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I, Jennifer Holmes ,

hereby submit this as part of the requirements for the degree of:

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in Health Promotion

It is entitled Athletic Trainer's Knowledge and Confidence Levels in Identifying Female College Athletes With Eating Disorders

Approved by:

Randall R Cottrell

Ruth A Kay

ATHLETIC TRAINERS' KNOWLEDGE AND CONFIDENCE LEVELS IN IDENTIFYING FEMALE COLLEGE ATHLETES WITH EATING DISORDERS

A thesis submitted to the

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by

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Abstract

Title: Athletic Trainers' Knowledge Level and Confidence Level in Identifying Female College Athletes with Eating Disorders

Master's Committee: Dr. Keith A. King (chair), Dr. Randall R. Cottrell

In the 1990's the incidence of eating disorders among college aged females had increased (Johnston & Christropher, 1991) with specific concern for female college athletes. A 1992 NCAA study found that 70% of responding institutions reported at least one case of an eating disorder with the highest prevalence in gymnastics, cross country, swimming, and track (Dick, 1993).

College athletic trainers dealt with athletes on a daily basis and were responsible for identifying and helping athletes with eating disorders. Researchers asserted that the education of athletic trainers on the issue of eating disorders was key in preventing future cases (Turk, 1999).

A comprehensive review of the literature revealed no published study examining college athletic trainers' knowledge of and perceived confidence in identifying athletes with eating disorders. Therefore, the purpose of this study was to assess Division IA and IAA college athletic trainers' knowledge and perceived efficacy expectation regarding female college athletes with eating disorders.

A four-page questionnaire was administered to 236 Division IA and IAA institutions. The survey consisted of questions on knowledge of eating disorders, perceived role and efficacy expectation of the athletic trainer, and demographic information.

There was a 72% overall response rate from all institutions. Results showed that the majority of athletic trainers felt it was their role to identify (strongly agree = 78%) athletes with eating disorders. Most correctly responded to knowledge questions on risk factors, warning signs, and long-term problems of eating disorders. However, only 1 in 4 (27%) felt efficacious in identifying an athlete with an eating disorder and only 1 in 3 (38%) felt efficacious in asking an athlete if she had an eating disorder. Gender and athletic department policy were significant with efficacy expectation and athletic trainers' knowledge did not differ based on gender or athletic department policy.

Based on the findings of this study, it appears beneficial for institutions to have a policy on eating disorders and having a resource person on staff, such a dietician, could also be beneficial. By establishing knowledge and confidence levels, future and continuing education could be focused on identifying and dealing with athletes with eating disorders.

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Chapter One

The Problem

Eating disorders affected 1% to 4% of all young women in the United States (American Psychiatric Association, 1994). Approximately 0.5% to 1% of female adolescents and young female adults met full diagnostic criteria for anorexia nervosa and 1% to 3% met full diagnostic criteria for bulimia nervosa (American Psychiatric Association, 1994). Anorexia nervosa had increased to epidemic proportions ranking it among the major health problems in the United States (Taub & Blinde, 1992). Eating disorders led to severe health consequences such as osteoporosis, ammenorrhea, electrolyte imbalances, heart problems, and even death (American Psychiatric Association, 1994).

The onset age of eating disorders was typically between 14 and 18, however the prevalence of eating disorders among college-aged individuals (ages 18-22) was also problematic and had increased during the past decade (Johnston & Christopher, 1991). One in ten college women reported symptoms that signified clinical or near clinical eating disorders and seven in ten reported body dissatisfaction or the desire to lose weight (Todd, Nichols, Mahamedi, & Keel, 1995).

Among college females there was growing concern with eating disorders especially in college female athletes. A 1992 NCAA study found that 70% of responding institutions reported at least one case of an eating disorder with 90% of those cases occurring in female sports (Dick, 1993). This was a six percent increase from the same study conducted in 1990. The highest prevalence of eating disorders was reported in

gymnastics, cross country, swimming, and track. Such sports emphasizing body weight and size placed an athlete at increased risk for developing an eating disorder. Other risk factors included the level of competition, sport specific training started early in adolescents, and a sudden increase in training volume.

Female college athletes were in daily contact with coaches and often sought their respect and advice. Any critical statements or misguided advice offered by coaches regarding unhealthy eating practices increased the athlete's risk for developing an eating disorder. It was therefore important for coaches to be knowledgeable about eating disorders and to promote healthy eating habits. In 1999, a national study of college coaches in NCAA division IA schools found that there was great need for coaches to increase their knowledge about eating disorders in the areas of etiology, identification of signs and symptoms, management and treatment, risk factors, education, and prevention (Turk, Prentice, Chappell, & Shields, 1999).

College athletic trainers also dealt with college athletes on a daily basis. Their primary responsibility was to assist athletes in maintaining optimal health. This responsibility included identifying athletes with eating disorders, identifying athletes at risk, preventing the development of eating disorders, and intervening when necessary. If such steps were missed or overlooked, then athletes with eating disorders were often not detected and in turn failed to receive the help they needed. Researchers asserted that the education of athletic trainers on the issue of eating disorders was key in preventing future cases (Turk et al., 1999). Therefore, it was recommended that college athletic trainers be properly educated about the extent, etiology, and prevention of eating disorders. In addition, athletic trainers were encouraged to develop the knowledge and self-confidence

to identify the risk factors for eating disorders. However, a comprehensive review of the literature revealed no published study examining college athletic trainers' knowledge of and perceived confidence in identifying athletes with eating disorders. Information gained from this population could be helpful in directing future professional preparation and continuing education of athletic trainers.

