

Eating Disorders Risk, Depression and Body Dissatisfaction among Iranian Females Participating in Sports

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ABSTRACT

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Background: The prevalence of eating disorders among young adults is rapidly increasing. However, a few studies have examined the risk of eating disorders and psychological factors of body dissatisfaction and stress in females of non-Western societies. The current study was designed to assess the correlations between eating disorders risk and body image and depression among Iranian females.

Methods: The participants were 221 females attending sports clubs in Tehran. The 26-item Eating Attitudes Test (EAT-26), Photographic Figure Rating Scale, and the Beck Depression Inventory were used. An EAT-26 score of ≥ 20 was considered as eating disorder risk cutoff.

Results: Approximately 50% of the participants were at higher risk of developing eating disorders. Additionally, 62.4% reported a history of overeating, and 43% reported the experience of being unable to control their eating and food intake. Using Spearman correlation analysis, we found significant associations between eating disorders risk and depression, body dissatisfaction, and anthropometric indices. In addition, weight control behaviors were prevalent in subjects, with dieting (43%) and exercise (31.2%) being the most prevalent strategies.

Conclusion: This study found a high prevalence of disordered eating. The findings revealed that poor psychological state may increase eating disorders risk. This warrants improving awareness and developing appropriate interventions targeting depression and body image satisfaction among females.

Introduction

Etiology of eating disorders is complicated and includes biological, psychological, hormonal, and environmental factors [1]. Disordered eating behavior has been reported in both developing and developed countries [2]. The rising prevalence of eating disorders in non-Western societies has been related to cultural transition and globalization [3].

Research has been conducted to identify factors related to abnormal eating behavior in an effort to prevent the development of dangerous abnormal eating behavior. Previous studies revealed that abnormal eating behavior is associated with symptoms of depression, low self-esteem, and dissatisfaction with one's body [4]. In clinical research by van den Berg et al [5], a group with

abnormal eating behavior were found to have lower self-esteem and a higher level of depression compared to a group without abnormal eating behavior. Moreover, Obeid et al [6] reported a close association between abnormal eating behavior and low self-concept and high social anxiety. Additionally, Johnson et al [7] showed that 9.5% and 38% of male college athletes in their study were at risk for anorexia nervosa and bulimia nervosa, respectively.

Unhealthy dieting strategies can have negative effects on psychological well-being [8]. Associations between greater use of unhealthy dieting strategies and depression have been found in female adults [9]. Negative affect has been related to unhealthy eating behaviors such as binge eating [10] and overconsumption of high-calorie foods within a buffet setting for obese

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individuals [11]. Stress-induced eating has been associated with increased risk of obesity and food and alcohol consumption among adults [12], but few studies exist on the relationship of depression with body weight or eating behavior in pediatric and adolescent populations.

Eating disorders (EDs) are important concerns, therefore the association between mood state and eating behavior needs more attention, and it is relevant to assess the association among eating behavior, depression, and body image in women attending sports clubs. However few studies have investigated this association and showed rather inconsistent findings. Frequent dieting and use of extreme weight control behaviors have been found to be predictive of negative body image outcomes such as body dissatisfaction and drive for thinness [13-14]. Use of weight control behaviors has been linked to a range of physical and psychological outcomes [8], but here we focus on depression, body image, and physical activity levels given their consistent associations with dieting behaviors. We hypothesized that mood state may be related to eating disorders and might differ between females with and without an ED. Furthermore, we believe that identifying this association will help clinicians to identify individuals who may be at higher risk of developing ED.

Subjects and methods

Participants and instruments

In this cross-sectional study, 221 women participating in sports activities in sports clubs in Tehran, Iran, were recruited. The clubs were selected via stratified random sampling whereby one or two clubs were selected randomly from each of the 4 geographical zones of Tehran. The questionnaires were filled out by the subjects before workout sessions. The sociodemographic information including age, educational level, general health, disease history, marital status, and parental schooling level was collected using a self-administered questionnaire.

Anthropometric indices

Weight was measured to the nearest 0.1 kg using a calibrated electronic balance (Seca 769 scale, capacity: max 200 kg, Germany) in light clothes and without shoes. The scale was calibrated against a 100-kg weight at the beginning of each data collection day. Height was measured to the nearest 0.1 cm using a stadiometer (Seca 220 stadiometer, range: 60-200 cm, Germany) without shoes and with shoulders in a normal

position. BMI was calculated for each participant by dividing weight (in kilograms) by height (in meters) squared.

