

Etiological model of disordered eating behaviors in Brazilian adolescent girls

Modelo etiológico dos comportamentos de risco para os transtornos alimentares em adolescentes brasileiros do sexo feminino

Modelo etiológico de los comportamientos de riesgo para los trastornos alimenticios en adolescentes brasileñas del sexo femenino

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Abstract

The objective was to construct an etiological model of disordered eating behaviors in Brazilian adolescent girls. A total of 1,358 adolescent girls from four cities participated. The study used psychometric scales to assess disordered eating behaviors, body dissatisfaction, media pressure, self-esteem, mood, depressive symptoms, and perfectionism. Weight, height, and skinfolds were measured to calculate body mass index (BMI) and percent body fat (%F). Structural equation modeling explained 76% of variance in disordered eating behaviors ($F_{(9, 1,351)} = 74.50; p = 0.001$). The findings indicate that body dissatisfaction mediated the relationship between media pressures, self-esteem, mood, BMI, %F, and disordered eating behaviors ($F_{(9, 1,351)} = 59.89; p = 0.001$). Although depressive symptoms were not related to body dissatisfaction, the model indicated a direct relationship with disordered eating behaviors ($F_{(2, 1,356)} = 23.98; p = 0.001$). In conclusion, only perfectionism failed to fit the etiological model of disordered eating behaviors in Brazilian adolescent girls.

Feeding and Eating Disorders; Body Image; Adolescent

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Introduction

Eating disorders (anorexia and bulimia nervosa) are psychiatric syndromes with multifactor etiologies¹. Patients with a clinical diagnosis of eating disorder present behavioral symptoms [chronic restriction of food intake, self-induced vomiting, binge eating, and purgative behaviors (laxatives/diuretics and over-exercising)] called disordered eating behaviors¹. Approximately 25% of the world's youth use disordered eating behaviors to control or lose body weight². Findings indicate that females are even more affected by disordered eating behaviors^{3,4}. Disordered eating behaviors can lead to health complications⁵ such as dehydration, reduced secretion of gonadal hormones (estradiol, follicle stimulating hormone, and luteinizing hormone), increased serum cortisol, and cardiovascular problems.

According to Flament et al.³ and Rodgers et al.⁴, several variables are related to the etiology of disordered eating behaviors, especially body dissatisfaction, defined as self-deprecation based on weight and physical appearance⁶. According to the tripartite model for disordered eating behaviors⁴, body dissatisfaction mediates the relationship between sociocultural pressures (parents, media, and friends) and disordered eating behaviors. However, personal characteristics (self-esteem, mood, depressive symptoms, and perfectionism) and body morphology (body mass index – BMI, and percent body fat – %F) can also be related to disordered eating behaviors, although they are not part of the tripartite model⁴.

Previous studies have indicated a relationship between sociocultural pressures (media, parents, and friends) and disordered eating behaviors^{3,7}. Thus, exposures to media images of slim women and talking with parents and friends about weight and physical appearance are risk factors for triggering disordered eating behaviors in adolescent girls. Body dissatisfaction may mediate this relationship⁴.

In addition to sociocultural pressures, studies have shown that personal characteristics like self-esteem (individual feelings and thoughts about self-worth, competence, and adequacy, leading to a positive or negative attitude about oneself)⁸, perfectionism (demanding standards, criticism towards one's own behavior, feelings of failure, and beliefs in strict assessment by others)⁹, mood (persistent positive and negative feelings that vary in intensity and duration)⁸, and depressive symptoms (sadness, loss of the ability to feel pleasure, and cognitive, motor, and somatic alterations)¹⁰ may also be related to disordered eating behaviors in adolescents^{8,9,11}. Ad-

olescents with low self-esteem, negative mood, depressive symptoms, or perfectionist traits can thus show increased susceptibility to disordered eating behaviors, these relations need to be tested in a multivariate analysis.

Body morphology (BMI and %F) also appears to be related to risk behaviors for eating disorders^{4,10}. According to Laus et al.¹², adolescents with high BMI or high %F are more prone to disordered eating behaviors. In other words, adolescents with excess body fat feel more pressured to use pathogenic methods to lose weight. Again, these relations need to be tested.