Statement of the Problem

The purpose of this study was to assess Division IA and IAA college athletic trainers' knowledge and perceived efficacy-expectation regarding female college athletes with eating disorders. More specifically, the following research questions were addressed.

Research Questions

1) Does working at a university with an institutional policy on eating disorders affect athletic trainers' knowledge about eating disorders?

2) Does working at a university with an institutional policy on eating disorders affect athletic trainers' perceived efficacy expectation in identifying female college athletes with eating disorders?

3) Does believing that it is the role of athletic trainers to identify female college athletes with eating disorders affect athletic trainers' knowledge about eating disorders?

4) Does believing that it is the role of athletic trainers to identify female college athletes with eating disorders affect athletic trainers' perceived efficacy expectation in identifying female college athletes with eating disorders?

5) Does gender affect athletic trainers' knowledge about eating disorders?

6) Does gender affect athletic trainers' perceived efficacy expectation in identifying female college athletes with eating disorders.

Hypotheses

Hypothesis 1.1 Does working at a university with an institutional policy on eating disorders affect athletic trainers' knowledge about eating disorders?

Null Hypothesis. There is no difference in eating disorder knowledge between athletic trainers working at a university with an institutional eating disorder policy and athletic trainers working at a university without an institutional policy.

Predictive Hypothesis. Athletic trainers working at a university with an institutional eating disorder policy will have higher eating disorder knowledge levels than athletic trainers working at a university without an eating disorder policy regarding eating disorders.

Alternative Hypothesis. Athletic trainers working at a university with an institutional eating disorder policy will have lower eating disorder knowledge levels than athletic trainers working at a university without an institutional policy regarding eating disorders.

Hypothesis 1.2 Does believing that it is the role of athletic trainers to identify female college athletes with eating disorders affect athletic trainers' knowledge about eating disorders?

Null Hypothesis. There is no difference in eating disorder knowledge between athletic trainers who perceive it to be their role to identify female college athletes with eating disorders and athletic trainers who do not perceive it to be their role to identify athletes with eating disorders.

Predictive Hypothesis. Athletic trainers who perceive it to be their role to identify female college athletes with eating disorders will have higher eating disorder knowledge

levels than athletic trainers who do not perceive it to be their role to identify female college athletes with eating disorders.

Alternative Hypothesis. Athletic trainers who perceive it to be their role to identify female college athletes with eating disorders will have lower eating disorder knowledge levels than athletic trainers who do not perceive it to be their role to identify female college athletes with eating disorders.

Hypothesis 1.3 Does gender affect an athletic trainer's knowledge level of eating disorders?

Null Hypothesis. There is no difference in knowledge of eating disorders between male athletic trainers and female athletic trainers.

Predictive Hypothesis. Female athletic trainers will have higher eating disorder knowledge levels than male athletic trainers.

Alternative Hypothesis. Female athletic trainers will have lower eating disorders knowledge levels than male athletic trainers.

Hypothesis 2.1 Perceived Does working at a university with an institutional policy on eating disorders affect athletic trainers' perceived efficacy expectation in identifying female college athletes with eating disorders?

Null Hypothesis. There is no difference in perceived efficacy-expectation between athletic trainers working at a university with an institutional eating disorder policy and athletic trainers working at a university without an institutional eating disorder policy.

Predictive Hypothesis. Athletic trainers working at a university with an institutional eating disorders policy will have higher efficacy-expectation levels in

identifying female college athletes with eating disorders than athletic trainers working at a university without an institutional eating disorder policy.

Alternative Hypothesis. Athletic trainers working at a university with an institutional eating disorder policy will have lower efficacy-expectation levels in identifying female college athletes with eating disorders than athletic trainers working at a university without an institutional eating disorder policy.

Hypothesis 2.2 Does believing that it is the role of athletic trainers to identify female college athletes with eating disorders affect athletic trainers' perceived efficacy expectation in identifying female college athletes with eating disorders?

Null Hypothesis. There is no difference in perceived efficacy expectation in identifying college female athletes with eating disorders between athletic trainers who perceive it to be their role to identify female college athletes with eating disorders and athletic trainers who do not perceive it to be their role to identify female college athletes with eating disorders.

Predictive Hypothesis. Athletic trainers who perceive it to be their role to identify female college athletes with eating disorders will have a higher efficacy expectation level in identifying female college athletes with eating disorders than athletic trainers who do not perceive it to be their role to identify female college athletes with eating disorders.

Alternative Hypothesis. Athletic trainers who perceive it to be their role to identify female college athletes with eating disorders will have a lower efficacy expectation level in identifying female college athletes with eating disorders than athletic trainers who do not perceive it to be their role to identify female college athletes with eating disorders.

Hypothesis 2.3 Does gender affect athletic trainers' perceived efficacy expectation in identifying female college athletes with eating disorders?

Null Hypothesis. There is no difference in perceived efficacy expectation in identifying female college athletes with eating disorders between male athletic trainers and female athletic trainers.

Predictive Hypothesis. Female athletic trainers will have a higher efficacy expectation level than male athletic trainers in identifying female college athletes with eating disorders.

Alternative Hypothesis. Female athletic trainers will have a lower efficacy expectation level than male athletic trainers in identifying athletes with eating disorders.

Delimitations

1) This study was limited to head certified athletic trainers practicing in NCAA Division IA and IAA schools in the United States.

Limitations

This study was limited by the following facts:

1) The willingness of the respondents to answer honestly on the survey.
2) The resources available to survey all division IA and IAA schools
3) The number of survey forms completed and returned.

