whole sample of participants. The participants provided data of self-reported weight and hight. After completing questionnaires participants were measured by school nurses using scales with stadiometers. IOTF cut-off points were used to classify BMI values. Differences between self-reported and objective values of key variables were calculated using paired *t*-test. McNemar test was applied to compare the prevalence of BMI classifications when using self-reported or measured BMI.

Results: On average, girls tended to underestimate their weight (kg) when self-reported compared with measured values ($p < 0.001$), respectively 54.9 ± 10.9 and 56.4 ± 10.6. Significant but small difference was also noted in the case of height (cm) ($p < 0.001$), respectively 163.7 ± 6.27 and 163.3 ± 5.98. Resulting on this, BMI from self-reported data were underestimated in comparison with objectively measured BMI ($p < 0.001$), respectively 20.4 ± 3.5 and 21.1 ± 3.6. The prevalence of underweight, normal and excess body weight was significantly different based on self-reported and objectively measured BMI, respectively 12.9% vs. 8.6%, 68.7% vs. 69.8%, 15.7% vs. 20%. A significant difference between subjective and objective classification into BMI categories was confirmed by McNemar test, $p < 0.001$.

Conclusions: There is a significant difference between self-reported and measured weight and hight among adolescent girls. It reflected in biases between BMI values and influenced the classification of girls in the BMI categories. Further analyzes should take into account factors that influence the bias.

A Clinical Case of MC4R Deficiency in a Portuguese Pediatric Cohort Study

Joana Rosmaninho-Salgado[1], *Janet Pereira*[2], *Alice Mirante*[3], *Jorge M Saraiva*[1], *Sergio B. Sousa*[1], *Raquel Soares*[4]

[1]Medical Genetics Unit, Hospital Pediátrico, Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal; [2]Department of Hematology, Centro Hospitalar e Universitário de Coimbra (CHUC), Coimbra, Portugal; [3]Department of Paediatric Endocrinology, Diabetes and Growth, Hospital Pediátrico de Coimbra, Coimbra, Portugal; [4]pediatric outpatient clinic, Hospital Pediátrico, Centro Hospitalar e Universitário de Coimbra, Coimbra (CHUC), Portugal

Aims: Melanocortin 4 receptor (MC4R) deficiency is the commonest monogenic form of non-syndromic obesity. MC4R is a seven transmembrane G-protein coupled receptor implicated in central regulation of body weight. The loss-of-function mutations in *MC4R* gene will contribute to early-onset obesity associated with hyperinsulinemia, hyperphagia and "binge eating".We aim to determine the prevalence of *MC4R* variants in a Pediatrics Portuguese cohort with obesity. We present our preliminary results and the clinical description of the first identified case.

Methods: Patients with obesity onset before 10 years old observed at Pediatrics Hospital of Coimbra, were screened for *MC4R* variants by Sanger sequencing after PCR amplification. Molecular and clinical characterization was performed in cases with identified *MC4R* variants.

Results: A total of 55 patients (mean age was 11 years, 32 boys) were included in the study. We identified one boy (1/55, 1.8%) with a pathogenic heterozygous *MC4R* variant: well-known 4 bp deletion with frameshift effect (c.631_634del (p.Leu211Metfs*6). This patient's phenotype will be detailed: 12 years-old boy with a BMI z-score of 2.1 (98th centile), height was on 75–90th centile, with onset obesity at 20 months and a binge-eating behavior. No specific dysmorphisms are reported. He had an attention-deficit/hyperactivity disorder. His father and sister have overweight (BMI of 29.9 and 27.6, respectively).

Conclusions: Our preliminary results point out that also in the Portuguese population, where specific data is lacking, the prevalence of *MC4R* deficiency is likely significant. The presented case with this diagnosis has no distinctive phenotypic features, reinforcing the need of screening large cohorts with broad inclusion criteria. This diagnosis is not only important for genetic counselling and enabling early diagnosis in other family members, but also to the follow-up of identified cases, as specific therapies are under development, using partial agonists of the MC4R.