Research has suggested that adolescence is a phase of increased vulnerability to risk behaviors for eating disorders^{2,3}, which justifies studies in this group. Despite some findings on factors associated with disordered eating behaviors in adolescents^{8,10,11,13}, no scientific study has attempted to construct an etiological model of risk behaviors for eating disorders in Brazilian adolescent girls. Such research helps elucidate the factors that can trigger disordered eating behaviors. This study thus aimed to construct an etiological model of disordered eating behaviors in Brazilian adolescent girls.

Methods

The research project was approved by the Ethics Research Committee in Human Subjects at the School of Philosophy, Sciences, and Literature, University of São Paulo (CAE – 03550312.8.0000.5407), according to *Ruling n. 466/12* of the Brazilian National Health Council.

Participants

This was a prospective study with a 6-month follow-up conducted from 2012 to 2014 in the cities of Juiz de Fora (Minas Gerais), Ribeirão Preto (São Paulo), Recife (Pernambuco), and Rio de Janeiro (Rio de Janeiro), Brazil, with adolescent girls from 12 to 15 years enrolled in 14 private schools and 15 public schools, with non-probabilistic convenience sampling.

The minimum sample size was set at 200 study subjects for performing structural equation modeling³. Based on sample losses in other studies^{12,13}, we decided to add 20%, so that a sample of 240 adolescent girls was set for each city.

The study only included adolescent girls who turned in the free and informed consent form signed by a parent or guardian and who were properly enrolled in school. Exclusion criteria were: (1) physical or mental disability and/or (2)

use of psychoactive medication in the previous 6 months.

The study originally included 1,694 adolescents, but 336 were excluded because they failed to complete the entire questionnaire and/or did not participate in the second stage (6-month follow-up), so the final sample consisted of 1,358 adolescents, as shown in Table 1.

Study instruments

Disordered eating behaviors were assessed using the *Eating Attitudes Test* (EAT-26), validated in Portuguese by Bighetti et al.¹⁴ The questionnaire consists of 26 questions distributed in three factors: (1) dieting, defined as the pathological refusal of high-calorie foods and concern with one's physical appearance; (2) bulimia and food preoccupation, defined as eating binges followed by purgative behaviors for body weight loss or control; and (3) oral control, or self-control in relation to food, assessing the environmental and social forces that stimulate food intake. In each item of EAT-26, six possible answers are assessed that vary from 0 (rarely, almost never, and never) to 3 (always). The only question scored in reverse order is 25. The EAT-26 is scored as the sum of its items. The higher the score, the higher the disordered eating behaviors rate. Respondents can also be classified according to risk of eating disorder (score ≥ 21 on the EAT-26 indicates risk of eating disorder). In the validation study, Bighetti et al.¹⁴ found internal consistency of 0.82. The current sample showed internal consistency of 0.91 according to Cronbach's alpha.

The version of the *Body Shape Questionnaire* (BSQ) validated for the Brazilian population¹⁵ was used to assess body fat dissatisfaction. The instrument shows good internal consistency (Cronbach's alpha = 0.97). The sample in the current study showed an alpha of 0.94, demonstrating the instrument's good consistency. The self-

report questionnaire consists of Likert-type 34 questions related to concern with body weight and shape, more specifically concern with the amount of body fat. The higher the score, the greater the body fat dissatisfaction.

To study the media's influence on body image, we used the *Sociocultural Attitudes Towards Appearance Questionnaire-3* (SATAQ-3), which consists of 30 questions of the Likert scale type with 5 choices for answers (from "definitely disagree" to "definitely agree"). The questionnaire has 4 subscales: internalization of the ideal athletic body; general internalization of socially established standards; pressure exerted by these standards; and the media as a source of information on appearance¹⁶. The total score is calculated as the sum of the answers, and all the questions with "no" in their wording have inverted scores. The higher the score, the greater the media influence on body image. Analysis of the questionnaire's internal consistency in the validation study was 0.91 for females¹⁶. For the current study's sample, Cronbach's alpha was 0.89.

