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Prevalence and factors associated with body mass index in children aged 9–11 years[☆]

Q1 Gerson Luis de Moraes Ferrari[a,b,*], Victor Matsudo[a],
Peter T. Katzmarzyk[c], Mauro Fisberg[b]

[a] Centro de estudos do Laboratório de Aptidão Física de São Caetano do Sul (CELAFISCS), São Caetano do Sul, SP, Brazil
[b] Universidade Federal de São Paulo (UNIFESP), Departamento de Pediatria, Centro de Atendimento e Apoio ao Adolescente, São Paulo, SP, Brazil
[c] Pennington Biomedical Research Center, Baton Rouge, LA, United States

Abstract

Objective: This study aimed to identify the prevalence and factors associated with body mass index (BMI) in children aged 9–11 years.

Methods: The study is part of the International Study of Childhood Obesity Lifestyle and the Environment (ISCOLE). Body composition was determined using the bipolar bioimpedance technique. The mean BMI value was categorized as recommended by the World Health Organization. For seven consecutive days, participants used an accelerometer to objectively monitor sedentary behavior (SB) and moderate to vigorous physical activity. Individual factors (anthropometric and behavioral), family aspects, and family and school environment were provided by participants and parents and were analyzed by multilevel linear regression adjusted for gender, ethnicity, school, number of siblings, and total annual family income.

Results: The mean BMI was 20.1 kg/m^2, and 51.8% of the children were overweight/obese (50.3% boys, 53.4% girls, $p = 0.014$). Considering all participants, the associated factors of BMI were body fat percentage (BF%, $\beta = 0.0216$, $p < 0.001$) and screen time (ST, $\beta = 0.0050$, $p = 0.006$). In boys, the associated factors were BF% ($\beta = 0.0209$, $p < 0.001$), ST ($\beta = 0.006$, $p = 0.036$), and healthy eating policies or practices ($\beta = 0.0276$, $p = 0.025$). In girls, only BF% was associated ($\beta = 0.0221$, $p < 0.001$) with BMI.

Conclusions: High prevalence of overweight/obesity was observed in children from São Caetano do Sul. Different associated factors were identified between the genders, with only BF% being common in both genders.

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Prevalência e fatores associados do índice de massa corporal em crianças de 9-11 anos de idade

Resumo

Objetivo: O objetivo deste estudo foi identificar a prevalência e os fatores associados do índice de massa corporal (IMC) em crianças de 9-11 anos de idade.

Métodos: O estudo faz parte do International Study of Childhood Obesity Lifestyle and the Environment (ISCOLE). A composição corporal foi determinada pelo método da bioimpedância bipolar. O valor médio do IMC foi categorizado conforme sugerido pela Organização Mundial de Saúde. Durante sete dias consecutivos, os participantes usaram acelerômetro para monitorar objetivamente o comportamento sedentário (CS) e atividade física de moderada a vigorosa. Fatores associados individuais (antropométricos e comportamentais), aspectos familiares, ambiente familiar e escolar, foram preenchidos pelos participantes e pais e foram analisados pela regressão linear multi-nível ajustados para sexo, raça, escola, número de irmãos, e renda familiar total anual.

Resultados: A média do IMC foi de 20,1 kg/m^2, sendo que 51,8% das crianças estavam com excesso de peso/obesidade (50,3% meninos; 53,4% meninas; p = 0,014). Considerando todos os participantes, os fatores associados do IMC foram a porcentagem de gordura corporal (%GC; β = 0,0216; p < 0,001) e o tempo de tela (TT; β = 0,0050; p = 0,006). Nos meninos, os fatores associados foram a %GC (β = 0,0209; p < 0,001), TT (β = 0,006; p = 0,036) e políticas ou práticas de alimentação saudável (β = 0,0276; p = 0,025). Já nas meninas, somente a %GC foi associada (β = 0,0221; p < 0,001) com o IMC.

Conclusões: Mostramos valores elevados de prevalência de excesso de peso/obesidade em crianças de São Caetano do Sul. Diferentes fatores associados foram identificados entre os sexos, sendo somente a %GC foi comum em ambos os sexos.

Introduction

The prevalence of overweight/obesity in children worldwide, including Brazil, has increased in recent decades,[1] raising the concern of public health authorities, which have encouraged regional and local governments to consider different strategies to reduce overweight/obesity.[2]

Overweight/obesity is considered the fifth most important factor for overall mortality and a determinant in the development of chronic diseases,[3] such as metabolic syndrome in children.[4] Moreover, excess weight in this age group and in adolescence tends to remain until adulthood.[5]

Due to the need and importance of overweight/obesity monitoring, and so that prevention programs are effective, factors associated with excess weight need to be identified, since the prevalence in Brazilian children is high.[6]

Studies have found that overweight/obesity, when assessed by body mass index (BMI), are associated with the family's socioeconomic status, number of siblings,[7] sedentary lifestyle,[8] screen time (ST) (TV, computer, or video games),[9] electronic equipment in the bedroom, total sedentary time (SED), and moderate-to-vigorous physical activity (MVPA).[10] However, there are limited data on the factors associated with BMI in Brazilian children, especially those measured objectively, such as accelerometry, which requires a combination of financial resources and technological knowledge, thus constituting a challenge for researchers from low and middle-income countries.[10]

In this study, the hypothesis was to find significant associations of individual, family, and school/family environment factors in children. Therefore, the aim of this study was to assess the individual anthropometric and behavioral, family, and school/family environment factors associated with BMI in children aged 9–11 years.

Methods

Study sample

This multicenter cross-sectional study is part of the International Study of Childhood Obesity, Lifestyle, and the Environment (ISCOLE). ISCOLE was carried out in 12 countries, comprising the five geographic regions of the world.[11] Details on ISCOLE have been previously published.[11]

The present study focuses on the data collected in the municipality of São Caetano do Sul, a representative of ISCOLE in Brazil, located in the state of São Paulo. In 2013, the municipality had 149,263 inhabitants, of whom 1557 were children aged 10 years.[10]

The project was presented and approved by the Municipal Education Secretariat, schools, and parents' associations. All children attending fifth grade were invited to participate in the study. Two complete lists of public and private schools were generated and each school was selected by drawing lots. Public and private schools were selected separately from each list, considering a ratio of four (public) to one