

Body dissatisfaction, psychological commitment to exercise and eating behavior in young athletes from aesthetic sports

Insatisfação corporal, comprometimento psicológico ao exercício e comportamento alimentar em jovens atletas de esportes estéticos

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Abstract – The prevalence of inadequate eating behavior is high in athletes. However, little is known about the factors that affect this phenomenon in this population. The aim of this study was to evaluate the association of body dissatisfaction and level of psychological commitment to exercise (LPCE) with inadequate eating behavior in young athletes from aesthetic sports. Forty-seven female athletes practicing aesthetic sports (artistic gymnastics, synchronized swimming and high diving), ranging in age from 12 to 16 years, participated in the study. The Eating Attitudes Test (EAT-26), Body Shape Questionnaire (BSQ) and Commitment to Exercise Scale (CES) were used to evaluate the risk behavior for eating disorders, body dissatisfaction and LPCE, respectively. Skinfold thickness was measured to calculate body fat percentage of the athletes. The results revealed a significant association between body dissatisfaction and eating behavior and between LPCE and risk behavior for eating disorders. Multiple linear regression analysis showed that all variables, except for fat percentage, influenced the eating behavior of young athletes. This analysis also indicated an influence of body fat percentage and body dissatisfaction on CES scores. It was concluded that body dissatisfaction and LPCE are factors that predispose to risky eating behaviors in athletes from aesthetic sports.

Key words: Athletes; Body image; Eating disorders.

Resumo – Evidências demonstram prevalência elevada para o comportamento alimentar inadequado em atletas. No entanto, pouco se sabe a respeito dos fatores que causam impacto sobre este fenômeno nesta população. O objetivo do estudo foi associar a insatisfação corporal e o grau de comprometimento psicológico ao exercício (GCPE) ao comportamento alimentar inadequado em jovens atletas de esportes estéticos. Participaram da pesquisa 47 atletas do sexo feminino de alguns esportes estéticos (ginástica artística, nado sincronizado e saltos ornamentais), com idade entre 12 e 16 anos. Para avaliar o comportamento alimentar de risco para transtornos alimentares (TA), a insatisfação corporal e o GCPE foram utilizados o Eating Attitudes Test (EAT-26), o Body Shape Questionnaire (BSQ) e a Commitment Exercise Scale (CES), respectivamente. Dobras cutâneas foram aferidas para o cálculo do percentual de gordura das atletas. Os resultados apontaram associação significativa entre a insatisfação corporal e o comportamento alimentar ($p < 0,05$), assim como entre o GCPE e o comportamento alimentar de risco para TA ($p < 0,05$). A partir da regressão linear múltipla, todas as variáveis, com exceção do percentual de gordura, demonstraram influências sobre o comportamento alimentar de jovens atletas. Este mesmo teste também apontou influências do percentual de gordura e da insatisfação corporal sobre os escores da CES. Concluiu-se que a insatisfação corporal e o GCPE foram fatores predisponentes para o comportamento alimentar de risco em atletas de esportes estéticos.

Palavras-chave: Atletas; Imagem corporal; Transtornos alimentares.

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INTRODUCTION

A number of studies have investigated psychological factors that interfere with the performance of athletes¹⁻⁴. Within this context, sports whose emphasis is on aesthetic performance are associated with a high risk for eating disorders (ED)⁵⁻⁸. Eating disorders, such as anorexia nervosa and bulimia nervosa, are psychiatric syndromes characterized by inadequate eating behavior, pathological control of body weight, and body image distortion⁹.

Body image can be defined as a multidimensional construct consisting of affective, behavioral and cognitive modalities¹⁰. Body dissatisfaction is one of the components of this construct¹¹, which refers to the depreciation of body weight and physical appearance¹². Furthermore, body dissatisfaction is not only a diagnostic criterion¹³, but also an important maintenance factor of ED^{2,14}.

The level of psychological commitment to exercise (LPCE) is one of the factors that contribute to the adoption of inadequate eating habits¹⁵. Particularly in aesthetic sports, female athletes suffer major pressure from parents, team members and coaches to restrict food intake^{16,17} in order to achieve the aesthetic ideal of the modality and to maximize performance. According to Perini et al.¹⁸, physical appearance can influence the judging process and, consequently, performance scores. In this respect, female athletes from aesthetic modalities such as artistic, rhythmic and trampolines gymnastics, artistic skating, synchronized swimming and classical ballet^{5,6} can present psychological addiction to exercise and may adopt of risk behaviors for ED^{15,17}. To our knowledge, there are no Brazilian studies investigating the association between psychological commitment to exercise and inadequate eating behaviors. Therefore, the inclusion of psychological commitment to exercise as an explanatory variable of the adoption of risky eating behaviors is an important scientific contribution since this is a relatively new variable that has been little studied in Brazil.

