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An association between the internalization of body image, depressive symptoms and restrictive eating habits among young males

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Abstract *The scope of this study was to analyze the relationship between the internalization of body image and depressive symptoms with restrictive eating habits among young males. Three hundred and eighty-three male adolescents, aged between twelve and seventeen, took part in this survey. The "Overall Internalization" and "Athletic Internalization" sub-scales taken from the Sociocultural Attitudes Towards Appearance Questionnaire-3 (SATAQ-3) were used to evaluate the internalization of body images. The Major Depression Inventory (MDI) was used to evaluate depressive symptoms. The "Diet" sub-scale from the Eating Attitudes Test (EAT-26) was used to evaluate restrictive eating habits. The logistic regression findings indicated 2.01 times greater chances of youngsters with a high level of overall internalization adopting restrictive eating habits (Wald = 6.16; p = 0.01) when compared with those with low levels. On the other hand, the regression model found no significant association between "Athletic Internalization" (Wald = 1.16; p = 0.23) and depressive symptoms (Wald = 0.81; p = 0.35) with eating restrictions. The findings made it possible to conclude that only overall internalization was related to eating restrictions among young males.*

Key words *Body image, Eating disorders, Depression, Adolescents*

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Introduction

Television soap operas and fashion magazines are always showing people with well-toned bodies[1], which in one way or another influence people, especially youngsters, to want to lose body weight[2]. In particular, magazines directed towards male audiences use propaganda that show the bodies of models and/or athletes who usually display lean body structures and well-defined muscles[3]. So, this is when youngster can start to focus on these body trends, known as body image internalization[4]. In other words, young people may start to worship certain types of physical appearances, even though for most, being thin and having a well-defined muscle structure, is something of an unobtainable ideal. Studies on the subject indicate that this phenomenon tends mostly to affect adolescents[1,3], who begin to seek a morphology that is imposed by the mass media, such as television, magazines and films. It should be highlighted that evidence shows that body image internalization can lead youngsters to become dissatisfied with their own body images[1,3,4].

Body image dissatisfaction in the male sex seems to be represented by two elements: leanness and muscularity[5,6]. Thus, these youngsters may show a certain preoccupation with being both thin and muscular. Studies show a prevalence of approximately 30% in this sector of society for body dissatisfaction related to being slim[7,8]. According to the socio-cultural body image model[9], body dissatisfaction establishes a relationship between body image internalization and restrictive eating. However, this model has only been tested in the female sex. So, it is important to test if body image dissatisfaction also establishes a relationship between body image internalization and dietary restrictions among young males.

Dietary restriction refers to cases when a person spends long periods without eating or ingests only a small amount of food[4,10], which is usually of a high-calorific value. Restrictive eating is classified as a restricted type of eating disorder and is common in patients who have been clinically diagnosed with an Eating Disorder (ED) [11]. Hence, restrictive eating can be seen as a pathological method to reduce body weight. Evidence indicates that approximately 25% of adolescents can adopt this form of behavior[12]. Furthermore, although a lean morphology with well-toned muscles is highly acclaimed by the mass media, researchers have been debating the fact that dietary restrictions may become an epidemic among the young, male population[3], which shows the relevance of investigating the facts related to this issue.

It is also worth highlighting that restrictive eating can also be linked to feelings of sadness, low self-esteem and guilt[12], considered as diagnostic criteria for a depressive disorder[13]. Researchers stress the fact that these feelings can be associated with a lack of appetitite[12], which would explain why restrictive eating is used as a method to lose weight. In addition, evidence has shown an increase in the cases of depressive symptoms among the male sex[14,15]. However, no studies have been found that link depressive symptoms with restrictive eating among young Brazilian males.

