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Body image dissatisfaction and associated factors in adolescents

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Abstract *This study aimed to examine the factors associated with body dissatisfaction in adolescents. This is a cross-sectional study with students from two public and four private schools in the metropolitan region of Rio de Janeiro. Body dissatisfaction was evaluated using the Body Silhouette Scale, by the difference between the image they perceive as their current image and the one they would like to have. The association was assessed by hierarchical logistic regression multinomial model, by estimating odds ratios (OR) and 95% confidence intervals (95%CI). Among the 1,019 adolescents evaluated (13-19 years), 75% showed body dissatisfaction, 41.4% wishing for a smaller silhouette and 33.7% wishing for larger silhouettes. The wish for a smaller silhouette was more significant in girls, overweight adolescents, those with an unsatisfactory meal pattern, and with higher waist circumference. Adolescents that had been exposed to teasing due to their body shape increased the probability of wishing for both smaller and larger silhouettes. Strategies are required for a more positive perception of body image, especially for girls and for overweight adolescents, which provide guidance on adequate meal consumption and prevent exposure to peer teasing, valuing coexistence and well-being in the face of existing bodily differences.*

Key words *Body image, Adolescents, Overweight*

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Introduction

Body image is part of the mechanism of personal identity that has a multidimensional construction[1]. In contemporary Western society, it is common to observe many people trying to fit the ideal beauty standards, generating dissatisfaction with body image when not successful[2]. Such dissatisfaction is more evident in adolescents because they are more vulnerable to pressures imposed by society, family, friends and the media to reach the perfect body as a way of obtaining acceptance and social success[3].

In the search for the aesthetic ideals imposed, many adolescents resort to very restrictive diets, exaggerated physical exercise, the use of diuretics and laxatives, anabolics, as well as the search for unnecessary aesthetic plastic surgeries[4]. Such behaviors may be in the genesis of eating disorders such as anorexia nervosa, bulimia and binge eating, which can severely compromise the health of young people.

Dissatisfaction with body image has been related to some demographic factors such as being adolescent and female[5], psychosocial, such as being involved with exposure to bullying[6], related to lifestyle habits, such as physical inactivity, and irregular dietary practices[7-9], and nutritional status, such as being overweight[5,10]. However, the interrelation between these factors requires that they are analyzed in a multidimensional context and from a hierarchical perspective that allows the identification of those who associate with the outcome independently.

Therefore, this study intends to evaluate the level of body dissatisfaction in adolescents and identify higher risk subgroups, based on the analysis of possible associated factors. Such research may be useful to subsidize the discussion about the problem and implement strategies that promote a more positive body image among adolescents, thus avoiding adverse health effects caused by such dissatisfaction.

Methods

Evaluated population

Data from adolescents enrolled in the 1st year of high school were analyzed in two public schools and four private schools in the metropolitan region of Rio de Janeiro in 2010, which were part of the baseline of the Longitudinal Study on Adolescent Nutritional Assessment (ELANA).

The exclusion criteria of the main study were being physically disabled, thus preventing anthropometric evaluation, pregnant adolescents and those who were undergoing some drug treatment for weight control. In total, 1,131 eligible participants were identified for the study. Of these, 92 did not participate because they did not submit authorization from their parents or guardians (17), because they refused to participate (66) or because they were absent on the day of data collection (9). Specifically, for this study, 20 adolescents who did not present data related to self-perceived body image were excluded, totaling 1,019 adolescents to be analyzed, corresponding to a response rate of 90%.

Data collection and study variables

Data was collected between February and August 2010 by a properly trained team, with the authorization of parents or guardians and following the students' assent.

Information was collected from self-completed questionnaires to investigate outcome variable (body dissatisfaction) and exposure variables: demographic (gender, age, skin color/ethnicity), socioeconomic status (economic class, household head schooling and school type), psychosocial (exposure to teasing), lifestyle (meal pattern, tobacco use, current experimentation and consumption of alcohol, physical activity and sedentary behavior), anthropometric and body composition variables (body mass index and body fat percentage).

The Body Silhouettes Scale adapted for adolescents[11] was applied to evaluate perceived body image. It consists of nine silhouettes for girls and nine for boys, ranging from the figure corresponding to the extreme thinness (nº1) to obesity (nº 9)[12]. The scale was accompanied by the following questions: 1. Check the figure you think you look the most; 2. Mark the picture you would most like to appear with. The variable "body dissatisfaction" was defined by the difference between the score corresponding to the silhouette that the adolescents thought was their current one (question 1) and what they would like to look like (question 2), which can range from -8 to +8. The negative score indicated a desire to have larger silhouettes and the positive score showed the desire to have smaller silhouettes.

