

Risk of Disordered Eating Among Division I Female College Athletes

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ABSTRACT

International Journal of Exercise Science 8(3): 256-264, 2015. The purpose of this study was to assess the risk of disordered eating (DE) among female athletes in lean and non-lean sports using the ATHLETE survey. The ATHLETE survey is divided into six different constructs, and a high score indicates a high risk for DE. Eighty-three varsity female athletes from eight Campbell University sports teams completed the survey and a medical history form anonymously. The sports were divided into sports that traditionally have a high risk for DE (lean sports) and those with a low risk (non-lean sports). The lean sports included: cheerleading, cross country/track and field, swimming, and volleyball. The non-lean sports included: basketball, golf, soccer, and softball. The total mean score of the ATHLETE survey for the lean sports was 100.1 ± 17.4 , compared to the non-lean sports scoring 90.1 ± 16.9 , $p = 0.011$. The two constructs that showed significant difference between lean and non-lean sports were Social Pressure on Body Shape (lean: 12.2 ± 3.9 , non-lean: 9.4 ± 4.6 , $p = 0.005$) and Team Trust (lean: 7.4 ± 3.3 , non-lean: 5.6 ± 2.2 , $p = 0.004$). The results indicate that lean sports exhibited a higher risk for development of DE compared to athletes participating in non-lean sports. It appears that the primary influence of DE in these female athletes came from external social pressures that may therefore dictate their exercise and nutritional habits.

KEY WORDS: Eating disorders, anorexia nervosa, bulimia nervosa

INTRODUCTION

Weight awareness appears to be an increasing problem among young women, especially when considering the increase in incorrect weight perception and in societal pressures to be thin in modern culture (4, 8, 9, 14, 20). Because of factors such as these, tendencies for unhealthy weight loss through poor eating habits and over exercising become a great concern in highly susceptible populations. Young females are inclined towards these weight-related

anxieties, and the presence of this anxiety has the ability to cause changes in diet and physical activity (6, 9). Disordered eating (DE) is a general term that describes abnormal and harmful eating habits used in attempt to lose weight or maintain an unhealthy weight (1).

Female athletes are susceptible to this type of anxiety from societal influences and are likely to experience the same type of weight concern that is common among non-athletic females (15). Female collegiate athletes are

at risk for having a higher prevalence of DE by approximately 14% to 19% compared to their male counterparts (1). Various studies have found conflicting data that finds sports participation positively influences female confidence, while other data shows increased DE and body image problems from sports participation. However, these studies tend to vary by sport and level of athlete performance (7, 13, 15). Sports that emphasize body composition (lean sports), tend to drive women towards DE in order to achieve an elite athlete body type (2). However Engel et al. found that only a small percentage of female athletes used restrictive eating because of the physique demands for their sports, which indicates that there are other external and internal factors affecting DE behaviors (7). Carter and Rudd found that 17-19% of female athletes participating in lean sports had a subclinical prevalence for an eating disorder, which indicates they participate in a type of DE behavior (5). The frequency of DE among female athletes puts them at risk for the potential development of an eating disorder (ED) (12, 17). The three main types of ED are anorexia nervosa, bulimia nervosa, and eating disorders not otherwise specified (EDNOS), which are characterized by severe disturbances in eating behavior and body image (1, 3).

College-aged women are more likely to use DE to combat their body dissatisfaction if they feel encouraged by their social environment to participate in these behaviors (8). Additionally, for those in "lean" sports, thinner denotes better performance and/or societal perception (13). These athletes who participate in DE learn to justify their DE habits with ease by using time constraints, superstitious eating

habits, and overtraining as seemingly valid excuses (1). Furthermore, many athletes, both with and without DE, partake in eccentric eating habits, like eating the same foods on a daily basis or certain meals as part of their pregame routine, and these destructive oddities often go unnoticed. In some instances, compulsive exercise habits become viewed as dedication rather than indications of severe psychological problems. Female athletes face serious medical complications from ED or DE including bradycardia, electrolyte abnormalities, dehydration, dental erosion, and hypotension, and most athletes show no concern for these possible consequences because of their weight concerns (12).

