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## Best Practices for Screening, Identification, and Referral of Female Collegiate Athletes with Disordered Eating

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Best Practices for Screening, Identification, and Referral of Female Collegiate Athletes with  
Disordered Eating

Submitted in partial fulfillment of requirements for the Doctor of Nursing Practice at Eastern  
Kentucky University

By  
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Winchester, KY  
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**Abstract**

Eating disorders have the highest mortality rate of any mental illness, including depression. Female collegiate athletes are at greater risk compared to the non-athlete population. Athletic personnel should be prepared to screen, identify, and refer female athletes for eating disorders. However, most staff are not familiar with common signs and symptoms of disordered eating, which could delay recognition of unhealthy behavior and ultimately long-term health risks. Appropriate screening protocols can assist with early identification. The purpose of this DNP project was improve the knowledge of the athletic staff regarding eating disorder recognition, awareness of university policy for identification and referral of student athletes, and use of reliable screening for all female athletes. Ultimately this project positions athletic personnel to screen, identify, and refer female student athletes appropriately, preventing long-term health and performance consequences.

*Keywords:* disordered eating, eating disorders, female athletes

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## Best Practices for Screening, Identification, and Referral of Female Collegiate Athletes with Disordered Eating.

Eating disorders have the highest mortality rate of any mental illness, including depression (NEDA, 2017). Disordered eating behavior occurs when pathologic eating is present but does not meet diagnostic criteria for a clinical eating disorder by the Diagnostic and Statistical Manual of Mental Disorders (DSM). The DSM-V provides diagnostic criteria for the spectrum of eating disorders to include anorexia nervosa and bulimia nervosa. Anorexia involves less-than or equal-to minimally-acceptable body weight due to restriction of intake, intense fear of weight gain despite significantly low body weight, and disturbance of body image, not recognizing low body weight. Bulimia is defined by recurrent episodes of consuming excessive amounts of food within a short period of time, with no control of food consumption. Inappropriate purging behavior accompanies bingeing episodes, both averaging once a week for three months, including self-induced vomiting, laxative/enema misuse, fasting, and excessive exercise (American Psychological Association, 2013). Regardless of the type of eating disorder, it is a problem for female athletes.

### **Problem Description**

Disordered eating is more prevalent among athletes than non-athletes, particularly in sports where leanness is desired, such as cross-country running and cycling (Joy et al., 2016). Bratland-Sanda and Sundgot-Borgen (2013) report prevalence of disordered eating among female collegiate athletes at 20-62%, with clinical eating disorder-prevalence ranging from 6%-45%. Precise prevalence rates are difficult to identify due to the secretive nature and stigma of the disorder, often causing sufferers to deny or hide their symptoms (Joy et al., 2016).

Additionally, coaches may misconstrue disordered eating behaviors such as over-training and thinness as positive influences to improved sport performance (Sherman et al., 2005).

Disordered eating and eating disorders can result in both health and performance consequences for the female student-athlete (Joy et al., 2016). Previously known as The Female Athlete Triad, the term “Relative Energy Deficiency in Sport (RED-S)” is a potential result of inadequate dietary intake related to expenditure. Physiologic consequences include impairment of metabolic rate, menstrual function, bone health, immune system, cardiovascular health, and protein synthesis (Nattiv, Loucks, & Manore, 2007). Cardiac dysrhythmias may occur when electrolyte balance is disrupted, secondary to inadequate dietary intake. Over-training also increases the athlete’s risk of musculoskeletal injury, thus negatively affecting sport performance (Joy et al., 2016).

Unrecognized and untreated eating disorders have the potential for long-term consequences. These athletes may experience mental health problems, such as depression and anxiety. Chronic amenorrhea and menstrual dysfunction due to low energy availability may affect future fertility, while also causing irreversible bone loss. Binging and purging practices of gorged eating followed by induced vomiting or laxative use may result in damage to the gastrointestinal system, including esophagitis and chronic bowel dysfunction (Mountjoy et al., 2014, O’Brien et al., 2017). Clearly, there is a need to screen and protect these women.

