

T5:S32:03

Pubertal associations with weight and body fat change over two years: Preliminary analysis of the adolescent rural cohort study of hormones, health, education, environments and relationships (ARCHER)

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Background: Puberty is a risk period for overweight and obesity (O&O). In epidemiological studies, early puberty timing is linked to O&O, but individual longitudinal data are lacking. The association of puberty tempo and O&O is undefined.

Aims: To determine puberty timing/tempo and associations with BMI z-score (BMIz) and body fat over two years in adolescents from the ARCHER study.

Methods: Puberty timing/tempo were estimated using age and Tanner stage (self-report). Linear regression intercepts and slopes (representing timing and tempo) were generated for the overall cohort (sex-specific) and for each individual. Deviations from the overall intercept/slope were stratified into earlier/later timing and faster/slower tempo groups, and used in a multivariate model to predict BMIz and body fat change.

Results: Data were available in 237 teens (44% female). O&O rose from 29% to 32%. Compared to boys, girls showed larger increases in BMIz (0.11 vs. -0.01; $p=0.03$) and body fat (3.8% vs. -2.1% $p<0.001$). Multivariate analysis (adjusted for baseline variables) suggests later timing ($p=0.01$) and faster tempo ($p=0.03$) may be linked to greater BMIz increases in girls, but not in boys.

Conclusions: O&O is prevalent in this cohort, with changes in BMIz and body fat showing sex-specific patterns. Greater weight gain in girls with later timing is contrary to epidemiological data, and results on puberty tempo are novel. More complex modelling of puberty are needed to confirm these findings.

T5:S32:04

Protein density in infancy is associated with early, modifiable infant feeding choices and BMI: Findings from the Melbourne infant feeding activity and nutrition trial (InFANT) program

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High consumption of animal protein has been associated with accelerated growth and increased BMI in infants at 12 months of age. Rapid infant growth rates have been associated with increased risk of obesity in early childhood, adolescence and adulthood. This study describes food sources of protein and correlates of intakes in 424 Victorian children across the first 5 years of life. Protein intakes derived from 3 *24 hour recalls at 9, 18, 42 and 60 months of age; child height and weight collected by trained staff. Associations between demographic and behaviour variables and protein density were examined using mixed models at each time point. Tracking was assessed via correlations between residualised protein scores at the different time points. Mean (SD) protein (gms) intake was 29.7(10.8), 46.3(11.4), 54.3(13.7) and 59.9 (14.7) at 9, 18, 42 & 60 months respectively, vastly exceeding age appropriate recommendations.

Increased protein density was associated at 9 months with earlier introduction of solids ($B=-0.30$ [95%CI: -0.49,-0.12]) & infant formula as principal milk source ($B=0.62$ [95%CI: 0.03,1.20]); at 18months with consuming > 500g/day of dairy milk ($B=0.40$ [95%CI: 0.01, 0.79]); and with increased zBMI at 18 ($B=0.23$ [95%CI: 0.07,0.40]) & 42months ($B=0.25$ [95%CI: 0.01,0.50]). Determining correlates of protein intake informs our understanding of how and when we might best intervene to support appropriate intakes and in turn reduce

T5:S32:05

Hyperfibrinogenemia in overweight and obese children and adolescents

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Obesity in childhood and adolescence is associated with several metabolic disturbances, including insulin resistance and low grade inflammation. Hyperfibrinogenemia is associated with an increased risk for coronary artery disease.

To determine the prevalence of increased serum fibrinogen levels and its association with cardiometabolic risk factors and thyroid dysfunction in overweight or obese children and adolescents.

In 306 (182 male) children and adolescents with overweight (BMI z-score > 1.35) BMI and BMI z score, thyroid hormones (TSH, FT4), fasting blood glucose, HOMA-IR, lipids (triglycerides, HDL and LDL cholesterol), fibrinogen (by turbidometric clot detection), homocysteine, blood pressure, and body composition (by BIA) were determined. Birth weight and familial history of diabetes was obtained by maternal recall. Univariate linear regression and T-test were performed.

In total, 68 (22 %) subjects had an elevated (>400 mg/dl) fibrinogen concentration. No gender difference was found. Fibrinogen was linearly related to age, adiposity (BMI z-score, body fat %), fasting glycemia, insulin resistance (HOMA-IR), FT4, homocysteine, LDL cholesterol and HDL cholesterol concentrations. Correlations with FT4 and LDL cholesterol persisted after correction for age and adiposity.

In conclusion, hyperfibrinogenemia is found in one fifth of obese children and adolescents, increases with age and adiposity and is associated with lower FT4 and higher LDL cholesterol values.

T5:S32:06

Associations between neck circumference and adipocytokines among adolescents

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Background: Neck circumference (NC) was recently introduced as a predictor of cardiovascular disease (CVD) risk factor. Adipocytokines may have a key role in the development of CVD.

Aims: The purpose of this study was to examine the associations between NC and adipocytokines, such as adiponectin and leptin in Portuguese adolescents.