Self-esteem was assessed with the *Rosenberg Self-Esteem Scale* (RSE). This scale consists of 10 items, with three choices for answers of the Likert type (1 = definitely agree, 2 = neither agree nor disagree, 3 = definitely disagree). The instrument has two factors. Factor 1 includes six items related to positive self-esteem and factor 2 groups four items related to negative self-esteem. The higher the score on the scale, the greater the individual's self-esteem. The scale's version used here was for Brazilian adolescents¹⁷, and the analysis of its internal consistency showed an alpha of 0.70. For the current sample, internal consistency evaluated by Cronbach's alpha was 0.81.

Mood was measured with the *Brunel Mood Scale* (BRUMS)¹⁸. The scale consists of 24 mood indicators and is subdivided into 6 subscales: anger (unstable emotional state ranging from mild irritation to rage, associated with stimuli to the

Table 1

Risk factors for eating disorders in Brazilian adolescent girls: sample distribution by city and age.

City (State)	Sample size	Age (years)			
		12	13	14	15
Juiz de Fora (Minas Gerais)	397	95	99	102	101
Recife (Pernambuco)	399	92	100	104	103
Ribeirão Preto (São Paulo)	302	81	75	78	68
Rio de Janeiro (Rio de Janeiro)	260	69	64	61	66
Total	1,358	337	338	345	338

autonomic nervous system), mental confusion (feelings of uncertainty, instability in controlling emotions and attention), depression (feelings of negative self-assessment, emotional withdrawal, sadness, difficulty adapting, self-disparagement or negative self-esteem), fatigue (states of exhaustion, apathy, low energy), tension (high musculoskeletal tension, agitation, restlessness), and vigor (feelings of excitement, alertness, and physical energy). Each subscale contains 4 items, and individuals respond on how they felt in the last few days including the day of the assessment, on a Likert scale from 0 (nothing) to 4 (extremely). The sum of the answers from each subscale produces a score that can vary from 0 to 96. The subscales tension, depression, anger, fatigue, and mental confusion are considered negative mood factors, while vigor is considered a positive factor. Total mood disturbance is calculated as the sum of the negative factors, subtracting the score for the positive factor. For this study's sample, internal consistency of BRUMS showed Cronbach's alpha of 0.88.

Depressive symptoms were assessed with the *Major Depression Inventory* (MDI), translated and adapted to Portuguese by Parcias et al.¹⁹ The MDI includes the 10 symptoms of depression from the International Classification of Disease (ICD-10)¹ and assesses the severity of depressive symptoms. It is classified as a short screening instrument and can be applied in different research and mental health contexts. MDI items 8 and 10 include sub-items "a" and "b", considering the highest score between them. The higher the score, the greater the magnitude of depressive symptoms. Scores can vary from 0 to 50, with 16 as the cutoff for risk of depression. The study on cross-cultural adaptation of the MDI¹⁹ identified internal consistency of 0.91. The current study showed a Cronbach's alpha of 0.89, reflecting good internal consistency.

Perfectionism was assessed by the *Multidimensional Perfectionism Scale* (MPS), validated in the Portuguese language (for Portugal) by Soares et al.²⁰ The scale consists of 45 items that aim to assess behavior traits related to perfectionism. Questions on the MPS are arranged on a Likert scale from 1 (definitely disagree) to 7 (definitely agree). The total score can vary from 45 to 315. The higher the score, the more perfectionist the behavior. In this study, Cronbach's alpha showed internal consistency of 0.81 for the MPS.

Body mass was measured with a portable digital scale (Tanita Corp., São Paulo, Brazil) accurate to 100g and with a maximum capacity of 200kg. Height was measured with a portable Welmy-brand (Welmy, São Paulo, Brazil) stadiometer, accurate to 0.1cm and with a maximum

height of 2.20m. BMI was calculated as $BMI = \text{body mass (kg)}/\text{height (m}^2\text{)}$.