ED risk: Risk of ED was assessed using the 26-item Eating Attitudes Test (EAT-26) validated for Iranian girls by Gargari et al [15]. The internal consistency (Cronbach's alpha) and test-retest reliability of this questionnaire were 0.75 and 0.85, respectively [15]. EAT-26 is a widely used self-report measure of disordered eating attitude and risk of eating disorders [16]. The usefulness of EAT-26 as a screening tool for identifying women at risk of developing ED was shown in an Iranian sample of university students [15]. The questionnaire consists of 26 questions that assess food refusal, exacerbated concern with physical appearance, purging behaviors, environmental factors, and oral control. The final EAT-26 score is the sum of its items and the cut-off point for risky eating behavior is 20, i.e., a score ≥ 20 indicates a problematic eating behavior and a score < 20 indicates a lower ED risk.

Body image: The Persian version of the Photographic Figure Rating Scale (PFRS), validated for use in the Iranian population by Azali et al [17], was used to assess body dissatisfaction.

Depression: In the current study, depression was assessed using the Beck Depression Inventory (BDI). The BDI is a 21-item self-compiled, multiple-choice questionnaire [18].

Statistical analyses

All statistical analyses were carried out using SPSS software version 16 (SPSS Inc., Chicago IL). Normality of data distribution of numerical variables was assessed with the Kolmogorov-Smirnov test. Data for continuous variables with normal data distribution were expressed as mean \pm SD; otherwise, median values (25th-75th percentiles) were reported. Categorical variables were shown as frequency (percent). A p value of less than 0.05 was regarded to be significant.

Results

As shown in (Table 1), the mean weight and BMI of the participants were 64.30 kg and 23.62 ± 4.16 kg/m². The majority of participants (70.1%) were between 20 and 30 years old. The median score on EAT-26 was 19 (11-29). The overall risk of eating disorders among participants was 21.60. As shown in Table 1, 49.8% of subjects were at risk of eating disorders (EAT-26 score of 20 or more). The total score of BDI in subjects was 11.95 ± 9.84 . Body dissatisfaction

score computed by subtracting ideal body image ratings from current body image rating is presented in (Table 1).

Variable	Mean \pm SD
Weight, kg	64.30 \pm 12.08
Height, cm	164.94 \pm 7.09
BMI, kg/m ²	23.62 \pm 4.16
n (%)	
Age, n (%)	
< 20	27 (12.2%)
20-30	155 (70.1%)
30-40	36 (16.3%)
40-50	3 (1.4%)
Total	221 (100%)
Physical activity, h/wk	6.64 \pm 4.40
EAT-26 score	Median (25th, 75th percentiles) 19 (11.00, 29.00)
Depression	11.95 \pm 9.84
EAT-26	
Disordered eating attitude	110 (49.8%)
Healthy subjects	111 (50.2%)
Body dissatisfaction	1.29 \pm 1.80

Additionally, when asking 5 other questions to get a better understanding of eating behaviors of subjects, 62.4% reported a history of overeating (question 1) and 43% reported the experience of being unable to control their eating and food intake (question 2). In response to the question, "Did the episodes of overeating occur twice a week for the past 3 months?" (question 3), 26.7%

of participant answered "yes." Regarding body weight concerns (question 4), a rather high percentage of participants (70.1%) answered "yes." Finally, we wanted to know about the participant's weight loss strategies. As presented in (Table 2) and (Chart 1), only one person tried none of the strategies to weight loss.

Questions	Frequency
Current use of supplements	
Yes	49 (22.2%)
No	172 (77.8%)
History of supplements use	
Yes	34 (15.4%)
No	187 (84.6%)
Question 1	
Yes	138 (62.4%)
No	83 (37.6%)
Question 2	
Yes	95 (43%)
No	126 (57%)
Question 3	
Yes	59 (26.7%)
No	162 (73.3%)
Question 4	
Yes	155 (70.1%)
No	66 (29.9%)
Question 5	
Vomiting	11 (5%)
Diarrhea	8 (3.6%)
Pills	18 (8.1%)
Diuretic	1 (0.5%)
Dieting	95 (43.0%)
Fasting	16 (7.2%)
Exercise	69 (31.2%)
Other	2 (0.9%)
None	1 (0.5%)