Assumptions

All participants read and understood the survey questions and responded with honesty.

Operational Definitions

1. NCAA Division IA and IAA- Colleges and universities that are members of the National Collegiate Athletic Association (National Collegiate Athletic Association, 2000) and have met all requirements to compete at the level of Division IA and IAA football.

2. Certified Athletic Trainer – A person who has taken and passed the National Athletic Training Association's certification exam.

3. Eating Disorder Knowledge Level – This was determined by three 'check all that apply' type questions on how knowledgeable athletic trainers were about eating disorders.

4. Efficacy Expectation – This was determined by a five question, seven point, Likert-scale questionnaire. The Likert-scale ranged from strongly agree to strongly disagree to assess the athletic trainer's belief that executing a particular behavior will produce a desired outcome.

Chapter Two

Review of Literature

Eating disorders were a concern in female collegiate athletics (Dick, 1991). Specific sports that emphasized body weight and size put an athlete at even greater risk for developing an eating disorder (Picard, 1999; Sundgot-Borgen, 1994; Sundgot-Borgen, 1993b). Eating disorders had long-term consequences, possibly even death. It was often the coach and/or the athletic trainer who was in a position to detect and intervene with athletes suffering from eating disorders (Johnson & Tobin, 1991). No research had assessed the knowledge and confidence of athletic trainers in dealing with eating disorders.

A comprehensive review of the literature revealed no published study examining college athletic trainers' perceptions of college athletes with eating disorders. Information gained from this population could be helpful in directing future professional preparation and continuing education of athletic trainers. Therefore, the purpose of this study was to assess Division IA and IAA college athletic trainers' knowledge and perceived efficacy expectation regarding female college athletes with eating disorders.

Eating disorders included anorexia nervosa, bulimia nervosa, and eating disorders not otherwise specified. According to the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-R) (American Psychiatric Association, 1994), anorexia nervosa was characterized by a refusal to maintain minimal body weight for normal age and height, an intense fear of becoming fat or overweight when actually underweight, a distorted body image, and amenorrhea. An

anorexic person restricted eating and often exercised excessively. Some anorexics also binged and purged by means of self-induced vomiting, laxatives, and/or diuretics. The average onset for anorexia nervosa was between the ages of 14 and 18 and was often initiated by a stressful life event such as leaving home for college (American Psychiatric Association, 1994).

The effects of anorexia were very severe and could result in death. Heart failure, irregular heart rhythms, osteoporosis, and starvation commonly occurred. It was often characteristic of anorexics to be perfectionists, overachievers, and appear in control, however they had low self-esteem and low confidence (American Psychiatric Association, 1994).

Bulimia nervosa was characterized by recurrent episodes of binge eating in a discrete amount of time, a feeling of loss of control while binge eating and purging. Purging included self-induced vomiting, laxatives, or diuretics, fasting, and/or excessive exercising to prevent weight gain. Binge episodes occurring at least twice a week for three months and an exaggerated concern with body weight were necessary to be properly diagnosed as bulimic (American Psychiatric Association, 1994).

Bulimia led to electrolyte imbalances, damage to the heart, inflammation of the esophagus, and erosion of the tooth enamel. It was often characteristic of the bulimic to have difficulty dealing with and controlling impulses, stress, and anxiety (American Psychiatric Association, 1994).

The final eating disorder classification was eating disorders not otherwise specified. This category included those who did not meet all diagnostic criteria for anorexia or bulimia but did possess similar symptoms and characteristics of each. More

specifically, this category included those who met behavioral criteria for anorexia but maintained normal weight and regular menses, those who met behavioral criteria for bulimia but the frequency of binging was less than twice a week for three months, and those who used inappropriate compensatory behaviors when normal weight was maintained and a small amount of food was eaten (American Psychiatric Association, 1994).

Eating disorders affected approximately 1% to 4% of the overall population. Nine out of every ten eating disorder cases involved females. There was a 10% mortality rate in the anorexic population. One percent to three percent of adolescents and young females met the diagnostic criteria for bulimia (American Psychiatric Association, 1994).

In the college population it was estimated that between 1% and 2% of college aged females had anorexia nervosa (Pope, Hudson, & Yurlegun-Todd, 1984). Approximately 6% to 8% of college-aged females had bulimia (Katzman, Wolchik, & Braver, 1984). The prevalence of eating disorders in the college setting varied among studies due to the instrument of measurement, sample size, and the under reporting of eating disorders by college students. Certain college populations such as athletes, dance majors, and dietetic majors were at greater risk.

Eating Disorders in College Female Athletes

The college athletic population was a group of concern related to eating disorders. The prevalence of eating disorders ranged from 1% to 39% among athletes (Warren, Stanton, & Blessing, 1990). A 1992 study conducted by the National Collegiate Association (NCAA) found that 70% of the 443 responding institutions reported at least

one case of an eating disorder with 90% of those reports being in women's sports (Dick, 1993). This was a 6% increase over the same study done in 1990 (Dick, 1991,1993). The highest percentage of female athletes with eating disorders was found in gymnastics, cross-country, swimming, and track. For males the highest percentage was in wrestling (Dick, 1993).

A later study of athletes at NCAA Division I schools found that no females (0%) and no males (0%) met DSM-IV criteria for anorexia. No males (0%) met criteria for bulimia, and 1.1% of females met diagnostic criteria for bulimia. In this study, 9.2% of females had a clinically significant problem with bulimia and 2.85% had a clinically significant problem with anorexia. Slightly over ten percent of females binged weekly or more and 5.52% exhibited purging behavior, which included vomiting, laxatives, and diuretics (Johnson, Powers, & Dick, 1999). Variations in prevalence found between studies were due to differences in defining eating disorders.