The International Olympic Committee (IOC), American College of Sports Medicine (ACSM), National Collegiate Athletic Association (NCAA), the American Psychiatric Association (APA), and the National Athletic Trainers’ Association (NATA) all advocate for early detection of eating disorder behavior (Mountjoy et al., 2014). In compliance with national recommendations, screening for disordered eating is typically performed as part of the pre-

participation physical exam (PPE). However, tools used for screening are inconsistent across institutions. Knapp, Aerni, and Anderson (2014) discuss the importance for university athletic staff to utilize a screening tool that is valid, reliable, and female athlete-specific to distinguish normal sport training from pathologic behavior. Pope, Gao, Bolter, and Pritchard (2015) report other commonly used screening tools including the Eating Attitudes Test-26 (EAT-26) and Eating Disorder Inventory (EDI), neither of which were developed for use in athletic populations. The Athletic Milieu Direct Questionnaire (AMDQ) and Physiologic Screening Test (PST) were constructed for screening female athletes, but have not been readily utilized given the time intensity to administer and score (Wagner et al., 2014; Martinsen et al., 2014; Knapp et al., 2014).

Regardless of the screening tool used to identify a student athlete with disordered eating, the NCAA (2016) recommends athletic departments have written protocols for mental health referral which specify a contact person/people with whom staff may consult. Typically, the contact person will initiate referral to on-campus mental health providers after interviewing the athlete. Care is to be provided by licensed mental health professionals, preferably with eating disorder experience in the collegiate population. Sudano and Miles (2017) emphasize the importance of readily-accessible mental health services for student athletes, either by self-referral or referral from athletic personnel. Therefore, referral procedures should be clear and accessible to athletic personnel for student athletes suggestive of disordered eating.

### **Available Knowledge**

A review of the literature was conducted to answer the question, among female collegiate athletes with disordered eating, what are the evidence-based recommendations for athletic staff regarding screening, identification, and referral? Eastern Kentucky University's (EKU) online



databases were queried, to include Cumulative Index of Nursing and Allied Health Literature (CINAHL), MEDLINE, PsycINFO, and SPORTdiscus. Keywords initially searched included coach knowledge, eating disorders/disordered eating, athletes, screening for eating disorders, which yielded forty-four results.

An expanded search was necessary to ascertain more appropriate and relevant literature to support the intervention and included keywords sports nutrition, mental health, athletic trainers, and student-athlete. This search generated twenty-one results. Literature was sorted by date, with those within the last ten years being kept. Further inclusion criteria included female athletes (high school and college). Quantitative studies were preferred, with the realization that qualitative evidence may be useful when evaluating the lived-experience of female athletes with disordered eating. Exclusion criteria included male athletes and those under the age of fourteen. The final twelve pieces of worthy evidence were evaluated with Melnyk's Rapid Critical Appraisal Tool (Melnyk & Fineout-Overholt, 2015) and are discussed in context of education standards, screening, and national sports group recommendations.

### **Standards of Practice**

Thompson and colleagues (2007) demonstrated the need for improved knowledge and awareness of student athletes' disordered eating behaviors by reviewing a random sample of 408 collegiate athletic trainers' (AT) perceptions of knowledge. Athletic trainers, along with head/assistant coaches, have frequent contact with student-athletes, allowing them the opportunity to recognize and intervene if disordered eating is suspected or observed. From a 30-item questionnaire, athletic trainers scored lowest in the domains of education and prevention of disordered eating knowledge, suggesting the need for more information. ATs who had attended

an education program within the last year, scored significantly higher than others:  $t=2.15$ ;  $p=0.032$ , supporting the DNP project's annual educational intervention.

A randomized controlled trial (RCT) by Martinsen et al (2015) revealed improved eating disorder-knowledge after two 3-hour education seminars targeting elite sports coaches. Weight regulation practices, signs and symptoms of eating disorders, and prevention/management was presented in each educational session. In addition to live lecture, case scenarios were discussed among the group, with feedback from the group leader. Post-test scores on total knowledge, weight regulation, and specific eating disorder components were significantly higher from coaches in the intervention group, with a large magnitude of effect of 0.91 for weight regulation questions ( $p < 0.001$ ) and 0.61 for eating disorder items ( $p = 0.004$ ).