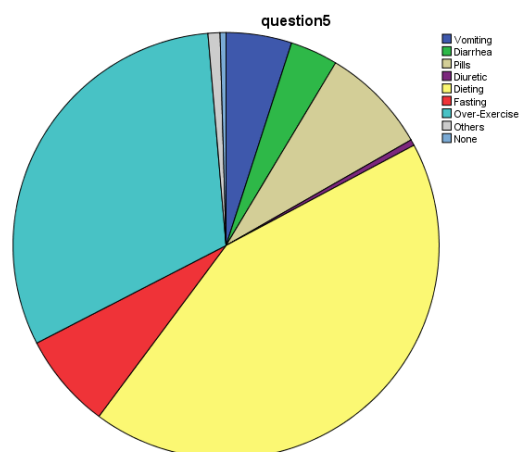


Chart 1. Response to the question “Which of the following ways do you try to lose weight?”

The simple Spearman’s correlation analysis showed significant correlations between EAT-26 score and body dissatisfaction, depression, weight, and BMI (Table 3).

Table 3. Correlation between EAT-26 and anthropometric indices and psychological factors

Variables	Depression	Body dissatisfaction	Weight	BMI
EAT-26				
r	0.160	0.209	0.130	0.142
p value	0.017	0.002	0.054	0.034

Spearman correlation test. Correlation is significant at the 0.05 level.

Discussion

Our findings show that Iranian females have a high risk of eating disorder. In this regard, it was observed that 43.0% of the participants reported using dieting as the major weight management strategy. Several reasons may account for this high prevalence of weight management behaviors including influences of foreign cultures, ethnic factors, class and social status, the level of social development, the influence of media, and following the fashions and customs [19].

Additionally, we observed high levels of use of nutritional supplements among young women. Since our participants showed a higher rate of disordered eating and body dissatisfaction, they were also more likely to have a greater tendency towards the use of supplements. Our findings reflect those of previous work in this field [20].

We found that disordered eating behavior was correlated with higher weight and BMI, which supports the finding of a previous study reporting the association of BMI with the loss of oral control and preoccupation with food [21]. Some studies [22-23] have also suggested that increased rates of obesity in society and the subsequent attempts to lose weight might act as a risk factor for the development of disordered eating and unhealthy weight control practices (i.e., fasting,

self-induced vomiting, laxatives).

This study investigated the association of body dissatisfaction and depression on abnormal eating behavior in Iranian females. First, the study results support our hypothesis that mood state and body dissatisfaction are associated with abnormal eating behavior. This is consistent with previous research findings [24] that mood state affects abnormal eating behavior via the mediatory role of body dissatisfaction. In other words, people with psychological problems such as high levels of depression and dissatisfied with their own body are more likely to show abnormal eating behaviors.

The current finding confirms the importance of psychological health for overcoming body dissatisfaction and further abnormal eating behaviors [25]. It has been stated that poor psychological conditions may be related to internalized false body image from media sources. Young females experience immense sociocultural pressures from the media to pursue the ideal thin body. The messages of achieving a slim figure are seen through sources such as entertainment shows, magazines, and products sold in stores. Young women are consumers of this message and may question whether their own bodies match up to an ideal image that has been relaid to them. This social pressure is more likely

to increase the risk of problematic eating behavior at young females [26]. It is particularly problematic in cases where young females have low self-esteem and negative emotions [24]. It has been previously indicated that the negative thoughts and emotions may originate from body dissatisfaction [24], which is in line with our findings and needs to be addressed.

Psychological measures are also commonly linked to stress-induced eating in nonclinical samples; their effects are potentiated in individuals with eating disorders [27]. One of the potential mechanisms underlying unhealthy eating behavior is the negative impact of psychological factors on eating behaviors; in this regard, stress-induced eating has been shown to be prevalent in women with an eating disorder [27].

Interestingly, the results found in the current study with respect to body dissatisfaction and disordered eating behaviors are similar to those found in men. It has been shown that men who internalize the muscular ideal and engage in disordered eating and exercise behaviors do so in an attempt to more closely conform to the muscular ideal rather than because they are inherently dissatisfied with their bodies [28]. Thus, it is also possible that although women who internalize the athletic ideal engage in disordered eating and exercise behaviors in order to more effectively achieve their desired body shape, they may not do so because they are dissatisfied with their bodies [29].