Restrictive eating is part of the etiology of Anorexia Nervosa (AN) and Bulimia Nervosa (BN)[11]. Even so, it should be said that these etiologies are multi-factorial[11]. Thus, several factors cause these EDs, namely: socio-cultural, depressive symptoms, personality traits and body morphology factors[16], among others. Research findings support the effects that body image internalization has on restrictive eating[4,9]. It should be highlighted, in particular, that body image dissatisfaction creates this relationship[3]. However, it should be said that there is a lack of research that deals with body dissatisfaction when evaluating the direct relationship between body image internalization and dietary restrictions in adolescent males.

Thus, the importance of this study should be highlighted since it investigates whether or not internalized body images in young males are related to the frequency of cases of restrictive eating practiced by this sector of society. Furthermore, this research is also relevant because it analyzes if, in fact, depressive symptoms are related to restrictive eating in Brazilian male adolescents. In the light of the above, the aim of this investigation was to analyze the relationship between body image internalization and depressive symptoms with restrictive eating habits among male adolescents.

Methods

Participants

This is a cross-sectional study, based on schools, conducted between 2012 and 2013, in the city of Juiz de Fora, State of Minas Gerais, with male adolescents aged between twelve and seventeen years. According to information issued

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by the Department of Education of Juiz de Fora, there are approximately forty-two thousand young male adolescents, aged between twelve and seventeen, enrolled at schools in this city. Thus, our sample calculation was based on the following criteria, as recommended by Fortes et al.[8]: a prevalence of 25% for restrictive eating behavior according to the findings of other case studies[7,16], 95% confidence, 5% sampling error and a further 20% was added to the sampling for possible losses, making a total of 331 adolescents who had to be assessed to obtain a representative sample of this sector of the population. The sample calculation was made using the EpiInfo (version 3.5) program.

Only youngsters who had presented an Informed Consent Form (ICF) signed by their parents or legal guardians and who were duly enrolled at elementary and high school in the city of Juiz de Fora, Minas Gerais, during 2013 were included in this survey. Four hundred and seven youngsters took part in the survey, while a further twenty-four were excluded because they did not complete the questionnaire properly or because they did not take part in the anthropometric evaluations. Therefore, this survey included a total sample of three hundred and eighty-three adolescents. The project was approved by the Human Research Ethics Committee at the School of Philosophy, Science and Literature at the University of São Paulo. Those responsible, like the adolescents, signed an ICF, which explained the aims of the study, and the procedures involved. Complete anonymity and confidentiality were guaranteed to those taking part and to the way information would be treated.

Instruments

In order to assess the effect that the media has on body image, the adolescents were asked to respond to the *Sociocultural Attitudes Towards Appearance Questionnaire-3* (SATAQ-3). This tool is marked according to a Likert scale with five choices of response (from 'I totally disagree' to 'I totally agree'). The total score of the SATAQ-3 is calculated by the sum of responses, in that the higher ratings indicate a higher level of influence from socio-cultural body image elements. The questionnaire consists of thirty questions intended to evaluate the overall internalization of socially acceptable standards (nine items), including the ideal athletic body (five items), the pressure that these standards impose (seven items) and the media as a source of information about personal appearances (nine items). However, only "Overall Internalization" and "Athletic Internalization" sub-scales were used in this investigation, with a total of fourteen items. The SATAQ-3 version used in this study was translated and adapted for adolescent members of the Brazilian population[17], the content and validity construct, as well as its reproducibility and internal consistency, being attested by this sector of the population. For the purpose of this survey an internal consistency calculation was made using Cronbach's alpha, obtaining satisfactory values above 0.80 for "Overall Internalization" (α = 0.84) and "Athletic Internalization" (α = 0.82). It should be emphasized that the median (a methodology already used in another study[18]) of the "Overall Internalization" sub-scale (11.5) was used to divide the adolescents into two groups: High level of overall internalization ($\geq$ 11.5) and a low overall level of internalization (<11.5). The same procedure was carried out for the "Athletic Internalization" sub-scale (9.00): High athletic internalization ($\geq$ 9.00) and low athletic internalization (<9.00).