Skin color/ethnicity information was obtained by self-evaluation. The adolescents were questioned about how they classified themselves and could choose the same options investigated

by the Census of the Brazilian Institute of Geography and Statistics[13], namely, black, brown, white, yellow or indigenous. White/non-white categories were used in the analysis of association, gathering black, brown, yellow and indigenous skin color classes, as well as in other studies conducted in Brazil[14], due to low frequency of yellows (2.8%) and indigenous (2.1%) and the possibility that black or brown individuals can self-classify in the same way.

Age was calculated by the difference between the date of birth (obtained in the enrollment forms of the adolescents since this source is more reliable than the information from the adolescent himself) and the date of evaluation.

The economic class was evaluated based on the 2008 Brazilian Economic Classification Criterion (CCEB) approved by ABA/ABIPEME (Brazilian Association of Advertisers/Brazilian Association of Market Institutes)[15] which uses the system of point assignment to the quantity of durable goods; bathroom in the residence; monthly wage earner domestic employee at home and head of household schooling. The economy class is classified in A, B, C, D and E, where A is the highest purchasing power and E lowest purchasing power, according to the scale score. In the analysis of association, the categories A, B and C/D grouped were considered, due to small frequencies and even absence in the lowest categories (E).

Schooling of the head of the household was informed by the parents or guardians of the adolescents, through a questionnaire forwarded to the households or by telephone interview, based on the question "What was the last grade (or year) and the last grade completed at school by the adolescent's parents?", also with an answer option of "never studied".

Meal frequency was investigated based on questions about the frequency of consumption of breakfast, lunch, and dinner, with the following response options for each of these meals: daily, 5-6 times a week, 3-4 times a week, 1-2 times a week and never or almost never. A score ranging from 0 to 9 points, resulting from the total of the points referring to the frequency of consumption of breakfast, lunch and dinner was used to classify the adolescent's frequency in the consumption of these meals. If the adolescents showed daily consumption of each of these meals, they scored 0 points; 3-6 times a week = 1 point; 1-2 times a week = 2 points; and never or almost never = 3 points. A satisfactory meal pattern was considered when total points ranged from 0 (i.e., daily consumption of the three meals) to 1 (up to 3 to 6 times a week in, at most, one of the three meals), as per the criterion proposed by Estima et al.[16].

Experimentation in alcohol consumption and current consumption over the past 30 days have been investigated from their respective questions: "Have you ever tried alcohol in your life?" "In the last 30 days, on how many days have you taken, at least, a glass or a dose of alcoholic beverage?" The presence of alcohol consumption was considered when the adolescent reported consumption at least once in the last thirty days. Adolescents answered the question to assess tobacco use: "Do you currently smoke cigarettes?".

Physical activity was evaluated through the short version of the International Physical Activity Questionnaire (IPAQ), validated in Brazil for adolescents[17]. Based on this questionnaire, adolescents are classified as very active, active, moderately or irregularly active and sedentary[18]. In this study, due to small frequencies in some categories, adolescents were classified into three groups: very active or active; irregularly active and poorly active.

Sedentary behavior was assessed by the frequency of the habit of watching TV and using a computer or video game, based on the following questions: "Do you watch television?" "Do you use a computer or play video games?" Each of the questions had the following answer options: never or almost never, 1-2 times a week, 3-4 times a week, 5-6 times a week and daily. Another question was "How many hours a day do you usually watch television? How many hours a day do you usually use a computer or video game? The total number of daily hours spent in each of these activities was calculated by multiplying the number of daily hours reported by the weekly frequency, divided by seven days. Sedentary behavior was considered when the daily time with any of these practices was equal to or greater than 2 hours[19].

Teasing exposure was investigated based on the Child-Adolescent Teasing Scale (CATS)[20]. In this study, only the subscale related to body and weight was used, since previous studies indicated association of bodily teasing with negative attitudes for the adolescent's health, such as restrictive diet, bulimic behaviors, low self-esteem, internalization of the thinness ideal and depression, as well as a causal link with body image dissatisfaction[21,22]. This subscale consists of two questions: 1) "How often do they mock me because of my body?"; 2) "How often do they mock me because of my weight", with the following an-

swer options: never (= 0 points); sometimes (= 1 point); almost always (= 2 points); always (= 3 points). Each item is accompanied by a question about how much the act annoys the teen when it is practiced, with the same response options. A continuous score was created for this study based on the total scores in each of the subscale items, multiplied by the corresponding score for the frequency with which they felt annoyed by the provocation, ranging from 0 to 18 points. Any score other than zero, that is, any "frequency of annoyance" for a given "provocation frequency" was considered as exposure to teasing.