A thorough study done on eating disorders in elite female athletes utilized both written questionnaires and interviews. Just more than 1% met diagnostic criteria for anorexia nervosa, 8.0% met diagnostic criteria for bulimia, and 8.2% met criteria for anorexia athletica. Athletes with anorexia athletica met some, but not all diagnostic criteria for anorexia nervosa. Eating disorders and the use of pathogenic weight control methods were higher among athletes competing in aesthetic and weight dependent sports as opposed to sports where weight was less of a factor (Sundgot-Borgen, 1993b).

A study by Beals, Manore, Dueck and Skinner (1998) found that of 425 female collegiate athletes, 15% had at risk behaviors for eating disorders, 26% had menstrual dysfunction (amenorrhea), and 42% were purposely restricting energy intake for weight

control. The study also found that athletes participating in aesthetic sports weighed significantly less than those in endurance or strength sports.

Rosen, McKeag, Hough, and Curley (1986) found that 32% of 182 female college athletes practiced weight control behaviors including self-induced vomiting, binging more than twice a week, laxatives, diet pills, and diuretics. These pathogenic weight control methods were extremely prevalent in gymnasts at 74% and distance runners at 47%.

Some studies questioned the problem of eating disorders in the athletic population. Warren and colleagues (1990) found that the typical college athlete was in the acceptable range for body mass and eating patterns. Cross-country runners were even at a slightly lower risk for body dissatisfaction than non-athletic persons and only gymnasts were at greater risk for preoccupation with weight.

Sundgot-Borgen (1993b) used a written questionnaire and then individually interviewed subjects to determine if athletes had eating disorders. By using this technique Sundgot- Borgen found that athletes were under-reporting eating disorders on the questionnaires. Another study examining elite female athletes found no reports of eating disorders identified via questionnaires, however two years following the study, 18 of the athletes had received treatment for eating disorders (Wilmore, 1991). A third study examining 14 nationally ranked female distance runners found a possible eating disorder problem with three of the subjects via questionnaires. Seven subjects, however, were subsequently diagnosed and treated for eating disorders (Wilmore, 1991). These studies demonstrated that questionnaires and surveys were not accurate in identifying eating disorders.

Many studies in the area of eating disorders and collegiate athletics were questionable due to small sample size and differing criteria used to determine if an eating disorder was present. Some studies found that using self-reporting or survey techniques resulted in an under representation of the actual number of eating disorders (Sundgot-Borgen, 1993b).

The Physical Consequences For Collegiate Female Athletes With Eating Disorders

The collegiate female athlete with disordered eating not only had to worry about performance, but also short and long-term effects of her nutritional practices. Anorexia had the potential to cause severe physical consequences such as abdominal pain, dry skin, peripheral edema, osteoporosis, cardiac problems, and impaired renal function. Bulimia caused eroded tooth enamel, enlarged salivary glands, electrolyte imbalances, and GI problems. Both had the potential to cause death (American Psychiatric Association, 1994).

Lack of nutritional intake often led to amenorrhea, a cessation of the menstrual cycle, and osteoporosis, a decrease in bone density. The combination of eating disorders, amenorrhea, and osteoporosis was known as the female athlete triad. It usually occurred in physically active girls and women. Those participating in sports that required low body weight or endurance sports were at increased risk for the development of the triad. It was usually the pressure to maintain low body weight that underlined the development of the female athlete triad (Otis, Drinkwater, Johnson, Loucks, & Wilmore, 1997).

Beals, et al. (1998) found that of 425 female college athletes 26% had menstrual dysfunction (amenorrhea) and other studies found the prevalence of amenorrhea in

athletes ranged from 3.4% to 66% (Loucks & Horvath, 1985; Otis, 1992). Picard (1999) found that lean athletes had significantly more irregular menstrual cycles.

Typical signs of the triad include rapid weight loss and recurrent stress fractures from the decrease in bone density. The effects of the triad also included a decrease in performance, fatigue, anemia, electrolyte imbalances, depression, and a decrease in fat and muscle mass (Yeager, Agostini, Nattiv, & Drinkwater, 1993).

Dueck, Matt, Manore, and Skinner (1996) found that through a 15 week diet and training treatment, amenorrheic athletes went from a negative to a positive energy balance, body fat increased, and the menstrual cycle was reestablished. Often, athletes believed that menstrual dysfunction was an indicator of quality performance, however, performance levels actually increased as the energy balance was increased.

Risk Factors Leading to Eating Disorders in Collegiate Female Athletes

The prevalence of eating disorders in athletes had been found to be higher than in non-athletes (Sundgot- Borgen, 1993b). There was substantial speculation as to why the athletic population was at increased risk for eating disorders. Several studies found that sports emphasizing body weight and leanness had the highest occurrence of eating disorders (Picard, 1999; Sundgot-Borgen, 1993; Sundgot-Borgen, 1994).

A study by Picard (1999) found that the level of competition was a factor in the development of eating disorders in female collegiate athletes. Those competing in a higher level of competition showed more signs of problem eating and were at increased risk for the development of eating disorders.

