

## ORIGINAL ARTICLE

# Unhealthy weight control behaviors, disordered eating, and body image dissatisfaction in adolescents from São Paulo, Brazil

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This study was conducted as part of the first author's doctoral studies at Universidade de São Paulo, São Paulo, SP, Brazil.

**Objective:** To identify the frequency of disordered eating (DE) and unhealthy weight control behaviors (UWCB) among adolescents and associations with age, sex, actual weight status, perceived weight status, and body image dissatisfaction.

**Methods:** Cross-sectional study of 1,156 adolescents. DE was assessed using a specific self-report questionnaire, UWCB by specific behaviors that were not typically recommended for weight management, and body dissatisfaction by Stunkard's silhouettes.

**Results:** The frequency of DE was 17.3%, and that of UWCB, 31.9%; 80.1% of participants were dissatisfied with body image. Perception of oneself as overweight was associated with 1.795-fold odds of DE. Those with UWCB had 7.389-fold odds of DE, while DE increased the odds of UWCB 7.280-fold. Girls, participants who perceived themselves as overweight, and those who reported body dissatisfaction were 2.266, 2.381, and 1.752 times more likely to have UWCB, respectively.

**Conclusion:** A high prevalence of UWCB and a moderate prevalence of DE behaviors was found in adolescents from the city of São Paulo, Brazil. Those who perceived themselves as overweight had more DE and UWCB, and both behaviors were related. UWCB was more common in girls and among those dissatisfied with their bodies.

**Keywords:** Adolescent; body image; feeding and eating disorders; disordered eating

## Introduction

Disordered eating (DE) is one of the most widely used expressions to refer to eating disorder risk behaviors, although there is no consensus among researchers.<sup>1</sup> DE can be characterized by the presence of classic symptoms of eating disorders that occur less frequently or with less seriousness than in full-blown eating disorders.<sup>1</sup>

Other behaviors – including fasting or eating very little food, use of meal substitutes (powders/drinks), taking diet pills, skipping meals, or smoking more cigarettes with the intention of controlling weight – could be viewed as less radical than DE. Nevertheless, they are no less serious and have been also the focus of research, as they represent risk factors for overweight or obesity, DE, and eating disorders, especially in adolescents.<sup>2</sup> The term unhealthy weight control behaviors (UWCB), first used by the EAT-Project in 2002, has been proposed for these practices.<sup>2</sup> DE behaviors and UWCB can be evaluated differently, and some questionnaires and items have been used to assess their frequency and associated factors.<sup>1</sup> In their original proposal, the EAT-Project classified weight

control behaviors as healthy (exercised, ate more fruits and vegetables, ate less high-fat foods, ate fewer sweets), unhealthy (fasted, ate very little food, used food substitute, skipped meals, smoked more cigarettes), and extreme (EWCB) (took diet pills, made myself vomit, used laxatives, used diuretics).<sup>2</sup> In subsequent studies, this classification was changed to pool all non-healthy behaviors as UWCB,<sup>3,4</sup> and in the later New Moves Project,<sup>5</sup> restrictive diet was also included as an UWCB.

In Brazil, two studies evaluated UWCB using the same reference: Leme et al.,<sup>6</sup> who used a distinct classification for UWCB (skip meals, eat little, and fast), EWCB (use diuretics and smoke), and other weight control behaviors (OWCB) (other medications, meal replacements), and Dunker & Claudino,<sup>7</sup> who used the same definitions adopted in the New Moves Project.<sup>5</sup> Among the factors which play a major role in DE and other dysfunctional eating behaviors, body image dissatisfaction has been implicated as a particularly important risk factor.<sup>8,9</sup> In Brazil, one study assessing 1,219 adolescent girls found that those dissatisfied with their body image had higher scores in the Eating Attitudes Test (EAT-26).<sup>10</sup> Conversely, body image

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satisfaction was identified as a protective factor against DE in North American adolescents.<sup>11</sup> The high frequency of body dissatisfaction found in Brazilian studies (from 39.8 to 59%) justifies the search for associations between this phenomenon and eating behaviors.<sup>12-14</sup>

Brazilian studies on DE in adolescents remain scant.<sup>1</sup> Some investigations about eating behaviors and body image were conducted in this population group,<sup>10,12,15,16</sup> but used mostly the EAT-26. In addition to its broad nature, use of this scale to assess DE could be problematic because its questions do not focus on typical ED behaviors, and the test has low positive predictive value.<sup>17</sup>

The last Brazilian National School-based Adolescent Health Survey (Pesquisa Nacional de Saúde do Escolar [PeNSE]),<sup>18</sup> conducted with adolescents aged 13 to 15 from all Brazilian regions (85.5% from public schools), collected data on vomiting and use of laxatives and other medicines to lose or gain weight among adolescents. Nonetheless, other issues, such as binge eating, food restriction, and other UWCBs, were not evaluated. Moreover, data were not analyzed in relation to body image perception.