One-Year BMI Increments in Norwegian Children and Adolescents

Hege Kristiansen[1], *Mathieu Roelants*[2], *Robert Bjerknes*[1], *Pétur B. Júlíusson*[1]

[1]Department of Clinical Science, Section for Paediatrics, University of Bergen, Bergen, Norway; [2]Environment and Health, Department of Public Health and Primary Care, KU Leuven – University of Leuven, Leuven, Belgium

Aims: To investigate the effect of sociodemographic and family factors on one-year BMI increments in 769 Norwegian children aged 5.5 to 15 years.

Methods: Baseline BMI z-scores and one-year. BMI z-scores increments compared to questionnaire data of 767 children included in the Bergen Growth Study. The data were analyzed with paired t-tests and linear and logistic regression models.

Results: Overall, there was an increase in BMI z-scores from baseline to one year by mean of 0.33 (95% CI = 0.01, 0.06). In children with overweight or obesity there were lower increments than in children with normal- or underweight. Family structure (the presence of stepparents or half siblings) was associated to higher increments (b = 0.07, 95 % CI = 0.017, 0.124), but was unrelated to baseline BMI z-scores. Maternal BMI was associated to both higher increments (b = 0.008, 95% CI = 0.002, 0.015) and baseline BMI z-scores (b = 0.059, 95% CI = 0.043, 0.075). Parental perception of the child as being overweight was associated to both higher increments (b = 0.166, 95 %CI 0.076; 0.255) and higher baseline BMI z-scores (1.338, 95 % CI = 1.139, 1.538). Parental perception of the child as being thin was associated to lower BMI increments (–0.208, 95% CI = –0.284, –0.133) and baseline BMI z-score (b = –1.146, 95% CI = –1.313; –0.980).

Conclusions: BMI increments identify ongoing changes in weight and could be valuable in identifying children at risk of developing overweight. Children with high maternal BMI and living in a disrupted family had high BMI increments, and these could be the children to watch out for in a preventive setting.

Acknowledgements: The Bergen Growth Study has been supported by the Western Norway Regional Health Authority and the University of Bergen. HK has received grants from the Western Norway Regional Health Authority and Førde Health Authority.

Psychology

Intuitive Eating in a Sample of Adolescents Undergoing Weight Loss Treatment

Sofia Ramalho[1], *Eva Conceição*[1], *Pedro F. Saint-Maurice*[2]

[1]University of Minho, School of Psychology, Braga, Portugal; [2]National Institutes of Health, National Cancer Institute, Bethesda, USA

Aims: Intuitive eating is an adaptive form of eating in which individuals are instinctively conscious of their bodies' natural hunger and satiety cues and use of such cues to decide when and how to eat. The present study 1) examines the psychometric properties of the Intuitive Eating Scale-2 (IES-2); and 2) investigates the relationship between intuitive eating, depression, and disordered eating behaviors, in a Portuguese sample of adolescents under treatment for overweight/obesity.

Methods: A sample of 202 adolescents (124 girls and 78 boys, 12 to 19 years) undergoing weight loss treatment with a mean BMI z-score of 2.4 (SD = 0.8) was evaluated for depression, stress, anxiety, disordered eating, physical activity, health-related quality of life, and intuitive eating [IES-2 total score and respective subscales: Reliance on Hunger and Satiety Cues (RHSC), Eating for Physical Rather Than Emotional Reasons (EPR), Unconditional Permission to Eat (UPE) and Body Food Choice Congruence (B-FCC)]. An exploratory and confirmatory factor analysis was conducted as a hierarchical regression model investigating the association between age, gender, depression and disordered eating behaviors with intuitive eating.

Results: The IES-2 confirmatory factor analysis supported a three-factor, 13-item measure with the subscales RHSC, EPR, B-FCC. The UPE subscale could not be replicated in this sample. Age, gender, depression, and disordered eating behaviors explained 36% of the variance in intuitive eating (adjusted $R^2 = 0.36$, $\Delta R^2 = 0.34$ $F(6, 168) = 15.88$, $p < 0.001$). Food preoccupation ($\beta = -0.27$), social pressure to eat ($\beta = 0.24$) and grazing eating pattern ($\beta = -0.29$) accounted significantly for the intuitive eating variance.