Byrne and McLean found a large variation in prevalence in percentage of female athletes who engaged in at least one weight control method ranging from 15-78%, from a group of uncontrolled studies (4). Three reasons have been proposed for such a wide range: (a) sample characteristics, (b) differing definitions in eating disorders, and (c) methods of assessing eating disorders (1). Only a few studies adhered to the strict guidelines of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), which produces a lower incidence of recorded eating disorders. Most studies characterized DE as a true eating disorder, which is the same type of clinical diagnosis as anorexia or bulimia. However, DE embodies portions of the qualifications of eating disorders rather than the clinical diagnostic criteria, thereby producing higher percentages (4, 5).

The purpose of the study was to identify the internal and external pressures associated with DE risk among collegiate

female athletes through the use of the ATHLETE questionnaire and differentiate the risk among “lean” and “non-lean” sports. The ATHLETE questionnaire was developed to provide athlete specific measures that survey psychological predictors of DE that other frequently used ED measures do not accurately assess (10). Specifically, the ATHLETE questionnaire is divided into six subcategories that address both internal and external stresses that may influence DE: 1. Drive for Thinness and Performance, 2. Social Pressure on Eating, 3. Performance Perfectionism, 4. Social Pressure on Body Shape, 5. Athlete Identity, and 6. Team Trust. This questionnaire is used as a screening tool to help identify risk of DE, as well as specific areas in which the athlete may feel particularly vulnerable in regard to their eating habits, exercise habits, and body image. Several studies indicate that both external (e.g. family, friends, and media) and internal pressures (e.g. body dissatisfaction, perceived stress, and depression) are key predictors in the eating and exercise behaviors of athletes and non-athletes alike (6-11).

METHODS

Participants

Eighty-three varsity female athletes from eight Campbell University sports teams (basketball, cheerleading, cross country/track and field, golf, soccer, softball, swimming, and volleyball) completed the surveys anonymously.

Protocol

Each participant had an opportunity to ask questions about the study prior to completing the university-approved informed consent form. The ATHLETE

questionnaire addressed six subcategories: 1. Drive for Thinness and Performance, 2. Social Pressure on Eating, 3. Performance Perfectionism, 4. Social Pressure on Body Shape, 5. Athlete Identity, and 6. Team Trust. Each category asked a variety of questions about each athlete’s individual life and the aspects that drives one’s performance. Questions were answered based on a strongly agree to strongly disagree method. Participants also completed a medical history questionnaire to detect any history of a clinical ED or DE, as well as current lifestyle habits related to eating frequency and volume.

The classification of lean sports versus non-lean sports refers to the emphasis placed on body weight within that particular sport. Lean sports maintain a competitive or aesthetic value on leanness (16) while non-lean sports do not place a high emphasis on body shape, size, and weight (12). In lean sports, a competitive advantage can be gained by minimizing fat mass in order to maximize their power while maintaining a minimum body weight (cross country/track and field, swimming). For lean sports that focus on aesthetic value, an athlete’s body size and shape are highlighted by form-fitting uniforms (volleyball, cheerleading) or their appearance/body composition is used in a subjective score from a judge. A trend of increased prevalence of DE and clinical eating disorders has arisen in female athletes in lean-sports (12) with one study showing 46.7% of female athletes in lean sports struggling with an ED/DE, 19.8% in non-lean sports, and 21.4% in the control group (16). For the current study, the teams considered lean were cross country/track and field, swimming,

cheerleading, and volleyball, and the non-lean sports teams were basketball, softball, soccer, and golf.

Statistical Analysis

Data was analyzed using SPSS Statistics 19 (IBM Corporation, Somers, NY). Differences in the total score and the scores for each construct were analyzed between lean and non-lean sports using a one-way analysis of variance (ANOVA). Differences in scores between sports were analyzed using the Kruskal-Wallis test. An alpha level of 0.05 was used to determine significance.

RESULTS

The results indicate a significant difference between lean and non-lean athletes as shown by the ATHLETE questionnaire, $F(1, 81) = 6.855, p = 0.011$. Table 1 displays the total scores for the ATHLETE survey for each sport. The highest possible score for the survey is 190, which represents the highest risk for DE. The lean sports scored 100.1 ± 17.4 , compared to the non-lean sports scoring 90.1 ± 16.9 . These data indicate that the athletes participating in lean sports displayed a higher prevalence of psychological factors and behaviors associated with disordered eating, compared to athletes in non-lean sports. The Kruskal-Wallis analysis did not show any significant difference between the eight sports for the total score of the ATHLETE survey, $H(7) = 9.022, p = 0.251$.

Figure 1 displays the differences in scores between lean and non-lean sports for each of the six constructs that make up the ATHLETE survey. A higher score in the construct indicates an increased risk of DE.

