



## ORIGINAL ARTICLE

# Comparison of body composition and adipokine levels between thin and normal-weight prepubertal children<sup>☆</sup>

Jadwiga Ambroszkiewicz<sup>a,\*</sup>, Joanna Gajewska<sup>a</sup>, Katarzyna Szamotulska<sup>b</sup>, Grażyna Rowicka<sup>c</sup>, Witold Klemarczyk<sup>c</sup>, Magdalena Chęłchowska<sup>a</sup>

<sup>a</sup> Institute of Mother and Child, Screening Department, Warsaw, Poland

<sup>b</sup> Institute of Mother and Child, Department of Epidemiology and Biostatistics, Warsaw, Poland

<sup>c</sup> Institute of Mother and Child, Department of Nutrition, Warsaw, Poland

Received 24 June 2016; accepted 8 November 2016

**KEYWORDS**

Leptin;  
Adiponectin;  
Body composition;  
Thinness;  
Children

**Abstract**

**Objective:** Thinness can have substantial consequences for child development and health. Adipokines, including leptin and adiponectin, play a significant role in the regulation of important metabolic functions. The aim of this study was to investigate associations between body composition and serum leptin and adiponectin levels in thin and normal-weight children.

**Methods:** The authors examined 100 healthy prepubertal children, who were divided into two subgroups: thin ( $n=50$ ) and normal-weight children ( $n=50$ ). Body composition was assessed by dual-energy X-ray absorptiometry. Serum concentrations of adipokines were determined by immunoenzymatic assays.

**Results:** Thin children had a similar body height but significantly lower ( $p < 0.0001$ ) body weight, body mass index, fat mass, lean mass, and bone mineral content compared with normal-weight children. Serum concentrations of leptin were about 2-fold lower ( $p < 0.0001$ ) in thin vs. normal-weight subjects. Serum levels of total adiponectin, adiponectin multimers, and soluble leptin receptor (SOB-R) were similar in both groups. The leptin/soluble leptin receptor ratio and leptin/adiponectin ratios were lower ( $p < 0.0001$ ) in thin vs. normal-weight children. In both groups of children, it was found that body composition parameters were positively related with leptin but not with adiponectin levels. Additionally, bone mineral content was positively related with body mass index, fat mass, lean mass, and leptin level in thin and normal-weight children.

<sup>☆</sup> Please cite this article as: Ambroszkiewicz J, Gajewska J, Szamotulska K, Rowicka G, Klemarczyk W, Chęłchowska M. Comparison of body composition and adipokine levels between thin and normal-weight prepubertal children. J Pediatr (Rio J). 2017. <http://dx.doi.org/10.1016/j.jpmed.2016.11.004>

\* Corresponding author.

E-mail: [jagoda.ambroszkiewicz@imid.med.pl](mailto:jagoda.ambroszkiewicz@imid.med.pl) (J. Ambroszkiewicz).

<http://dx.doi.org/10.1016/j.jpmed.2016.11.004>

0021-7557/© 2017 Sociedade Brasileira de Pediatria. Published by Elsevier Editora Ltda. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

**PALAVRAS-CHAVE**

Leptina;  
Adiponectina;  
Composição corporal;  
Magreza;  
Crianças

**Conclusions:** Prepubertal thin children have disturbances in body composition and adipokine profile. Early recognition of thinness and determination of body composition parameters and adipokine levels can be useful in medical and nutritional care of thin children for the optimization of bone mineral accrual.

© 2017 Sociedade Brasileira de Pediatria. Published by Elsevier Editora Ltda. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

**Comparação da composição corporal e dos níveis de adipocina entre crianças pré-púberes magras e com peso normal****Resumo**

**Objetivo:** A magreza pode ter consequências substanciais para o desenvolvimento e a saúde das crianças. As adipocinas, incluindo a leptina e a adiponectina, desempenham um papel significativo na regulação de importantes funções metabólicas. O objetivo do estudo foi investigar as associações entre a composição corporal e os níveis séricos de leptina e adiponectina em crianças magras e com peso normal.

**Métodos:** Examinamos 100 crianças pré-púberes saudáveis, que foram divididas em dois subgrupos: crianças magras (n = 50) e com peso normal (n = 50). A composição corporal foi avaliada pelo método de absorciometria de dupla energia de raios-X. As concentrações séricas das adipocinas foram determinadas por ensaios imunoenzimáticos.

**Resultados:** As crianças magras apresentaram altura semelhante, porém peso corporal ( $p < 0.0001$ ), índice de massa corporal (IMC), massa gorda, massa magra e conteúdo mineral ósseo (CMO) significativamente menores em comparação a crianças com peso normal. As concentrações séricas de leptina foram aproximadamente 2 vezes mais baixas ( $p < 0.0001$ ) em indivíduos magros que em crianças com peso normal. Os níveis séricos de adiponectina total, múltiplos de adiponectina e receptor de leptina solúvel (sOB-R) foram semelhantes em ambos os grupos. Os índices de leptina/sOB-R e leptina/adiponectina foram inferiores ( $p < 0.0001$ ) em crianças magras que crianças com peso normal. Em ambos os grupos de crianças, descobrimos que os parâmetros de composição corporal estavam positivamente relacionados à leptina, porém não aos níveis de adiponectina. Além disso, observamos que o CMO estava positivamente relacionado ao IMC, massa gorda, massa magra e ao nível de leptina em crianças magras e com peso normal.

**Conclusões:** As crianças pré-púberes magras possuem alterações na composição corporal e no perfil de adipocinas. O reconhecimento precoce da magreza e a determinação dos parâmetros de composição corporal e dos níveis de adipocina podem ser úteis no cuidado médico e nutricional de crianças magras para otimização do acúmulo mineral ósseo.

© 2017 Sociedade Brasileira de Pediatria. Publicado por Elsevier Editora Ltda. Este é um artigo Open Access sob uma licença CC BY-NC-ND (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

**Introduction**

It is widely recognized that overweight and obesity in childhood should be closely monitored for public health policy reasons.<sup>1</sup> However, there is scant research examining the prevalence of thinness in early childhood, despite potential negative consequences for health and development across the course of life. The most widely studied index of nutritional status in adults has been body mass index (BMI). However, the definition of thinness is dissimilar between adults and children. The World Health Organization (WHO) defines thinness as BMI less than the fifth percentile of the reference values for normal-weight children. Cole et al.<sup>2</sup> proposed a new graded definition of thinness in childhood and adolescence, based on pooled international data for BMI and linked to the WHO-recommended adult cut-off points. These international BMI cut-offs allow distinctions between

different grades of thinness: grade 1 (17 to  $<18.5$  – mild thinness), grade 2 (16 to  $<17$  – moderate thinness), and grade 3 ( $<16$  – severe thinness).

In the literature there are many studies presenting the prevalence of childhood thinness, including severe thinness, in low-income countries.<sup>3,4</sup> Thinness was also observed in about 7–11% of Japanese children and 5–6% of Australian children, with a higher proportion in girls than boys.<sup>5,6</sup> In developed European countries, thinness has been reported to range from 4.8% to 11.9% in girls, and from 3.1% to 9% in boys, but this prevalence differs by age, sex, and region.<sup>7,8</sup> In Poland, depending on the standard used, the prevalence of thinness was diagnosed in about 6–8% of boys and 9–11% of girls.<sup>9</sup>

It is important to note that not only optimal body weight but body composition, including bone mass, lean mass, and fat mass are relevant to child development and healthy

Download English Version:

<https://daneshyari.com/en/article/8809798>

Download Persian Version:

<https://daneshyari.com/article/8809798>

[Daneshyari.com](https://daneshyari.com)