Evaluators were standardized based on the Habicht[23] criteria to gauge the anthropometric measures. The following were measured: weight, height and waist circumference. Weight was measured by an electronic and portable scale with a capacity of up to 180 kg and variation of 50g. Height was measured by a portable anthropometer, Alturexata®, with a range from 0 to 213 cm and a variation of 0.1 cm. Two measures of height were performed and the arithmetic mean calculated, assuming a maximum variation of 0.5 cm between the two measurements. Adolescents were barefoot, without accessories and wearing light clothing to measure weight and height. The body mass index (BMI = weight in kg/height^2 in meters) was calculated using weight and height data. The weight adequacy classification was based on BMI, age- and gender-specific cutoff points, according to the World Health Organization criteria[24]. The adolescents were classified as underweight (BMI <-2 Z score), adequate weight (BMI ≥ -2 and <1 Z score), overweight (BMI ≥ 1 and <2 Z score) and obesity (BMI ≥ 2 Z score). In the analysis of association, adolescents were classified as overweight (grouping overweight and obesity) and not overweight (grouping themselves with underweight and adequate weight).

Waist circumference was measured at the lowest horizontal extension of the trunk, with a 150 cm inextensible measuring tape with a variation of 0.1 cm. Two measurements were performed and the arithmetic mean calculated, assuming a maximum variation of 1.0 cm between them. The adolescents were classified as having high waist circumference when they were above the 90th percentile of the sample distribution.

Body composition was estimated by electrical bioimpedance, with tetrapolar body fat analyzer (RJL System model 101 Q®). This assessment required adolescents to follow a protocol to control their intake of liquids, coffee, alcoholic beverages, and use of laxatives or diuretics. The fat-free mass (FFM) was estimated from the validated equation for adolescents[25], as follows: FFM = 0.61RI + 0.25BM + 1.31, where: RI = Height^2 (cm)/Resistance (Ω); BM = Body Mass (weight in kg).

Body fat was estimated by calculating the difference between body mass (kg) and FFM (kg), then obtaining the relative body fat (BF %). Adolescents with values above 25% for boys and 30% for girls were considered as having high BF%[26].

Data analysis

Multiple data imputation

Due to missing data, especially in the socioeconomic variables (approximately 20%), we decided to perform the multiple imputations using the Multiple Imputation command of the software Statistical Program for the Social Sciences, version 19.0 (SPSS, Chicago, IL). For this procedure, random loss characteristics were assumed, which allows the imputation of data from other variables available in the database[27]. We chose to perform 10 imputed bases predicted by linear regression, inserting all the variables analyzed in this study. The Markov Chain Monte Carlo (MCMC) method was used for arbitrary (monotonic or non-monotonic) loss pattern and 20 iterations for imputed bases[27,28].

In the statistical analyses, bivariate and multivariate analyses were performed through multinomial logistic regression to investigate the association between the independent variables and body dissatisfaction, estimating the odds ratio (OR) and the 95% confidence interval (95%CI). The response variable (body image dissatisfaction) was analyzed in three categories: (1) satisfied (reference), (2) desire to have larger silhouettes and (3) desire to have smaller silhouettes. All the independent variables investigated in the bivariate analyses were part of the multivariate analyses to observe the interdependence between them in the association with the outcome, although they have not shown association with it in the bivariate analysis.

The multivariate analysis was based on a hierarchical operational model, outlined in Figure 1. Based on this model, it is hypothesized that the relationship of the exposure variables investigated with the outcome of body dissatisfaction is given by more distal determinations, such as those expected for the demographic and socioeconomic variables, from the lifestyle- related

Ciência & Saúde Coletiva, 25(7):2769-2782, 2020

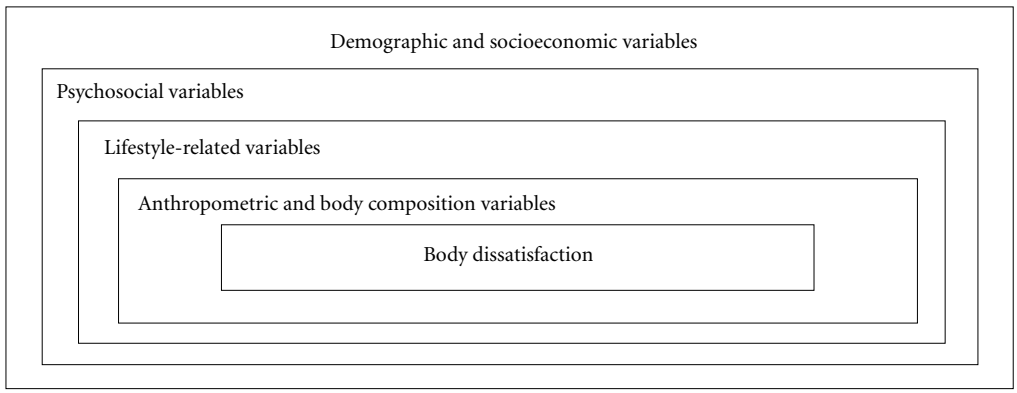

Figure 1. Hierarchical operational model for multivariate analysis.