Depressive symptoms were assessed using the *Major Depression Inventory* (MDI), translated and adapted for the Portuguese language by Parcias et al.[15]. The MDI includes ten CID-10[14] symptoms of depression, and also assesses the severity of the symptoms of depression. This is classified as a short screening instrument, and can be applied in different research and mental health contexts. Items eight to ten of the MDI show sub-items "a" and "b," which represent the highest rating between them. The higher the score, the greater the state of depression. Scores can vary between zero and fifty, in that the cut-off point of 16 indicates some level of depression (MDI+). In the MDI[16] transcultural adaptation study, the authors identified an internal consistency of 0.91. This investigation showed Cronbach's alpha equal to 0.83, which represents a good internal consistency.

A *Body Shape Questionnaire* (BSQ) was applied to assess body dissatisfaction using a version that had been validated for the adolescent population in Brazil[18]. In the case of the sampling used in this study, a value of α=0.96 was identified, showing that the instrument's consistency was good. The self-reporting questionnaire included thirty-four questions on a *Likert*-type scale, related to the concerns that the youngsters showed as regards their weight and physical appearance. The person assessed stated with what frequency, in the previous four weeks, they had experienced events indicated in the alternatives

and their final score was obtained from the total sum of these items, in that the higher the score, the greater body dissatisfaction they felt. In view of the fact that studies have shown that body dissatisfaction is an intermediate between body image internalization and high-risk eating behaviors for EDs[4,9], it was decided to control the BSQ scores in this study.

To assess eating restriction, a "Diet" sub-scale from the *Eating Attitudes Test* (EAT-26), validated by Bighetti et al.[10] for Brazilian adolescents, was applied. This sub-scale aims to measure a pathological refusal of high-calorific content foods. The person assessed was given six different response options for each item, which varied between 0 (rarely, almost never and never) and 3 (always). The only question that gives a score in reverse order is number 25. The "Diet" sub-scale score is made by adding its items. In the case of this sampling, the internal consistency value was found to be 0.86, assessed by Cronbach's alpha. In order to classify adolescents with high and low levels of food restrictions, a median from the "Diet" subscale was used, according to the method already mentioned in another study that was performed using EAT-26 as an assessment tool[19]. Thus, youngsters with scores equal to or higher than 5 were included in the High food restriction group, while adolescents with scores lower than 5 were included in the Low food restriction group.

Body mass was measured using a Tanita brand digital scale with a precision of 100g and a maxim capacity of 200kgs. A portable Welmy brand stadiometer with 0.1cm precision and maximum height of 2.20m was used to measure the height of the adolescents. The body mass index (BMI) was obtained using the following calculation: BMI – body mass (kgs)/height^2(m). Since research evidence has shown that the BMI affects the eating habits of adolescents[2,16,20], it was decided to control these values during the statistical tests.

A protocol developed by Slaughter et al.[21] for adolescents was used to calculate the percentage of body fat. The triceps and subscapularis skin folds were measured, according to standards established by the *International Society for the Advancement of Kineanthropometry*[22], using a LANGE® (Cambridge Scientific Industries Inc.) scientific compass (adipometer), with 1mm precision. Since the findings of several previous investigations showed that body fat influences eating behavioral patterns[7,16], the percentage of fat was controlled in the statistical analyses.

Procedures

The directors of twelve schools (six private and six state schools) were invited to participate in this survey, and were duly informed about its objectives and the procedures involved. Once the school directors had given their authorization, meetings were held with each class to explain the objectives and procedures required to include these schools in the survey. An ICF was given to each adolescent, who was asked to return this one week later, duly signed by their parent or legal guardians in the event that they agreed to participate in this survey on a voluntary basis. The survey was conducted in two stages. During the first phase, the students responded to these questionnaires (SATAQ-3, MDI, BSQ sub-scales, and EAT-26 "Diet" sub-scale). This stage was conducted in a group, by a single researcher who standardized the verbal explanations. This procedure lasted an average of thirty minutes. Once the students had filled in the questionnaires, they were taken to a room, made available by the school, to have their anthropometric measurements taken (body mass, height and skin folds). This process was carried out on an individual basis. This meant that only one student at a time was allowed to enter the room.