Table 1. Means \pm standard deviation of sports surveyed based with results of ATHLETE Questionnaire. *Indicates a significant difference between lean and non-lean sports ($p < 0.05$).

Sport	N size	Total ATHLETE Score
Cheer	5	93.2 \pm 18.8
Swimming	14	100.6 \pm 13.4
Volleyball	8	97.3 \pm 15.0
Cross Country	10	105.2 \pm 23.5
Total Lean	37	100.1 \pm 17.4*
Basketball	8	94.3 \pm 18.8
Softball	14	87.4 \pm 16.7
Soccer	20	94.5 \pm 18.2
Golf	4	89.0 \pm 6.5
Total Non-Lean	46	90.1 \pm 16.9*

Note: The total scores for the ATHLETE survey for each sport. The highest possible score for the survey is 190, which represents the highest risk for disordered eating.

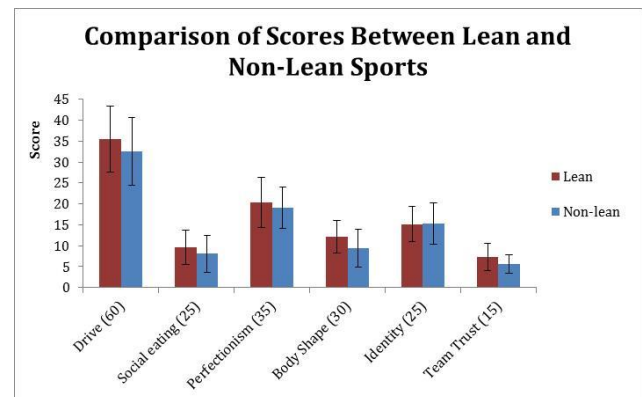


Figure 1. Means \pm standard deviation of scores between lean and non-lean sports for each of the six constructs that make up the ATHLETE survey. Maximum score for each construct is in parentheses. A higher score in the construct indicates an increased risk of DE. *Indicates a significant difference between lean and non-lean sports ($p < 0.05$).

A significant difference between lean and non-lean sports was found for both Social Pressure on Body Shape, $F(1, 81) = 8.458, p = 0.005$, and Team Trust, $F(1, 81) = 8.873, p = 0.004$. Lean athletes averaged 12.2 ± 3.9 on Social Pressure on Body Shape, whereas non-lean athletes averaged 9.4 ± 4.6 . For Team Trust, lean athletes averaged a higher

Table 2. Means \pm standard deviation of scores by sport between each of the six constructs. The maximum score for each construct is shown in parentheses.

Sport	Drive (60)	Social Eating (25)	Perfectionism (35)	Body Shape (30)	Identity (25)	Team Trust (15)
Cheer	35.8 \pm 12	10.6 \pm 5.8	14.2 \pm 5.4	10.8 \pm 2.8	14.8 \pm 3.9	7.0 \pm 3.3
Cross Country	36.9 \pm 4.8	12.2 \pm 4.5	20.9 \pm 3.7	12.8 \pm 3.2	13.9 \pm 5.3	8.5 \pm 3.2
Swim	36.6 \pm 4.8	8.9 \pm 3.1	21.1 \pm 5.2	13.0 \pm 4.8	15.7 \pm 3.8	5.4 \pm 2.1
Volleyball	31.5 \pm 5.6	7.4 \pm 2.6	22.3 \pm 8.3	10.8 \pm 3.2	15.9 \pm 3.9	9.5 \pm 3.0
Basketball	30.1 \pm 7.7	6.4 \pm 3.9	21.8 \pm 3.7	8.4 \pm 5.5	11.9 \pm 5.2	5.8 \pm 3.3
Softball	29.3 \pm 6.7	8.9 \pm 4.3	20.0 \pm 6.0	10.5 \pm 5.0	13.9 \pm 4.6	4.9 \pm 1.5
Soccer	35.6 \pm 8.3	8.7 \pm 4.9	17 \pm 4.1	9.7 \pm 4.3	17.6 \pm 4.3	6.0 \pm 2.0
Golf	33.0 \pm 8.8	6.3 \pm 2.5	21.0 \pm 2.7	6.5 \pm 1.0	16.5 \pm 4.7	5.8 \pm 3.1

score (7.4 \pm 3.3) than non-lean athletes (5.6 \pm 2.2). The data indicates that athletes in lean sports tend to respond more negatively to outside criticism on their body shape and were less likely to trust their teammates than athletes in non-lean sports.