Whisenhunt et al. (2008) utilized a RCT design to investigate the effect of a 1.5-hour presentation to elite cheer coaches regarding negative coaching behaviors, signs and symptoms of eating disorders, and management of athletes with eating disorders on coaches' knowledge and behavior. The Eating Disorders Knowledge Quiz (EDKQ) contained 10 multiple-choice items, with correct answers given a score of 1, incorrect answers scored as 0. Higher scores indicated greater knowledge. Administered pre and immediately post intervention, mean post-test scores were significantly higher in the intervention group ( $7.75 \pm 1.55$ ) versus control group ( $5.70 \pm 1.26$ ). Magnitude of effect was large at 3.8 for the experimental group immediately post-intervention and at 9-month follow-up (1.12).

Sebbens et al (2016), in a quasi-experiment evaluating the effectiveness of a mental health workshop targeting elite-sports coaches, sports nutritionists, and athletic administrators, discovered increased mental health literacy and confidence to help student athletes post-intervention. A 4-hour workshop on recognizing mental health problems in student athletes was

presented to 166 athletic staff, including coaches, sports nutritionists, and administrators. A pre and post-test design was used to measure knowledge of depression and anxiety, and confidence in knowledge at 2 weeks and 4 weeks post-intervention. Depression and anxiety literacy were measured separately, each with an 11-item questionnaire. Within-group changes over time were significant across all parameters (depression and anxiety literacy and confidence), with  $p < 0.001$  and magnitude of effect moderate for depression literacy (0.5), large for anxiety literacy and confidence to help (0.9, 1.1). Although specific disordered eating content was not part of this educational workshop, symptoms of anxiety or depression may be part of the initial presentation of an eating disorder. Sports personnel must possess skills to recognize these early indicators (Joy, 2016).

A particular concern for student athletes with disordered eating is decreased energy availability resulting from inadequate nutrition. Jacob and colleagues' (2016) quasi-experiment measured accuracy of coaches' nutrition recommendations following two 90-minute programs on sports nutrition guidelines. Forty-one high school coaches from a variety of sports were randomly assigned to the intervention or control group and presented with sports- nutrition information. The intervention (IV) group also received a sports nutrition algorithm at the end of the second program, along with case study discussion. Nutrition knowledge was measured pre and post-intervention with the 69-item Nutrition Knowledge Questionnaire (NKQ). A 1-week post-test revealed significant increase in knowledge of both groups from baseline (72% to 81% IV, 70% to 82% control group). Only the IV group maintained nutritional knowledge at 2-month follow up with scores of 81.5% in the IV group and 78.0% in the comparison group ( $F[2, 74]=3.36; p_{\text{group*time}}=0.04$ ). Results would be more meaningful with a larger sample size, however, they do support a brief educational intervention with decision-making support via

algorithm and case study discussion for athletic staff for ensuring accurate nutrition recommendations for student athletes.

Arthur-Cameselle and Baltzell (2012) collected qualitative data from 16 female athletes in recovery from eating disorders, asking for advice for coaching staff, parents and other female athletes with disordered eating. Common advice for coaches included becoming educated on disordered eating to be more accurately aware of the condition; offer proper nutritional counseling; avoid singling out athletes by body size or weight; show emotional support without judgement; refer to appropriate professionals in a timely manner.

### **Screening of Female Collegiate Athletes**

An observational, quantitative study by Sudano and Miles (2017) examined mental health services among NCAA Division I institutions, specifically credentials of providers and location of services. Athletic trainers (AT) from Division I NCAA-member schools were asked types of mental health clinicians who worked with their student athletes, with the majority (16%) being clinical psychologists, followed by sport psychologist (9.4%) and counseling psychologist (6.3%). ATs were also questioned regarding mental health issues they regularly encounter in the student athlete, the most frequent being depression (98.4%), anxiety (97.6%), and disordered eating (92.1%). Questions of ATs also revealed a lack of consistent use of screening tools for disordered eating/eating disorders of their student athletes.

Kroshus' (2016) cross-sectional study assessed presence of mental health screening practices and protocols within sports medicine departments of NCAA-member organizations. Fewer than half (44.5%) of the 365 team physicians and head athletic trainers reported written or verbal screening practices for disordered eating. Substantial variations were found among institutions regarding methods of screening practices and existence of mental health resources.