Therefore, much remains unknown about dysfunctional eating behaviors among Brazilian adolescents, including associations among them and with body image issues. These problems are considered broadly disseminated in Western countries, but Brazil is a developing nation of continental proportions, and the reality of Europe and the United States cannot be assumed to apply. In this context, the present study aimed to identify the frequency of DE and UWCB among adolescents and associations of these phenomena with age, sex, actual weight status, perceived weight status, and body image dissatisfaction.

## Methods

This cross-sectional study was conducted during 2009-2013 in 12 vocational secondary schools in the city of São Paulo, Brazil. As of 2009, the city had 27 vocational schools, 15 of which offered a secondary education (data were collected between 2009 and 2010). Of these 15, two refused to participate and one was selected for pilot testing; hence, 12 schools with a total enrollment of 7,223 adolescents were available for study. The sample size was calculated for a prevalence of 50% (considering the highest

prevalence of all hypotheses studied in the project), power of 0.95, and effect size of 0.20 – an absolute precision of 3 percentage points – plus 20% to account for attrition, resulting in a final sample of 1,280 adolescents.

Cluster sampling was used to establish the number of students from each school to be assessed. As each school had a different enrollment, sample size also varied proportionately, from 14 to 189 adolescents per school. For classroom-based assessment, classes were chosen according to availability. Although the predicted sample size was 1,280, only 1,156 adolescents who met the inclusion criteria (age between 12 and 19 years and signed informed consent from parents) were available. Ten otherwise eligible participants who did not give their age and one who was 20 years old were excluded.

Vocational schools in Brazil are intended for adolescents from low-income backgrounds. They deliver both regular secondary-school instruction and vocational training in several technical subjects, including nutrition and dietetics (to avoid bias, students of these programs were not included).<sup>6</sup>

The questionnaire used was translated and adapted for use in Brazil based on an original designed for the Eating Among Teens Project.<sup>2</sup> A more simplified form of this instrument by the Healthy Girls Program<sup>6</sup> was previously validated for Brazilian girls<sup>7</sup>; this version only evaluated less-extreme behaviors, which in the present study were defined as UWCB: “Have you ever done any of the following things in order to lose weight or keep from gaining weight during the past year?”<sup>2</sup> Adolescents answered all items with yes or no: ate very little food, used food substitutes (shakes, supplements), skipped meals, smoked more cigarettes, or took diet pills (Box 1). An affirmative answer to any of these items was considered UWCB.<sup>2</sup>

In this study, DE included the more extreme weight control behaviors, was assessed using five endorsed and reliable<sup>19</sup> questions<sup>20</sup> previously used among Brazilian adolescents.<sup>21,22</sup> Items focused on frequency of binge-eating episodes and loss of control and distress after overeating; compensatory mechanisms, such as purging through the use of diuretics, laxatives, or self-induced vomiting with the intent of controlling weight; and very strict diet or fasting within the last 3 months (Box 1).

### Box 1 Unhealthy weight control behaviors and disordered eating items evaluated in the present study

Unhealthy weight control behaviors (in the past year)	Disordered eating (within the last 3 months)
Answer options: yes or no	Answer options: not at all, less often than once a week, once a week, or two or more times a week
Ate very little food in order to lose weight or keep from gaining weight	Binge-eating episodes and loss of control and distress after overeating
Skipped meals in order to lose weight or keep from gaining weight	Diuretics with the intent of controlling weight
Used food substitutes (shakes, supplements) in order to lose weight or keep from gaining weight	Laxatives with the intent of controlling weight
Smoked more cigarettes in order to lose weight or keep from gaining weight	Self-induced vomiting with the intent of controlling weight
Took diet pills in order to lose weight or keep from gaining weight	Very strict diet or fasting with the intent of controlling weight

Adolescents who reported engaging in at least one of these behaviors once a week or more frequently were classified as having DE.<sup>19-22</sup>

Body image dissatisfaction was evaluated by Stunkard's silhouettes,<sup>23</sup> on which adolescents chose two figures: one representing their current body shape and one representing their desired body. The magnitude of body dissatisfaction was calculated as the difference between the number for current and desired figures. Those who chose any figure different from current were classified as body dissatisfied.