According to Sundgot-Borgen (1994) some at risk athletes reported beginning sport-specific training and dieting earlier than others. Choosing a specific sport early in adolescents made it difficult to choose an appropriate sport for a body type that was not fully developed. Other athletes felt puberty occurred too early and because of the extra weight, optimal performance could not be met. This provided another incentive for dieting. Additional risk factors included prolonged periods of dieting, frequent weight fluctuations, a sudden increase in training volume and traumatic events such as injury or the loss of a coach.

Many athletes dieting to increase performance reported that losing weight was recommended by a coach. Rosen and Hough (1988) found that 75% of athletes that were told to lose weight started using pathogenic weight control methods. It was not reported how many actually developed eating disorders. Sundgot-Borgen (1994) reported that 75% of those athletes that did not have an eating disorder and were told to lose weight had guidance during the weight loss process. Only 10% of those with eating disorders instructed to lose weight had guidance during the weight loss process. Unsupervised dieting put an athlete at increased risk for developing an eating disorder.

Personality was another factor to be considered. Certain personality traits typical of people with eating disorders were also exhibited in athletes. Athletes and those with eating disorders share certain personality traits which included being a perfectionist, persistent, and independent. These qualities could help to succeed in athletic performance, however, they also placed an athlete at greater risk for developing an eating disorder (Yates, 1991).

One study discovered that eating disorder symptoms were significantly influenced by the socio-cultural pressure for thinness, athletic performance and anxiety, and negative self-appraisal of athletic achievement (Williamson et al., 1995). If these factors led to over concern with body shape and size, it was likely that an eating disorder would develop. Through this study it was determined that eating disorders were multifaceted and many factors played into their development.

College Professionals' Role Regarding College Female Athletes With Eating Disorders

The two professionals most in contact with athletes were coaches and athletic trainers. Turk et al. (1999) found that coaches in NCAA Division IA schools needed to increase their knowledge base about eating disorders in the areas of etiology, identifying signs and symptoms, management and treatment, risk factors, and education and prevention. Coaches were also surveyed on their confidence in responding correctly to questions about eating disorders among athletes. It was found that education and prevention of eating disorders had the highest rating of confidence, however, it was the domain with the lowest percentage of correct answers. This had serious implications for an athlete who came to a coach for advice. Educational programs on eating disorders for coaches and athletes were seldom sponsored by athletic departments and there was poor communication between athletic departments and coaches concerning the accessibility of educational resources on eating disorders.

The advice given by coaches had a major influence on athletes. If a coach told an athlete to lose weight, the athlete tended to see it as necessary to increase performance. This belief possibly led to excessive dieting and even an eating disorder. Inaccurate

advice was possibly detrimental considering not enough coaches and athletic trainers had proper education about eating disorders (Sundgot-Borgen, 1993a). According to Sundgot-Borgen (1993a), pathogenic weight control methods were recommended to athletes by coaches without formal education on eating disorders. Coaches with formal education had better knowledge of eating disorders, which helped in recognizing the signs and symptoms in athletes. Sixty-six percent of coaches believed that they were responsible for determining the weight of their athletes at the time of competition. Fifty-six percent of female coaches and 40% of male coaches supervised the dieting practices of their athletes, which reduced the risk of developing an eating disorder.

Athletic trainers were also responsible for prevention, detection, and intervention with eating disorders. The athletic trainer needed information on eating disorders that included signs, symptoms, handling a suspected problem, and treatment options so that early detection and intervention were possible. Educational materials on eating disorders were available through the NCAA and were used to educate trainers, coaches, and administrators (Grandjean, 1991).

Awareness of inappropriate behaviors and actions of the athletic staff reduced the risk of triggering eating disorders. Not emphasizing weight as a factor on performance, never encouraging purging behaviors, and having private weigh-ins to reduce athlete anxiety were all actions that were recommended. Policies, procedures, and behaviors of the athletic staff were examined to ensure the staff was not contributing to the development of an eating disorder (Grandjean, 1991).

The relationship between an athlete and athletic trainer was based on trust. Because of that trust, athletes often disclosed personal information, including information

about having an eating disorder. The athletic trainer recognized the seriousness of the situation and referred the athlete. If the athlete desired, the trainer was included in the treatment process, however, treatment was primarily handled by a professional (Grandjean, 1991).

Some athletic trainers had had a few nutrition courses and provided some nutritional services. However, simply having a nutrition course did not ensure information was received on recognizing and treating eating disorders. Due to other job responsibilities, athletic trainers were often too busy to provide necessary nutritional guidance to athletes (Short, 1994).

Coaches and athletic trainers were in contact with athletes on a daily basis and provided guidance, but were coaches and athletic trainers qualified to give nutritional advice to athletes? According to Parr, Porter, and Hodgson (1984), athletic trainers had a better nutrition background than coaches and athletic trainers believed that they were primarily responsible for the athlete's nutrition. Seventy-three percent of athletic trainers had a formal course in nutrition and 61% of coaches had no formal background. Coaches and athletic trainers were mainly concerned with fluid intake while the primary concern of athletes was weight.

Athletes, although in contact with coaches and trainers on a regular basis, did not rely on them as a primary source of nutritional information. Athletes mainly relied on parents for such information. Written materials, advertisements, pamphlets, labels, and television were second behind parents (Parr et al., 1984).

Coaches influenced athletes and their nutritional attitudes, however, the athlete's own nutritional knowledge also played a role. Nutritional knowledge was a factor in the

eating practices of athletes, but knowledge alone was not enough to ensure quality eating practices. Athletes only used and internalized information that was relevant to their own situation (Witta, Stombaugh, & Buch, 1995).