realms and psychosocial aspects related to the adolescent, to the more proximal realms related to the adolescents' individual aspects, such as anthropometric and body composition variables. This form of analysis was based on Victora et al.[29]. Thus, the model's first realm includes demographic and socioeconomic variables: gender (male and female), age group (< 15 years and ≥ 15 years), skin color (white and black/brown/yellow/indigenous), school type (public or private), economic classification (A, B, C/D grouped), and head of household schooling (none or up to 4 years of study, 5-8 years of study, 9-12 years of study); the second realm includes the psychosocial issue, represented here by the variable teasing exposure associated with the body (yes and no); the third realm includes the lifestyle-related variables, as follows: meal standard (unsatisfactory and satisfactory), tobacco use (yes and no), experimentation of alcohol (yes and no), current consumption of alcoholic beverage (yes and no), physical activity (a) poorly active, b) irregularly active and c) active or very active) and sedentary behavior (yes and no). The fourth and last realm includes the anthropometric and body composition characteristics of the adolescent: classification based on BMI (overweight and not overweight), waist circumference (< P90 and ≥ P90 of the investigated sample distribution), and body fat percentage (high and not high). The variables were introduced in the block model, followed by order of the most distal realm to the one most proximal to the outcome. The variables that showed a significance level of $p < 0.05$ were maintained at each step of the hierarchical analysis, analyzed in the next step and retained in the final model.

Statistical analysis and multiple data imputation were performed with the Statistical Program for the Social Sciences, version 19.0 (SPSS-IL, CHICAGO, 2009).

The ELANA study, whose data were analyzed in this work, was approved by the Research Ethics Committee of the Institute of Social Medicine of the State University of Rio de Janeiro. Only the adolescents who agreed and whose informed consent form was signed by the parents or guardians participated in the study.

Results

The sample profile is described in Table 1. It can be seen that 53.4% of the adolescents were female and 53.8% were black/brown/yellow or indigenous; most were aged over 15 years (81.8%) and the household head schooling ranged from 9 to 12 years (69.6%); just over half were in social class B (53.2%) and about a quarter of adolescents reported having suffered exposure to teasing; a little more than half (54.6%) had an unsatisfactory meal standard, most had never smoked (97.3%) but had already tried alcohol (71.6%), although 63.1% reported not having consumed of alcoholic beverages currently. Based on the IPAQ application, most adolescents (75.5%) were classified as active or very active, although 71.3% reported having a sedentary habit of more than two hours

Table 1. Characterization of adolescents according to categories of variables investigated.

Variables (N)	%	95%CI
Gender (1,019)		
Female	53.4	50.3-56.5
Male	46.6	43.5-49.7
Age group (1,019)		
≥15 years	81.8	79.5-84.2
< 15 years	18.2	15.8-20.5
Skin color (1,017)		
Non-white	53.8	50.7-56.9
White	46.2	43.1-49.3
School type (1,019)		
Private	49.8	46.7-52.8
Public	50.2	47.2-53.3
Economic classification (810)		
A1	2.0	1.0-2.9
A2	13.7	11.3-16.1
B1	23.6	20.7-26.5
B2	29.6	26.5-32.8
C1	22.7	19.8-25.6
C2	7.0	5.3-8.8
D	1.4	0.6-2.2
Household head schooling (830)		
9-12 years	69.6	66.5-72.8
5-8 years	19.5	16.8-22.2
0-4 years	10.8	8.8-13.0
Teasing (1,014)		
Yes	24.2	21.5-26.8
No	75.8	73.2-78.5
Meal standard (1,013)		
Unsatisfactory	54.6	51.5-57.7
Satisfactory	45.4	42.3-48.5
Tobacco use (1,018)		
Yes	2.8	1.7-3.8
No	97.2	96.2-98.3
Alcohol		
Experimentation (1,019)		
Yes	71.6	68.9-74.4
No	28.4	25.6-31.1
Current consumption (1,009)		
Yes	36.8	33.8-39.7
No	63.2	60.3-66.2
Physical activity (1,007)		
Sedentary	3.9	2.7-5.1
Irregularly active B	12.2	10.2-14.2
Irregularly active A	8.3	6.6-10.1
Active	53.3	50.2-56.4
Very active	22.2	19.7-24.8
Sedentary behavior (1,018)		
Yes	71.3	68.5-74.1
No	28.7	25.9-31.5
BMI-based classification (996)		
Underweight	1.5	0.7-2.3
Adequate	72.3	69.5-75.1
Overweight	18.0	15.6-20.4
Obese	8.2	6.5-9.9
Waist circumference (995)		
≥P90	9.8	8.0-11.7
< P90	90.2	88.3-92.0
% of BF[t] (980)		
High	5.3	3.9-6.7
Not high	94.7	93.3-96.1

[t] Body fat.