Perceived weight status was assessed with the question: "You perceive your current weight as: very underweight, underweight, the right weight, overweight, very overweight." Responses for the first two categories were grouped as underweight, the category "the right weight" as normal weight range, and the last two categories as overweight.

The self-report questionnaire was filled out by students in the classroom, in the presence of the researchers. Anthropometric measurements (body weight and height) were collected by the research team, and body mass index (BMI)-for-age was calculated using percentiles developed by the World Health Organization (WHO).<sup>24</sup>

Participation in the study was contingent upon provision of informed consent forms signed by the adolescents' parents or legal guardians.

Analyses were performed in SPSS version 21.0. The chi-square and Fisher's exact tests were employed to evaluate the association between categorical variables, and the Student *t*-test to compare means.

A multivariate logistic regression model (backward stepwise method) was used to evaluate the factors that influenced DE and UWCB, using each as the dependent variable separately, including only those variables that had  $p < 0.20$  on univariate analysis. A confidence level of 95% and  $p < 0.05$  were considered for all analyses.

#### Ethics statement

The study was approved by the research ethics committee of Faculdade de Saúde Pública, Universidade de São Paulo, Brazil (protocol 293/09).

#### Results

Of 1,156 adolescents participating in the study, 51.12% were male, with a mean (SD) age of 16.0 (1.0) years (range, 13 to 19 years).

The majority had normal weight (72.4%). Girls were more often in normal weight range, while boys were more likely to be underweight or overweight (Table 1).

Regarding perceived weight status, the majority of respondents saw themselves as having a normal weight

**Table 1** Sample profile (actual weight status, body image dissatisfaction, perceived weight status, disordered eating behaviors, and unhealthy weight control behaviors), stratified by sex

Variable	Total sample (n=1,156)	Sex		p-value
		Males (n=591)	Females (n=565)	
Actual weight status				0.028 <sup>†</sup>
Underweight	11 (1.0)	9 (1.5)*	2 (0.4)	
Normal weight	831 (72.4)	412 (70.1)	419 (74.8)*	
Overweight	194 (16.9)	99 (16.8)	95 (17.0)	
Obese	112 (9.8)	68 (11.6)*	44 (7.9)	
Body image dissatisfaction	920 (80.1)	476 (81.1)	444 (79.1)	0.409 <sup>†</sup>
Perceived weight status				< 0.001 <sup>†</sup>
Underweight	207 (18.2)	155 (26.5)*	52 (9.4)	
Normal weight	526 (46.2)	272 (46.6)	254 (45.8)	
Overweight	406 (35.6)	157 (26.9)	249 (44.9)*	
Disordered eating	200 (17.3)	75 (12.7)	125 (22.1)	< 0.001 <sup>†</sup>
Binge-eating	120 (10.4)	52 (8.8)	68 (12.0)	0.076 <sup>†</sup>
Fasting or very strict diet	100 (8.7)	27 (4.6)	73 (12.9)	< 0.001 <sup>†</sup>
Diuretics	16 (1.4)	3 (0.5)	13 (2.3)	0.009 <sup>†</sup>
Laxatives	4 (0.3)	0 (0.0)	4 (0.7)	0.057 <sup>‡</sup>
Self-induced vomiting	4 (0.3)	2 (0.3)	2 (0.4)	1.000 <sup>‡</sup>
Unhealthy weight control behaviors	369 (31.9)	123 (20.8)	246 (43.5)	< 0.001 <sup>†</sup>
Eat very little food	236 (20.6)	60 (10.2)	176 (31.5)	< 0.001 <sup>†</sup>
Skip meals	238 (20.8)	71 (12.1)	167 (30.1)	< 0.001 <sup>†</sup>
Food substitute use	87 (7.6)	38 (6.5)	49 (8.8)	0.141 <sup>†</sup>
Take diet pills	25 (2.2)	5 (0.9)	20 (3.6)	0.002 <sup>†</sup>
Smoke	19 (1.7)	15 (2.6)	4 (0.7)	0.015 <sup>†</sup>

Data presented as n (%), unless otherwise specified.

The number of subjects with missing values was eight for weight status and body image; 17 for perceived weight status; three for binge-eating; one each for fasting or very strict diet, diuretics, laxatives, and self-induced vomiting; nine for eating very little and food substitute use; 14 for skipping meals; 19 for taking diet pills; and 18 for smoking.