Table 2 displays the differences in scores by sport between each of the six constructs. Statistical analyses indicated a significant difference between sports for Performance Perfectionism, $H(7) = 16.260, p = 0.023$, and Team Trust, $H(7) = 18.602, p = 0.010$. Both cheerleading (14.2 \pm 5.4) and soccer (17 \pm 4.1) athletes scored lower in the Performance Perfectionism construct than the six other sports. This shows that these athletes were less focused on external views of their performance. For Team Trust, both volleyball (9.5 \pm 3.0) and cross country (8.5 \pm 3.2) athletes displayed higher scores, indicating that they were less likely to trust their teammates.

The results of the medical questionnaire did not indicate any significant differences between lean and non-lean sports for any of the questions. Three athletes were previously diagnosed with a clinical ED:

two cross-country runners and one softball player. Both runners displayed signs of increased DE risk on the ATHLETE survey, and one admitted to having a current struggle with anorexia. The previously diagnosed softball player did not show to be currently at risk. Four athletes, one cross country runner, and three swimmers indicated that they could potentially have DE. All three swimmers' results showed positive risk of DE, but the runner did not. Five additional swimmers, whom did not believe they had a CED, had results that indicated a positive risk for DE.

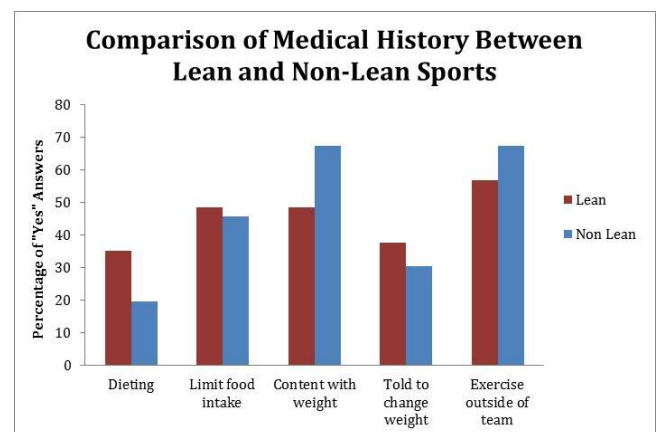


Figure 2. Percentages of affirmations for lean and non-lean athletes for five questions from the medical history questionnaire.

Figure 2 displays percentages of affirmations for lean and non-lean athletes for five questions from the medical history questionnaire that related to dieting, limiting food intake, personal and external satisfaction with weight, and exercise habits. There was no significant difference between lean and non-lean athletes for any of the questions. Overall, 26.5% of all athletes were trying to lose weight through dieting, with 35.1% of lean athletes and 19.6% of non-lean athletes attempting to lose weight. Less than half of both lean and non-lean athletes admitted to limiting their food intake, though eleven athletes (3 non-lean, 8 lean) specifically admitted to skipping meals. Though this is typically a strong indicator of DE, two of those who had skipped meals did not score at risk for DE. On average, lean athletes ate 2.8 ± 0.7 meals per day compared to non-lean athletes eating 2.9 ± 0.6 meals per day. Additionally, lean athletes ate 2.3 ± 1.9 snacks per day compared to non-lean athletes that ate 2.65 ± 1.8 snacks per day. Fourteen athletes indicated that they excluded certain foods from their diet. Amongst the foods listed were red meat, dairy products, gluten, and high fructose corn syrup. However, the restriction of gluten and dairy products may have been related to allergies, which were not addressed in the questionnaire. Of the 33.7% of all athletes who indicated that they were content with their current body weight, nine scored positive for DE risk (3 from non-lean sport, 6 from lean sports). More non-lean athletes (67.4%) indicated satisfaction with their current weight than lean athletes (48.6%). One-third of both types of athletes indicated having been told to alter their weight for sport. Sixty-two percent of the participating athletes (30

non-lean, 19 lean) regularly exercised outside of the required team practice schedule.

DISCUSSION

This study sought to find the prevalence of DE risk among female college athletes and to assess the internal and external factors that appear to increase the risk of DE. Results indicated that lean sport female athletes showed greater risk of DE than non-lean sport athletes, which agrees with previous studies that indicate a higher prevalence of DE among lean sports, affecting over 60% of athletes (12, 13). Results also showed that both internal and external factors affected these athletes' risk of DE, particularly external views of their body satisfaction (8) and performance and internal issues of team trust. The information from the medical history questionnaire supported the notion that the lean athletes demonstrated more tendencies related to DE than non-lean athletes.