Conclusions: The revised IES-2 constitutes a useful self-report instrument for the assessment of intuitive eating in adolescents with overweight or obesity. Future should explore IES-2 in other cultures and clinical populations.

Families' Perceptions of Authenticity in a Shared-Care Intervention

Dan Grabowski[1], *Didde Høeg*[1]

[1]Steno Diabetes Center Copenhagen Health Promotion Research, Gentofte, Denmark

Aims: To study whether and how an analytical framework focusing on communicative healthcare authenticity can be used to observe and elaborate upon aspects of adherence in relation to health behavior change in a family-based shared-care childhood obesity intervention. We focus on the families' experiences with a childhood obesity intervention that is shared between the outpatient clinic at the hospital and the local municipal health nurses.

Methods: The dataset consists of 21 in-depth semi-structured family interviews. Radical hermeneutics was used to analyse the data.

Results: The study shows that the Shared-care model has great potential in terms of facilitating several kinds of communicative authenticity – because families are met by both the medical knowledge authority at the hospital and the local nurses in their municipality. When the families perceived the healthcare communication as authentic they were more adherent to health behavior changes. The four kinds of authenticity identified were:1) Authentic relationship between family and healthcare professionals: creating a sense of genuine caring, as opposed to rule-bound caring. 2) Authentic healthcare professional: owing to the position he/she represents or because he/she possesses important skills or knowledge. 3) Authentic thematic contents: creating a sense of thematic applicability to and usability in daily family life. 4) Authentic activities: creating a sense that the activities are meaningful.

Conclusions: Using theories of authenticity in this context adds theoretical and analytical potential and manages to incorporate elements of participation in tasks and practices of value, a sense of who we are and what we know, negotiation of meaning, emphatic caring, consistency between values and actions and horizons of significance. The article brings new perspectives on how family-based interventions could be tailored to communicatively suit individual families.

Acknowledgements: We would like to thank all the participating families and healthcare professionals.

Satisfaction with Apolo-Teens Online Program for Overweight/Obese Adolescents

Silvia Félix[1], *Sofia Ramalho*[1], *Eva Conceição*[1], *Pedro F. Saint-Maurice*[2], *Diana Silva*[3], *Helena Ferreira Mansilha*[4]

[1]University of Minho, School of Psychology, Braga, Portugal; [2]National Institutes of Health, National Cancer Institute, Bethesda, USA; [3]Faculty of Nutrition and Food Sciences, University of Porto, Porto, Portugal; [4]Centro Hospitalar e Universitário do Porto – Centro Materno Infantil do Norte (CMIN), Porto, Portugal

Aims: APOLO-Teens is an online intervention for adolescents with overweight and obesity delivered by Facebook® to optimize treatment as usual by targeting healthy food frequency consumption, participation in physical activity, and psychological well-being. This study: 1) describes the participant's satisfaction with APOLO-Teens; and 2) explores depressive symptomatology and grazing eating pattern as predictors of participant's satisfaction at the end of the intervention.

Methods: Fifty-two adolescents (71.2% females) who participated in APOLO-Teens intervention fulfilled a set of questionnaires about depressive symptomatology and grazing eating pattern at baseline, middle (3 months) and end of intervention (6 months). A satisfaction questionnaire was completed at the end of the intervention.

Results: Participants scored an average of 2.3 points (of 4 possible points; SD = 0.63) in APOLO-Teens Satisfaction Question-

naire. The participant's preferred intervention theme was physical activity and the least preferred was healthy eating. The model tested with path analysis showed a good fit to the data ($\chi^2 = 11.578$, df = 9, p = 0.238; CFI = 0.963, TLI = 0.914, IFI = 0.969, RMSEA = 0.075) and suggested that higher levels of grazing and depressive symptomatology at the baseline predicted higher levels of depressive symptomatology at the 3 and 6 months. Subsequently, depression symptomatology at 6 months was associated with higher levels of compulsive grazing at 6 months, which in turn predicted less satisfaction with the program at the end of the intervention.

