



## Does nutritional status interfere with adolescents' body image perception?



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### ABSTRACT

Adolescents' body image (BI) may not match their nutritional status. This study selected representative sample of healthy adolescents aged between 12 and 18 from public and private schools. Anthropometric measures were performed in order to calculate the body mass index (BMI) percentile. The silhouette scale proposed by Childress was used to evaluate BI, making it possible to assess BI satisfaction and BI distortion. The sample was composed of 1168 adolescents with a mean age of 14.7 years; 52.9% were female, 50.9% were fair-skinned, 62.4% had consumed or still consume alcohol and 67% attended public school. Male adolescents presented more overweight and obesity (28.4%) ( $p < 0.05$ ) than the female (17.1%). It was observed that 69.4% were dissatisfied with BI, 91.1% of the obese and 69.8% of those with overweight wished to lose body weight and 82.5% of those underweight wished to gain body weight. BI distortion was identified, since 35% of the adolescents who were underweight did not regard themselves thin, 39.1% of the overweight individuals and 62.1% of the obese did not see themselves in their adequate classifications. Adolescents with overweight/obesity were those who presented higher dissatisfaction with BI, mainly the females. Male individuals presented a greater wish of gaining weight. BI distortion was present in adolescents of all classes of BMI percentile.

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### 1. Introduction

Increased sedentariness and poor eating are directly related to the population's prevalence of overweight and obesity, which reflects on the occurrence of non-communicable chronic diseases (Vinholes, Assunção, & Neutzling, 2009). Adolescents are more exposed to adverse physical and mental health effects minimizing the opportunity of adopting a healthier lifestyle (Silva & Lopes, 2008).

Adoption of a sedentary lifestyle, increase of excess weight prevalence and excessive thinness may be related to a greater dissatisfaction with body image (BI) (Kakeshita & Almeida, 2006; Conti & Latorre, 2009). Adolescents regard self-perception and BI satisfaction as important self-acceptance factors (Brazil. National Survey of School Health, 2009). When the adolescent's perception of their body is not in accordance with their ideal image, they may have inadequate attitudes which may impair their development and growth.

Some adolescents, even with adequate weight or underweight, feel obese and are concerned about weight and appearance. This is denominated BI distortion and it is related to eating disorders and to obesity, which may cause low self-esteem and high levels of body dissatisfaction (Anton, Perri, & Riley, 2000; Conti, Frutuoso, & Gambardella, 2005).

It is possible to find situations of body dissatisfaction in which the adolescent's perception of their body is not in accordance with what they idealize and the perception of their biotype is different from reality (Brazil. National Survey of School Health, 2009; Conti et al., 2005).

The objective of this study was to identify the influence of BMI percentile on BI perception in teenage students of public and private schools of a large city.

### 2. Material and methods

Descriptive cross-sectional study of a representative sample of male and female healthy adolescents aged between 12 and 18, enrolled in public and private schools, was conducted. Physical disability which did not allow anthropometric evaluation, pregnancy, chronic diseases and the use of medication were the exclusion criteria. This study was part of a project originally entitled: "Blood Pressure Home Measurement and its correlation with left ventricular mass index and insulin resistance

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in adolescents with masked and white coat hypertension”—“Projeto CorAdo” (Coração de Adolescente—Adolescent’s heart), approved by the institution’s ethics committee and granted by CNPq, process number 477626/2009-2.

The sample calculation was performed regarding the fact that the city has 125,525 inhabitants aged between 12 and 18 (IBGE, 2009). For the present study, it was calculated a sample of 306 adolescents, for an obesity prevalence of 3.5% (Ramos & Barros Filho, 2003), confidence interval of 95% and absolute precision of 2%. However, all adolescents who participated in the original project were analyzed.

The schools were selected and 26 schools participated. Students were randomly selected and all of those who met the inclusion criteria and signed the Acceptance Term (AT) took part.

Collection period was between October 2010 and November 2011. A duly trained team went to the schools and upon arrival applied the AT and the questionnaire to the students. Weight and height were measured, according to the methods described by Lohman, Roche, & Martorell (1988); the BMI percentile was calculated, based on the new curves of the World Health Organization (WHO) (OMS, 2007).

BI perception was evaluated through the application of the scale proposed by Childress, Brewerton, Hodges, & Jarrel (1993), which was based on the scale models developed by Stunkard, Sorenson, & Schlusinger (1983) to allow the use on adolescents. The scale is formed by a group of drawings, containing eight figures of female and male silhouettes, which represent human figures with variations, in ascending order, of body size. The group of silhouettes was shown to adolescents. Each drawing contained a numeration that corresponds to a class of BMI percentile, which was calculated by the Brazilian website created by the Health Ministry, that follows the WHO criteria, being numerations 1 and 2 = below the weight ( $W < 3$ ); 3 and 4 = healthy ( $W \geq 3$  and  $< 85$ ); 5 and 6 = overweight ( $W \geq 85$  and  $< 97$ ); 7 and 8 = obesity ( $W \geq 97$ ) (Adami, Frainer, Santos, Fernandes, & De Oliveira, 2008; Almeida, Santos, Pasian, & Loureiro, 2005; Brasil. Cálculo de IMC Infantil, 2013; Gomes, Anjos, & Vasconcellos, 2010).