Collison, Kuczmarski, and Vickery (1996) performed a study on a nutrition education program that included nutritional knowledge, attitudes, and nutritional intake of athletes. The program increased nutritional knowledge and attitude scores, however, there was no significant impact on dietary practices. It was found that the program needed to be more personable and focus on additional factors that influenced food selection.

Institutions had found the role of a sports nutritionist very beneficial in the realm of nutrition and eating disorders. A sports nutrition program was beneficial when the nutritionists understood the athletic culture, physiological milestones, and life stressors involved within the athletic population (Vinci, 1998).

The University of Minnesota's Women's Intercollegiate Athletics Department created an approach to help recognize, intervene, refer, treat, and rehabilitate athletes with nutritional or eating disorders. If a coach felt an athlete should lose weight, the athlete was referred to a nutritionist for body composition and nutritional counseling. Weight loss was never recommended during the competition season and all coaches received a handbook which contained information on eating disorders (Wollenburg, 1991).

The first university in the country to implement a full-time sports nutritionist position was Penn State University. Creating the position had many positive effects. A sports nutritionist developed educational materials specific to each team, collected body

composition data, provided guidance to coaches and trainers regarding an athlete's weight, planned meals, developed policy, and counseled athletes. A sports nutritionist played a vital role in helping athletes with eating disorders. The nutritionist developed eating disorders policy, counseled athletes with eating disorders, and educated coaches, athletic trainers, and athletes (Clark, 1994).

Prevention of Eating Disorders

The first step in the prevention of eating disorders was education. Coaches, athletic trainers, and athletes needed to be educated on the causes, identifying signs, symptoms, management, treatment, risk factors, and prevention of eating disorders. The athletic department needed to take responsibility for nutrition education programming that included specific information on eating disorders (Turk et al., 1999).

Another prevention technique was developing a risk management team. The risk management team included coaches, athletic trainers, sports nutritionists, doctors, and psychologists. At the fist sign or symptom of an eating disorder the risk management team became involved and utilized services available (Rhea, Jambor, & Wiginton 1996).

Coaches needed to play a larger role in the prevention of eating disorders by not placing emphasis on weight. Critical statements or misguided advice by a coach put athletes at risk for developing unhealthy eating practices. The potential existed for coaches to help prevent eating disorders by de-emphasizing body weight, not having group weigh-ins, and discouraging dieting and pathogenic weight control methods.

Prevention was also thought to occur during pre-participation physical examinations. At the University of Washington a screening was performed by an athletic

trainer, a doctor, a psychologist, and a nutritionist. Body composition was determined so that realistic weight goals could be set for the entire year. Eating disorders screening test were also given (Wollenburg, 1991).

The NCAA became involved with the prevention of eating disorders in collegiate athletics in 1989. The NCAA distributed informational videotapes and printed materials on "Nutrition and Eating Disorders in Collegiate Athletics" to all association member institutions. However, it was found many institutions did not utilize the materials (Dick, 1993).

Self Efficacy

Little research was done in assessing the knowledge and confidence of athletic trainers in dealing with eating disordered athletes. However, many other professions had determined confidence levels by using the self-efficacy model, which is a portion of the social cognitive theory. One such profession was teachers. In a study by Perry-Casler, Price, Telljohann, and Chesney (1997) perceived self-efficacy for teaching a tobacco prevention program to students was successfully determined. Self-efficacy had also been used in physical activity, disease management, and smoking cessation.

The self-efficacy model was based on an individual's belief that their ability to perform a behavior would produce a desired outcome. This belief determined which activities a person participated in, how much effort was exerted, and how long the effort lasted (Bandura, 1997). The higher self-efficacy one had the more likely that a given behavior would be repeated. However, self-efficacy was specific to a given behavior.

The three main components of self-efficacy were efficacy expectations, outcome expectations, and outcome values. Efficacy expectation was a person's belief that he/she could execute a particular behavior to produce a desired outcome. Outcome expectation was the belief that a specific behavior would produce a desired outcome. Outcome value was the worth a person placed on the desired outcome of a specific behavior (Bandura, 1997). Factors that influenced self-efficacy include such things as age and education (Clark & Dodge, 1999).

Self-efficacy had also been used to help those who suffered from an eating disorder. Self-efficacy was assessed on acceptance of one's body, the urge to binge, and performing stimulus control techniques. Each of these components were important in the prediction of bulimic behavior after treatment (Schneider, O'Leary, & Agras, 1987).

Summary

Eating disorders were a problem in society, particularly among the female athlete population. Specific sports concerned with aesthetic appeal and emphasizing leanness, put an athlete at greater risk for developing an eating disorder. The physical consequences of eating disorders were possibly dangerous and early intervention was key to preventing permanent damage.

An eating disorder was a serious medical condition that needed to be handled by professionals. Coaches and athletic trainers often intervened with eating disorders; yet, few studies had examined the knowledge of athletic trainers. Misguidance by coaches or athletic trainers possibly contributed to triggering eating disorders. The purpose of this study was to assess the knowledge and confidence levels of collegiate athletic trainers in dealing with athletes' eating disorders. Further, the study was designed to determine if

differences existed in knowledge and confidence level based on institutional policy, perceived responsibility, and gender of athletic trainers. Information from this study was helpful in directing future professional preparation and continuing education efforts with athletic trainers.

Chapter Three

Methods

Anorexia nervosa and bulimia nervosa were eating disorders that plagued many collegiate athletes. A nationwide study of NCAA Division IA and IAA institutions indicated that 70% of these institutions reported having at least one eating disorder case, a 6% increase from 1990 (Dick, 1993). Among female college athletes, the prevalence rate of eating disorders ranged up to 39% (Warren et al., 1990). This prevalence rate compared to 1% for females in the general population.

