Adipose Tissue, Appetite, and Obesity

INTEGRATED PHYSIOLOGY OF OBESITY AND METABOLIC DISEASE

Adiposity Profiles and Insulin Resistance in Urban and Rural Indonesian Young Adults and Its Association With Gut Inflammation Marker Lipocalin-2

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Obesity and type 2 diabetes (T2D) prevalence are increasing worldwide, including in the young adult population. In general, the prevalence is higher in urban than in rural. Relatively higher calories and fat intake with more sedentary lifestyle in urban population can cause a surplus in energy homeostasis that will eventually be stored as body fat. This change might influence the gut environment, which based on recent studies, could interact with the immune system leading to inflammation and contribute to the pathogenesis of obesity and T2D. Our study aimed to assess the differences in adiposity profiles and insulin resistance between urban and rural Indonesian young adults and its association with serum lipocalin-2, a marker for systemic and gut inflammation. In this study, 242 individuals from urban and 233 subjects originating from rural areas were recruited. Anthropometry measurements, including body height, weight, and waist circumference (WC), were conducted. Body mass index (BMI) was calculated from the body height and weight. Fasting blood glucose and fasting insulin were also measured, from which a homeostasis model assessment of insulin resistance (HOMA-IR) was calculated as a surrogate marker for whole body insulin resistance. Meanwhile, serum lipocalin-2 was measured by ELISA. Urban subjects had higher BMI and WC compared to rural counterparts [mean diff. (95% CI): 1.71 (0.99;2.43) kg/m^2, P<0.001 and 4.4 (2.6;6.2) cm, P<0.001), respectively]. Additionally, HOMA-IR was also higher in urban than rural subjects [0.12 (0.008;0.24), P=0.04, after adjusted for age, sex, and BMI]. Lower serum lipocalin-2 level was observed in urban compared to rural individuals [-74.09 (-96.95-51.23) ng/mL, P<0.001]. However, no significant correlations were observed between serum lipocalin-2 with BMI, WC, or HOMA-IR (r=-0.06, P=0.19; r=-0.08, P=0.10; r=-0.002, P=0.96, respectively). The findings of worse adiposity profiles and insulin resistance in urban than rural subjects were consistent with the results observed in previous studies. Higher intestinal inflammation in rural subjects, as shown by higher serum lipocalin-2, could be caused by presumably a higher rate of chronic and recurrent intestinal infection usually found in people living in rural areas. These could indirectly affect the nutrient uptake and eventually contribute to the lower adiposity and insulin resistance in the rural population, apart from the relatively lower calories and fat intake in their diet. Therefore, further study that incorporate dietary intake analysis and assay for intestinal infection are warranted to confirm this hypothesis.

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Anti-Obesity Medication Prescriptions by Race/ Ethnicity and Use of an Interpreter in a Pediatric Weight Management Clinic

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Background: Healthcare disparities associated with race/ethnicity and low English proficiency are well established in the US. We sought to determine if there are race/ethnic differences in anti-obesity medication prescription rates among youth with severe obesity (body mass index (BMI) ≥1.2 times the 95th percentile and/or BMI ≥35 kg/m^2) treated in a pediatric weight management clinic (PWMC). We secondarily sought to determine if, among youth from families in whom English was not the primary language, there are differences in prescription rates between those using an interpreter during visits and those not.

Methods: We reviewed electronic health records of youth 2–18 years old with severe obesity seen at a PWMC from 2012–2020. Race/ethnicity was self-reported and categorized as Non-Hispanic White (NHW), Hispanic/ Latino, Non-Hispanic Black (NHB), Asian, American Indian/Alaska Native and Mixed. Anti-obesity medicines included stimulants (i.e. phentermine, lisdexamfetamine), topiramate, naltrexone (± bupropion), and glucagon-like peptide-1 agonists. We used Poisson regression models with robust standard errors to compare incidence rates of medicine prescription (incidence rate ratio (IRR), accounting for visit frequency) within the first 1 and 3 years of being followed in a PWMC. We controlled for age, baseline degree of obesity (percent of the 95th BMI percentile (%BMIp95)), number of obesity-related comorbidities (i.e. insulin resistance, hypertension, fatty liver), area-level socioeconomic status (median household income based on ZIP code), and interpreter use. We repeated similar analyses among families in whom English was not the primary language, comparing those using an interpreter with those not.

Results: From 2012–2020, 1258 youth (mean age 11.8 years; %BMIp95 143%) were seen in our PWMC (57% NHW, 19% Hispanic/Latino, 16% NHB) of which 26% were prescribed anti-obesity medication. 86% primarily spoke English and 5.2% used an interpreter. There

were no statistically significant differences in the IRR of prescriptions by race/ethnicity at 1 and 3 years; however, although not statistically significant point estimates suggest Hispanic/Latino youth being prescribed medication less often at 1 (IRR 0.71; p=0.08) and 3 (IRR 0.75; p=0.13) years compared to NHW. Among non-primary English speakers, rates of prescriptions were higher at 1 (IRR 5.7; p<0.01) and 3 (IRR 3.5; p<0.01) years in those using an interpreter versus those not.
Conclusions: We found no significant race/ethnic differences in anti-obesity medication prescriptions; however, Hispanic/Latino youth received fewer prescriptions, albeit not statistically significant. Among non-primary English speakers, use of an interpreter was associated with increased prescriptions. Our results suggest that addressing healthcare disparities and language barriers may improve care delivery for youth with obesity.

