



Self-reported eating disorder risk in lean and non-lean NCAA Collegiate Athletes

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Abstract

Purpose The purpose of this present study was to examine gender differences in overall scores on the Eating Attitudes Test (EAT-26) in National Collegiate Athletic Association (NCAA) college athletes in “lean” sports versus “non-lean” sports.

Methods Using a self-report survey design, this study examined eating disorder risk in 121 NCAA college athletes, using the EAT-26. We expected that female athletes and athletes in “lean” sports would report higher scores on the EAT-26.

Results There was a significant effect of sport type (lean vs. non-lean) on eating attitudes and behaviors, with those in non-lean sports reporting higher scores, on average, on the attitudinal measure and those in lean sports reporting, on average, higher scores on the behavioral measure. There was an interaction between gender and sport type (lean vs. non-lean) on eating attitudes and behaviors. Male athletes in non-lean sports had the highest overall average scores on the attitudinal portion of the EAT-26, and males in lean sports had the lowest scores. However, on the EAT-26 behavioral portion, men in lean sports reported significantly higher scores than did men in non-lean sports. Female athletes, regardless of sport type, reported similar scores on both the EAT-26 attitudinal and behavioral sections.

Conclusions Our findings suggest that athletes, regardless of sport type and gender, may be affected by eating disorder symptomatology. Gender differences may be smaller in athletic populations than previously thought. Sport type may affect whether disordered eating symptomatology presents as attitudinal or behavioral in nature, especially in male athletes.

Level of evidence Descriptive study, Level V.

Keywords Athletes · Eating disorder risk · EAT-26 · Lean · Non-lean

Introduction

Eating disorder (ED) pathology has been acknowledged and studied in athletes of all types. It has been suggested that some eating disorders (as well as some eating disordered attitudes and behaviors) are more prevalent in athletes than in the general population [1, 2, but see 2]. Athletes are vulnerable to eating disorder pathology due to personal pressure to achieve merit, while also facing institutional, social, team, familial and financial pressure to perform [3–7]. These pressures coupled with a rigorously competitive environment can be a breeding ground for ED risk; and for these reasons,

treatment and recovery often look different for athletes than for non-athletes [7].

Research suggests that between 1 and 62% of athletes demonstrate risk for the development of an eating disorder [8]. The apparent inconsistencies amongst reported numbers of athletes who present with disordered eating risk may be the result of two factors: gender and sport type (lean vs. non-lean). Athletes in sports that emphasize leanness as a means to improve performance, have weight classes, or are judged aesthetically are at increased risk for the development of eating disorders [9–12]. Sports of this nature are termed “lean” sports (e.g., distance running, wrestling, gymnastics). Athletes in these “lean” sports may engage in restrictive eating, skipping meals, fasting, laxatives [3], diet pills, excessive exercise or other risky behaviors considered part of disordered eating as a means of enhancing performance [4]. However, sports termed as “non-lean” (that is, sports in which leanness is not considered to provide a competitive advantage, do not have

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weight classes, or do not judge participants aesthetically; e.g., football, volleyball, basketball, soccer, golf) [2, 13, 14] are not immune to eating disorder risk. One example could be a football player that must eat copious amounts of food to fulfill a physical expectation of the position. Although the football player may not present traditional ED symptomatology, the time spent thinking, tracking and logging food intake could have adverse effects.

Research has suggested that inconsistencies in prevalence rates of disordered eating in female athletes [8] may be a result of sport type (lean vs. non-lean); however, they may also differ based on whether the athletes surveyed were male or female. Much of the research on eating disorder (ED) risk, diagnoses, and various treatments in athletes has been based on female's experiences [15, 16], thus creating insufficient knowledge and literature regarding male eating disorder risk [6, 17]. Studies have indicated that women are more likely than are men to suffer with eating disorders in the general population [3, 18]. However, research suggests that the gender gap is narrower in athletic populations [2, 10, 12]. According to a study conducted by Petrie, Greenleaf, Reel, and Carter [19], as many as 19% of male collegiate athletes were reported as symptomatic of a clinical eating disorder. Male athletes may be vulnerable to eating disorder risk; yet, due to stigmas and insufficient literature surrounding eating disorders, male athletes could be eluding diagnosis [3, 10, 17, 20].

The purpose of this present study is to examine gender differences in overall scores on the Eating Attitudes Test (EAT-26) [21] in U.S. NCAA collegiate athletes in “lean” sports versus “non-lean” sports. We first hypothesized that athletes participating in lean sports, regardless of gender, would report more eating disorder symptomatology (higher scores on the EAT-26) than those in non-lean sports [22]. Second, we hypothesized that females would report more eating disorder symptomatology than their male counterparts, regardless of sport type [3, 16, 19, 20].