Statistical analysis

The Kolmogorov Smirnov test was applied to assess the distribution of the EAT-26 "Diet" subscale scores. In view of the parametric violation, non-parametric tests were performed. Central tendency measurements (median) and dispersion measurements (minimum and maximum) were used to describe the EAT-26 and SATAQ-3 sub-scales, as well as the BSQ and MDI subscales. A Spearman Hank correlation was used to relate the scores from all the questionnaires. In addition, a multinomial logistic regression was conducted to analyze the association between the MDI (MDI+) classifications, the "Overall Internalization" and "Athletic Internalization" subscales with food restriction ("EAT-26" "Diet" sub-scale). It should be highlighted that the "age," BSQ, BMI and body fat percentage variables were controlled in all the statistical tests. It should also be highlighted that central tendency measurements (average) and dispersion measurements (standard deviation) were used to describe some of the research variables (age, BMI and body fat percentage) since the Kolmogorov Smirnov test

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did not indicate parametric violation. The SPSS 20.0 software, with a 5% significance level was used for all data.

Findings

Table 1 presents the demographic variable descriptive data (age, BMI and fat percentage) and the questionnaire scores (SATAQ-3, BSQ, MDI sub-scales and EAT-26 sub-scale).

Table 2 shows correlation values for "Overall Internalization," "Athletic Internalization," MDI and "Diet." The findings indicate a statistically significant relation between "Overall Internalization" and "Athletic Internalization" (r=0, 57; p=0,001). Similarly, the Spearman test showed a positive relationship between "Overall Internalization" and "Diet" (r=0, 17; p=0, 03). The other findings failed to reveal statistically significant relationships (p>0, 05).

The findings of the logic regression indicated 2.01 more chances of adolescents with a high overall internalization to practice eating restrictions (*Wald*=6, 16; p=0, 01) when compared to those with a low overall internalization. On the other hand, the regression model did not show a significant association between "Athletic Internalization" (*Wald*=1, 16; p=0, 23) and symptoms of depression (*Wald*=0, 81; p=0, 35) with diet restrictions in male adolescents (Table 3). In particular, it is noteworthy that age (X^2=10, 92; p=0, 01) and BSQ (X^2=28, 32; p=0,001) was shown to be associated with food restriction, a fact not identified for BMI (X^2=1, 87; p=0, 30) and body fat percentage (X^2=2, 09; p=0, 18).

Discussion

The scope of this study was to analyze the relationship between body image internalization and symptoms of depression with dietary restriction in male adolescents. In general, the findings showed a relationship between body image internalization and restrictive eating behaviors.

The findings showed a significant correlation between overall internalization and eating restrictions. This shows that the greater the desire of youngsters to look like television and film "stars," the greater the frequency in food restrictions, thereby corroborating other research studies[3,6]. However, it should be emphasized that this finding should be treated with caution, since the correlation index was low (r=0, 17). In any case, scientific literature has emphasized that ad-

Table 1. Descriptive values of all study variables.

Age (years)	BMI (kg/m²)	%G	Overal Inter	Athletic Inter	BSQ	MDI	Diet
Average (standard deviation)			Median (minimum & maximum)				
14.31 (2.22)	21.18 (3.49)	20.53 (8.10)	11.5 (7 – 35)	9.0 (4 – 20)	62.0 (34 – 164)	17.0 (0 – 50)	4.5 (0 – 36)

BMI = body mass index; Overall Inter = Overall internalization; Athletic Inter = Athletic Internalization; BSQ = Body Shape Questionnaire; MDI = Major Depression Inventory.

Table 2. Correlation between SATAQ-3, MDI and Diet sub-scales in male adolescents.