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watching TV or video game. In the BMI-based classification, 26.2% were overweight, but only 5.3% had a high fat percentage.

Among the adolescents evaluated, 422 (41.4%) desired a smaller silhouette and 343 (33.7%) a larger silhouette, that is, 765 (75.1%) were dissatisfied and reported wishing to have a silhouette different from that in which they perceived themselves.

Based on the bivariate analysis, we observed that the desire to have smaller silhouettes than those with which they self-identified was more likely in girls than in boys (OR = 1.97, 95%CI 1.44-2.71), in overweight adolescents than in those non-overweight (OR = 6.22, 95%CI 4.18-9.26), with waist circumference ≥ 90th percentile than in those with a value below this limit (OR = 15.70, 95%CI 5.95-41.6), with body fat % higher than with adequate values (OR = 9.53, 95%CI 2.44-37.2), in those with an unsatisfactory meal pattern than those with a satisfactory meal pattern (OR = 2.70, 95%CI 1.96-3.74). Being exposed to teasing increased the probability both for the desire to have smaller silhouettes (OR = 4.79, 95%CI 3.00-7.65) and larger silhouettes (OR = 2.98, 95%CI 1.83-4.86) (Table 2).

Based on the hierarchical multivariate analysis (Table 3), it can be observed that only the gender and school type variables were associated with body dissatisfaction in the first stage of the

Ciência & Saúde Coletiva, 25(7):2769-2782, 2020

Table 2. Bivariate multinomial regression analysis (Odds ratio and 95% confidence interval) for the association between dissatisfaction with body image and demographic and socioeconomic, anthropometric and body composition, psychosocial and lifestyle variables.

Variables	Satisfied (%)	Dissatisfied							
		Want smaller silhouettes				Want larger silhouettes			
		%	OR	IC95%	p-value	%	OR	IC95%	p-value
I. Demographic socioeconomic									
Gender									
Female	22.6	50.4	1.97	1.44-2.71	<0.01	27.0	0.80	0.58-1.11	0.18
Male	27.6	31.1	1.0			41.3	1.0		
Age group									
≥ 15 years	25.2	39.7	0.76	0.51-1.14	0.18	35.1	1.23	0.79-1.91	0.36
< 15 years	23.8	49.2	1.0			27.0	1.0		
Skin color									
Black/brown/yellow/ indigenous	24.7	38.8	0.89	0.65-1.21	0.45	36.5	1.22	0.88-1.69	0.23
White	25.1	44.5	1.0			30.4	1.0		
School type									
Private	25.0	46.2	1.25	0.91-1.70	0.17	28.8	0.74	0.54-1.03	0.07
Public	24.8	36.7	1.0			38.5	1.0		
Social and economic classification									
A	21.0	47.8	1.29	0.75-2.21	0.35	31.2	0.85	0.49-1.48	0.56
B	27.8	40.8	0.83	0.55-1.25	0.37	31.4	0.64	0.43-0.97	0.03
C and D	22.1	39.1	1.0			38.8	1.0		
Household head schooling									
9-12 years	27.1	40.0	0.75	0.45-1.26	0.28	32.9	0.84	0.47-1.53	0.57
5-8 years	18.6	44.3	1.22	0.65-2.27	0.54	37.1	1.39	0.69-2.77	0.36
0-4 years	22.8	44.5	1.0			32.7	1.0		

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analysis, with the same association observed in the bivariate analysis for girls compared to boys, and students in private schools were more likely to wish to have smaller silhouettes compared to students from public schools.

In the second stage, besides gender and school type, the psychosocial variable body teasing exposure was inserted, which was associated with both the desire to have a smaller silhouette (OR = 4.70, 95%CI 2.94-7.51) and the desire to have a larger silhouette (OR = 3.00, 95%CI 1.84-4.91) with a higher probability for those who suffered teasing compared to those who did not. At this stage, the gender variable maintained the significant association observed in the previous stage, whereas the school type variable did not.

In the third stage, besides variables gender and teasing exposure, the lifestyle-related variables were introduced. Gender and teasing exposure maintained the associations observed in the previous stages and there was an association between meal pattern and tobacco use so that adolescents with unsatisfactory meal patterns were more likely to wish for smaller silhouettes (OR = 2.50, 95%CI 1.78-3.51), and adolescents who smoked were less likely to wish for both smaller (OR = 0.36, 95%CI 0.14-0.90) and larger (OR = 0.34, 95%CI 0.12-0.96) (Table 2) silhouettes.

In the fourth and last stage, besides the variables that were shown to be associated with some body dissatisfaction in the previous stages (gender, teasing, unsatisfactory meal pattern

Table 2. Bivariate multinomial regression analysis (Odds ratio and 95% confidence interval) for the association between dissatisfaction with body image and demographic and socioeconomic, anthropometric and body composition, psychosocial and lifestyle variables.