Method

Participants

There were 121 participants in this study, 45 (37%) were men and 76 (63%) were women. Participants were National Collegiate Athletic Association (NCAA) athletes in the United States that voluntarily participated. The average age was 20.12 (SD = 1.41). Participants were 78.2% Caucasian, 8.9% Black or African American, and 3.2% Native Hawaiian/Pacific Islander; 1.6% self-identified as Asian, less than 1% identified as American Indian/Alaska Native, and 7.3% self-identified as Other.

Materials

Participants completed Eating Attitudes Test along with demographic information (EAT-26) [21]. The EAT-26 is a commonly used [23–26] self-report measure that determines whether an individual may be at risk for developing an eating disorder. It is not a diagnostic tool; rather, it is used to indicate level and type of symptomatology. Cited validity coefficients for the scale range from $r = 0.60$ – 0.93 (see [21] for all psychometric properties of the EAT-26). The internal consistency in the present study was $\alpha = 0.85$. The first 26 items (e.g., I am terrified of being overweight) are attitudinal items measured on a 6-point Likert scale, where Always = 3, Usually = 2, Often = 1, and Sometimes, Rarely and Never are coded as 0. Consistent with previous research [24–26], after recoding positively worded items, all items are summed to create a scale score. The final 6 items are behavioral items that ask about participants' use of exercise, laxatives, and vomiting as methods to control weight, in addition to their binge eating behavior. The first four behavioral items were measured on a 6-point Likert scale from 0 = Never to 5 = Once a day or more. The last two behavioral items were yes (1)/no (0) questions regarding whether they had lost 20 pounds or more in the previous 6 months or had ever been treated for an eating disorder. These six items were then summed to create a behavioral EAT-26 score.

Procedure

Before data collection began, the study was approved by the Institutional Review Board at Boise State University. Athletes were recruited via email and Facebook to complete a survey using the online program Qualtrics. No minors were recruited to participate in this study; participants were told they must be 18 or older to take the survey. Participants signed up via Qualtrics and were tested using an online survey format. After completing the study, participants were entered into a drawing for the chance to win a 25-dollar gift card and were thanked for their participation.

Statistical analysis

Data were entered into the Statistical Package for Social Sciences (SPSS v. 25). Means and standard deviations were calculated for all variables. Analyses focused on participants' EAT-26 scores that were divided into two separate categories: attitudes (first 26 items) and behaviors (last six behavioral items). We then examined differences using a 2×2 design (Gender \times L/NL) analysis of variance (ANOVA).

Results

To test our hypotheses, EAT-26 scores were analyzed according to lean/non-lean (L/NL) affiliation and by gender (see Table 1). This allowed us to explore the relationship between gender, sport type (L/NL), and EAT-26 behavioral and attitudinal scores. In the omnibus multivariate test, there was a significant effect of sport type (lean vs. non-lean) on eating attitudes and behaviors, $F(2, 116) = 3.04, p = 0.05$, with those in non-lean sports reporting higher scores, on average, on the attitudinal measure and those in lean sports reporting, on average, higher scores on the behavioral measure. There was no significant effect of gender on eating attitudes and behaviors, $F(2, 116) = 1.49$.

However, there was an interaction between gender and sport type (lean vs. non-lean) on eating attitudes and behaviors, $F(2, 116) = 3.54, p < 0.05$ (see Table 1). We then conducted follow-up univariate tests to further examine the interaction. Although male athletes in non-lean sports had the highest overall average scores on the attitudinal portion of the EAT-26, and males in lean sports had the lowest overall scores, there was no significant difference between scores for males in non-lean sports vs. males in lean sports, $t(44) = 1.38, p = 0.17$. However, on the EAT-26 behavioral portion, men in lean sports reported significantly higher scores than did men in non-lean sports, $t(44) = 1.88, p = 0.05$. Female athletes, regardless of the lean and non-lean sport affiliation, reported similar scores on both the EAT-26 attitudinal and behavioral sections.