Athletic trainers from Division II and III schools, with a higher proportion of student athletes, screened for fewer mental health disorders than Division I institutions. Staffing adequacy was a proposed contributor to this variability.

Wagner et al., (2016) performed a literature review to support use of valid screening tools to recognize disordered eating in female athletes. Three studies of level 3 evidence or higher, identified diagnostic accuracy for the Brief Eating Disorders in Athletes Questionnaire, version 2 (BEDA-Q2), Athletic Milieu Direct Questionnaire, version 2 (AMDQ-2), and Physiologic Screening Test (PST). Diagnostic accuracy was measured by sensitivity, meaning the tool correctly identified student athletes with the disorder, and specificity, allowing the clinician to correctly decide the disorder does not exist. Sensitivity and specificity of PST was 87% and 78%; BEDA-Q2, 82% and 85%; AMDQ-2, 80% and 75%. The BEDA-Q2 was reported to be most feasible to administer with only 9-items, compared to AMDQ-2 with 19 items and PST with 12. All 3 instruments were appropriate for the female elite athlete.

Martinsen and colleagues (2014) emphasize the importance of using an appropriate screening instrument to identify concerning disordered eating behavior in athletes, developing The Brief Eating Disorders in Athletes Questionnaire, version 2 (BEDA-Q2), see Appendix A. The BEDA-Q2 will be implemented as a secondary screening tool by the team physician for any female athlete whose initial screen with the Female Athlete Health Questionnaire is positive. The inexpensive 9-item tool makes it feasible for use in the college sports environment. Items 1-6 question the athletes' perception/feelings of eating, body image, and parental expectations. Responses are Likert scale-scored, weighted as follows: 3= always, 2= usually, 1= often, 0= sometimes, 0= rarely, 0= never. Reverse-scored items are weighted in the opposite manner. Items 7 and 8 elicit a "yes" or "no" response to questions of current or previous dieting. If either

or both are “yes”, item 9 asks the number of times the athlete has tried to lose weight. Positive scores on the BEDA-Q2 warrant further medical and psychological evaluation.

Martinsen et al. (2014) report sensitivity of the BEDA-Q2 to be 82%, specificity 85% and positive likelihood ratio (+LR) 5.4, which supports its use to accurately identify female athletes on the continuum of disordered eating. Wagner and colleagues (2016) provided a grade A to the strength of recommending the BEDA-Q2 for accurately detecting female athletes at risk for eating disorders (based on Grades of Recommendation, Centre for evidence Based Medicine, 2009). Cronbach’s alpha is 0.81 (Martinsen et al., 2014). No data will be collected from the use of the BEDA-Q2. Without identification, treatment and recovery cannot occur.

### **Sports Community Recommendations**

The National Collegiate Athletic Association (NCAA), International Olympic Committee (IOC), and American College of Sports Medicine (ACSM) have all come to recognize the prevalence and seriousness of disordered eating among female athletes. In 2013 the NCAA convened a multidisciplinary task force to address the mental health issues facing competitive athletes, leading to *“Mental Health Best Practices: Understanding and Supporting Student-Athlete Mental Wellness”*, providing recommendations for athletics and sports medicine departments for promoting athlete mental health. The four key components in the collegiate environment include: 1) offer appropriately-trained mental health personnel to provide mental healthcare, 2) establish policies and procedures for identifying and referring student athletes for mental health services, 3) ensure pre-participation mental health screening with validated tools, and 4) provide an environment conducive to and supportive of positive mental health.

Mountjoy and colleagues (2014) reveal scientific advances since 2007 led the ACSM to redefine the Female Athlete Triad (menstrual dysfunction, low bone density, and low energy

availability) to RED-S, or relative energy deficiency in sport. The new term includes a more comprehensive definition, related to disordered-eating, including potential consequences for the athlete's metabolic, immune, cardiovascular, and psychological health. The IOM Consensus group advocates screening all collegiate athletes for RED-S during the pre-participation physical exam, and endorses the BEDA-Q2 as a valid screening instrument for female student athletes. In summary, evidence supports all components of the DNP project, including appropriate screening of female athletes, skills to identify disordered eating, and sport-community guidelines for referral.