Conclusions: Participants were satisfied with APOLO-Teens online intervention. Depressive symptomatology and grazing emerged as important predictors of satisfaction. Future interventions targeting adolescents with overweight and obesity should include topics related to physical activity in order to optimize treatment outcomes and enhance satisfaction.

Emotional Characteristics of Preschool Children with Overweight and Obesity

Vladimir Polyakov[1], *Viktoria Shkrobtak*[1], *Anastasiya Domashenkina*[1], *Aryuna Kosovtseva*[1], *Zhanna Prokhorova*[1], *Lyubov Rychkova*[1]

[1]Scientific Centre for Family Health and Human Reproduction Problems, Irkutsk, Russia

Aims: to study emotional development in preschool children with overweight and obesity.

Methods: We studied the emotional state in 40 preschool children aged 5–6 years. Twenty children with overweight and obesity were included in to the main group; other twenty children with normal weight comprised the control group. Both groups were equal in age and sex. We measured body mass index (BMI by the formula) of every child. Body mass index was calculated by the formula: $I = m/h^2$, where: m — weight in kilograms, h — height in meters. Tests were carried out during children's stay at a preschool institution in the afternoon; every child passed several tests. To analyze the emotional state we used the complex of diagnostic tests: the Lüscher color test (for preschoolers), the Rosenzweig picture-frustration test (for children), the kinetic family drawing technique (Berns C.R., Kaufman S.) and the house-tree-person test (J.Buck). All tests were given in one sequence to all children.

Results: The majority of children with overweight and obesity had higher levels of anxiety and aggression comparing with the children with normal weight. This can indicate the presence of chronic stress. Preschool obese children also showed intropunitive reactions to a frustrating event, which usually points at excessive self-criticism or lack of confidence, decreased or unstable level of self-respect. By means of projective drawing tests, we determined low indices of family well-being, fears, feeling of alienation, lack of confidence, and need for protection and care in children with overweight and obesity.

Conclusions: Thus, the results of the study can indicate negative influence of overweight and obesity in preschool children on their emotional state and personality development. Angst and chronic stress prevail among emotional reactions of such children.

Parents' Adolescents-Control Behaviours in Adolescents with Overweight Risk

Carla Sá[1], *João Luís Viana*[1], *Gustavo Silva*[1], *Luisa Aires*[2], *Maria João Lagoa*[1]

[1]Research Center in Sports Sciences, Health Sciences and Human Development, CIDESD, Portugal; [2]Research Centre in Physical Activity, Health and Leisure, CIAFEL, University of Porto, Portugal

Aims: We aimed to evaluate the differences in parents' adolescents-control perception between two groups of adolescents – overweight risk group (ORG) and without overweight risk group (WORG).

Methods: This study included 413 Portuguese adolescents (mean age 12.38 ± 1.79 years) from "Family in Move", a school-based project. Adolescents' and parents' anthropometric measurements were collected: body mass (weight and height) and BMI. We applied the Child feeding questionnaire (CFQ) to their parents, and we analysed three of the seven factors: 'restriction' to assess the extent to which parents restrict their adolescent's access to food, 'concern about child weight' to assess parental concern about the child risk of being overweight, and 'perceived child weight' to assess parental perception concerning child's weight status history. All items were measured using a 5-point Likert-type scale. Descriptive statistics, independent sample t-test analysis and spearman correlation were used for data analysis.

Results: Results showed that ORG was significantly higher than WORG with respect to 'concern about child weight' (2.7 ± 1.2 vs. 1.8 ± 1.0), $p < 0.001$), and 'perceived child weight' (3.1 ± 0.3 vs. 2.7 ± 0.4, $p < 0.001$). There was no significant differences on 'restriction' between groups, however there was an inverse association between BMI and 'restriction' ($\rho = -0.121$, $p < 0.05$).