Variables	Satisfied (%)	Dissatisfied							
		Want smaller silhouettes				Want larger silhouettes			
		%	OR	IC95%	p-value	%	OR	IC95%	p-value
II. Psychosocial and lifestyle									
Teasing									
Yes	9.7	57.2	4.79	3.00-7.65	<0.01	33.1	2.98	1.83-4.86	<0.01
No	29.8	36.4	1.0			33.8	1.0		
Meal standard									
Unsatisfactory	20.1	51.7	2.70	1.96-3.74	<0.01	28.2	1.07	0.77-1.48	0.68
Satisfactory	30.7	29.1	1.0			40.2	1.0		
Tobacco use									
Yes	42.9	35.7	0.49	0.21-1.15	0.10	21.4	0.36	0.13-0.97	0.04
No	24.4	41.6	1.0			34.0	1.0		
Experimentation of alcohol									
Yes	24.2	41.4	1.10	0.78-1.54	0.60	34.4	1.19	0.83-1.70	0.35
No	26.6	41.6	1.0			31.8	1.0		
Current consumption of alcohol									
Yes	22.8	45.3	1.32	0.95-1.84	0.09	31.9	1.06	0.75-1.49	0.77
No	26.1	39.2	1.0			34.7	1.0		
Physical activity									
Not very active	28.4	46.3	1.04	0.48-2.26	0.92	25.3	0.68	0.28-1.63	0.39
Irregularly active	21.4	44.2	1.31	0.88-1.96	0.18	34.4	1.22	0.80-1.85	0.36
Very active or active	25.7	40.4	1.0			33.9	1.0		
Sedentary behavior									
Yes	24.1	41.1	1.09	0.781-1.54	0.59	34.8	1.26	0.88-1.80	0.21
No	27.0	42.1	1.0			30.9	1.0		
III. Anthropometric and body composition									
BMI classification									
Overweight	14.3	82.3	6.22	4.18-9.26	<0.01	3.4	0.15	0.07-0.32	<0.01
Not overweight	28.8	26.5	1.0			44.7	1.0		
Waist circumference (cm)									
≥P90	4.5	92.8	15.70	5.95-41.6	<0.01	2.7	0.41	0.08-2.22	0.30
< P90	27.3	35.5	1.0			37.2	1.0		
% of BF									
High	7.1	88.2	9.53	2.44-37.2	<0.01	4.7	0.46	0.09-2.47	0.37
Not high	26.2	38.0	1.0			35.8	1.0		

and tobacco use), anthropometric and body composition variables were inserted. The variables gender, exposure to body-related teasing and unsatisfactory meal pattern maintained the associations observed in previous steps. Regarding the anthropometric variables, it was observed that adolescents with waist circumference above the 90th percentile (OR = 3.71, 95%CI 1.03-13.42) and those overweight (OR = 5.08, 95%CI 3.19-8.08) were more likely to wish for smaller

Ciência & Saúde Coletiva, 25(7):2769-2782, 2020

Table 3. Results of hierarchical multivariate multinomial regression analysis (Odds ratio and 95% confidence interval) for the association between body image dissatisfaction with demographic and socioeconomic, psychosocial, lifestyle, anthropometric and body composition variables.

Variables	Want smaller silhouettes			Want larger silhouettes		
	OR	IC95%	p-value	OR	IC95%	p-value
1st Stage - Demographic and socioeconomic variables						
Gender						
Female	2,00	1,45-2,77	<0,0	0,77	0,56-1,08	0,13
Male	1,0			1,0		
Age group						
≥ 15 years	0,85	0,56-1,30	0,46	1,10	0,69-1,75	0,69
< 15 years	1,0			1,0		
Skin color						
Black/brown/yellow/indigenous	0,92	0,66-1,27	0,61	1,13	0,81-1,59	0,47
White	1,0			1,0		
School type						
Private	1,51	1,00-2,28	0,05	0,85	0,56-1,29	0,45
Public	1,0			1,0		
Social and economic classification						
A	1,44	0,76-2,75	0,26	1,07	0,56-2,07	0,84
B	0,93	0,57-1,51	0,76	0,74	0,47-1,16	0,19
C and D	1,0			1,0		
Household head schooling						
9-12 years	0,57	0,31-1,05	0,07	1,03	0,54-1,98	0,92
5-8 years	1,16	0,61-2,23	0,65	1,48	0,74-2,97	0,27
0-4 years	1,0			1,0		
2nd Stage - Psychosocial variable						
Gender						
Female	1,95	1,41-2,70	<0,01	0,76	0,55-1,05	0,11
Male	1,0			1,0		
School type						
Private	1,32	0,96-1,83	0,09	0,73	0,53-1,01	0,06
Public	1,0			1,0		
Teasing						
Yes	4,70	2,94-7,51	<0,01	3,00	1,84-4,91	<0,01
No	1,0			1,0		