Since athletic trainers were in contact with athletes on a daily basis, some researchers asserted that the education of athletic trainers on the issue of eating disorders was key in preventing future cases (Turk et al., 1999). Therefore, college athletic trainers needed to be properly educated about the extent, etiology, and prevention of eating disorders. In addition, athletic trainers needed to feel knowledgeable of and efficacious in identifying the risk factors for eating disorders.

A comprehensive review of the literature revealed no published study examining college athletic trainers' perceptions of college athletes with eating disorders. Therefore, the purpose of this study was to assess Division IA and IAA college athletic trainers' knowledge and perceived efficacy expectation regarding female college athletes with eating disorders.

Participants

The participants in this study were all trainers certified by the National Athletic Trainers Association as athletic trainers. Each subject held a position as a head-certified

athletic trainer at NCAA Division IA and IAA institutions. Names and addresses were obtained through the National Athletic Directors Association 2000 directory. All 236 institutions that were Division IA or IAA were surveyed. Participation in the study was voluntary and confidential.

Instrumentation

A four page, 53-item questionnaire was developed based on a comprehensive review of the literature (Appendix A). The questionnaire consisted of nine sections which included efficacy expectation, outcome expectation, outcome value, attitude towards eating disorders, experience in dealing with athletes with eating disorders, knowledge of issues associated with eating disorders, sources of information, appropriate intervention steps to be taken, and demographic information. Each of these sections are described below in detail.

Efficacy Expectation Subscale. Efficacy expectation was the belief that one can execute a particular behavior to produce a desired outcome (Bandura, 1977). The questionnaire in the present study evaluated the athletic trainers' efficacy expectation by using five questions. More specifically, these questions evaluated the athletic trainer's belief that he/she could effectively identify an athlete with an eating disorder, could talk with coaches to determine whether an athlete had an eating disorder, ask an athlete if he/she had an eating disorder, and could refer an athlete with an eating disorder to a psychologist or nutritionist. Each of the five questions employed a seven point Likert scale with one representing "strongly disagree" and seven representing "strongly agree." Thus, the total points for this subscale potentially ranged from 5 to 35. Six questions employed a seven point Likert-scale and was included to evaluate the athletic trainer's

outcome expectation but were not included as a part of the current study. Three questions employed a seven point Likert-scale to evaluate outcome value, but were not part of the current study

Attitudes Towards Eating Disorders. Nine questions were included to evaluate the attitudes of the athletic trainers. Questions evaluated athletic trainers attitudes toward their role in dealing with eating disordered athletes, toward coaches, toward the athletes with eating disorders, toward their educational background, toward their continuing education training, and toward the role of a registered dietician being on an athletic department staff. These nine questions employed a seven point Likert scale with one representing "strongly disagree" and seven representing "strongly agree." Thus the total points for this subscale potentially ranged from 9 to 63. Whether the athletic trainer believed it was their role to identify an athlete with an eating disorder was the only item used in this study. The remaining findings were not included in this study.

Appropriate Intervention Steps to be Taken. This section included two questions on how the athletic trainer would act in the event an athlete developed an eating disorder. Each of the responses employed a seven point Likert scale with one representing "strongly disagree" and seven representing "strongly agree." The findings of this section were not included in the present study.

Knowledge of Issues Associated with Eating Disorders. To analyze the athletic trainers' eating disorders knowledge four questions were included. Questions included the following: Which of the following are risk factors for eating disorders? Ten responses were listed, six of which were correct and four which were foils. Which of the following are warning signs of an eating disorder? Twelve responses were listed, nine of

which were correct and three of which were foils. Which of the following are potential long-term problems of eating disorders? Eight responses were listed, six of which were correct and three which were foils. All correct responses were given one point. Thus the total points for this subscale potentially ranged from 1-30.

Experience in Dealing with Eating Disordered Athletes. Questions were included on the present questionnaire to determine the athletic trainer's past experience in dealing with athletes with eating disorders. The question "does your institution have a policy on how to deal with an athlete who has an eating disorder?" was included as part of the current study. Five additional questions were also included on the survey instrument. However, their findings were not included in the current study.

Demographic Information. The final section of the questionnaire was on the demographics of the athletic trainer. Questions with written responses included age, number of years as an athletic trainer, number of years at their current institution, and number of students at their school. Additional demographic questions included sex (male or female), race/ethnicity (African American, Asian, Hispanic, White, Other), location of school (urban, suburban, or rural), belief whether the percent of athletes with eating disorders was increasing, decreasing, or staying the same, belief whether more attention should be placed in preventing athletes from developing eating disorders (yes or no), belief whether screenings for eating disorders should be conducted at pre-participation physical exams (yes or no), whether they had ever had a friend with an eating disorder (yes or no), and whether they had ever had an eating disorder (yes or no).

Instrument Testing

After approval from the Master's committee and the Human Subjects committee at the University of Cincinnati, the survey was tested for validity. To establish face validity, items in the survey were constructed based on a comprehensive review of the literature.

To establish content validity, the instrument was critiqued by five experts in the following professions: health promotion, athletic training, and nutrition. The survey was reviewed by the experts and returned with suggestions for improvement. Suggestions were then incorporated into the final instrument.