In fact, there are no Brazilian studies evaluating the influence of psychological commitment to exercise and body dissatisfaction on the adoption of risky eating behaviors in athletes from different aesthetic sports. Therefore, the objective of the present study was to evaluate the association of body dissatisfaction and LPCE with inadequate eating behavior in young female athletes from aesthetic sports.

METHODOLOGICAL PROCEDURES

Ethical Aspects

The study was approved by the Ethics Committee on Human Research of Universidade Federal de Juiz de Fora (UFJF) (Permit No. 232/2010). The adolescents and their parents or legal guardians signed a free informed consent form that explained the objectives and procedures of the study. The anonymity of the participants and confidentiality of the data were guaranteed.

Study population

A cross-sectional study was conducted on a sample of competitive female athletes from different aesthetic sports (artistic gymnastics, synchronized swimming and diving), ranging in age from 12 to 16 years, who were enrolled in clubs in the city of Rio de Janeiro, Brazil.

Criteria for inclusion in the study were a consent form signed by the responsible person; a training frequency of at least 5 days per week in the respective modality, with a minimum duration of 2 h/training; participation in at least one regional competition in 2011, and voluntary agreement to answer the questionnaires and to participate in the anthropometric assessments.

The present sample consisted of 49 adolescent female athletes. However, two girls were excluded from the study since they did not fill out the questionnaires completely. The final sample included 47 athletes (19 gymnasts, 21 synchronizing swimmers, and 7 divers). The mean age of the participants was 13.75 ($\pm$ 1.56) years and the mean body fat percentage was 19.19 ($\pm$ 3.46).

Instruments

Risk behaviors for ED were evaluated using the Eating Attitudes Test (EAT-26) validated for Brazilian adolescent girls by Bighetti et al.¹⁹, with an internal consistency of 0.82. This instrument showed good internal consistency in the present study (α = 0.84). The questionnaire consists of 26 questions that evaluate food refusal, exacerbated concern with physical appearance, purging behaviors, environmental influence, and self-control around food. The final EAT-26 score is calculated by the sum of its items and the cut-off point for risky eating behavior is 21, i.e., a score < 21 indicates an unfavorable behavior and a score $\geq$ 21 indicates favorable attitudes to development ED.

The Body Shape Questionnaire (BSQ) validated for the Brazilian adolescent population was administered to evaluate body dissatisfaction²⁰. The instrument shows good internal consistency (Cronbach's alpha = 0.96) and a significant correlation coefficient between test-retest scores (0.89 for girls)²⁰. Alpha values of 0.89 were obtained for the present sample, demonstrating good consistency of the instrument. This self-report questionnaire consists of 34 questions that are rated on a Likert-type scale and evaluate the subject's concern with body weight and physical appearance. The subject indicates how often, in the last 4 weeks, he/she experienced the events proposed by the alternatives and the final score is calculated by the sum of all items. The higher the score, the greater the level of body dissatisfaction. The BSQ scores for adolescents are classified into four levels of body dissatisfaction: < 80, no dissatisfaction; 80 to 110, mild dissatisfaction; 110 to 140, moderate dissatisfaction, and $\geq$ 140, severe dissatisfaction. Since evidence indicates that body dissatisfaction influences risky eating behavior^{1, 2, 4}, the BSQ scores were included as a covariate in some of the statistical analyses performed in the present study.

LPCE was evaluated using the Commitment to Exercise Scale (CES), which was translated, adapted and validated for Portuguese by Teixeira et al.²¹ ($\alpha = 0.79$). The internal consistency calculated for the present sample was $\alpha = 0.77$. The questionnaire comprises 8 questions that describe attitudes towards physical exercise. On a visual analog scale, the subject marks a point on a line that best corresponds to her attitude towards each question. Each line ranges from 0 to 155 mm; therefore, the maximum score obtained by the sum of all items is 1240 mm. The higher the score, the greater the LPCE.