In order to evaluate BI, perceived body silhouette was subtracted from desired body silhouette identified by the scale numbers (Anton et al., 2000; Brazil. National Survey of School Health, 2009; Conti & Latorre, 2009; Conti et al., 2005; IBGE, 2009; Kakeshita & Almeida, 2006; Silva & Lopes, 2008; Vinholes et al., 2009). If the variation was equal to zero, the adolescent was classified as satisfied; if it was different from zero, the adolescent was classified as dissatisfied. A positive difference indicated dissatisfaction with the desire of reducing the silhouette, and, when negative, dissatisfaction with the desire of increasing the silhouette. The comparison between the calculated BMI percentile and the self-reported BMI percentile was

performed in order to identify BI perception distortion (Laus, Costa, & Almeida, 2009).

Data analysis was performed with software SPSS Statistics version 20 and by software Open Epi. Kolmogorov–Smirnov’s test was utilized for the distribution analysis, Wilcoxon’s test to compare both related samples, Pearson’s Chi-square was done to calculate categorical variables, and when necessary, Fisher’s exact test. For the agreement analysis of measures taken among observers considering the ordinal scale, Kendall’s Tau was utilized. It was considered the significance level of 5% and the confidence interval of 95%.

### 3. Results

Sample was formed by 1168 adolescents, being 67% enrolled in public schools and 33% in private schools. Mean ( $\pm$ SD) age was 14.7 years ( $\pm 1.6$ ), and the predominant gender was female (52.9%). Fair-skin was identified in 50.9%, the consumption of alcohol self-reported by 62.4% and 1.2% claimed to be smokers.

It was observed that 3.4% of the sample ( $n = 40$ ) was underweight, 7.7% ( $n = 90$ ) was obese and 14.7% ( $n = 172$ ) was overweight, which demonstrated a prevalence of 22.4% ( $n = 262$ ) of excess weight.

Nutritional classification identified more male adolescents overweight, 18.9% ( $n = 104$ ), and obese, 9.5% ( $n = 52$ ), than females overweight, 11% ( $n = 68$ ), and obesity, 6.1% ( $n = 38$ ) ( $p < 0.05$ ). The evaluation according to age demonstrated that obesity was more present among the youngest individuals ( $p < 0.05$ ), and that the oldest adolescents were eutrophic ( $p < 0.05$ ). Higher frequency of eutrophic adolescents was observed in public schools, whereas more overweight and obese students were in private schools ( $p < 0.05$ ).

Regarding BI perception, it was observed that 811 adolescents (69.4%) were dissatisfied with their body image, 30% wished to gain weight and 39.4% would like to lose weight.

It was verified that 37.6% of the male adolescents were dissatisfied and wished to gain weight, whereas 46.4% of the female were also dissatisfied and wished to lose weight ( $p < 0.05$ ). The youngest adolescents were the ones with greater dissatisfaction and wished to reduce their body weight ( $p < 0.05$ ). It was observed that the public ones had more adolescents dissatisfied wishing to gain body weight ( $p < 0.05$ ).

The comparison between nutritional evaluation and BI perception identified that among those underweight, 82.5% ( $n = 33$ ) would like to gain weight, which demonstrated the expected perception. Among those overweight, 69.8% ( $n = 120$ ) wished to lose weight. Among the obese, 91.1% ( $n = 82$ ) would like to lose weight, which also demonstrated an adequate perception. Nevertheless 5.1% of the total sample reported a desire to maintain or even increase their weight (Table 1).

**Table 1**  
Distribution of frequency and percentage of BMI percentile classification by body image satisfaction. Goiânia—GO, Brazil, 2012. ( $n = 1168$ ).

BI perception	Percentile classification								$p^*$		
	Underweight (a)		Eutrophic (b)		Overweight (c)		Obesity (d)				
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%			
Dissatisfied—gain	33	82.5	310	35.8	6	3.5	1	1.1	<0.001	<0.001	0.032
Satisfied	6	15.0	298	34.4	46	26.7	7	7.8	0.012	0.059	<0.001
Dissatisfied—lose	1	2.5	258	29.8	120	69.8	82	91.1	0.183	<0.001	<0.001

\*Classification according to WHO percentile. Fisher’s exact test.

Most studied adolescents presented BI distortion, 39.1% of those overweight did not regard themselves overweight; moreover, 62.1% of those obese believed that they were eutrophic or only overweight. There was a moderate level of agreement between measured BMI (gold standard) and perceived BMI ( $\tau - b$  of Kendall = 0.538). Among those evaluated as obese, only 37.9% ( $n = 33$ ) classified themselves in this condition (Table 2).

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