Our results revealed that higher levels of body image dissatisfaction were linked to higher engagement in disordered eating patterns. Similarly, it has been stated that body dissatisfaction and unhealthy eating behaviors are positively associated [30].

Findings from the current study suggest that appearance-related concerns do account for increased risk of eating disorder. Based on our findings, females may be vulnerable to concerns about appearance and sport-related body ideals, which is consistent with previous studies [31-32]. Similarly, it has been suggested that negative self-image precedes the development of ED [33], and body dissatisfaction was found to be related to the later development of ED [34].

Thus, weight bias internalization and depression appear to be important factors related to disordered eating behaviors and could be targeted for interventions such as psychological acceptance and mindfulness therapy [35].

Conclusion

This study provides new insight into the relationships among depression, body image, nutritional options, and eating attitudes. Among the strengths of the study is the use of standardized measures to assess body image and attitudes towards eating. However, there were also some limitations, including the relatively small sample size. We suggest that future research follow these relationships longitudinally in order to determine whether psychological factors predict the use of supplements and weight change behaviors.

Informed consent

Informed consent was obtained from all the individuals participating in the study.

Disclosure statement

There are no competing financial interests.

Conflict of interest

None of authors have conflict of interests.

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References

1. Klump KL, Bulik CM, Kaye WH, Treasure J, Tyson E. Academy for eating disorders position paper: eating disorders are serious mental illnesses. *Int J Eat Disord*. 2009; 42(2):97-103.
2. Pavlova B, Uher R, Dragomirecka E, Papezova H. Trends in hospital admissions for eating disorders in a country undergoing a socio-cultural transition, the Czech Republic 1981–2005. *Soc Psychiatry Psychiatr Epidemiol*. 2010; 45(5):541-50.
3. Becker AE, Fay KE, Agnew-Blais J, Khan AN, Striegel-Moore RH, Gilman SE. Social network media exposure and adolescent eating pathology in Fiji. *Br J Psychiatry*. 2011; 198(1):43-50.
4. Frost J, McKelvie S. Self-esteem and body satisfaction in male and female elementary school, high school, and university students. *Sex roles*. 2004; 51(1-2):45-54.
5. Van den Berg P, Wertheim EH, Thompson JK, Paxton SJ. Development of body image, eating disturbance, and general psychological functioning in adolescent females: A replication using covariance structure modeling in an Australian sample. *Int J Eat Disord*. 2002; 32(1):46-51.
6. Obeid N, Buchholz A, Boerner KE, Henderson KA, Norris M. Self-esteem and social anxiety in an adolescent female eating disorder population: age and diagnostic effects. *Eat Disord*. 2013; 21(2):140-53.