\* Residual adjusted.

<sup>†</sup> Pearson chi-square test.

<sup>‡</sup> Fisher's exact test.

(though less than the actual number in normal weight range). Girls more often described themselves as overweight, and boys, as being in normal weight range. The majority were dissatisfied with their body image (no gender difference) (Table 1).

DE behavior was identified predominantly in girls, as were fasting, a very strict diet, and use of diuretics. Regarding UWCB, positive answers were also more common among girls; the most prevalent behaviors were eating very little food, skipping meals, and taking diet pills. Smoking was more common among boys (Table 1).

DE behaviors were reported with a frequency of once weekly or greater by 17.3% of respondents (n=200). Of these, 14% reported one DE behavior, 2.9% two DE behaviors, 0.3% three DE, and 0.1% four. Overall, approximately 32% reported any UWCB: 16.3% endorsed one behavior, 12.1% two, 2.4% three, 1% four, and 0.1% five.

Considering DE as a dependent variable, factors with  $p < 0.20$  on univariate or bivariate analyses (age, sex, current weight status, perceived weight status, UWCB, and body image) were included in the regression model (Table 2).

Adolescents who perceived themselves as overweight/very overweight were almost twice as likely to engage in DE behaviors than those who perceived themselves as being in normal weight range (OR = 1.795). It is important to stress that only 20% of boys and 22.5% of the girls were actually overweight. Adolescents who reported UWCB had an OR of 7.389 for engaging in DE behaviors (Table 2). Considering UWCB as a dependent variable, factors with  $p < 0.20$  on its univariate or bivariate analyses (age, sex, current weight status, perceived weight status, DE, and body image) were included in the regression model (Table 2).

Girls were more than twice as likely to engage in UWCB than boys (OR = 2.266). Adolescents who perceived themselves as underweight had 78.8% lower odds of UWCB, while those who perceived themselves as overweight had 2.381-fold higher odds of UWCB. Adolescents

who reported body dissatisfaction (with any difference) had 1.752-fold higher odds of UWCB, while adolescents with DE behaviors were much more likely to present with an UWCB as well (OR = 7.280) (Table 2).

## Discussion

UWCB and body dissatisfaction were highly prevalent among adolescents in the city of São Paulo, particularly among girls, and these behaviors were associated with DE (such as binge-eating and fasting or eating very little food). This finding should raise concerns, as adolescence is the starting point of eating disorders.

A study assessing UWCB – using the same question adapted from the Eating Among Teens Project<sup>2</sup> – found a prevalence ranging from 32.6% among boys to 56.9% among girls. The higher prevalence among U.S. adolescents may be attributable to the diversity of ethnic groups evaluated; the greatest prevalence for UWCB was for Native American girls (69.2%). In addition, the authors found a lower prevalence in white girls (53.7%), which dispels the myth that excessive weight preoccupation and UWCB occur predominantly among white, upper-class girls. However, for white boys (23.9%), the prevalence was similar to that of our sample. Although ethnicity was not assessed in our study, this diversity may explain some of our prevalence differences, since we evaluated low-income adolescents. As in our study, a previous investigation of U.S. adolescents<sup>4</sup> found that UWCB increased the risk of DE. Another study of overweight adolescents conducted by the same U.S. research group found that dieting, UWCB, and greater hours of moderate physical activity were predictive of a higher incidence and prevalence of DE.<sup>11</sup> Thus, it must be highlighted that even though these behaviors are considered less severe – such as eating very little food and skipping meals, which were the most frequent UWCB in our study – they may still be associated with increased odds of engaging also in DE behaviors, which are considered more severe

**Table 2** Disordered eating, unhealthy weight control behaviors, and associated variables among adolescents from the city of São Paulo, Brazil

Variables	B	OR	95%CI		p-value
			Lower	Higher	
Disordered eating					
Age	-0.153	0.859	0.719	1.024	0.091
Normal perceived weight status					0.006
Underweight perceived weight status	0.015	1.016	0.543	1.899	0.961
Overweight/obese perceived weight status	0.585	1.795	1.236	2.608	0.002
Unhealthy weight control behaviors	2.000	7.389	5.060	10.791	< 0.001
Constant	-0.358	0.699			0.804
Unhealthy weight control behaviors					
Sex (female)	0.818	2.266	1.674	3.068	< 0.001
Normal perceived weight status					< 0.001
Underweight perceived weight status	-1.549	0.212	0.113	0.399	< 0.001
Overweight/obese perceived weight status	0.868	2.381	1.713	3.310	< 0.001
Body image dissatisfaction	0.561	1.752	1.150	2.669	0.009
Disordered eating	1.985	7.280	4.936	10.738	< 0.001
Constant	-2.228	0.108			< 0.001

Binary logistic regression.