Discussion

The purpose of the present study was to explore the effect of gender and sport type (“lean” or “non-lean”) on disordered eating attitudes and behaviors in collegiate athletes. Similar to previous studies [9, 10, 12], we predicted that athletes

in lean sports would report higher scores on the EAT-26 attitudinal and behavioral scales than their “non-lean” counterparts. However, our results only partially supported this hypothesis. Whereas athletes in lean sports reported higher scores on the behavioral measure than did those in non-lean sports, athletes in non-lean sports reported higher scores on the attitudinal measure than did those in lean sports. The fact that athletes in lean sports had higher scores on the behavioral section than did athletes in non-lean sports is not surprising. Athletes in lean sports are suggested to have higher symptomatology due to the restriction or management of diet, sport pressures and the nature of the sport [15, 17, 27, 28]. On the other hand, athletes who participate in non-lean sports are thought to be less likely to exhibit behavioral symptomatology because the nature of these sports is non-weight class dependent and is not aesthetically judged. Interestingly, athletes in non-lean sports reported higher scores on the attitudinal portion of the EAT-26, which suggests a potential disconnect between unhealthy thought and behaviors. This finding can help inform clinical practice, intervention, and help identify athletes that are at risk in a multidimensional way by assessing both behaviors and attitudes.

Similar to Carter and Rudd [17], we also hypothesized that female athletes, regardless of sport type affiliation, would report higher symptomatology than male athletes. Research currently supports the idea that female athletes are at greater eating disorder risk when compared to male athletes [3, 16, 20]. However, there was no significant effect of gender on EAT-26 scores on either the attitudinal or behavioral sections. Rather, our study demonstrated that eating disorder risk gender differences may be smaller than previously thought. Ten years ago, we used to think that female athletes were at greater risk of developing eating disorders than were male athletes. More recent studies [6] suggest that the gap is narrowing to the point that some research is finding smaller gender differences or no gender differences at all [2, 12]. For example, the ratio of male to female athletes diagnosed with anorexia nervosa has narrowed from 1:15 twenty years ago to now 1:2 [10]. Studies regarding male athletes with eating disorder are less prominent than female athletes. This lack of research has resulted in varying prevalence rates amongst men and differences of opinion on whether eating disorder risk presents differently in male and females [2, 12, 17]. The lack of gender differences in EAT-26 scores in the present study suggests that more research may be needed on this topic.

The most interesting finding in our study was the interaction between gender and sport type (lean vs. non-lean) on eating attitudes and behaviors. To our knowledge, no other research has examined differences in EAT-26 behavioral and attitudinal measures between lean and non-lean sports in male athletes. However, in the present study, men in lean

Table 1 EAT-26 results

Lean/non-lean	Gender	<i>M</i>	<i>SD</i>	<i>N</i>
Attitudinal				
Lean	Male	7.88	7.32	25
Non-lean	Male	10.75	6.38	20
Lean	Female	9.49	9.81	51
Non-lean	Female	9.44	8.91	25
Behavioral				
Lean	Male	4.24	3.54	25
Non-lean	Male	2.35	2.32	20
Lean	Female	2.43	2.70	51
Non-lean	Female	2.52	3.06	25

sports reported significantly higher scores on the EAT-26 behavioral portion than did men in non-lean sports. This is particularly noteworthy given that male athletes in non-lean sports had the highest overall average scores on the attitudinal portion of the EAT-26, and males in lean sports had the lowest overall scores. These seemingly conflicting results suggest that unhealthy attitudes about exercise and food may not necessarily trigger unhealthy behaviors in men. That being said, this finding suggests that some athletes may elude diagnosis due to a disconnect between their attitudes and their behaviors. Further research needs to be conducted on male athletes in lean and non-lean sports to examine this, as our findings suggest that male athletes, regardless of sport type, may be vulnerable to sub-clinical eating disorders [2, 3, 17, 20].

Limitations

This study had several limitations that need to be addressed. First, we utilized the EAT-26 to assess disordered eating risk as that measure has been used with both male and female athletes [23–26] and has shown to be valid and reliable in athletic populations [29]. However, the EAT-26 is not without its shortcomings [29]; no norms have been established for US collegiate athletes. Thus, it is difficult to ascertain how the athletes in our study compare to US collegiate athletes in other studies. In addition, one of the main criticisms of the EAT-26 is that it is not sensitive to denial and may result in both false positives and false negatives when used as a screening tool [30–32]. In fact, EAT-26 attitudinal scores may increase as individuals undergo treatment and reduce their levels of denial [31]. In addition, research suggests that athletes may not present with “traditional” eating disorder symptomology and traditional screening tools may not detect eating disorders accurately in athletic populations [12]. Screening would have been more complete had we used additional testing procedures, including measures that were not self-assessments, and had we included measures to investigate how much of a factor denial might have been in this population. In addition, athletes self-selected to participate in our research. It is difficult to determine how representative our sample was of all collegiate NCAA athletes in the United States.