Percent body fat (%F) was estimated by the doubly indirect method. The tricipital and subscapular skinfolds were measured. Measurements were taken three times on a rotating basis, and the mean of the values was used. Calculation of %F used the protocol proposed by Slaughter et al.²¹ All measurements used the standardizations of the International Society for Advancement for Kineanthropometry²².

Procedures

The principals of 32 schools (15 private and 17 public) were invited to participate in the study and were informed of its objectives and procedures. Following authorization by the school principals (14 private and 15 public), meetings were held with each class to explain the objectives and procedures for the students' inclusion in the study. The adolescents received an informed consent form, which they were asked to return the following week, properly signed by a parent or guardian for them to participate voluntarily.

The study involved two stages. In the first stage, the adolescent girls answered the questionnaires (BSQ, SATAQ-3, MPS, BRUMS, MDI, and RSE). This stage was conducted in groups (classes with a maximum of 40 students each) by a single researcher (the same researcher for the four cities), who standardized the verbal explanations. Next, the adolescents were referred one by one to an adjoining room for anthropometric measurements (weight, height, and skinfolds). This first stage lasted an average of 60 minutes.

Six months after the first stage (6-month follow-up), the EAT-26 was applied, also in groups (classes with a maximum of 40 students), lasting approximately 10 minutes.

Statistical analysis

Analyses of asymmetry, kurtosis, and Mardia's coefficient were performed to assess the data's distribution. The Kolmogorov-Smirnov test was also used to assess assumptions of data normality. Since no parametric violation was observed, means and standard deviations were used to describe the study variables. Confirmatory factor analysis was used to test the psychometric instruments used in the study. The following indicators were used to test the fit in the confirmatory factor analysis: root square mean error of approximation (RMSEA), goodness of fit index (GFI), adjusted goodness of fit index (AGFI), and Tucker-Lewis index (TLI).

Pearson's correlation was used to relate the study variables. Next structural equation modeling (SEM) was performed in the AMOS 21.0 package (IBM SPSS AMOS 21.0. IBM Corp., Armonk, USA) to analyze the study variables' relations, adopting the body dissatisfaction questionnaire (BSQ) and disordered eating behaviors (EAT-26) as the dependent variables. Likelihood estimation was used, with the critical region as the indicator of estimated odds of reproducing the observed data. The bootstrapping technique (1,000 samplings) was used to test the effect of the mediating variables. Besides, no outliers were identified, corroborating the theoretical assumptions for the SEM²³. The following were used to assess the model: RMSEA, GFI, AGFI, and TLI. The values proposed by Farias & Santos²³ (0.008 for RMSEA and 0.90 for the other indicators) were used as indicators of the model's fit. For SEM, significance was set at 5%.

Results

The study included 1,358 adolescent girls with a mean age of 13.89 years, of whom 42% were white, 30% black, 18% Asian-descendant, and 10% with other ethnic identities. 43% of the girls in the sample were enrolled in private schools and 57% in public schools.

Table 2 shows the sample's descriptive data. In relation to the EAT-26, 26% of adolescents showed disordered eating behaviors (EAT-26 \geq 20 points).

Table 3 shows the data from the confirmatory factor analysis for the psychometric instruments used in the study, confirming all the questionnaires' factorial structures.

Statistically significant correlations were identified between the study variables (Table 4), thus meeting assumptions for conducting SEM. The study variables showed good fit to the structural equation model (Table 5), as recommended by Farias & Santos²³. The general model explained 76% of variance in disordered eating behaviors (Figure 1, $F_{(9, 1,351)} = 74.50$; $p = 0.001$). The results did not indicate missing data.

The findings indicated that body dissatisfaction (BSQ) mediated the relationship between media pressures (SATAQ-3), self-esteem (RSE), mood (BRUMS), BMI, %F, and disordered eating behaviors (EAT-26) ($F_{(9, 1,351)} = 59.89$; $p = 0.001$). Perfectionism (MPS) did not fit the etiological model for disordered eating behaviors ($F_{(1, 1,357)} = 4.59$; $p = 0.11$). However, although depressive symptoms (MDI) were not related to body dissatisfaction (BSQ), the model indicated a direct relationship between depressive symptoms (MDI) and disordered eating behaviors (EAT-26) ($F_{(2, 1,356)} = 23.98$; $p = 0.001$). In addition, media pressures (SATAQ-3) showed a direct relationship to disordered eating behaviors (EAT-26) ($F_{(2, 1,356)} = 34.41$; $p = 0.001$), explaining 27% of their variance. Finally, media pressures (SATAQ-3), self-esteem (RSE), total mood disturbance (BRUMS), BMI, and %F explained 69% of variance in body dissatisfaction (BSQ) ($F_{(6, 1,352)} = 40.97$; $p = 0.001$).