95%CI = 95% confidence interval; OR = odds ratio.

(such as binge eating and fasting, the most frequent in our study). In socioeconomically diverse countries, such as United States<sup>2,4,9,11</sup> and Brazil,<sup>13,14,21,25</sup> the problem is similar; Brazilian studies of DE in adolescents reported frequencies of DE ranging from 1.1<sup>14</sup> to 39.04%,<sup>13</sup> using the Bulimic Investigatory Test Edinburgh (BITE) and EAT-26 questionnaires.<sup>1</sup> The frequency observed in the present study lay midway in the overall range of rates reported for Brazil. Prevalence tended to be lower when scales assessing more severe and specific behaviors for ED were used,<sup>14</sup> but higher when assessing atypical and less severe eating patterns according to the BITE.<sup>13,25</sup>

Nonetheless, comparison with other studies is difficult, even internationally, since DE is a nonstandard nomenclature and has been assessed by different methods. Worldwide, high variability in DE prevalence has been reported (from 0.8 to 38.3%).<sup>1</sup> This may be related to cultural, racial, or ethnic differences, or may be explained by disparities in the instruments used for assessing DE.<sup>1</sup>

A study conducted in Rio de Janeiro<sup>21</sup> found higher frequencies of all DE behaviors (37.3% binge-eating, 24.7% restricted diet, 2.1% use of laxatives, 1.6% use of diuretics, and 1.4% self-induced vomiting).

Furthermore, other studies of adolescents have assessed DE behaviors separately and found higher prevalence of food-intake restriction and binge-eating than of purgative behaviors.<sup>26,27</sup> Dieting with the intention of weight loss was assessed among 4,452 Brazilian adolescents in a cohort from Southern Brazil<sup>28</sup>; 8.6% reported having engaged in some form of diet or food restriction – more frequently among girls. The PeNSE study<sup>18</sup> found a 7% prevalence of vomiting or laxative intake in an attempt to lose weight. Use of other medicines or products was reported by 6.8% of boys and 5.2% of girls aiming to lose weight and by 8.6% for boys and 5.6% for girls with the aim of gaining weight or muscle. Another population-based study of 60,973 adolescents from all Brazilian states found that 4.2% of those assessed used diet pills,<sup>15</sup> while a study of 5,028 adolescents from Southern Brazil found a much higher prevalence (24.2%) of this behavior.<sup>16</sup>

The frequency of body dissatisfaction was higher than the rates found in previous Brazilian studies using silhouette scales with adolescents,<sup>14,29,30</sup> but similar to studies in Mexican,<sup>31</sup> Japanese, and Vietnamese<sup>32</sup> adolescents using the same method. Using a seven-point Likert scale (very dissatisfied to very satisfied) to assess body dissatisfaction, a recent Brazilian study<sup>33</sup> found a lower, but still high prevalence of weight dissatisfaction, highlighting that in Brazil there is great concern with achieving an ideal beauty standard. This high prevalence of body dissatisfaction can be explained by the highly sensitive criteria of the instrument, where only slight desire to change (one silhouette of difference) led to classification of individuals as dissatisfied, due to the amplitude of the scale (nine figures).<sup>34</sup> Nonetheless, the marked frequency of body image dissatisfaction among teenagers is well documented.<sup>35</sup>

Overweight and obese adolescents exhibited a higher frequency of DE and UWCB. A higher prevalence of DE and UWCB among overweight/obese adolescents was similarly evidenced by studies in other countries, including

Israel,<sup>36</sup> Argentina,<sup>37</sup> and the United States.<sup>9,11,27,38</sup> In this sense, it is important to emphasize that DE behaviors can not only lead to the development of eating disorders, but also to obesity.<sup>38</sup>

Considering perceived weight status, there was a higher frequency of boys in normal weight range seeing themselves as underweight, and a higher frequency of girls in normal weight range seeing themselves as overweight/very overweight. The tendency for girls to overestimate and boys to underestimate their body weight has been shown in a number of studies conducted in Brazil<sup>34,39,40</sup> and elsewhere.<sup>8,37,41</sup> This could be related to gender-specific standards of beauty (slim for girls and strong for boys). It is also interesting to see this phenomenon occurring in a developing country such as Brazil. The PeNSE Brazilian study<sup>18</sup> found that 18.3% of adolescents considered themselves fat or very fat, and 25.6% desired to lose weight; among girls, 21.8% considered themselves fat or very fat. However, the study did not report how many adolescents among those who perceived themselves as overweight were actually overweight or obese.