Conclusions: Although parents of ORG are more concerned about their adolescents' weight, they do not have the perception that they restrict their eating. This can be identified as potential foci for overweight prevention and intervention programs.

Acknowledgments: CIDESD (UID/DTP/04045/2013) and NanoSTIMA (NORTE-01-0145-FEDER-000016).

How Do the Obese Children and their Parent Perceive Family System Functioning?

Agnieszka Zachurzok[2], *Agnieszka Pasztak-Opilka*[1], *Ewa Malecka-Tendera*[2]

[1]Institute of Psychology, Faculty of Pedagogy and Psychology, University of Silesia, Katowice, Poland; [2]Department of Pediatrics and Pediatric Endocrinology, Medical University of Silesia, School of Medicine in Katowice, Poland

Aims: The aim of the study was to assess the family system functioning in obese children evaluated by obese children and their parents and to compare these perceptions.

Patients and Methods: Forty six couples: obese child–parent were enrolled into study. The children's group comprises 22 (48%) boys and 24 (52%) girls in the age of 11–18 years (13.0 ± 1.9 years) with simple obesity (BMI z-score 2.1 ± 0.3). There were 40 (87%)

mothers and 6 (13%) fathers in parents' group. Each parent fulfil the questionnaire composed of 25 questions about nutritional habits and obesity in child and family. Both, parents and children filled up the polish version of Flexibility and Cohesion Evaluation Scales (FACES IV). The questionnaire is comprised of 62 statements, constitute eight scales which assess: Cohesion, Disengagement, Enmeshment, Flexibility, Rigidity, Chaos, Communication and Family Satisfaction.

Results: Only in 4% of obese children parents were normal weight, in 35% of children at least one parent was obese and in 61% – both parents were obese. According to questionnaire, nutritional problems in family were declared only by 47% parents. Parents considered low physical activity (87%), unhealthy eating (87%) and genetic factors (48%) as the main reason of child obesity. The least important reason was family problems (11%). According to FACES IV, higher level of Rigidity reported by children compering to parents (20.2 ± 5.0 vs. 18.0 ± 4.1 points, p = 0.02) was observed. Parents indicated higher level of Enmeshment than children, the difference did not reach level of statistical significance (14.6 ± 4.8 vs. 16.3 ± 5.6 points, p = 0.06). In children's perception 57% of families were assessed as balanced, according to parents – only 30% (p = 0.01).

Conclusions: Significant differences between evaluation of family system functioning reported by obese children and their parents may give the evidence of some disturbances of family performance. Moreover parents do not perceive the nutrition disturbances as the consequence of family life style and parental obesity.

Physical Activity

Adherence 24hr Movement Guidelines and Adiposity Among Portuguese Preschoolers

Susana Vale[1], *Carla Rego*[2], *Jorge Mota*[3]

[1]Department of Sport Sciences, High School of Education. Polytechnic Institute of Porto, Portugal; [2]Universidade Católica Portuguesa, CBQF – Centro de Biotecnologia e Química Fina – Laboratório Associado, Escola Superior de Biotecnologia – Porto, Portugal; [3]Centro de Investigação em Atividade Física Saúde e Lazer (CIAFEL), Faculdade de Desporto – Universidade do Porto, Portugal

Aims: 24-Hour Movement Guidelines were developed for Canadian group with the hope of improving health and future health outcomes in children. This guidelines provide specific recommendations, include physical activity (light to vigorous), screen and sleep time, that preschoolers should achieve for a healthy day (24 h). The aim of this study was to assess adherence to 24-Hour Movement Guidelines among Portuguese preschoolers and their associations with adiposity: BMI z-scores; waist circumference and waist to height ratio.

Methods: 542 preschool children (mean age = 4.9 ± 0.8 years, 46% girls) participating in the PreStyle Project were analyzed. Children completed objectively measured physical activity and parents reported on children's screen and sleep time. Preschoolers were classified as meeting/not meeting the overall 24-Hour Movement Guidelines if they met physical activity (≥180 min/day of TPA including ≥60 min/day of MVPA), screen time (≤1 h/day), and sleep time (10–13 h/day) recommendations. Body Mass Index z-scores was calculated according WHO growth standards. Logistic and multiple regression models assessed associations between this new guidelines and adiposity outcomes.