Table 2

Descriptive values (minimum, maximum, mean, and standard deviation) of study variables.

Variable	Range	Minimum	Maximum	Mean	SD
EAT-26	0-78	0.00	72.00	19.94	11.49
BSQ	34-204	34.00	201.00	78.88	21.01
SATAQ-3	30-150	30.00	144.00	82.13	18.26
SER	10-30	10.00	30.00	17.55	6.36
BRUMS	0-96	0.00	88.00	36.55	15.89
MDI	0-50	0.00	48.00	15.66	9.01
MPS	45-315	45.00	298.00	133.45	29.70
BMI	-	12.33	42.99	20.51	3.49
%F	-	8.36	45.55	25.05	11.82
Age (years)	12-15	12.00	15.00	13.89	1.03

%F: percent body fat; BMI: body mass index; BRUMS: Brunel Mood Scale; BSQ: Body Shape Questionnaire; EAT-26: Eating Attitudes Test; MDI: Major Depression Inventory; MPS: Multidimensional Perfectionism Scale; RSE: Rosenberg Self-esteem Scale; SATAQ-3: Sociocultural Attitudes Toward Appearance Questionnaire 3; SD: standard deviation.

Table 3

Goodness of fit indices in the confirmatory factor analysis of the psychometric instruments used in the current study.

Instrument	RMSEA	GFI	AGFI	TLI
EAT-26	0.007	0.91	0.94	0.93
BSQ	0.006	0.94	0.96	0.95
SATAQ-3	0.007	0.95	0.97	0.96
RSE	0.005	0.97	0.98	0.96
BRUMS	0.006	0.92	0.91	0.94
MDI	0.008	0.90	0.92	0.91
MPS	0.008	0.89	0.91	0.90

AGFI: adjusted goodness of fit index; BRUMS: *Brunel Mood Scale*; BSQ: *Body Shape Questionnaire*; EAT-26: *Eating Attitudes Test*; GFI: goodness of fit index; MDI: *Major Depression Inventory*; MPS: *Multidimensional Perfectionism Scale*; RMSEA: root mean square error of approximation; RSE: *Rosenberg Self-Esteem Scale*; SATAQ-3: *Sociocultural Attitudes Toward Appearance Questionnaire 3*; TLI: Tucker-Lewis index.

Table 4

Correlations between study variables.

	EAT-26	BSQ	SATAQ-3	MPS	BRUMS	MDI	RSE	BMI	%F
EAT-26	-	0.64 *	0.41 *	0.16 *	0.21 *	0.34 *	-0.29 *	0.39 *	0.33 *
BSQ		-	0.72 *	0.09	0.18 *	0.46 *	-0.37 *	0.47 *	0.31 *
SATAQ-3			-	0.12	0.17 *	0.23 *	-0.28 *	0.32 *	0.27 *
MPS				-	0.06	0.11	0.05	0.10	0.07
BRUMS					-	0.26 *	-0.30 *	0.24 *	0.19 *
MDI						-	-0.43 *	0.35 *	0.31 *
RSE							-	-0.23 *	-0.20 *
BMI								-	0.48 *
%F									-

%F: percent body fat; BMI: body mass index; BRUMS: *Brunel Mood Scale*; BSQ: *Body Shape Questionnaire*; EAT-26: *Eating Attitudes Test*; MDI: *Major Depression Inventory*; MPS: *Multidimensional Perfectionism Scale*; RSE: *Rosenberg Self-esteem Scale*; SATAQ-3: *Sociocultural Attitudes Toward Appearance Questionnaire 3*.