Despite these limitations, it is clear that more sport-specific lean/non-lean research needs to be conducted to study eating disorder risk in both male and female athlete populations. Given our non-significant gender differences in the present study, more research on athletic and non-athletic populations is needed to provide effective preventative and treatment measures [3]. A comparison of athlete’s behavior and attitudes in season and out of season could

help determine if fluidity with eating and exercise ideals are possible depending on in season or out of season demands [28, 33].

Clinical considerations

The perceived lower prevalence rates in male athletes have created a gap in the research surrounding males with eating disorders [10]. Thus, many persons working with athletes believe that men are not at risk. Many nutritional and exercise practices athletes engage in to be competitive could lead to high, or unhealthy, EAT-26 scores. For example, male participants in non-lean sports, such as football, basketball, and golf, are often believed to be unaffected by eating disorder symptomatology. However, the demands to fulfill a particular physique for a certain position may place strains on the way in which these non-lean male athletes are approaching exercise and eating habits. On the other hand, lean male athletes may not hold the same unhealthy beliefs about exercise and food but may engage in risky or dysfunctional behaviors to be more competitive. For example, a wrestler may not think negatively about food or exercise but might have to cut ten to fifteen pounds to compete in a tournament [28]. In fact, recent research suggests that eating disorder treatment for the athletic population may need to differ slightly from typical treatment due to differing sport-related pressures [7, 16].

Oftentimes the social stigmas and pressures surrounding eating disorder culture prevent coaches from helping male athletes at risk, or even admitting male athletes could have eating disorder symptomatology [34]. In addition, it is unclear how much of a role denial plays in the reporting or recognition of eating disordered attitudes in collegiate athlete populations. Sport specific therapy technique should be created to serve the specific needs of athletes in lean and non-lean sports. Attitudinal and behavioral specific therapies should be targeted. Education amongst athletic support staff (i.e., coaches, athletic trainers, nutritionists, etc.) is critical to prevent, recognize and treat athletes at risk for developing eating disorders [3, 16, 28].

Conclusion

Our study was the first of its kind to examine both attitudinal and behavioral scores on the EAT-26 in male and female US collegiate athletes. Similar to recent studies of symptoms of orthorexia nervosa in collegiate athletes [2], our findings suggest that athletes, regardless of sport type and gender may be affected by eating disorder

symptomatology. It has been previously thought that women regardless of sport participation will have greater eating disorder risk than male counterparts [3, 20]. However, our findings suggest that gender differences may be smaller in athletic populations than previously thought, as there was no significant effect of gender on eating attitudes and behaviors in the omnibus test. Sport type may affect whether the disordered eating symptomatology is attitudinal or behavioral in nature, especially in male athletes. In fact, in our study, men in non-lean sports reported the highest scores on the EAT-26 attitudinal portion (higher than women in both lean and non-lean sports and men in lean sports). However, men in lean sports reported the highest scores on the behavioral portion of the EAT-26 (higher than women in both lean and non-lean sports and men in non-lean sports). Given the concerns about how denial may affect scores on the attitudinal portion of the EAT-26 [31], it is unclear whether this apparent discrepancy in findings (men in non-lean sports reporting the highest scores on the EAT-26 attitudinal portion, but men in lean sports reporting the highest scores on the behavioral portion of the EAT-26) is due to differences in sport demands or the influence of denial. Future studies should investigate this further to establish whether certain aspects of specific sport types make men and women more vulnerable to disordered attitudes and/or behaviors. Future studies may also wish to include other screening tools to help ascertain whether denial is a factor in disordered eating attitudes in collegiate athletes, as research suggests that attitudinal scores may not accurately reflect eating disordered behaviors in those who have displayed disordered eating attitudes and behaviors for less than one year [31]. As such, it would be interesting to track collegiate athletes over time to better understand how EAT-26 attitudinal and behavioral scores change in male and female collegiate athletes in both lean and non-lean sports, particularly if those athletes were offered sport-specific treatment options for their disordered eating attitudes and behaviors during that time. More research on disordered eating behaviors and attitudes needs to be conducted within the entire athletic population regardless of sport type or gender. Although not a cause and effect result, athletes need to be aware of the psychological effects of the ways they approach nutrition and exercise beliefs. Athletes need to understand that participation in a college athletics may increase maladaptive behaviors and/or attitudes towards eating and exercise. The dangers associated with eating disorders and disordered eating behaviors, paired with inconsistent prevalence rates, warrant further research efforts to help better serve this population [9, 10].

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Compliance with ethical standards

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

Conflict of interest The authors declare that they have no conflicts of interest.

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