OBSERVATIONS

Impact of Obesity on Metabolic Syndrome in Brazilian Adolescents: A Population-Based Study

It is increasingly important to warn about the prevalence of metabolic syndrome in obese adolescents, especially considering the postpubertal age range, when obesity has a great risk of remaining until adult age (1). The weight of Brazilians has been increasing in recent years. The last large population-based study performed in Brazil, Surveys on Family Budgets, which was conducted between 2008 and 2009, witnessed that according to the assessment parameters from the World Health Organization, in the 10- to 19-year age range obesity prevalence was 5.9% for males and 4% for females (2). In an analysis of the last Brazilian census from 2010, there were probably ~1,708,000 obese adolescents (2). In Brazil and Latin America, few population-based studies have been performed on the prevalence of metabolic syndrome in adolescents in large cities (3). Most studies do not assess all elements of the population—not determining, therefore, the best probabilistic approach. This information alerted us to conduct a population-based study to determine metabolic syndrome in obese adolescents. In the period from April 2007 to May 2009 in the municipality of Fortaleza, the fifth most inhabited city in the country, we conducted a study with 272 postpubertal, obese adolescents in the 15- to 19-year age range from 64 schools, with 73.5% being students from public schools and 26.5% from private ones—a distribution proportional to that encountered in the city. In determining metabolic syndrome prevalence, parameters from the third report of the National Cholesterol Education Program–Adult Treatment Panel III (NCEP–ATP III), modified by Cook et al. (4), were used as reference: according to age range and the proposal by the International Diabetes Federation (5), which, in 2007, defined criteria for children and adolescents. Metabolic syndrome prevalence was 36 and 32.4%, respectively, according to criteria adopted by NCEP–ATP III and the International Diabetes Federation, being higher in males (49.1%) than in females (26.9%; $P < 0.05$). Insulin resistance was assessed using homeostasis model assessment of insulin resistance and was higher in obese subjects with metabolic syndrome (45.5 vs. 25.2%; $P < 0.05$). Elevated abdominal circumference and high blood pressure were the most prevalent metabolic syndrome components, while hyperglycemia was the least frequent. The characteristics of the studied adolescents are presented in Table 1. This is a population-based study that shows the prevalence of metabolic syndrome in obese adolescents in a large Brazilian city, representing a probabilistic sample because the studied population, randomly selected, represented the diverse social classes and had participants from all regions of the city of Fortaleza. Despite great limitations in the comparison between studies in literature, metabolic syndrome in obese young people represents a problem for public health, being present in expressive levels, as much in developed countries as in developing ones. Given the importance of this topic and given increased obesity rates in young people, immediate strategies should be established during childhood and adolescence for the prevention of metabolic syndrome.

Table 1—*Clinical and epidemiological characteristics of obese adolescents with and without metabolic syndrome: Fortaleza, Ceará, Brazil, 2007–2009*

Characteristics	Metabolic syndrome	No metabolic syndrome	*P*
n	98	174	
Age (years)	16.6 ± 1.3	16.4 ± 1.2	0.260[a]
Male/female sex	55/43	57/117	<0.001[b]
Public/private school	67/31	133/41	0.148[b]
White/nonwhite race	25/73	55/119	0.289[b]
BMI	33.3 ± 4.2	31.8 ± 3.3	0.003[a]
Abdominal circumference (cm)	105.5 ± 11	99.9 ± 9.6	<0.001[a]
HDL cholesterol (mg/dL)	36.8 ± 8.1	46.6 ± 9.2	<0.001[a]
Triglycerides (mg/dL)	148.9 ± 68.0	85.4 ± 34.0	<0.001[a]
Glycemia (mg/dL)	89.4 ± 12	87.7 ± 8.2	0.181[a]
Insulin (μUI/mL)	22.2 ± 13	15.9 ± 8.7	<0.001[a]
HOMA-IR	5.0 ± 3.2	3.51 ± 2.0	<0.001[a]
HBP 90th percentile, yes/no	71/27	66/108	<0.001[b]
HBP 95th percentile, yes/no	54/44	47/127	<0.001[b]

Data are *n*/*n* or means ± SD unless otherwise indicated. HBP, high blood pressure; HOMA-IR, homeostasis model assessment of insulin resistance. [a]*P* = descriptive level of Student *t* test. [b]*P* = descriptive level of χ^2 test.

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L.A.C. and O.M.S.A. designed research, conducted research, analyzed data, and wrote the manuscript, and read and approved the final manuscript. A.C.F. designed research, analyzed data, and read and approved the final manuscript. O.M.S.A. is the guarantor of this work and, as such, had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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