The protocol for adolescents proposed by Slaughter et al.²² was used to calculate body fat percentage. Triceps and subscapular skinfold thickness was measured according to the standards of the International Society for the Advancement of Kinanthropometry²³ using a Lange® caliper (Cambridge Scientific Industries, Inc.), to the nearest 1 mm. Measurements were taken in a rotational order and the mean of three measurements was used for analysis. Since body fat has been shown to influence risk behaviors for ED^{1, 2, 16}, body fat percentage was included as a covariate in some of the statistical analyses.

Procedures

First, the responsible researcher contacted the coaches of the aesthetic sports modalities (artistic gymnastics, diving and synchronized swimming). The procedures and objectives of the study were explained in detail and authorization for participation of the team in the study was obtained. After consent was obtained from the coaches, a meeting was held with each team to inform the athletes about the ethical procedures of the investigation and the consent form was handed out so that the parents or legal guardians could authorize the participation of their daughters by signing the form.

The data were collected on two different occasions always by the same researcher in adequate rooms made available by the participating clubs. On the first occasion, the athletes answered the questionnaires (BSQ, EAT-26, and CES). Anthropometric measurements (skinfold thickness) were obtained on the second occasion. Thus, the girls received the same verbal instructions and doubts were clarified. The questionnaires also contained instructions of how to fill them out. There was no communication between athletes during application of the questionnaires and no time limit was established.

Data analysis

The Kolmogorov-Smirnov test showed a normal distribution of the data. Thus, measures of central tendency (mean) and dispersion (minimum, maximum, and standard deviation) were used to describe the variables studied (EAT-26, BSQ, CES, age, and body fat percentage). Pearson's chi-squared test was applied to evaluate the association of risky eating behavior with body dissatisfaction and LPCE. In addition, the median CES score (638) was used to classify athletes as high (≥ 638) and low LPCE (< 638) as proposed by Gapin and Petruzello²⁴. Two stepwise multiple regression models were

constructed: 1) to evaluate the influence of BSQ, CES and body fat percentage on EAT-26 scores; 2) to identify the influence of BSQ and body fat percentage on CES scores. Finally, univariate analysis of covariance (ANCOVA) using BSQ and body fat percentage as covariates was applied to compare EAT-26 scores between the groups established based on the median CES score (high LPCE: ≥ 638 and low LPCE: < 638). The SPSS 17.0 software was used for statistical analysis, adopting a level of significance of 5%.

RESULTS

The final sample consisted of 47 young female athletes with a mean age of 13.75 (± 1.56) years and mean body fat percentage of 19.19 (± 3.46) (Table 1). Application of the EAT-26 showed that approximately 20% ($n=9$) of the athletes presented ED risk behaviors. In addition, 39% ($n=18$) of the adolescents showed some level of body dissatisfaction evaluated by the BSQ: mild dissatisfaction in 17% ($n=8$), moderate dissatisfaction in 13% ($n=6$) were, and severe dissatisfaction in 8% ($n=4$). A high LPCE (CES > 638) was observed in almost 40% ($n=19$) of the sample.

Table 1. Descriptive values (minimum, maximum, mean and standard deviation) of the variables studied

Variable	Minimum	Maximum	Mean	SD
EAT-26	2	29	12.94	7.72
BSQ	38	124	70.34	21.40
CES	128	1001	640.37	219.75
% Body fat	11.59	24.55	19.19	3.46
Age (years)	12	16	13.75	1.56

SD = standard deviation; EAT-26 = Eating Attitudes Test; BSQ = Body Shape Questionnaire; CES = Commitment to Exercise Scale.

Pearson's chi-squared test revealed a significant association between body dissatisfaction and eating behavior ($X^2=8.76$, $p=0.01$) (Table 2). Thus, the prevalence of body dissatisfaction increased as a function of EAT-26 classification. In other words, most athletes who were dissatisfied with their body scored 21 or higher in the EAT-26 and most adolescents who were satisfied with their body scored less than 21. Similarly, an association was observed between LPCE and eating behavior ($X^2=10.15$, $p=0.001$), with the prevalence of high LPCE increasing as a function of EAT-26 classification as shown in Table 2. In summary, most athletes with low LPCE presented a low frequency of risky eating behavior, whereas most girls with high LPCE scored 21 or higher in the EAT-26.

The multiple linear regression model using EAT-26 as a criterion variable showed that all variables, except for body fat percentage, had an influence on eating behavior (Table 3). In this respect, CES scores explained 9% ($p<0.05$) of the variation in EAT-26 scores, whereas BSQ scores modulated 16% of risky eating behavior ($p<0.05$). The entire model explained 17% of the variation in EAT-26 scores ($p<0.01$).