it continues

silhouettes when compared to adolescents with a waist circumference below the 90th percentile and those not overweight, respectively. At this stage, tobacco use remained associated (with borderline statistical significance, p = 0.06) with body dissatisfaction so that adolescents who smoked remained less likely to desire smaller silhouettes (OR = 0.36, 95%CI 0.13-0.98). Gender variables, exposure to body-related teasing, unsatisfactory meal pattern, waist circumference above the 90th percentile and overweight were retained in the final model for the desire to have smaller silhouettes. Concerning the desire to have larger silhouettes, only the body-related teasing variable was retained (Table 3).

Discussion

One of the main results of this study is the high prevalence of body dissatisfaction among adolescents. About three-quarters of the sample stud-

Table 3. Results of hierarchical multivariate multinomial regression analysis (Odds ratio and 95% confidence interval) for the association between body image dissatisfaction with demographic and socioeconomic, psychosocial, lifestyle, anthropometric and body composition variables.

Variables	Want smaller silhouettes			Want larger silhouettes		
	OR	IC95%	p-value	OR	IC95%	p-value
3rd Stage - Lifestyle-related variables						
Gender						
Female	1,71	1,22-2,40	<0,01	0,76	0,54-1,07	0,11
Male	1,0			1,0		
Teasing						
Yes	4,55	2,83-7,33	<0,01	3,00	1,84-4,91	<0,01
No	1,0			1,0		
Meal standard						
Unsatisfactory	2,50	1,78-3,51	<0,01	1,10	0,78-1,54	0,59
Satisfactory	1,0			1,0		
Tobacco use						
Yes	0,36	0,14-0,90	0,03	0,34	0,12-0,96	0,04
No	1,0			1,0		
Experimentation of alcohol						
Yes	0,85	0,56-1,28	0,44	1,18	0,78-1,78	0,43
No	1,0			1,0		
Current consumption of alcohol						
Yes	1,42	0,95-2,12	0,09	1,06	0,70-1,58	0,80
No	1,0			1,0		
Physical activity						
Not very active	0,99	0,44-2,21	0,98	0,76	0,31-1,87	0,56
Irregularly active	1,18	0,77-1,81	0,45	1,29	0,84-1,99	0,25
Very active or active	1,0			1,0		
Sedentary behavior						
Yes	1,10	0,77-1,57	0,62	1,22	0,84-1,76	0,30
No	1,0			1,0		
4th Stage (final model) - Anthropometric and body composition variables						
Gender						
Female	2,58	1,77-3,78	<0,01	0,65	0,46-0,92	<0,01
Male	1,0			1,0		
Teasing						
Yes	3,15	1,90-5,22	<0,01	3,41	2,06-5,64	<0,01
No	1,0			1,0		
Meal standard						
Unsatisfactory	2,41	1,68-3,47	<0,01	1,09	0,77-1,53	0,62
Satisfactory	1,0			1,0		
Tobacco use						
Yes	0,36	0,13-0,98	0,05	0,37	0,13-1,05	0,06
No	1,0			1,0		
BMI-based classification[£]						
Overweight	5,08	3,19-8,08	<0,01	0,12	0,05-0,27	<0,01
Not overweight	1,0			1,0		
Waist circumference						
≥ P90	3,71	1,03-13,42	0,05	1,41	0,20-10,07	0,73
< P90	1,0			1,0		
% of BF[ŧ]						
High	1,64	0,31-8,52	0,56	0,78	0,07-9,24	0,84
Not high	1,0			1,0		

[£] Body Mass Index (weight/height^2); [ŧ] Body fat.

ied claims to wish for a different body silhouette from the self-perceived. This finding is in line with the trend of high frequencies of body dissatisfaction among adolescents regardless of the evaluation method[5,30-32].

While the prevalence of body dissatisfaction has been high across genders, the profile of dissatisfaction is opposite between girls and boys. While girls showed a greater desire for smaller silhouettes, the boys, on the other hand, had a greater desire to have larger silhouettes. These results are similar to those obtained in other studies that report that, regardless of their weight, girls generally want to be thinner, that is, to decrease their body silhouette, while boys crave for stronger bodies, thus larger silhouettes[30,33,34]. This gender gap can be explained, among other factors, by the vulnerability of both genders to the current ideal of beauty that values female thinness and the strong, muscular, masculine body[8]. Such differences can also be related to cultural influences, through which girls, from childhood to adulthood, are induced to engage in physical activities involving weight loss, with a more aesthetic focus, while boys are encouraged to practice sports activities and other social skills more focused on physical strength[8]. Due to these gaps, strategies involving the best perception and bodily acceptance among adolescents should be conducted differently for each gender.

