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CHILDHOOD OBESITY I.

22. Preventing childhood obesity in Hungary – the GYERE® program

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Objective: Obesity is a growing public health issue, what affects 67 percent of the adults and more than 20 percent of the Hungarian children population. To overcome the obesity epidemic the WHO recommends to improve lifestyle by promoting healthy eating habits and physical activity in all socio-economical settings. The GYERE ("Children's Health") program aims to prevent childhood obesity by acting on the behavior of the whole family, changing its environment and community norms. The first GYERE pilot program has initiated by the Hungarian Dietetic Association in 2014. The three years program is rolled-out in partnership with the Semmelweis University, Faculty of Health Sciences, the National Institution for Health Development and the State Secretariat of Health. **Method:** The GYERE program adopts the EPODE four pillars approach (public-private partnerships, political commitment and support, social marketing techniques and evaluation) for early engagement of children, involvement of all stakeholders, including families and communities. As part of the health education several thematic campaigns were carried out on healthy eating and active lifestyle. The program is using various communication channels (e.g. lectures, drawing and recipe competition, GYERE menu in school canteens, Facebook posts, educative articles) involving all of the children below 18y and their families in Dunaharaszti. **Results:** To measure impact of the health intervention anthropometric data of 6–12y children are collected at baseline and after the three years intervention. N = 1,421 (51.1 % boys, 48.5 % girls in 2014), 1315 (50.3 % boys, 49.7 % girls in 2017). Mean BMI of the total sample from 2014 is significantly higher than the mean BMI in 2017 ($p = 0.000$). Mean BMI of 8–10y boys, 7–8y girls and 11–12y girls is significantly lower in 2017 vs. 2014 ($p = 0.000$). Prevalence of overweight has decreased by 5 % and obesity by 2 % between 2014 and 2017. **Conclusion:** Our findings show that implementation of community based interventions has a potential to improve health behavior, therefore to reduce obesity prevalence.

23. Setting up obesity school programs: Challenges & Examples

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A common component of prevention and treatment concept of obesity in childhood is teaching nutrition-related knowledge, as it is necessary to adopt healthy behaviours. Due to the existing infrastructure, school staff, facilities, policies, and environments, the school setting provides a logical choice as a context for implementing interventions to promote a healthy lifestyle. Additionally, building healthier food environments in and around schools may further improve healthier eating habits. Consequently, a combination of health promotion and health promoting school environment are warranted. The Austrian *Special Institute for Preventive Cardiology And Nutrition* (SIPCAN) has set itself the target of improving nutrition education and the school environment e.g. cafeteria and vending machines. The school program includes three educational interventions ("Drinking & snack license", "Movement is fun", and "Smart drinking") and three environmental interventions ("Vending machine check", "School cafeteria check", and "Lunch check"). The education is delivered by a teacher with whom the school children are familiar and it is also aimed to reach the school children's parents, to reinforce healthier lifestyle also in the home environment. Therefore, no specially trained professionals are required. Additionally, such interventions require a minimum of money, effort, and school time and contain practical lessons regarding healthy nutrition and physical activity. In addition, by e.g. optimizing the vending machine, a reduction in the total mean sugar content of the beverages within the vending machine and therefore the school environment is a feasible intervention. Consequently, a complete package of school-based education and optimizing the school environment is able to increase nutrition-related knowledge, dietary behaviour with decreases in the consumption of unhealthy food and with healthy choices but without bans.

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24. "Obesity reduction program – School of Obesity" and utility of non-traditional risk factors and biomarkers in cardiovascular disease risk assessment