Table 2. Prevalence of body dissatisfaction and level of psychological commitment to exercise in young female athletes from aesthetic sports as a function of EAT-26 classification

Variable	Eating behavior		<i>p</i> value
	EAT- (<21)	EAT+ (≥21)	
BSQ			
Satisfied	62.5%	37.5%	0.01
Mild dissatisfaction	37.5%	62.5%	
Moderate dissatisfaction	31%	69%	
Severe dissatisfaction	25%	75%	
CES			
< 638	60%	14.3%	0.001
≥ 638	40%	85.7%	

BSQ = Body Shape Questionnaire; CES = Commitment to Exercise Scale.

On the other hand, the explanatory variables used in the second multiple regression analysis better fitted the model (Table 4). Body fat percentage and BSQ influenced CES scores by 19% and 12%, respectively ($p < 0.05$). The entire model explained 23% of the variation in CES scores ($p < 0.01$).

Table 3. Multiple linear regression on the variation in the eating behavior of young female athletes from aesthetic sports using BSQ, CES and body fat percentage as explanatory variables

Variable	Block	B	R	R ²	R ^{2*}	<i>p</i> value
% Body fat	1	0.14	0.06	0.004	0.003	≤0.73
CES	2	0.11	0.31	0.09	0.06	≤0.05
BSQ	3	0.14	0.40	0.16	0.13	≤0.02
All variables		5.32	0.41	0.17	0.08	≤0.01

R^{2*} = adjusted R²; CES = Commitment to Exercise Scale; BSQ = Body Shape Questionnaire.

Table 4. Multiple linear regression on the variation in the level of psychological commitment to exercise of young female athletes from aesthetic sports using body fat percentage and BSQ as explanatory variables

Variable	Block	B	R	R ²	R ^{2*}	<i>p</i> value
% Body fat	1	0.14	0.44	0.19	0.16	≤0.01
BSQ	2	0.13	0.35	0.12	0.10	≤0.02
All variables		6.78	0.48	0.23	0.15	≤0.01

R^{2*} = adjusted R²; BSQ = Body Shape Questionnaire.

Comparison of EAT-26 scores by ANCOVA according to LPCE group revealed a statistically significant difference ($F=17.44$, $p=0.01$). This result suggests a higher frequency of risky eating behavior in young female athletes with high LPCE compared to those with low LPCE, as illustrated in Table 5.

Table 5. Comparison of EAT-26 scores of young female athletes from aesthetic sports according to LPCE group

Variable	Group		<i>p</i> value
	Low LPCE (CES < 638)	High LPCE (CES ≥ 638)	
EAT-26	9.76 (± 3.39)	13.55 (± 3.87)	≤0.01

EAT-26 scores are reported as the mean (standard deviation). LPCE = level of psychological commitment to exercise; CES = Commitment to Exercise Scale; EAT-26 = Eating Attitudes Test.

DISCUSSION

The main objective of the present study was to evaluate the association of body dissatisfaction and LPCE with inadequate eating behavior in young athletes from aesthetic sports. Studies conducted in Brazil have investigated the association between body image and unhealthy eating habits in athletes from different aesthetic sports modalities^{7,8,18}. However, we found no reports evaluating the relationship between psychological addiction to physical exercise and body dissatisfaction and adoption of risky eating behaviors in aesthetic sports athletes.

The present results demonstrated not only an association between these variables, but also identified body dissatisfaction and LPCE as explanatory factors for risky eating behavior. The relationship between body dissatisfaction and inadequate eating behavior has been discussed extensively in the literature. Fortes and Ferreira², evaluating adolescent athletes from different sports modalities, identified negative body image as one of the psychological factors that predispose to ED among female competitors of sports with distinct characteristics. Supporting this view, Fortes et al.¹ observed an association between body dissatisfaction and inadequate eating behavior in soccer players. Perini et al.¹⁸, studying elite synchronized swimmers, found a tendency towards being concerned with physical appearance that was able to induce the adoption of unhealthy eating habits. Therefore, the present findings support the hypothesis raised in the introduction that body dissatisfaction is intimately related to risky eating behavior in the population of athletes.