7. Johnson C, Powers PS, Dick R. Athletes and eating disorders: the National Collegiate Athletic Association study *Int J Eat Disord.* 1999; 26(2):179-88.
8. Mulgrew KE, Kannis-Dymand L, Hughes E, Carter JD, Kaye S. Psychological factors associated with the use of weight management behaviours in young adults. *Journal of Health Psychology.* 2016; 24(3):337-50.
9. Gillen MM, Markey CN, Markey PM. An examination of dieting behaviors among adults: Links with depression. *Eat Behav.* 2012; 13(2):88-93.
10. Rosenbaum DL, White KS. The relation of anxiety, depression, and stress to binge eating behavior. *J Health Psychol.* 2015; 20(6):887-98.
11. Privitera GJ, King-Shepard QW, Cuifolo KN, Doraiswamy PM. Differential food intake and food choice by depression and body mass index levels following a mood manipulation in a buffet-style setting. *J Health Psychol.* 2019; 24(2):199-208.
12. Torres SJ, Nowson CA. Relationship between stress, eating behavior, and obesity. *Nutrition.* 2007; 23(11-12):887-94.
13. Cruz-Sáez S, Pascual A, Salaberria K, Echeburúa E. Normal-weight and overweight female adolescents with and without extreme weight-control behaviours: Emotional distress and body image concerns. *J Health Psychol.* 2015; 20(6):730-40.
14. Cruz-Sáez S, Pascual A, Salaberria K, Etxebarria I, Echeburúa E. Risky eating behaviors and beliefs among adolescent girls. *J Health Psychol.* 2015; 20(2):154-63.
15. Gargari B, Khadem-Haghighian M, Taklifi E, Hamed-Behzad M, Shahraki M. Eating attitudes, self-esteem and social physique anxiety among Iranian females who participate in fitness programs. *J Sports Med Phys Fitness.* 2010; 50(1):79-84.
16. Garner DM, Garfinkel PE. The Eating Attitudes Test: An index of the symptoms of anorexia nervosa. *Psychol Med.* 1979; 9(02):273-9.
17. Azali AK, Azaryan S, Ghorbanzadeh B, Khoshnevis F. Figure rating and body appreciation in sedentary and those women present in sport activities from Tabriz city. *Journal of Health Promotion Management.* 2016; 5(3):1-14.
18. Beck AT, Steer RA, Brown GK. Beck depression inventory. 1996.
19. Soh NL, Touyz SW, Surgenor LJ. Eating and body image disturbances across cultures: A review. *European Eating Disorders Review.* 2006;14(1):54-65.
20. Yager Z, O'Dea JA. Relationships between body image, nutritional supplement use, and attitudes towards doping in sport among adolescent boys: implications for prevention programs. *J Int Soc Sports Nutr.* 2014;11(1):13.
21. Solmi F, Hatch SL, Hotopf M, Treasure J, Micali N. Prevalence and correlates of disordered eating in a general population sample: the South East London Community Health (SELCoH) study. *Soc Psychiatry Psychiatr Epidemiol.* 2014; 49(8):1335-46.
22. Neumark-Sztainer D. Can we simultaneously work toward the prevention of obesity and eating disorders in children and adolescents? *Int J Eat Disord.* 2005;38(3):220-7.
23. Haines J, Neumark-Sztainer D. Prevention of obesity and eating disorders: a consideration of shared risk factors. *Health Educ Res.* 2006; 21(6):770-82.
24. Lim SA, You S. Effects of Self-Esteem and Depression on Abnormal Eating Behavior among Korean Female College Students: Mediating Role of Body Dissatisfaction. *Journal of Child and Family Studies.* 2017; 26(1):176-82.
25. Di Blasi M, Cavani P, Pavia L, Lo Baido R, La Grutta S, Schimmenti A. The relationship between self-Image and social anxiety in adolescence. *Child and Adolescent Mental Health.* 2015;20(2):74-80.
26. Holland G, Tiggemann M. A systematic review of the impact of the use of social networking sites on body image and disordered eating outcomes. *Body Image.* 2016; 17:100-10.
27. Klatzkin RR, Gaffney S, Cyrus K, Bigus E, Brownley KA. Stress-induced eating in women with binge-eating disorder and obesity. *Biological Psychology.* 2018; 131:96-106.
28. McCreary DR. The Drive for Muscularity Scale: Description, Psychometrics, and Research Findings. *American Psychological Association.* 2007; 87-106
29. Bell HS, Donovan CL, Ramme R. Is athletic really ideal? An examination of the mediating role of body dissatisfaction in predicting disordered eating and compulsive exercise. *Eat Behav.* 2016; 21:24-9.
30. Ferreira C, Pinto-Gouveia J, Duarte C. Self-compassion in the face of shame and body image dissatisfaction: Implications for eating disorders. *Eat Behav.* 2013; 14(2):207-10.
31. Anderson LM, Reilly EE, Gorrell S, Anderson DA. Running to win or to be thin? An evaluation of body dissatisfaction and eating disorder symptoms among adult runners. *Body Image.* 2016; 17:43-7.
32. Swami V, Steadman L, Tovee MJ. A comparison of body size ideals, body dissatisfaction, and media influence between female track athletes, martial artists, and non-athletes. *Psychology of Sport and Exercise.* 2009; 10(6):609-14.
33. Mantilla EF, Bergsten K, Birgegård A. Self-image and eating disorder symptoms in normal and clinical adolescents. *Eat Behav.* 2014;15(1):125-31.

34. Striegel-Moore RH, Bulik CM. Risk factors for eating disorders. *American Psychologist*. 2007;62(3):181.
35. O'Brien KS, Latner JD, Puhl RM, Vartanian LR, Giles C, Griva K, et al. The relationship between weight stigma and eating behavior is explained by weight bias internalization and psychological distress. *Appetite*. 2016; 102:70-6.