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ORIGINAL ARTICLE

Anthropometric indices among schoolchildren from a municipality in Southern Brazil: a descriptive analysis using the LMS method[☆]

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KEYWORDS

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Anthropometry,
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Abstract

Objective: To describe the percentile values for body mass index (BMI), waist circumference (WC) and waist-to-height (WHtR) of children from Colombo, Brazil, and compare them with data of children from other countries.

Methods: This was a cross-sectional study with a random sample of 2,035 children aged 6-11 years. Age- and sex-specific smoothed percentile curves for BMI, WC and WHtR were created using the LMS method. Values of 10th, 50th and 90th percentiles from Brazilian children were compared with data from other countries.

Results: There was a trend of increasing BMI and WC with age in both sexes. WHtR remained constant with advancing age in boys and girls. Comparison of the growth pattern among countries showed clear differences. Southern Brazil boys and girls had elevated 90th percentile values for BMI, which was similar to German children and higher than the North American and World Health Organization percentile values. However, children from this study had intermediate values for WC and WHtR in comparison to children from other countries.

Conclusions: Elevated BMI values were observed among southern Brazilian children, but WC and WHtR percentile values were lower in southern Brazilian children than in children from other countries. Interventions at different levels should be made to avoid a probable increase of nutritional disorders (especially general obesity) in the next years.

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[☆]Study conducted at Sports Center, Physical Education Department, Universidade Federal de Santa Catarina, Florianópolis, SC, Brazil.

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PALAVRAS-CHAVE

Desenvolvimento infantil;
Antropometria;
Estado nutricional;
Estudo transversal;
Crianças

Índices antropométricos em escolares de um município no Sul do Brasil: análise descritiva utilizando o método LMS

Resumo

Objetivo: Descrever os valores percentílicos do índice de massa corporal (IMC), circunferência da cintura (CC) e relação cintura-estatura (RCEst) em crianças de Colombo, Brasil, e compará-los com os de crianças de outros países.

Métodos: Estudo transversal com amostra probabilística de 2.035 crianças de 6 a 11 anos de idade. Valores percentílicos do IMC, CC e RCEst, suavizados e específicos para sexo e idade, foram calculados utilizando o método LMS. Os percentis 10, 50 e 90 foram comparados com dados de diferentes países.

Resultados: Houve uma clara tendência de aumento do IMC e da CC com a idade, em ambos os sexos. Os valores da RCEst permaneceram estáveis com o avanço da idade, em meninos e meninas. A comparação do padrão de crescimento mostrou claras diferenças entre os países. Meninos e meninas deste estudo tiveram elevados valores de percentil 90 para o IMC, semelhantes aos de crianças alemãs e superiores aos de crianças americanas e do padrão da Organização Mundial de Saúde. Contudo, as crianças deste estudo tiveram valores intermediários para a CC e RCEst, em comparação com crianças de outros países.

Conclusão: Valores elevados para IMC e intermediários para CC e RCEst foram observados, em comparação às crianças de outros países. Intervenções em diferentes níveis sociais podem evitar uma provável elevação de disfunções nutricionais (principalmente obesidade geral) nos próximos anos.

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Introduction

Body growth standard indicates the “acceptable” and “expected” body development during childhood, which all children should achieve.¹ However, the occurrence of nutritional disorders related to child’s growth, such as general or centralized (abdominal) obesity reflects the interaction between unfavorable environmental factors and/or genetic predisposition.² As the general and abdominal obesity are increasingly present in children³ and they increase the chances of early^{4,5} and future⁶ metabolic complications, monitoring of physical growth is crucial in promoting children’s health.

The combination of different anthropometric measurements (e.g., weight, height or waist circumference [WC]) or indicators (e.g., body mass index [BMI] and waist-to-height ratio [WHtR]) has been frequently used in studies on child growth and health.⁶⁻⁸ Of these, BMI is the most frequently anthropometric indicator used to identify physical growth pattern and nutritional status in clinical and epidemiological practice because it is a simple and low-cost indicator, as well as it is a strong predictor of child’s health.^{7,8} WC represents the accumulation of abdominal and visceral fat and predicts cardiovascular risk factors as well as or even better than BMI.^{4,6} Other studies have highlighted that WHtR is strongly associated with cardiovascular risk factors at early ages.^{5,9} Thus, the use of these different anthropometric methods allows a better estimate of child growth pattern and nutritional status during childhood.

Reference percentile curves were developed to show the growth pattern and the nutritional status of pediatric populations of different countries.¹⁰⁻²⁰ These curves apply the LMS method, a statistical procedure for more robust estimation of percentiles values, especially if the physical growth variables do not have a symmetrical distribution in the population.^{21,22} Some studies also used the LMS method to compare body mass and height percentiles from Brazilian children with those of other countries.^{23,24} However, a comparison of BMI, WC and WHtR percentiles values between Brazilian children and children from other countries is unknown. A study with these different anthropometric indicators may represent a better estimate of physical growth pattern among Brazilian children. Also, it is necessary to test whether there is anthropometric difference between children from Brazil and from these countries in order to identify growth pattern distinctions and test the necessity of the anthropometric percentile curves for Brazilian children.¹⁸ Finally, this comparison may identify if a childhood population has physical growth trends (for environmental and genetic conditions) that favor nutritional disorders such as general and abdominal obesity.² These issues are important for the development of public policies aimed at reducing nutritional disorders in Brazilian children.

Therefore, the aim of this study was to determine the physical growth pattern (BMI, WC and WHtR) among schoolchildren from Colombo, Parana, southern Brazil, and to compare it with the physical growth of children from other countries.

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