* $p < 0.01$.

Table 5

Indices of fit for the structural equation model.

RMSEA	GFI	AGFI	TLI	Critical ratio *
0.006	0.91	0.94	0.93	2.63

AGFI: adjusted goodness of fit index; GFI: goodness of fit index; RMSEA: root mean square error of approximation; TLI: Tucker-Lewis index.

* Indicates the parameter's estimate.

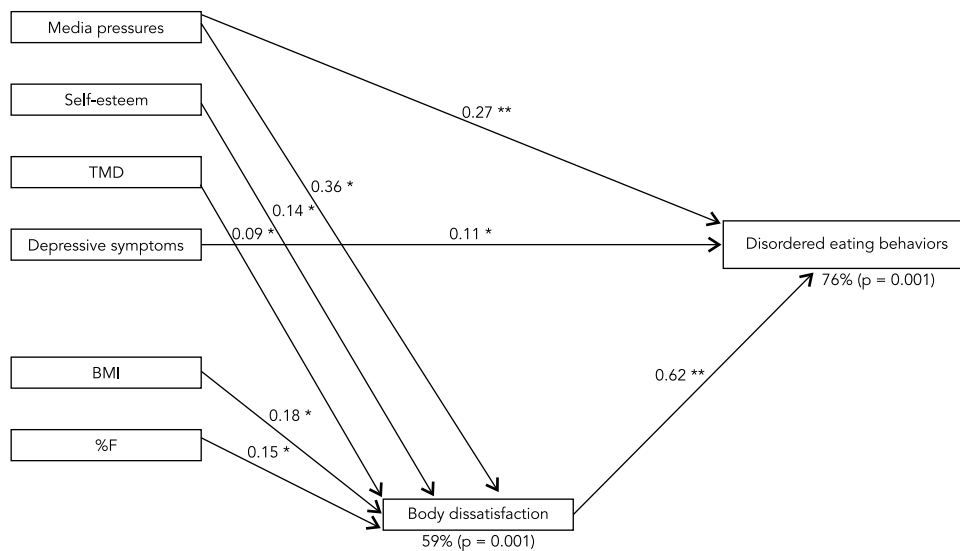
The bootstrapping results were significant ($F_{(9, 1,351)} = 56.03$; $p = 0.001$; 95% confidence interval – 95%CI: 0.59-0.68), indicating that the mediating effects represent an empirical approximation of the original population's distribution (Brazilian adolescent girls).

Discussion

The study's premise was to create an etiological model of disordered eating behaviors in Brazilian adolescent girls. In practical terms, an etiological model for risk behaviors for eating disorders in adolescents is important for implementing pre-

Figure 1

Structural equation model for disordered eating behaviors in Brazilian adolescent girls.



%F: percent body fat; BMI: body mass index; TMD: total mood disturbance.

* $p \leq 0.05$;

** $p \leq 0.01$.

ventive programs and/or psychological interventions to reduce the incidence of eating disorders in this group. Based on the current study's findings, school teachers and staff can intervene in factors involving disordered eating behaviors in adolescent girls.

The study showed 26% prevalence of disordered eating behaviors, corroborating other studies^{2,3} that about one-fourth of adolescent girls display disordered eating behaviors. According to Goldschmidt et al.⁷, the media is the principal factor accounting for this situation, promoting slimness as the sociocultural ideal. Adolescent girls thus feel pressured to lose weight and adopt disordered eating behaviors as their strategy.

The structural equation model showed a direct relationship between media pressures (SATAQ-3) and disordered eating behaviors. According to these findings, internalization of the ideal of slimness and subliminal media messages on physical appearance were associated with triggering disordered eating behaviors in Brazilian adolescent girls. Studies with Canadian and American adolescents have also shown this relationship^{3,4}. Young girls that browse fashion magazines, watch TV, and/or make social comparisons of their bodies appear to be more sus-

ceptible to disordered eating behaviors⁷. However, SATAQ-3 only assesses the media's influence, while parents and friends can apparently also influence the adoption of disordered eating behaviors. Studies have shown that "fat talking" with parents and friends is related to vulnerability to eating disorders^{3,4}. However, some researchers²⁴ highlight that body dissatisfaction mediates the relationship between media pressures and disordered eating behaviors, as found in the current study. Adolescents influenced by media pressures thus generate dissatisfaction with their bodies, which in turn accounts for the adoption of disordered eating behaviors, as discussed in the tripartite model for disordered eating behaviors in other countries^{3,4}.