### **Theoretical Rationale**

Transformational leadership (TFL) is an influential leadership theory for the athletic community, particularly the relationship between student-athlete and coach. Bass (1985) proposed this theory to focus on the needs of the followers (student-athletes) rather than the leader (athletic staff), through motivating and inspirational behaviors. Other athletic personnel with frequent athlete contact are interchangeable with coach, such as athletic trainer and sports medicine/strength and conditioning staff.

Major components of transformational leadership are shown in Appendix B, and include idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration (Bass, 1985). Turnnidge and Côté (2017) describe inspirational influence as coaches gaining trust of athletes through positive role modeling and display of consistent values; inspirational motivation occurs with coach behaviors that promote team unity and inspire future plans; intellectual stimulation happens with coaches involving athletes in decision-making and promoting critical thinking; individualized consideration transpires through coaches' authentic care and concern for each athlete's unique needs. Individualized consideration is also

demonstrated through intentional support and positive feedback toward student-athletes' psychosocial needs, providing an environment which fosters health and well-being (Bass & Riggio, 2006). The proposed educational intervention for collegiate athletic staff is guided by all components of TFL theory, particularly individualized considerations, which will facilitate athletic staff's demonstration of genuine concern for athletes' personal health, well-being, and optimal sport performance (Turnnidge & Côté, 2017).

### **Specific Aims**

Specific aims of this DNP project were to advance athletic staff's knowledge of accurate screening of female athletes, signs and symptoms of disordered eating, and reinforce University processes to refer student athletes with disordered eating. By ensuring proper screening, identification, and referral of female student athletes with disordered eating to mental health services, they have the opportunity for appropriate treatment and recovery. This may reduce the risk for negative health outcomes of this population.

### **Context**

#### **Setting and Target Population**

The agency for project implementation is the athletic department of Eastern Kentucky University (EKU), a regional Division I institution. EKU offers 17 varsity sports, including over 300 student athletes (113 being female), and is an Ohio Valley Conference member (EKU, 2018). Approximately 2-3 female athletes are identified by staff each year with disordered eating behaviors (Dr. K. Kaiser, personal communication, August 20, 2017). Target population for the project includes athletic administrators, head/assistant coaches, athletic trainers, strength and conditioning staff, and the team physician.

#### **Project Congruence to Agency**



The university Department of Athletics' mission and vision mirror that of the National Collegiate Athletic Association (NCAA), the OVC, and the university. Core priorities include providing “experiences for all student-athletes and staff that foster and promote healthy minds, bodies, and the development of leadership skills.” (EKU Athletic Staff Handbook, 2017, p.12). The Sports Science Institute, a wellness-driven division of the NCAA (2016), advocates for safe environments, evidence-based best practices, and life-long physical and mental development of student athletes.

### **Stakeholders**

Norris and colleagues (2017) highlight the significance of stakeholder engagement in process improvement and practice change. They define stakeholders as persons having a vital interest in outcomes of a project, or who may be affected by or have an effect on practices. University athletic department staff, student athletes, university administrators, and university mental health professionals are all stakeholders of this project. Initial meetings with the university sports medicine director and team physician revealed unrecognized and untreated disordered eating of female athletes as a problem of interest. After sharing prevalence data and potential health and performance consequences with the university athletic director, full project support was granted.

## **Method**

### **Intervention Description**

Prospective project participants were identified for recruitment by their attendance at the annual Department of Athletics Compliance meeting. A cover letter (Appendix C) was included in the envelope provided to all meeting attendees, explaining the study purpose and responsibilities of both the participant and project leader (PL), as well as serving as the invitation

to participate. Explanation included risks and benefits and methods of protecting confidential information. The PL provided assurance that completion of data collection instruments was completely voluntary, and would not affect employment status should potential participants choose not to complete. Only those staff with previous or current contact with female student-athletes were included. Completion of questionnaires constituted informed consent.

