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## ORIGINAL ARTICLE

# Sociodemographic and behavioral factors associated with body adiposity in adolescents<sup>☆</sup>

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### KEYWORDS

Abdominal obesity;  
Adiposity;  
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### Abstract

**Objective:** To identify sociodemographic and behavioral factors associated with abdominal obesity (AO) and high body fat percentage (high BF%) in adolescents from the city of Curitiba-PR.

**Methods:** The sample consisted of 1,732 adolescents, aged 11 to 19 years, of both genders. The triceps and calf skinfolds were measured for the calculation of BF%, as well as the waist circumference. A questionnaire was completed by adolescents with the following variables: gender, age, type of residence, socioeconomic status, time spent watching TV on weekdays and weekends, and daily energy expenditure. Logistic regression was used to measure the association of sociodemographic and behavioral variables with abdominal obesity and high BF%.

**Results:** Female adolescents were more likely to have high BF% (OR: 2.73; 95% CI: 2.32-3.33), but were less likely to have abdominal obesity (OR: 0.58; 95% CI: 0.44-0.78). Older individuals (16-19 years) were more likely to have high BF% (OR: 1.36; 95% CI: 1.02-1.83). The older age groups (13-15 years and 16-19 years) had an inverse association with abdominal obesity. Regarding daily energy expenditure, the less active individuals were more likely to present high BF% (OR: 1.36; 95% CI: 1.07-1.71) and obesity (OR: 1.40; 95% CI: 1.09-1.80).

**Conclusions:** Interventions to increase physical activity levels in young people should be designed in order to combat excess body fat should be designed to combat excess adiposity.

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**PALAVRAS-CHAVE**

Obesidade abdominal;  
Adiposidade;  
Saúde do adolescente

**Fatores sociodemográficos e comportamentais associados à adiposidade corporal em adolescentes****Resumo**

**Objetivo:** Identificar fatores sociodemográficos e comportamentais associados à obesidade abdominal (OA) e ao percentual de gordura corporal elevado (%GC elevado) em adolescentes de Curitiba-PR.

**Métodos:** A amostra probabilística foi composta por 1.732 adolescentes, de 11 a 19 anos, de ambos os sexos, da rede pública de ensino. Foram coletadas as medidas de dobras cutâneas tricípital e panturrilha para o cálculo do %GC, além da medida da circunferência da cintura. Um questionário foi preenchido pelos adolescentes para avaliação das seguintes variáveis: sexo, idade, tipo de residência, nível socioeconômico, tempo gasto assistindo à TV durante a semana e o fim de semana, além do gasto energético diário. A regressão logística foi utilizada como medida de associação dos fatores sociodemográficos e comportamentais com a obesidade abdominal e o percentual de gordura corporal elevado.

**Resultados:** As meninas apresentaram maior chance de ter o %GC elevado (OR: 2,73; IC95%: 2,32-3,33). Em contrapartida, têm menor chance de ter obesidade abdominal (OR: 0,58; IC95%: 0,44-0,78). Indivíduos mais velhos (16-19 anos) apresentaram maior chance de ter o %GC elevado (OR: 1,36; IC95%: 1,02-1,83). Em contrapartida, as faixas etárias mais elevadas (13-15 anos e 16-19 anos) tiveram uma associação inversa com a obesidade abdominal. Em relação ao gasto energético diário, os indivíduos menos ativos apresentaram maior chance de ter %GC elevado (OR: 1,36; IC95%: 1,07-1,71) e obesidade abdominal (OR: 1,40; IC95%: 1,09-1,80).

**Conclusões:** Intervenções relacionadas ao aumento nos níveis de atividade física na população jovem devem ser elaboradas para o combate do excesso de adiposidade corporal. © 2014 Sociedade de Pediatria de São Paulo. Publicado por Elsevier Editora Ltda. Todos os direitos reservados.

**Introduction**

The current epidemiological scenario shows that overweight and obesity are health problems at an alarming proportion in the world young population.<sup>1</sup> In 2010, international data observed that 43 million children worldwide were overweight or obese, of whom 35 million come from developing countries. The worldwide prevalence of childhood overweight and obesity increased from 4.2% in 1990 to 6.7% in 2010, and these prevalence rates are expected to reach 9.1% in 2020.<sup>2</sup>

In Brazil, the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística - IBGE)<sup>3</sup> estimated that in only three decades (1975-2009), the population of overweight Brazilian adolescents increased from 3.7% to 21.7% among males, and from 7.6% to 19.4% among females. The evolution of obesity also follows the upward trend described for overweight. As these nutritional conditions are associated with the development of several health disorders (such as dyslipidemia, insulin resistance, and hypertension),<sup>4</sup> the control of excess body fat is the key to promoting health among young individuals.

Epidemiological studies<sup>5,6</sup> have sought to identify body adiposity (overall or in the abdominal region) and to estimate the proportion of adolescents with abnormal values. However, it is also vital to identify the main factors associated with excess adiposity in adolescents. Its determinants comprise a complex set of biological, behavioral, and environmental factors that are interrelated and potenti-

ate each other.<sup>1</sup> Thus, to propose actions for an effective intervention in reducing excess body fat, it is necessary to know the set of factors associated with this condition in young individuals. Considering this evidence, the present study aimed to determine the prevalence and sociodemographic and behavioral factors associated with high body fat percentage (BF%) and abdominal obesity in a random sample of adolescents from public schools in Curitiba, state of Paraná, Brazil.

**Method**

This was a cross-sectional study performed with adolescents enrolled from the sixth grade of elementary schools to second year of high school in the public schools of Curitiba city. To estimate the sample size needed for this study, the following parameters were considered: (i) population of 115,524 adolescents; (ii) a confidence level of 95%; (iii) sampling error of 3 percentage points; (iv) prevalence of the outcome of interest of 50% (which considers a maximum variance and overestimates the sample size), resulting in a minimum sample of 1,057 adolescents.<sup>7</sup> A design effect of 1.4 was added to correct the error related to the multistage process of sample selection,<sup>7</sup> as well as an allowance for possible losses and refusals of 20%. Therefore, a total sample of 1,776 adolescents was estimated.

The sample selection for this study was based on a multistage sampling process. In the first stage, all state and

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