Although some demographic variables (ethnicity and socioeconomic status) were not included in the etiological model, they are apparently related to disordered eating behaviors in adolescents^{3,4}. However, the latter studies were conducted in countries other than Brazil. Besides, Fortes et al.²⁵ did not identify a relationship between ethnicity, socioeconomic status, and disordered eating behaviors in adolescent girls, which leaves doubt as to whether ethnicity and socioeconomic status are closely related

to disordered eating behaviors in Brazilian adolescent girls. The current study opted to include adolescents from both public and private schools in order to inhibit the effects of socioeconomic status. Likewise, the ethnic distribution in this study corroborates other Brazilian national surveys^{25,26}. Therefore, this study's etiological model can be applied to Brazilian adolescent girls of different ethnic origins.

According to various authors^{8,9,11}, some personal characteristics (self-esteem, mood, depressive symptoms, and perfectionism) can be related to disordered eating behaviors. The structural equation model only showed a direct relationship with depressive symptoms (MDI), corroborating the findings by Fortes et al.¹⁰. This result indicates that adolescents susceptible to depressive disorder are prone to disordered eating behaviors. Still, self-esteem (RSE) and mood (BRUMS) showed an indirect relationship with disordered eating behaviors, as opposed to another study with Brazilian adolescent girls⁸. The relationship between self-esteem and mood and disordered eating behaviors was mediated by body dissatisfaction (BSQ). In this sense, adolescent girls with low self-esteem or negative mood (anger, fatigue, and tension) only use disordered eating behaviors if they are dissatisfied with their bodies, as shown in a study with Canadian adolescents³. However, contrary to the literature⁹, perfectionism (MPS) did not show a relationship with either body dissatisfaction or disordered eating behaviors. According to Soares et al.²⁰, perfectionist behaviors tend to be more evident in the workplace, at school, or at home. Thus, persons with perfectionist traits do not necessarily adopt behaviors in order to change their body shape, which in a sense explains the findings from the structural equation model.

The results pointed to an indirect relationship between morphological variables (BMI and %F) and disordered eating behaviors. Studies have indicated that BMI and %F generate body dissatisfaction^{12,13}, which in turn is considered the principal trigger for disordered eating behaviors⁴, as corroborated by the current study. Still, some studies have demonstrated a direct relationship between BMI and disordered eating behaviors^{25,26}, which was not identified by the structural equation model. At any rate, due to women's pressure concerning thinness³, BMI and %F factors can be considered risk factors for disordered eating behaviors in Brazilian adolescent girls.

Although this study produced unprecedented and important results, its limitations merit discussion. The study used self-report instruments as assessment tools, so the results may

not reflect the actual context, since the answers were subjective. Not all the instruments used in the study have psychometric indices that have been validated for the Brazilian female adolescent population, so the findings should be interpreted with caution. For example, the SATAQ-3 has only been validated in adults¹⁶. In addition, the cross-cultural adaptation of BRUMS is faulty in the methodological care involving equivalence procedures between the original and translated versions¹⁸. The adaptation was only applied to an extremely small sample, thus ruling out evidence of validity and precision in the new version. Meanwhile, the MDI has only been validated in adults¹⁹. Finally, the MPS was adapted to the Portuguese language, but for the population of Portugal, not Brazil²⁰. Although the two countries share Portuguese as their official language, they have significant cultural differences and even minor differences in the written language.

The use of these instruments may thus have affected the results. However, authors recommend confirmatory factor analysis when the psychometric tool lacks validation for the respective target population²³. In order to ensure the validity of the resulting data, confirmatory factor analysis was therefore performed for all the questionnaires, and the findings indicate acceptable fits, thereby reducing the risk of the above-mentioned instruments' non-validity for the current study's sample.