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Childhood obesity is one of the most serious public health challenges of the 21st century. The atherosclerotic process, as evidenced by functional and morphological changes in the heart and blood vessels, begins early in childhood. *In our study on* 224 randomly selected students (17.72 ± 1.20 years of age, 120 female) from 7 high schools in Kosice we confirmed high prevalence of overweight/obesity (24 %), hypertension (9.3 %), and insulin resistance (14 %)**,** obesity-related GH deficiency and the relationship between Adv36 infection and non-traditional cardiovascular risk factors, including leptin and UA. The current study results emphasize the importance of stratification of non-traditional CV risk factors and biomarkers in the paediatric population besides of stratification traditional CV risk factors. The treatment of childhood obesity and prevention of its related CVD being vital in to addressing rising levels of non-communicable diseases, with specific emphasis on childhood obesity. At Department of Paediatrics and Adolescent, Faculty of Medicine, Pavol Josef Safarik University in Kosice the management of obesity includes hospitalization to exclude secondary causes of obesity, and outpatient program. Our highly specialized *Clinic for preventive cardiology* focuses on group outpatient therapy of obesity, and also on cardiovascular risk stratification in children and adolescent. Organized team of specialists (cardiologist, nephrologist, endocrinologist, psychologist) is working on interdisciplinary outpatient program – *"Obesity reduction program – School of Obesity",* which is under the patronage of the president of Slovak section for Atherosclerosis of Slovak Society of Clinical Biochemistry (member of IAS) – *Assoc. prof. Ingrid Schusterova, MD, PhD.* This program is focused on the same sex/age groups of children and adolescent and their parents. The goal of this program is to win the fight against obesity – prevention of cardiovascular disease associated with obesity, and treatment of childhood obesity by new way.

25. Risk factors of cardiovascular and metabolic diseases in Slovak adolescents: association with obesity

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Objective: It is now widely believed that adolescence levels of cardiovascular and metabolic risk factors predict early cardiac and vascular pathology. We found obesity/prehypertensive parameters in a considerable group of primary school children (Conference on Pre-Hypertension 2011, Vienna). Universal screening of total cholesterol is performed at age 11 and 17 yrs in Slovakia, but data on blood lipid profile and insulin resistance risk parameters of general population Slovak adolescents are not available. **Methods:** Respect for Health is a crossectional study of the major cardiometabolic risk parameters -hypertension, dyslipidaemia, insulin resistance – and their association with obesity in a representative sample 2,767 healthy Bratislava region secondary school students aged 15–19, in school milieau. **Results:** Obesity (BMI > 97th percentile of representative age/gender specific population) was found in 17,6 % boys and 10 % girls. Mean **blood pressure** is significantly higher in obese than at normal weight (systolic + 8 mm Hg boys, + 7 mm Hg girls) (diastolic + 4 mm Hg boys, + 3 mm Hg girls). The prevalence of **high blood pressure** in obese boys and girls is 26.2 % and 13.5 %, versus 8.8 % and 2.7 % in normal weight, odds ratio (OR) = 3.69 $p \leq 0.05$ and OR = 5.71 $p < 0.05$, **Dyslipidaemias:** the average **cholesterol (TC)** of obese, compared to normal weight boys is significantly higher by 0.38 mmol/l. The **risk level TC** ≥ 5.181 mmol/l occurred in 7.6 % obese, compared with 2.2 % normal weight boys, OR = 3.69 pHDL-cholesterol (HDL-C) is significantly lower by 0.12 mmol/l and 0.19 mmol/l in obese boys and girls compared to normal weight. The prevalence of **risk level HDL-C** < 1,036 mmol/l in obese boys and girls is 28.9 % and 10.8 % vs. 14.2 % and 2.3 % in normal weight, OR = 2.45 $p \leq 0.05$ and OR = 5.05 pLDL-cholesterol (LDL-C) is significantly higher in obese compared to normal weight boys and girls, by 0.33 mmol/l and 0.16 mmol/l. The **risk level LDL-C** ≥ 3,368 mmol/l occurred in 6.2 % of obese, compared to 2.3 % in normal weight boys, OR = 2.82 pnon-HDL-cholesterol (non-HDL-C) in obese compared to normal weight boys and girls is significantly higher by 0.49 and 0.21 mmol/l. The **risk level non-HDL-C** ≥ 3,756 mmol/l occurred in 12.4 % of obese compared with 2.8 % in normal weight boys, OR = 4.86 $p \leq 0.05$. The mean **triacylglycerols** are significantly higher by 0.36 mmol/l and 0.11 mmol/l in obese compared to normal weight boys and girls. The **risk triacylglycerol level** ≥ 1,467 mmol/l occurred in 22.2 % and 12.2 %