	Overall Inter	Athletic Inter	MDI	Diet
Overall Inter	-	0.57*	0.14	0.17*
Athletic Inter	0.57*	-	-0.06	0.06
MDI	0.14	-0.06	-	0.05
Diet	0.17*	0.06	0.05	-

SATAQ-3 = Socio-cultural Attitudes Towards Appearance Questionnaire 3; Overall Inter = Overall Internalization; Athletic Inter = Athletic Internalization; MDI = Major Depression Inventory; * p < 0.05 analyzed using the Spearman Hank test (age, IMC, BSQ & percentage of body fat were used as "adjustment variables").

Table 3. Odds ratio between independent variables and Diet subscales (reference: High level of restrictive eating) in male adolescents.

Classification	OR	CI (95%)	p value
Overall Internalization			
Low (n = 238)	-		0.01*
High (n = 245)	2.01	1.56 – 7.84	
Athletic Internalization			
Low (n = 243)	-		0.23
High (n = 240)	0.81	0.40 – 5.98	
MDI			
Low (n = 233)	-		0.35
High (n = 250)	0.88	0.46 – 2.54	

OR = Odds ratio; CI = Confidence interval; MDI = Major Depression Inventory. * $p < 0.05$ evaluated using multi nominal regression logic (age, IMC, BSQ & percentage of body fat were used as "adjustment variables

olescents who crave to have a body like famous men are more likely to practice restrictive eating behavior[23]. According to Blashill[23], these youngsters may often develop a pattern of refusing food over long periods with the intention of reducing their body weight. Rodgers et al.[4], also add that the media has been seen as the main agent that culturally influences restrictive eating behaviors. Thus, exposure to figures of slim and well-toned muscular models/actors seems to be the main element that triggers restrictive eating in adolescents.

Although researchers underscore the possible relationships between a desire to look like athletes and restrictive eating in adolescents[1,] this investigation did not find a relationship between "Athletic internalization" and "Diet," as shown in Table 2. Since most male athletes have a muscular appearance, perhaps the desire to look like them is unrelated to restrictive eating. In fact, restrictive eating is inversely proportional to muscular development[4], which may in some way explain this finding.

In addition, contrary to that which is suggested in studies involving females[23], the findings of this research fail to indicate a relationship between symptoms of depression and restrictive eating. It is possible that feelings of sadness, low self-esteem and guilt, commonly found in patients with depressive disorders[12], are not associated with restrictive eating behaviors in males. Another explanation could be that, since male body dissatisfaction involves another element (muscularity), symptoms of depression can be associated with the practice of behaviors that involve increasing muscle density. However, further research to clarify this relationship needs to be conducted.

With regard to other regression models, our findings indicated that adolescents with a high overall internalization were more liable to adopt a pattern of restrictive eating when compared to youngsters with a low level of overall internalization. In other words, adolescents who feel higher levels of anxiety about being compared to models and television/film actors were more likely to adopt restrictive eating habits, thereby corroborating the findings contained in scientific literature[3]. It is worth noting that, according to Gondoli et al.[9], the way the media shows slim bodies with bulging muscles is even more exacerbated in Western countries when compared to countries in the East, which can have negative repercussions on body image internalization, with negligible results as regards the adoption of restrictive eating habits, a fact that was proven by the findings of this study. Furthermore, according to Blashill[23], adolescents who regularly watch television or read fashion magazines may be more open to socially acceptable body image internalization. So, if youngsters feel they are above a recommended weight for their sex, they may adopt restrictive eating as a way to reduce their body weight[20,24], which may explain the association seen between overall internalization and restrictive eating.

On the other hand, multinomial regression did not indicate a link between athletic internalization and restrictive eating. The following finding may provide a possible explanation for this: Fortes et al.[1] highlight that the bodies of male athletes tend to display more muscle mass. So, if adolescents want a morphology that is similar to that of athletes, they need to do physical exercise or eat food supplements to attain their objectives, which is the opposite behavior of those who adopt restrictive eating. However, if adolescents long for an appearance similar to athletes who practice esthetic sports (diving or figure skating), it is possible that there may be an association between athletic internalization and restrictive eating. However, further studies need to be conducted to better clarify this relationship.