Results: The majority of preschool children met physical activity (94.5%) and high percentages met sleep guidelines (77.8%). Although, low proportion met screen-time guidelines (34.4%). Only 26.4% met the overall 24-Hour Movement Guidelines. Meeting only physical activity recommendations was associated with BMI z-scores (OR: 3.3 IC (1.4–7.5)), with waist circumference (OR: 3.2 IC (1.3–8.0)) and waist to ratio ratio (OR: 4.1 IC (1.7–9.8)). No associations were observed between overall 24-Hour Movement Guidelines and adiposity outcomes.

Conclusions: Nevertheless most children were meeting physical activity and sleep time recommendations, high percentage screen-time longer than expected. Strategies to limiting screen-time are necessary.

A Physical Activity Consultation in the Management of Adolescent Overweight

Antonio Videira-Silva[1], *Luís Sardinha*[2], *Helena Fonseca*[3]

[1]Pediatric University Clinic, Faculty of Medicine, University of Lisbon, Lisbon, Portugal; [2]Exercise and Health Laboratory, Faculty of Human Kinetics, University of Lisbon, Lisbon, Portugal; [3]Pediatric Obesity Clinic, Department of Pediatrics, Hospital de Santa Maria, Lisbon, Portugal

Aims: This study aimed to present the preliminary results at six months of the non-randomized control trial PAC-MAnO (Physical Activity Consultation for the Management of Adolescent Overweight), designed to investigate the impact of a Physical Activity (PA) Consultation, based on Motivational Interview, on PA behavior and weight status among adolescents with overweight followed at a Pediatric Obesity Clinic.

Methods: Data from 85 adolescents (control group- standard care, n = 30; experimental group I -EG I- standard care plus PA Consultation, n = 26; experimental group II -EG II- exposure to two sessions/week of structured PA in addition to the standard care and PA Consultation, n = 29) with overweight (BMI ≥ p85), aged 12–18, who have completed six months of the PAC-MAnO project, were analyzed.

Results: Both experimental groups have shown a decrease in BMI z-score (EG I d = 0.39, EG II d = 0.30, p = 0.024) and body fat mass (EG I d = 0.39, EG II d = 0.30, p = 0.024) compared to the control group. EG II showed an increase in skeletal muscle mass compared to the control group (d = 0.35, p = 0.041). Although not statistically significant, both experimental groups have shown a trend to increase PA time compared to the control group (EG I d = 0.20, EG II d = 0.50, p = 0.224). Changes in PA levels were positively associated with changes in skeletal muscle mass ($r(85)$ = 0.30, p = 0.010), and negatively associated with changes in body fat mass ($r(85)$ = 0.27, p = 0.022).

Conclusions: Based on these findings, it seems crucial to increase PA levels of adolescents with overweight in order to im-

prove BMI and body composition outcomes. PA Consultation has shown to be an effective strategy to increase PA and to improve BMI and body composition. A PA Consultation, as part of a multidisciplinary program, has an added value in adolescent weight management compared to standard care comprising only Pediatric and Nutrition consultations.

Metabolic Syndrome in Overweight/Obese Youth: A Multicomponent Intervention

Anelise Reis Gaya[1], *Lars Bo Andersen*[2], *Caroline Brand*[1], *Arieli Fernandes Dias*[1], *Rodrigo Antunes Lima*[3], *Tais Feitosa Silva*[3], *Adroaldo Araujo Gaya*[1], *Jorge Mota*[4], *Clarice Lucena Martins*[3]

[1]Federal University of Rio Grande do Sul; [2]Western Norway University of Applied Sciences; [3]Federal University of Paraiba; [4]University of Porto, Porto, Portugal

Aims: to investigate the effects of a multicomponent intervention on metabolic syndrome, including nonalcoholic fatty liver disease (NAFLD) markers in overweight/obese low-income children and adolescents.