Methods: A cross-sectional school-based study was conducted on 529 Portuguese adolescents (267 girls), mean age 14.3±1.7 years. We measured NC, plasma biomarkers (serum adiponectin and plasma leptin), cardiorespiratory fitness (20m shuttle run test), socio-economic status, adherence to the Mediterranean diet and pubertal stage. **Results:** The mean of NC in girls was 31.0±2.2 cm and for boys it was 33.5±2.9 cm. NC was significantly and positively correlated with leptin and negatively correlated with

adiponectin, after controlling for age, sex, pubertal stage, cardiorespiratory fitness, socioeconomic status and diet ($p < 0.001$). Linear regression analyses showed that NC was positively associated to leptin ($\beta = 3.722$, $p < 0.001$), whereas it was significantly and inversely associated with adiponectin ($\beta = -1.326$, $p < 0.001$), after adjusting for several confounders.

Conclusions: The use of NC, as novel predictor of CVD risk factor, should be considered. Since the onset of chronic disease risk factors starts in early childhood, it is important to assess the risk predictors in order that effective preventive strategies targeting those at risk start as early as possible.

T5:S32:08

Nutrition & dietetics services for assessing adolescents' anthropometric status in Saudi Arabia

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Understanding and addressing the components and services of nutritional status of adolescents, particularly anthropometry in clinical settings, are important constituents of clinical care. This study aimed to evaluate dietetic services concerning anthropometry as an assessment method particularly, for weight status in adolescent group. A service evaluation questionnaire based survey conducted in ten general hospitals in Jeddah city, Saudi Arabia. Results showed that seven hospitals have separate independent dietetic departments. Three hospitals have divisions of adolescent medicine and 70% of dietetic departments; provide services to adolescents such as growth and development, weight problems and for diabetic patients. Tools of anthropometry are measured height/weight, circumferences and Body Composition Analysers. Reference data for comparison are international reference standards and not Saudi Reference Data. The Saudi Arabian dietetic services should be guided nationally by the authorized professional organization Saudi Dietetic Association (SDA), which needs to emphasize some specific basics for all nutrition and dietetic services. The study evaluates Jeddah anthropometry services; identify methods' enablers and barriers, particularly for adolescents. We predict that this study will provide bases for the services of anthropometric assessment that could improve services provided for adolescents, particularly when defining the weight status of this group

T5:S32:09

The role of free fatty acids in the inflammatory profile in adolescents with metabolic syndrome engaged in interdisciplinary therapy

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Background: Obesity is related to an inflammatory state, which lead to metabolic dysfunction.

Aims: to evaluate if interdisciplinary therapy can influence inflammation and serum fatty free acid profile in obese adolescents.

Methods: 108 obese adolescents, 14-19 years, were submitted to 1-year of interdisciplinary therapy (nutrition, psychology, physical exercise and clinical support). Blood samples were collected to

analyze glucose, lipid, adipokines and fatty free acids concentrations. Body composition and anthropometric profiles were measured. Adolescents were divided according to metabolic syndrome diagnoses: MetS and Non-MetS.

Results: MetS and Non-MetS groups improved inflammatory profile (leptin, adiponectin, leptin/adiponectin ratio, adiponectin/leptin ratio and CRP). Both groups reduced miristic acid (C14:0) and increased docosahexaenoic acid (DHA, C22:6n3), heneicosapentaenoic acid (HPA, C21:5n3) and arachidonic acid (AA, C20:4n6). Leptin and leptin/adiponectin ratio were negatively associated with changes in docosapentaenoic acid (C22:5n3) and stearidonic acid (C18:4n3), independent of metabolic syndrome and the number of metabolic syndrome parameters. Adiponectin/leptin ratio was positively associated with HPA. Changes in adiponectin were positively correlated with changes in HPA.

Conclusion: interdisciplinary therapy can influence serum fatty acids and inflammatory profile in obese adolescents. Moreover, serum fatty acids can modulate inflammatory biomarkers.

T5:S32:10

The impact of adiponectin levels on cardiometabolic risk among Brazilian adolescents with obesity

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Background: Recently, adiponectin has gained attention as a serum biomarker due to its correlation with various cardiometabolic risk factors such as insulin resistance, dyslipidemia, and also cardiovascular disease.

Aims: To explore cardiovascular risk according to different levels of adiponectin in adolescents with obesity, through a cohort study.

Methods: 220 adolescents with obesity, aged from 15 to 19 years, of both genders. Body composition, metabolic profile and adiponectin concentrations were obtained. Adolescents were distributed according to adiponectin tertile. GLM test was performed to analyze difference between groups with p level set at ≤ 0.05 .

Results: Tertile 1 (lower levels of adiponectin ≤ 4.85) presented statistically higher BMI, fat mass (kg), lean mass (kg), subcutaneous fat and waist circumference than tertile 3 (higher levels of adiponectin > 9.63); and higher levels of subcutaneous fat and lean mass when compared with tertile 2 (medium levels of adiponectin > 4.85 e ≤ 9.63). Considering metabolic parameters, tertile 1 presented statistically higher values of insulin, HOMA-IR, HOMA-AD, total cholesterol, triglycerides and LDL-c; and lower values of QUICKI and HDL-c when compared with tertile 3.

Conclusion: We have showed that among adolescents with obesity, the level of adiponectin may modulate cardiometabolic risk. (FAPESP 2013/08522-6; 2015/14309-9)