Despite the limitations, the study's results are extremely important for schoolteachers and staff. The findings can also facilitate the elaboration of programs for the prevention and/or treatment of risk behaviors for eating disorders in Brazilian adolescent girls.

Finally, perfectionism was the only independent variable that did not fit the etiological model for disordered eating behaviors in Brazilian adolescent girls. Media pressures, personal characteristics (self-esteem, mood, and depressive symptoms), body morphology (BMI and %F), and body dissatisfaction comprised the etiological model for disordered eating behaviors in this group.

Further research is recommended with Brazilian adolescent girls to confirm the findings (external validity). We also recommend constructing an etiological model of disordered eating behaviors in Brazilian adolescent boys.

Contributors

L. S. Fortes, J. F. Filgueiras and F. C. Oliveira participated in the data collection, analysis, and interpretation and writing and revision of the article. S. S. Almeida participated in the data analysis and interpretation and writing and revision of the article. M. E. C. Ferreira oriented the entire research project and participated in the revision.

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Resumo

O objetivo foi construir um modelo etiológico dos comportamentos de risco para os transtornos alimentares em adolescentes brasileiros do sexo feminino. Participaram 1.358 adolescentes de quatro cidades. Foram avaliados os comportamentos de risco para os transtornos alimentares, insatisfação corporal, pressões midiáticas, autoestima, estado de humor, sintomas depressivos e perfeccionismo por intermédio de escalas psicométricas. Peso, estatura e dobras cutâneas foram aferidos para calcular o índice de massa corporal (IMC) e o percentual de gordura (%G). O modelo de equação estrutural explicou 76% da variância dos comportamentos de risco ($F_{(9, 1.351)} = 74,50; p = 0,001$). Os achados indicaram que a insatisfação corporal mediou a relação entre as pressões midiáticas, autoestima, estado de humor, IMC, %G e os comportamentos de risco ($F_{(9, 1.351)} = 59,89; p = 0,001$). Vale destacar que embora os sintomas depressivos não tenham se relacionado com a insatisfação corporal, o modelo indicou relação direta com os comportamentos de risco para os transtornos alimentares ($F_{(2, 1.356)} = 23,98; p = 0,001$). Concluiu-se que somente o perfeccionismo não aderiu ao modelo etiológico dos comportamentos de risco para os transtornos alimentares em adolescentes brasileiras.

Transtornos da Alimentação e da Ingestão de Alimentos; Imagem Corporal; Adolescente

Resumen

El objetivo fue construir un modelo etiológico de los comportamientos de riesgo para los trastornos alimenticios en adolescentes brasileñas del sexo femenino. Participaron 1.358 adolescentes de cuatro ciudades. Se evaluaron comportamientos de riesgo para los trastornos alimenticios, insatisfacción corporal, presiones mediáticas, autoestima, estado de humor, síntomas depresivos y perfeccionismo mediante escalas psicométricas. Se calculó peso, estatura y dobleces cutáneas para calcular el índice de masa corporal (IMC) y el porcentaje de grasa (%G). El modelo de ecuación estructural expuso un 76% de la variancia de los comportamientos de riesgo para los trastornos alimenticios ($F_{(9, 1.351)} = 74,50; p = 0,001$). Los hallazgos indicaron que la insatisfacción corporal medió la relación entre las presiones mediáticas, autoestima, estado de humor, IMC, %G y los comportamientos de riesgo para los trastornos alimenticios ($F_{(9, 1.351)} = 59,89; p = 0,001$). Vale destacar que pese a que los síntomas depresivos no se hayan relacionado con la insatisfacción corporal, el modelo indicó relación directa con los comportamientos de riesgo para los trastornos alimenticios ($F_{(2, 1.356)} = 23,98; p = 0,001$). Se concluyó que solamente el perfeccionismo no se adhirió al modelo etiológico de los comportamientos de riesgo para los trastornos alimenticios en adolescentes brasileñas.

Transtornos de Alimentación y de la Ingestión de Alimentos; Imagen Corporal; Adolescente

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