The 20-minute staff development training session, as outlined by National Eating Disorders Association (NEDA) Coaches' Toolkit, included risk factors for disordered eating/eating disorders, signs and symptoms, and appropriate management and referral. The session was led by the PL, a certified family nurse practitioner with twenty years of practice experience and currently practices one day per week at ECU Student Health Services. Current ECU policy regarding student-athletes with disordered eating was also reviewed, per the ECU Athletic Staff Handbook. Significance of screening female athletes during the pre-participation physical exam (mandatory for and no cost to athletes) was also discussed in the training session. A 4 x 6" laminated reference tool, including signs and symptoms and referral sources was provided to all participants (Appendix D).

A pre-test, post-test design was used to evaluate the effectiveness of the educational session on athletic staff's ability to identify disordered eating symptoms and behaviors, effectively screen student athletes, and appropriately manage those identified. Pre-tests were completed prior to the training session and returned to the numbered envelope, while the post-test was completed immediately after the training. To protect anonymity of participants and those who chose not to complete data collection instruments, an assistant (DNP team member) collected all envelopes at the end of the session.

The team physician agreed to administer the BEDA-Q2 secondary screening tool to any female athlete who screens positive with the currently-used Female Athlete Health Questionnaire. The BEDA-Q2 will assess risk of the full spectrum of eating disorders, including anorexia, bulimia, and binge eating disorder. Any positive-scored item prompted the team physician to further evaluate or refer the female athlete, based on her professional opinion. No data was collected from the use of BEDA-Q2, although it is now standard policy and included in the ECU Athletic Staff Handbook, Disordered Eating and the Female Athlete Triad Management Plan. As of the current date, the BEDA-Q2 has not been indicated during the PPE (email Dr. Kim Kaiser, October 3, 2018).

### **Resources**

No government agencies/organizations or educational institution provided monetary support. Estimated costs associated with project implementation were minimal. Printing of pre- and post-questionnaires cost approximately \$25.00; manila folders for the questionnaires, approximately \$20.00. Printing, cutting, and laminating of the reference card totaled \$85.00; printing of the BEDA-Q2 \$20.00, for an approximate total of \$150.00. The team physician performing the female athletes' PPE is reimbursed by ECU Athletic Department, an annual salary of \$50,000; utilization of the secondary screening tool is included in that agreement. Athletic staff are required to attend the annual compliance meeting where the educational presentation was provided, therefore no addition cost related to staff-time was incurred.

### **Timeline of Project Phases**

Discussion began with university Sports Medicine director and the team physician in summer of 2017, with regular follow up meetings and emails. A meeting with the PL, Athletic Director, and Director of Athletic Marketing/Senior Women's Administrator, took place on May

2, 2018. Support for the project was received with the approval to implement staff education at the compliance training. International Review Board approval was granted on July 23, 2018. The educational session was presented to athletic staff August 18, 2018.

### **Implementation Framework**

Larrabee's (2009) revised Model for Evidence-Based Practice (EBP) Change (Appendix E) was used to plan and successfully implement a sustainable educational intervention to EKU Athletic staff and a secondary screening tool for the female athlete pre-participation physical exam. The model consists of six steps: 1) assess the need for practice change, 2) locate the best evidence, 3) critically-analyze the evidence, 4) design practice change, 5) implement and evaluate practice change, and 6) integrate and sustain practice change. The project leader could move fluidly between any of the steps, as more information may be needed from earlier steps. The PL initially met with the Director of Sports Medicine and team physician at EKU Fall, 2017 to discuss project ideas/needs of the athletic department and student athletes. Recognition and identification of female athletes with disordered eating by staff was identified as a problem, along with appropriate management and referral once recognized.

As in Larabee's (2009) Model for EBP Change- steps 2 and 3, evidence to support a practice change/intervention was searched and critically-analyzed. Subsequent meetings with Director of Sports Medicine and the team physician followed, as well as DNP project advisor, to design the intervention and practice change (step 4). Implementation of the educational session to Athletic staff occurred August 15, 2018, during a mandatory compliance meeting. Approval to present was granted by the university's athletic director. The BEDA-Q2 secondary screening tool was also implemented in August, with the pre-participation physical exam for female athletes.

### **Measures**

**Demographics.** Each participant completed nine demographic items as part of the questionnaire discussed below. Information obtained included gender, age, current position, years of experience in athletics, and previous exposure to athletes with disordered eating. Sources of previous training on eating disorders was also queried (Appendix F).