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obese, compared to 3.8 % and 7.7 % normal weight boys and girls, OR = 7.26 p < 0.05 and OR = 1.67 p < 0.05. **Insulin resistance:** Mean fasting insulin and HOMA-IR in obese boys are two-fold, in obese girls 1.5-fold higher, QUICKI significantly lower than with normal weight. The prevalence of **risk level QUICKI** ≤ 0,305 in obese is 26.7 % and 17.6 % compared to 2.9 % and 3.5 % in normal weight boys and girls OR = 13.07 p < 0.05, and OR = 5.84 p < 0.05. **Conclusions:** A great proportion of healthy Slovak adolescents carry substantial burden of cardiovascular and metabolic risk factors, significantly more expressed in obese and male gender.

26. Epicardial adipose tissue and cardiometabolic risk factors in overweight and obese children and adolescents

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Background: Epicardial adipose tissue (EAT) is the visceral fat deposit around the heart and is commonly increased in obese subjects. EAT is related to cardio metabolic risk factors and non-alcoholic fatty liver disease (NAFLD) in adults, but this relationship is not well known in children. **Objectives:** The aim of our study was to assess by echocardiography the EAT in overweight and obese children and its relationship to cardio metabolic risk factors, insulin resistance, NAFLD markers and hyperuricemia. **Study group and methods:** In 25 (mean age 13.0 ± 2.3) overweight and obese subjects and 24 lean controls, blood pressure (BP), WC, fasting plasma glucose and insulin, lipids, uric acid and hepatic enzymes were established and EAT thickness measured by transthoracic echocardiography. **Results:** In overweight and obese subjects, EAT was significantly higher compared to normal weight children. Overweight and obese children had significantly higher body mass index (BMI), WC, BP, triglycerides (TAG), low-density lipoprotein and total cholesterol, hepatic enzymes alanine aminotransferase (ALT) and g-glutamyl transferase, and lower high-density lipoprotein cholesterol (HDL-C). EAT correlated significantly with BP, TAG, uric acid, HDL-C, Apo protein B and ALT. Correlation coefficients were similar or better than for WC, but similar or lower than for BMI. **In conclusion** EAT thickness in children is associated with an unfavorable cardio metabolic risk profile including biochemical signs of NAFLD and hyperuricaemia, but is not a stronger indicator than BMI.

27. What is the influence of a weight loss program on cognitive functions in obese adolescents?

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Introduction: Obesity is a global health problem in today's society often due to sedentary behaviour. In adolescents with uncomplicated obesity, subtle structural changes were found in the brain, accompanied by reduced overall intellectual functioning, reduced mental flexibility and attention impairments. In obese adults, a relationship was already found between increased BMI and decreased cognitive function, in adolescents data are limited. This research studies the effect of a multidimensional weight loss program on body composition and cognitive functions and determines whether these structural brain abnormalities and cognitive decline are reversible through lifestyle changes and weight loss. **Methods:** A total of 48 obese adolescents 15.8 ± 1.8 years old were included in a 30-week multidisciplinary inpatient weight loss program (Belgium). Parameters were assessed at baseline and after the intervention. BIA was used to determine body composition parameters (fat mass and fat percentage). Stroop Test (selective attention), Continuous Performance Test (sustained attention) and Ray Auditory Verbal Learning Test (short term memory) were used to determine cognitive functioning. Additionally, self-perceived fatigue was evaluated as a possible explanatory parameter. **Results:** Significant reductions in weight, BMI, fat mass and fat percentage was found after the intervention program (all p < 0.01). Improved reaction time for Stroop test and Continuous Performance Test was found (all p < 0.01), but accuracy for these tests did not change. Short term memory improved for total score and recall (p < 0.01) recognition showed a trend to improvement (p = 0.06). Self-perceived fatigue decreased significantly (p = 0.04) after the intervention. Improved reaction time was independent of improved fatigue, BMI, fat mass and fat %. Lower fatigue was related with positive evolution in short term memory. **Conclusion:** After a weight loss intervention, improved cognitive functioning, weight status and fatigue was found. These improvements in cognitive functioning was not linked with decreased fat mass or fat % like expected, enhanced short term memory was influenced by reduced fatigue. Further research is needed to determine explanatory parameters for improved cognitive functioning.