Methods: This pilot experimental study was developed with overweight/obese children and adolescents, aged between 7 and 13 years, allocated in intervention (IG: n = 17) and control group (CG: n = 18). The multicomponent intervention was developed during twelve weeks, consisting of exercise sessions (twice/week; 1 h), nutritional education sessions (once/month), and parental support (twice/week). Height and body weight were determined by a stadiometer, body fatness was measured by a bioimpedance scale; cardiorespiratory fitness was evaluated by 20 m Shuttle-run Test. Maturational stage was obtained according to Tanner's criteria. Total cholesterol (TC), triglycerides (TG), glucose, aspartate aminotransferase (AST), alanine aminotransferase (ALT), were measured through peripheral puncture in the cubital vein after a nocturnal twelve hour-fasting. Also, it was calculated a cardiovascular disease composite z-scores (Body fatness, Glucose, AST, ALT, TG, TC/HDL ratio). For data analysis, change scores were calculated by subtracting post-intervention values from baseline values. General linear models were performed to analyze differences between IG and CG in change scores from baseline to post-intervention adjusted for sex, sexual maturation, age category and baseline level.

Results: Compared to the control group, participants decreased body fatness (Δ–0.97; $p < 0.001$), glucose levels (Δ–0.15; $p = 0.005$), ALT (Δ–2.84; $p = 0.021$), TC/HDL ratio (Δ–0.93; $p < 0.001$) and the CVD composite score (Δ–0.97; $p < 0.001$).

Conclusions: A three-month multi-component intervention was effective on decreasing metabolic syndrome parameters, including NAFLD in overweight/obese low-income children and adolescents. Although the intervention was not extensive in number of stimulus per week or duration, this model of intervention was effective on decreasing metabolic syndrome parameters in youth. Schools and policy makers can also feel encouraged to implement this model of intervention in larger scale, since the benefits seem to be clear.

Sedentary Time and Safety Perceptions Among Adolescents

Andreia Pizarro[1], *José Ribeiro*[1], *Jorge Mota*[1], *Maria Paula Santos*[1]

[1]Ciafel – Faculty of Sports – Porto University, Portugal

Aims: Safe neighborhoods with low crime seems to be associated with increased physical activity and lower sedentary behavior, on the other hand a sedentary behaviour has been assotiated with poor health outcomes like obesity. Therefore, the aim of our study is to analyze the association between objectively measured sedentary time and safety perceptions in normoponderal and overweight adolescents.

Methods: 184 adolescents (113 girls) with a mean age 16.88 ± 0.94 years old used a GT3x accelerometer for 7 days to measure sedentary time. Neighborhood and crime safety perceptions were self-reported through 14 NEWS-Y questionnaire. The International Obesity Taskforce (IOTF) cut-offs were used to define weight status based on Body mass index (kg/m^2). Mann-whitney test was used to compare sedentary time in the different weight categories. Stepwise linear regression models were conducted to predict sedentary time based on adolescents' safety perceptions. Models were adjusted for age, gender and neighborhood SES.

Results: No significant differences were found for average sedentary time and average moderate t vigorous physical activity between normoponderal and overweight adolescents. For normoponderal adolescents sedentary time was significantly associated with high crime rate ($\beta = -0.29$, $p < 0.038$) and with perception of unsafety to walk at night due to the crime rate ($\beta = 0.40$, $p < 0.004$). In overweight adolescents, sedentary time was significantly predicted by the fear of being hurt by stranger in a park ($\beta = 0.36$, $p < 0.045$) and with disagreeing with fear of being hurt by a stranger when walking with friends ($\beta = -0.58$, $p < 0.002$).

Conclusions: Crime safety related perceptions were important predictors of sedentary time both in normoponderal and overweight adolescents. Therefore, exertions to improve neighborhood crime safety should be on the public health agenda as a safer neighborhood also encourage youth to be active outdoors.