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Are Obese Patients Evaluated for Non-Alcoholic Fatty Liver Disease in an Endocrinology Outpatient Clinic?

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Background: Obesity is an increasing global health problem worldwide and Uruguay mirrors these trends. It leads to various complications that include non-alcoholic fatty liver disease (NAFLD). NAFLD is one of the most common liver disorders in industrialized countries with an estimated global prevalence of 25–30%. It is one of the main causes of liver transplant, for which is considered a global public health problem. It includes simple steatosis, and nonalcoholic steatohepatitis, that can progress to cirrhosis and hepatocellular carcinoma. Several studies have shown a close relationship between NAFLD and obesity, with a reported prevalence of up to 80% in these patients. The diagnosis of NAFLD requires demonstration of hepatic steatosis by imaging and exclusion of other causes (absence of significant alcohol consumption, hepatitis infection, autoimmune hepatitis and hemochromatosis). We aimed to determine whether obese patients are evaluated for NAFLD in our endocrinology outpatient clinic. **Methods:** We conducted a cross-sectional study among 130 obese adults attending our clinic from December 2019 to March 2020. **Results:** The mean age was 53.8 years (range 19–80) and 80% were women. The mean BMI was 35.9 kg/m^2 ± 5.3. Obesity class I, II and III was present in 55%, 25% and 20% of patients, respectively. Type 2 diabetes (DM2), hypertension and dyslipidemia were found in 46.2%, 61.5% and 76.2% of patients, respectively. Abdominal ultrasound was not performed in 62% of patients. Abdominal ultrasound was performed significantly more often in diabetics compared to non-diabetics (48.3% vs. 38%, p=0.046). There was no significant association between obesity class and presence of ultrasound (p=0.20), or liver steatosis (LS) (p=0.58). Seventy-eight percent showed LS (56% mild, 31% moderate and 13% severe). The majority (87.7%) had liver enzymes measured. Patients with and without LS showed similar proportion of elevated enzymes (36% and 36.4%, respectively). The most frequent raised enzyme was gamma-glutamyl transferase, present in 82.9% of patients, and in similar proportion between patients with and without LS (30.8% and 36.4%, respectively). Elevated liver enzymes were found in 22.7%, 46.6% and 80% of mild, moderate and severe LS, respectively. There was significant association between LS grade and liver enzymes elevation (p<0.01). Secondary causes of LS were evaluated in 35.9% of patients, in all cases except one by the gastroenterology service. Half of the individuals had other causes of liver disease (alcoholism (28.6%), hepatitis B virus (28.6%) and methotrexate (28.6%) and prednisone (14.2%)treatment). Conclusion: NAFLD is a scantily evaluated disorder in our obese patients. In those evaluated we found a high frequency of LS, with almost 50% having moderate or severe disease. Further research is warranted to determine its prevalence and associated complications in our population.

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Association of Urbanization and Lower Light Exposure With Increased Body Mass Index

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Introduction: Light/dark cycles are the main synchronizing signal (*zeitgeber)* that entrain human's internal clock to the 24h-days. Some aspects of urban environments, including irregular light exposure and weak *zeitgebers*, influence the circadian organization and thereby may have an impact on metabolism. Comparing communities at different levels of urbanization and with different histories of access to electricity might provide evidence to support associations previously found between disrupted patterns of light exposure and increased populational rates of overweight and obesity. The present study aimed to investigate whether living at a higher level of urbanization would be associated with higher body mass index (BMI). It was hypothesized that BMI is higher in urbanized communities, since their inhabitants have weaker *zeitgebers*, often associated with disrupted circadian rhythms. **Methods:** We conducted a cross-sectional study in Quilombolas communities, located in the south of Brazil. Subjects were categorized into 5 groups based on their communities' stage of urbanization and history of access to electricity: from rural with no access to electricity to highly urbanized communities that have access to the grid. We used data from 134 participants aged 16 - 92 years old (63% women), who had 7 days of light exposure recordings collected using wrist-worn actimeters. We also collected anthropometric data to calculate BMI, which was then categorized as follows: ≥18.5 kg/m² to <25 kg/m² = normal weight; ≥25 kg/m² to < 30 kg-m² = overweight; ≥ 30 kg/m² = obesity. We used Shapiro-Wilk to test for normality, Kruskal-Wallis followed by Dunn to compare BMI between groups and Spearman to assess whether there was an association between patterns of light exposure and BMI.