Attempts to establish an association between LPCE and psychological factors have been made only recently in the literature. Fortes et al.²⁵ evaluated male swimmers and indoor soccer players and found no association between LPCE and body dissatisfaction in either modality. In contrast, in another study, Fortes et al.²⁶ showed that LPCE together with negative body image, body mass index and body fat percentage significantly influenced EAT-26 scores in adolescent boys and girls. In agreement with this view, Fortes et al.²⁷ reported a low correlation between LPCE and body dissatisfaction in young athletes participating in an international competition. The results of the present study demonstrated that LPCE was associated with inadequate eating behavior. Since no consensus on this topic exists in the studies cited, further investigation of these variables is needed.

Multiple linear regression analysis used to determine the influence of the independent variables on the main outcome of this study revealed findings that deserve further discussion. Body fat percentage was the only variable that had no impact on the eating behavior of young female athletes from aesthetic sports, whereas body dissatisfaction and LPCE modulated EAT-26 scores by 16% and 9%, respectively. In the final model, all variables together explained 17% of the variation in EAT-26 scores. Taken together, these results suggest that concern with body weight and physical appearance and a high LPCE are predictors of unhealthy eating

habits in athletes. In this respect, some investigators emphasize that body dissatisfaction is the main factor responsible for a high frequency/intensity of physical training designed to lose weight^{2,26}. However, if the increase in training volume or intensity is not sufficient to promote changes in body composition (fat reduction), the athlete is likely to adopt daily habits of food restriction for long periods of time, use of laxatives/diuretics and even self-induced vomiting as a complementary method to achieve her main goal, i.e., weight loss.

However, the findings described above suggest that approximately 83% of the modulation in the eating behavior of athletes can be explained by other factors. Studies have shown that pressure from coaches demanding better results¹⁷, use of clothes exposing the body²⁶, high competitive level experience²⁷, and the relationship with parents and team members¹⁷ are factors that also explain the variation in this phenomenon.

The results of the multiple regression model using CES as the criterion variable indicated that both fat percentage and body dissatisfaction modulated the variation in LPCE. These findings agree with the studies of De Bruin et al.¹⁶ and Fortes et al.²⁷. It therefore seems that the morphological characteristic most depreciated in the performance assessment of aesthetic sports competitors, i.e., body fat, triggers negative psychological adaptations such as a high LPCE. In addition, evidence suggests that athletes dissatisfied with their weight are prone to engage in excessive physical training since they believe that an increase in training volume would reduce body fat and consequently improve the dissatisfaction with their body^{6,29}. However, some investigators emphasize that strenuous physical training does not necessarily have positive effects on the body image of young athletes, a fact that, in a certain way, can cause psychological conflicts in this population^{15,24}.

Comparison of EAT-26 scores according to CES classification showed a higher frequency of unhealthy eating behavior among young female athletes who were strongly committed to exercise compared to those with low LPCE. These results agree with the statement of Fortes et al.²⁵ that adolescent athletes who are excessively committed do physical training may be more susceptible to developing ED. In fact, it is not rare that a female athlete increases her training volume without consent from her coach, believing that this attitude will benefit her sport performance. In this respect, Fortes et al.²⁷, studying Brazilian female athletes participating in the Pan-American School Games, observed a marked prevalence of LPCE. The authors argued that excess training can induce negative psychological adaptations such as depression, anxiety, and tension.

The present study only included girls since aesthetic sports are a predominantly female sport and some modalities are practiced exclusively by women. In addition, the literature has shown that women are more dissatisfied with their bodies than men^{20,28-30}. One limitation of this study was the small sample size, a fact impairing generalization of the results. However, similar sample sizes have been used in studies on the same topic^{7-8,25}.

CONCLUSION

The present results permit us to conclude that body dissatisfaction and LPCE are associated with risky eating behavior in female athletes from aesthetic sports. In this respect, girls dissatisfied with their body weight and appearance or adolescents with a high LPCE were more susceptible to developing unhealthy eating behaviors. In summary, young females competitors of aesthetic sports who are dissatisfied with their own body or show psychological signs of excessive commitment to exercise may be more vulnerable to the development of ED. Another interesting finding was the impact of body fat percentage and body dissatisfaction on LPCE. Body shape and a feeling of disgust with their own body were determinant factors to increase LPCE in young athletes practicing aesthetic sports. The present investigation sought to fill a knowledge gap in the literature. However, further studies that include larger samples and additional aesthetic modalities and that evaluate the influence of other factors on the eating behavior of athletes are needed.

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