Physical Fitness of Down Syndrome Adolescents: Intervention and 1-Year Follow-Up

Clarice Martins[1], *Dafne Macêdo*[1], *Maria Luísa Félix*[1], *Luís Filipe Lemos*[2], *Taís Feitosa*[2], *Anelise Reis Gaya*[3], *Jorge Mota*[4]

[1]Federal University of Paraíba; [2]University Centre of João Pessoa; [3]Federal University of Rio Grande do Sul; [4]University of Porto, Ciafel

Aims: To compare the observed changes in physical fitness components of Down Syndrome adolescent exposed to a 6-month multicomponent intervention program and to follow-up these responses after 6 months and 1 year of intervention.

Methods: The sample was composed of 14 volunteers (15.1 ± 2.6, 6 boys) who participated in the 6-months multicomponent intervention program composed by physical education classes (twice a week), nutritional education (once a week), and parental support. Physical fitness components were evaluated according to

international protocols: a) body composition was assessed by dual-emission Densitometry; b) physical tests, including measurements of lower and upper limbs strength, flexibility, cardiorespiratory fitness, gross coordination, agility, and velocity were measured according to the Assessing Levels of Physical Activity (ALPHA) Battery, and the Koordinations Test für Kinder (KTK). Friedman's variance analysis and non-parametric multivariate analysis of variance were used. The mean and standard deviation were calculated and the results subjected to analysis of variance of repeated measures, considering the 95% significance range. The magnitude of the effect between the times was calculated using Cohen's d as reference. The analyses were performed using SPSS (version 24.0) and the R Software for nonparametric multivariate analysis of variance.

Results: There was a significant increase in lean mass at all moments of evaluations, and significant improvements in cardiorespiratory fitness, strength, speed and agility ($p \leq 0.05$). Even after 1 year without intervention the participants presented better values than the initial ones.

Conclusions: Positive changes were observed after the 6-months multicomponent intervention for strength, cardiorespiratory fitness, speed and agility. These changes were observed even after a year of the end of the intervention program.

Exercise-Induced Symptoms in Obese/Overweight Asthmatic Teenagers

Maria São Pedro[1], *Mafalda Matias*[1], *Inês Ganhão*[1], *Catarina Lacerda*[1], *Susana Correia*[1], *Ana Fernandes*[1]

[1]Centro Hospitalar Barreiro-Montijo, Portugal, Department of Pediatrics, Barreiro, Portugal

Aims: Exercise-induced symptoms (EIS) are frequent in asthmatics. The relationship between EIS and asthma control remains unclear and may be due to physical deconditioning rather than poor disease control, particularly in obese and/or sedentary patients. This study investigates the correlation between these factors.

Methods: Analytical and retrospective study, conducted in a suburban hospital. Sample consisting of asthmatic obese/overweight teenagers that attended respiratory disease and cardiovascular risk or nutrition consultations, within the first semester of 2018. Data related to the severity of the disease (GINA's criteria), presence of factors associated with poor asthma control (low compliance to therapy, exposure to aeroallergens or passive smoking) and the results of pulmonary function tests (PFT) (positive if FEV1 increased more than 12% with salbutamol bronchodilation test) were collected. Sedentarism was defined as the absence or just 1 weekly session of an extracurricular physical activity. Software *SPSS*-version 24.0 was used for statistical analysis.

Results: 30 patients, 13 female, with average age 14, 33 years old (SD 2.8) [10–18 years old]. Seventeen had EIS, 12 of them (70.6%) with a negative PFT [being 9 of these (75%) sedentary]. The remaining 5 patients, with positive PFT, had moderate asthma and/or presence of factors related with poor asthma control. From the 13 patients without EIS, 6 had normal PFT, 5 of which had mild asthma and good compliance to therapy, therefore good control of the disease. A higher percentage of negative PFT was found in the sedentary (15 in 20 – 75% *versus* 4 in 10 – 40% in the non-sedentary). None of the tests applied was statistically significant.

Conclusions: Although it seems that EIS in obese/overweight asthmatics teenagers might be related with sedentarism and deconditioning, and not only with poor disease control, this relation couldn't be established, since the sample was small. Larger studies are needed to clarify this correlation.