**NCAA questionnaire for collegiate coaches (2003).** The 2003 NCAA Questionnaire for Collegiate Coaches of Female Student-Athletes (Appendix F) was chosen to evaluate staff attitudes, beliefs, and behaviors of student athlete eating practices, processes of identifying pathologic eating, and management/referral patterns for those athletes identified with high concern. The authors modified a previous questionnaire by Turk (1999), to arrive at the current version, piloting with a sample of high school coaches to determine readability, ease of use, and time of responding. No reliability or validity data were offered.

Following demographic questions, items 9 and 10 ask participants to rate seriousness of health and performance-related consequences of eating behaviors. Responses were Likert-scale from “not at all serious, somewhat serious, serious, or very serious”. Answers were given a number score for data collection, from 0, 1, 2, or 3, respectively. Higher score indicated more serious perceived behavior. Questions 12, 13, and 14 are “yes, no” answers regarding awareness of female athletes’ menstrual pattern and previous referrals made for concern. “Yes” answers would receive a score of 1, “no” answers a score of 0. Questions 15a, 16a, 17a, and 18a elicit multiple-answer responses regarding who is involved in care of student athletes with disordered eating. Items 15b, 16b, and 17b are one-answer responses of athletic staffs’ actions/behavior with regard to a student athlete with disordered eating. Items 19 and 20 address attitudes regarding recruitment of student athletes with disordered eating, responses are on a Likert-scale ranging from “very important, important, somewhat important, not at all important”. These would be

scored as 1, 2, 3, and 4, respectively. Items 21 and 22 provided a hypothetical case of a student athlete, asking participants to rank their responsive actions, 1=would be done first, 2=would be done second, and so on). Questions 23-26 ask if participants have previously referred a student athlete to a mental health professional, general counselor, dietician, or eating disorder specialist. If so, they are asked to rate the helpfulness of the service, with Likert scale responses 1-4, one being poor, 4 being excellent.

### **Analysis**

Pre-and post-test data was entered by the PL by numerical identifier into Statistical Package for Social Science (SPSS) Version 24.0. Data was sorted into categories of: demographics, identification of disordered behavior and referral/management of disordered eating. A paired-sample *t*-test was conducted to evaluate the impact of the training session on perceived seriousness of health and performance consequences from certain eating behaviors. Other categorical variables without total scoring were analyzed by frequency. Correlation analysis evaluated the relationship of athletic staff's level of experience and prior experience with disordered eating to total perceived health consequences score (pre-test).

### **Ethical Considerations**

Eastern Kentucky University's Institutional Review Board granted exemption approval for the project for a three-year period, on July 23, 2018. Although the PL is employed as faculty at the setting-university, no conflict of interest exists. There is no overlap of teaching responsibilities or frequent interaction between the PL's department of employment and Department of Athletics.

### **Results**

Twenty-three athletic staff members participated in the project from a voluntary convenience-sample. Age of participants ranged from twenty-two years to fifty-eight years of age,  $M=34.13$  years. Sixty percent of participants were female; thirteen staff identified role as coaching staff (56.6%) while 21.7% indicated an administrative role or other ( $n=5$ , respectively). Sports with which participants were directly involved included multiple (43.4%), volleyball (13%), softball, basketball, soccer, and cross country/track (each representing 8.6%). The remaining 10% were distributed between golf and cheerleading. Five of the twenty-three staff members reported no previous training on eating disorders. Of those that reported previous training, most received information by attending lectures ( $n=14$ ).

A paired samples t-test was conducted to evaluate the impact of the training session on athletic staffs' scores on items rating seriousness of disordered eating behaviors, from the 2003 NCAA Questionnaire for Collegiate Coaches of Female Student-Athletes. Seriousness of health consequences of binge-eating, self-induced vomiting, laxative abuse, and excessive exercise were assessed pre- and post-intervention. There was a statistically significant increase in post-intervention scores for all four behaviors, shown in Table 1, Appendix G.