It is also worth emphasizing that the BSQ scores were controlled in the regression model. In view of the fact that restrictive eating is influenced by body dissatisfaction[9], and that this, in

turn, is triggered by body image internalization[4], it is possible that there is no direct link between athletic internalization and restrictive eating habits in males, which could provide another explanations for these research findings.

Depressive symptoms were also unassociated with restrictive eating behaviors. Although there is evidence to suggest that people diagnosed with depressive disorders are more vulnerable to EDs[12], it should be highlighted that, maybe, this relationship does not apply in the case of the male sex. Thus, it is probable that depressive symptoms are not part of the etiology for either AN or BN in young males. In is therefore important that further investigations should be conducted to shed more light on this issue.

The findings indicated that there is a relationship between age, body dissatisfaction and restrictive eating behaviors. This result shows that the older a male adolescent, the greater chance he will have of adopting restrictive eating. In the same way, the findings show that the greater level of body dissatisfaction a person feels, the more liable they will be to adopt restrictive eating. According to Flament et al.[3], older adolescents worry more about their physical appearance, since they believe that body morphology is a criterion for social acceptance, which in a sense, can lead a person to resort to restrictive eating, thereby supporting the evidence of these findings as regards the relationship that exists between age, body dissatisfaction and restrictive eating patterns.

The regression model found no statistically significant relationship between BMI, body fat and restrictive eating patterns, even though scientific evidence has shown the opposite[8,16]. It is worth emphasizing, however, that the male sex is usually more concerned with muscularity[5]. So, behavior patterns, such as restrictive eating may be a less frequent occurrence in young males, who practice physical exercise instead and use food supplements/anabolic steroids. In any case, researchers highlight the importance of assessing factors related to behavioral patterns that concentrate on being thin and muscular[3], since males have these two facets in mind when forming their body image.

Although this study is the first to obtain important findings for discussion in the scientific literature, it has some limitations. For instance, *a priori,* the use of self-reporting instruments should be highlighted. According to some authors[3,9,25], adolescents may not reply truthfully to questionnaires, which can therefore influence the results. It should also be stressed that non-validated tools were used for the target population of this study (SATAQ-3), which represents another limitation. However, the high level of internal consistency for these sub-scales among adolescents participating in this survey, also provide good quality psychometric scales among this sector of the population. Another limitation was the use of the EAT-26 "Diet" sub-scale, since this tool was validated for females. Therefore, there are no guarantees that the psychometric qualities of this sub-scale will be the same for young men. Above all, the internal consistency of 0.86 also indicates the good psychometric qualities of the sub-scales among this sector of the population. It should also be said that another limitation was the type of cross-sectional outline used. According to Fortes et al.[2], it is not possible to neither make inferences of causality nor assess the direction of associations found in cross-sectional studies. Furthermore, the BSQ is a tool that is used mainly to evaluate concerns with body weight, although male body image dissatisfaction is more closely related to muscularity.

Finally, these findings made it possible to conclude that only overall internalization was related to restrictive eating in young males. Therefore, preventive strategies against body image internalization could be created so that young male adolescents avoid adopting restrictive eating behaviors. These strategies might help reduce the great number of cases of body image internalization as promoted by the media. This would make youngsters less liable to adopt restrictive type eating disorders.

It is suggested that further studies with a longitudinal design should be conducted to assess the impact of body image internalization and depressive symptoms related to restrictive eating in male adolescents.

Collaborations

LS Fortes drafted the research project and wrote the article. JFF Meireles gathered the data and reviewed the article. ST Paes collected the data and conducted the statistical analyses. FC Dias helped draft the project and reviewed the article. FM Cipriani tabulated the data and reviewed the article. MEC Ferreira supervised the entire project.

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