Among the variables investigated for possible associations with body dissatisfaction, and commonly used in the field of adolescent health and collective health, exposure to body-related teasing was one of the most strongly associated with the problem. Teasing exposure can be understood as exposure to provocation or as a specific form of harassment suffered by individuals who, in some way, have physical or behavioral characteristics that differentiate them from the majority, always with a negative connotation[35]. When this exposure occurs due to the individual's weight, it may be a relevant aspect for body dissatisfaction, and a possible justification for the strong association found.

Besides being a violence, usually between peers, studies show that adolescents who suffer from teasing due to their body shape are less likely to adhere to healthy behaviors such as fruit, greens and vegetable consumption and physical activity, and a higher propensity to inappropriate weight control behaviors, such as purgative practices and restrictive diets, when compared to those who did not suffer such exposure[19,30]. Such inadequate weight control practices tend to increase when adolescents are exposed to teasing, not only in school but also in the family[30]. Thus, coping actions must extend beyond the school environment and reach families in order to be effective with this type of problem.

Corroborating previous studies[36], adolescents with unsatisfactory meal pattern had a higher prevalence of body dissatisfaction, particularly for the desire to have smaller silhouettes, compared to those with a satisfactory meal pattern. This evidence suggests that adolescents may skip meals as an inadequate strategy for weight loss, regardless of whether or not they are overweight since the association was maintained even after adjusting for weight adequacy, justifying the need to demystify this practice.

Adolescent smokers were less likely to wish for smaller silhouettes. The reason that could justify such association would be the fact that smokers usually have a fear of gaining weight if they quit smoking and may use cigarettes as a weight control method[37]. On the other hand, Duca et al.[33] investigated the same relationship and did not observe an association between these variables.

As expected, the body overweight was associated with the desire for a smaller silhouette, corroborating studies evaluated in a recent systematic literature review[5]. Similarly, a higher waist circumference was also associated with the desire for a smaller silhouette. These results express a realistic perception of the individuals who have high body measurements which, to a certain extent, favor the interventions that seek the adequacy of such measures with the perspective of better health status. However, the percentage of high body fat was not associated with dissatisfaction with the body silhouette in the multivariate analysis. Such findings may be indicating that the BMI and waist circumference may reflect adolescents' perception of their body shape better than the fat percentage.

This study has some limitations. The study sample is not representative of a specific geographical area or specific population group since it comprised adolescents from four private schools and two public schools in the metropolitan region of Rio de Janeiro. Thus, the generalization of the findings regarding the prevalence of body dissatisfaction for a broader population of adolescents should be avoided. Another limitation is that the cross-sectional design estimates the associations between the variables at a specific moment in time, not allowing to establish causal relationships between the variables of in-

terest. A third limitation would be the use of the Body Silhouettes Scale to measure body dissatisfaction. According to Gardner et al.[38], the number and similarity of the silhouettes presented could confuse individuals in the identification between their assumed current image and the one they would like to have. However, the Scale of Silhouettes has been widely used by other authors to evaluate body perception due to operational advantages such as ease of application in clinical and epidemiological studies and low cost[30,39].

As positive points of the research, we first highlight the fact of having used a hierarchical multivariate approach in the process of data analysis that allows, through a multidimensional perspective, to identify subgroups vulnerable to body dissatisfaction. The possibility of investigating both dissatisfaction with desire for smaller silhouettes and dissatisfaction with desire for larger silhouettes than the currently perceived silhouettes was also a strength of the study since it facilitated the identification of subgroups of different risk per each type of dissatisfaction.

As pointed out throughout the text, girls, those overweight, with high waist circumference and unsatisfactory meal pattern were the subgroups most vulnerable to the desire of having a smaller silhouette than the current self-perceived, while boys and those not overweight seem to be more vulnerable to the desire to have larger silhouettes. On the other hand, those exposed to body-related teasing are more vulnerable to body dissatisfaction both for wanting smaller and larger silhouettes. This differentiated profile regarding dissatisfaction highlights the importance of incorporating specific aspects to the actions of health promotion in schools and other environments of socialization of adolescents and young people, which take into account the cultural differences of gender and other aspects investigated here. It also seems extremely relevant that public policies and actions aimed at a more positive perception of self-image and better acceptance of aesthetic differences among adolescents are encouraged, not restricted to the school environment but also involving families and other social spaces.

Collaborations

GX Carvalho was responsible for the literature review, data analysis and main text writing. APN Nunes collaborated in data analysis and text review. CL Moraes participated in the design of the study and revision of the text. GV Veiga was responsible for the design of the ELANA baseline study and the present study, for the coordination of all fieldwork and for the revision of the text.

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