The ATHLETE questionnaire was particularly useful in that it indicated specific areas of negative influence with the six subcategories. Based on the data collected and analyzed there was a significant impact of outside influences on lean athletes, showing that female lean athletes allow the media, family, or friends to influence how they feel about their body shape. Rodgers and Charbol theorized that it is possible for females to misjudge parental encouragement for weight management into pressure to become thinner (14); however, the major concern is that the typical female will feel pressured to be thin. In the current study, one-third of the athletes surveyed reported having been

told to alter their body weight for their sport in order to improve performance. This demonstrates that the pressures athletes face regarding their body shape or composition may be a strong contributor to the risk of DE in order to satisfy their coach and improve their athletic abilities.

External pressures for athletic success are also thought to contribute to increased DE risk. Parental pressure, peer influence, and the media have been associated with DE along with body dissatisfaction (14), and specifically peer influence has been found to be a significant predictor of bulimic behaviors (20). This present study found that cheerleading scored significantly lower in this construct than the other sports. However, cheerleading may have scored low in this area because there was a significantly lower sample of cheerleaders compared to other lean sports.

Lean sport athletes demonstrated low scores in team trust in the ATHLETE survey compared to non-lean sports. Considering the lean sports that were surveyed, three out of four sports (cross country/track and field, swimming, cheerleading) are considered to be an individual sport, whereas the non-lean sports only contained one individual sport (golf). Team trust is not a major factor in success in these individual sports, which may explain the lack of it in our lean sports surveyed. The cross country/track and field and volleyball athletes scored the highest in the team trust responses. These positive responses indicated that the athletes in these sports may be less likely to trust their teammates because of competition within the team or fear that their teammates will talk about them to others. Both the

increased level of competition between teammates and the inability to confide in one's teammates about problems can impact nutritional choices and activity habits that may influence DE. Specifically, if an athlete feels competitive with her teammates, she is likely to manifest behaviors that will help her stand out from her teammates. Sixty-two percent of the athletes surveyed reported participating in regular exercise outside of scheduled team practices, which shows strong dedication to maintaining or altering body composition and body image.

Because of the potential for DE to develop into a clinical ED, unhealthy eating behaviors should be monitored in athletes who are consistently engaging in them. Considering the volume of female athletes with disturbed eating habits and DE, special attention must be given to the emotional status of the athlete and typical habits because not every athlete shows physical signs of DE (1). The medical history questionnaires completed by cross-country athletes and swimmers provided valuable insight to athletes' perceptions of DE. Of the three athletes previously diagnosed with a clinical ED, two showed an increased risk of DE and one admitted struggling with anorexia. Also, three of the four athletes who admitted to a possibility of DE showed an elevated risk. Additionally, five athletes showing an elevated risk of DE believed that they followed healthy eating patterns. These results reinforce the need for pre-participation screening to assess athletes for possible DE patterns.

Limitations of this study include the study population was focused in the same private

university, and all participants volunteered providing a convenient population sample. It is possible that any student athletes who did not want to indicate their DE or clinical ED chose not to participate. Another limitation was in our method of self-reported data collection, which the accuracy and truthfulness in the answers are not able to be determined.

As shown by these data, DE is a valid concern in female collegiate athletes. The results from this study reaffirm that athletes who participate in lean sports tend to have a higher risk of DE than non-lean athletes (12, 13) as well as influence a higher risk for the development of another ED. Results also indicate that internal and external pressures both play a role in eating and exercise behaviors of female athletes. While this data helped determine an area of behavioral influence, more research is necessary to determine correlations between the types of pressure, origin of the influence, and the type of sport. Pre-participation screening, such as the ATHLETE survey, may be a valuable tool in assessing the health and safety of female athletes as related to dietary habits. Pre-participation examinations should incorporate questions in the medical history that serve as markers for early signs of clinical ED/DE. Prevention is ideal; methods include detailed athlete education on the dangers and warning signs of DE as well as the importance of and recommendation for a proper diet. For coaches, athletic trainers, and anyone related to the athlete's health, the utilization of the ATHLETE survey in regular assessments of female athletes would help to provide signs and markers for DE and the potential for developing an ED.

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