Correlation analysis was performed using Pearson product-moment correlation coefficient, for the relationship between staff's years of experience in athletics and total score for seriousness of certain disordered eating behaviors. Interestingly, this resulted in a negative correlation, finding staff with more years' experience perceived behaviors as less serious,  $r = -0.276$ ,  $n = 21$ ,  $p < 0.01$  than those with less experience. Missing data was recorded for several items that asked participants to choose one response to the questions pertaining to who most frequently determines a female athlete is engaging in disordered eating, what criteria is most often used to determine an athlete is engaging in disordered eating, and what is most frequently

done when a student athlete has been identified. Many participants chose multiple responses, preventing analysis of these variables. These items were preceded by questions that allowed multiple responses, likely contributing to the misunderstanding.

## **Discussion**

### **Summary**

Providing athletic staff with information to better recognize and identify female athletes with risk for eating disorders and appropriately refer those identified resulted in a positive change in staff's beliefs, attitudes, and behaviors related to disordered eating. Staff's perception of seriousness of several disordered eating behaviors increased post-intervention. Initial intervention responses to hypothetical cases were also more appropriate post-intervention. Although no specific data was collected regarding use of the BEDA-Q2, the use of a validated, reliable screening tool that is specific to female student athletes, was adopted to strengthen compliance to evidence-based practice.

### **Interpretation**

The frequent, direct involvement of athletic staff with student athletes provides a unique opportunity and responsibility for staff to recognize disordered eating behaviors. The intervention is in line with the available knowledge supporting athletic staff's ability to identify/recognize disordered eating, appropriately screen, and refer those identified, to improve both physical and mental health outcomes (NCAA, 2016; Wagner et al., 2016; Martinsen et al., 2015; Sebbens, 2016). Further interpretation of behavior change was difficult to assess in the immediate-posttest phase.



The project provided processes to improve identification, screening and referral practices of female collegiate athletes with disordered eating, based on international and national sport-group recommendations and the literature. Regular education for athletic staff on recognizing problematic behaviors, effective screening, and institutional policy regarding management and referral are all included in the process, and supported by the literature. Data which quantifies the number of student athletes screened with the BEDA-Q2, identified with disordered eating, and referred for further evaluation/treatment would further validate the process improvement.

The DNP project is feasible to sustain. The brief educational session on disordered eating risk factors, recognition, management and referral, could be made a standardized program to be offered at the annual compliance meeting each August. The Athletic department could appoint an alternate educator to deliver the session, while the PL will provide all materials and information. The secondary screening tool was added to the Athletic Staff Handbook as part of the pre-participation physical exam screening protocol, with instructions to be used when initial screening is positive for disordered eating.

### **Limitations**

The project methodology had limitations. Assessment of staff's beliefs, attitudes, and behaviors was conducted prior to and immediately following the intervention. Several items from the questionnaire were not able to assess a change due to the lack of opportunity to observe behavior post-intervention. Timing of follow up would have yielded more relevant data if performed at least 2 weeks following the intervention, as conveyed in previous studies (Whisenhunt et al., 2008; Martinsen et al., 2015; Sebbens et al., 2016). Additionally, the length of the measurement instrument and time to complete prevented debriefing of the case scenarios presented in the questionnaire. Time for questions and answers following the intervention was

also impacted as the project implementation occurred as part of the agenda of a scheduled meeting.

### **Conclusions**

In conclusion, college female athletes are at risk for disordered eating. This quality improvement project reiterated the significance of disordered eating among this population and the associated health and performance consequences. Ensuring athletic staff provide best mental health practices to ECU female student athletes will ultimately reduce potential negative health outcomes.

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Appendix A

The Brief Eating Disorders in Athletes Questionnaire (BEDA-Q2)

(Martinsen et al., 2014)

Appendix B

Transformational Leadership Theory

Bass, B. M. & Riggio, R. E. (2006). *Transformational leadership (2<sup>nd</sup> ed)*. Mahwah, NY:  
Erlbaum.



Appendix C

Appendix D

Athletic Staff Resource Card

Appendix E

Model for Evidence-Based Practice (EBP) Change

Larrabee, J. H. (2009). *Nurse to nurse: Evidence-based practice*. New York: McGraw-Hill.

Appendix F

**(Sherman et al., 2005)**

Appendix G