Body dissatisfaction was associated with DE only on univariate regression analysis, but just the association with UWCB remained in the adjusted one. This association is consistent with the knowledge that body issues constitute one of the leading risk factors for developing eating disorders. In this regard, Philippi & Leme<sup>33</sup> found that adolescents who faced weight-teasing by family or peers tended to be more dissatisfied with their physical appearance, which resulted in UWCB. Haley et al.<sup>9</sup> also found an association between UWCB and body dissatisfaction, highlighting that early diagnosis of UWCB may help prevent the development of eating disorders, particularly among adolescents that tend to perceive themselves as overweight.

The association between body dissatisfaction and UWCB highlights the need for interventions to foster body acceptance and satisfaction to prevent the emergence of these behaviors. Brazil is undergoing profound economic and change, and the prevalence of obesity, has been rising consistently – with young people most affected.<sup>42</sup> Amid multiple other, more pressing problems, body image issues and UWCB are mostly ignored by the health care system. This is especially problematic among adolescents who are socially excluded, have had a poor education, and lack access to health services – all factors that could increase the risk of UWCB as a means of modifying one's appearance so as to be accepted in society.<sup>6</sup> The findings of this study should draw attention to these problems as well.

The public- and mental-health repercussion of these findings involve the fact that early identification of UWCB may help prevent DE, which are more severe and place a higher cost burden on the public health system. UWCB have been associated with body dissatisfaction, among other problems, which, in turn, may lead to obesity, depression, anxiety, and a higher risk of suicide in adolescents.<sup>43-45</sup> Furthermore, to prevent DE, encouraging healthy weight-control behaviors (physical activities, eating more vegetables, drinking less sugar-sweetened beverages, eating less sugar and fat, paying attention to portion sizes) is not enough; UWCB must be actively discouraged. To do

so, first, it is important to screen for UWCB and understand why adolescents engage in these behaviors and their beliefs about them. Eating little food, skipping meals, and consuming meal substitutes are seen as “healthy” or normal behaviors, especially in individuals who are actually overweight. Therefore, if UWCB are not explored and discussed, a DE prevention program will not be able to promote broad health benefits.

Some limitations need to be taken into account in interpreting these findings. First, the sample was recruited from a single Brazilian city and therefore is not representative of all adolescents across the country. Nevertheless, the sample size was adequate (with proper power and effect size) for the analyses performed and conclusions attested. Second, the study had a cross-sectional design, which precluded any causal inference. Furthermore, odds ratios given by regression analysis must be interpreted with caution as true measures of “risk,” and could be understood prudently as demonstrating an association between variables only. Third, the instrument used to assess body dissatisfaction is not specific for adolescents, who may find it difficult to analyze the figure that is supposed to represent them; furthermore, the inclusion of only one question to evaluate binge eating and loss of control can underestimate the prevalence of this phenomenon.<sup>46</sup> Lack of socioeconomic data limits results, since it does not allow comparisons with other samples from developing countries, making our study a simple characterization of a local population, despite the strength of a large and representative sample.

On the other hand, strengths of the present study include the large sample size and its nature as the first Brazilian study to analyze associations among DE, UWCB, and body dissatisfaction simultaneously. Furthermore, this is one of few studies of adolescents from Brazil,<sup>6,7,21</sup> which at the time of data collection was a low-income Latin American country, to show associations among these variables and demonstrate their importance as compounders of obesity and food insecurity in a developing-nation context.

Further studies, including representative samples of the Brazilian population, should contribute to early identification of adolescents with DE, UWCB, body image dissatisfaction, and poor perception of body size, which in turn can prevent classic eating disorders and promote a truly healthy lifestyle. This issue is an important one even in countries dealing with poverty, socioeconomic crisis, the obesity pandemic, and public health limitations. To this end, interventions should promote not only the adoption of a healthy diet and the practice of physical activity, but also foster body satisfaction.

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### Disclosure

The authors report no conflicts of interest.

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