To establish stability reliability, a pilot study was conducted using a convenience sample of 15 athletic trainers. None of the 15 trainers were included in the actual survey. The survey was mailed out with a cover letter explaining the survey and the purpose of the pilot study, and a self-addressed stamped envelope. Two weeks later another survey, cover letter, and self-addressed stamped envelope were sent to the convenient sample of athletic trainers. Feedback from the trainers was provided on the second survey. Pearson correlation coefficients were determined for each question to assess stability reliability over time. The Pearson r correlation for efficacy expectation was .66. The Pearson r correlation for knowledge was .73.

Procedures

The survey, a cover letter, consent form, and a self addressed stamped envelope were sent to each head athletic trainer. The cover letter explained the purpose and importance of the study, the confidentiality involved, the length of time to complete the

survey, the date to return the survey by, and how to obtain results from the study (Appendix B). Each survey was coded by number and matched with the coded number given to each university so that follow-up mailings were sent to only schools that had not replied.

Surveys, cover letters, and consent forms were sent out in late November 2000 and were to be returned by December 7, 2000. Any institution that had not replied by the December date received a second survey, which included another self-addressed stamped envelope, consent form and cover letter explaining the importance of completing the survey. Upon completion of the study and data analysis, all surveys were destroyed.

Data Analysis

An SPSS computer program on a Dell Personal computer was used to analyze data. To analyze data regarding the efficacy expectation subscale, multivariate analyses of variance (MANOVAs) were conducted. Data from the knowledge subscale was analyzed by conducting one-way ANOVAs based on demographic variables. Significance was set at the .05 alpha level to reduce the likelihood of committing a Type I error.

Chapter Four

Results

Eating disorders affected 1% to 4% of all young women in the United States (American Psychiatric Association, 1994). Approximately, 0.5% to 1% of female adolescents and young female adults met full diagnostic criteria for anorexia nervosa and 1% to 3% met full diagnostic criteria for bulimia nervosa (American Psychiatric Association, 1994). Eating disorders led to severe health consequences such as osteoporosis, ammenorrhea, electrolyte imbalances, heart problems, and even death (American Psychiatric Association, 1994).

One in ten college women reported symptoms that signify clinical or near clinical eating disorders and seven in ten reported body dissatisfaction or the desire to lose weight (Todd, Nichols, Mahamedi, & Keel, 1995). Among college females there was growing concern of eating disorders especially in college female athletes. A 1992 NCAA study found that 70% of responding institutions reported at least one case of an eating disorder with 90% of those cases occurring in female sports (Dick, 1993). This was a six percent increase from the same study conducted in 1990. The highest prevalence of eating disorders was reported in gymnastics, cross country, swimming, and track. Such sports emphasizing body weight and size placed an athlete at increased risk for developing an eating disorder.

Female college athletes were in daily contact with coaches and often sought their respect and advice. Any critical statements or misguided advice offered by coaches

regarding unhealthy eating practices may have increased the athlete's risk for developing an eating disorder. It was therefore important for coaches to be knowledgeable about eating disorders and to promote healthy eating habits.

College athletic trainers also dealt with college athletes on a daily basis. Their primary responsibility was to assist athletes in maintaining optimal health. This responsibility included identifying athletes with eating disorders, identifying athletes at risk, preventing the development of eating disorders, and intervening when necessary. If such steps were missed or overlooked, then athletes with eating disorders may have failed to be detected and in turn failed to receive the help they needed. Researchers have asserted that the education of athletic trainers on the issue of eating disorders may be key in preventing future cases (Turk, Prentice, Chappell, & Shields, 1999). Therefore, college athletic trainers should be properly educated about the extent, etiology, and prevention of eating disorders. In addition, athletic trainers should feel knowledgeable of and self-efficacious in identifying the risk factors for eating disorders. However, a comprehensive review of the literature revealed no published study examining college athletic trainers' knowledge of and perceived confidence in identifying athletes with eating disorders. Therefore, the purpose of this study was to assess Division IA and IAA college athletic trainers' knowledge and perceived efficacy-expectation regarding female college athletes with eating disorders. Information gained from this population could be helpful in directing future professional preparation and continuing education of athletic trainers.

Participants

Response Rate.

The present study surveyed head athletic trainers at Division IA and IAA universities as defined by NCAA standards for the sport of football. There were 236 institutions that met Division IA or Division IAA criteria. However, 11 institutions did not identify their head athletic trainer or did not have an identifiable mailing address and were therefore omitted from this study. Two surveys were undeliverable due to incorrect mailing addresses. Overall, 171 surveys were returned, resulting in a 77% response rate (171/223). However, 9 surveys had to be eliminated from final data analysis because of incomplete responses. Therefore, 160 surveys were used in the final data analysis.

Demographics

The majority of the athletic trainers responding were male (59%) and white (92%) (Table 4.1). Approximately, one third worked at an urban institution (38%), one third worked at a suburban institution (35%) and one fourth worked at a rural institution (26%). While most (94%) reported that they had never had an eating disorder, almost half (48%) reported having had a friend with an eating disorder. The mean age of the athletic trainers was 37 years (SD= 10.0) (Table 4.2). The mean number of years employed as an athletic trainer was 15 (SD= 9.1) and the mean number of years working at the current institution was 11 (SD= 8.9). The mean number of students at an institution was 14,532 (SD=10, 383.1).

Table 4.1

Demographic Characteristics

Items	n[a]	(%)[b]
Gender		
Male	94	59
Female	66	41
Ethnicity		
White	146	92
African American	7	4
Hispanic	3	2
Asian	2	1
Other	1	1
Location of Institution		
Urban	60	38
Suburban	56	35
Rural	42	26
Do you have a friend with an eating disorder?		
Yes	76	48
No	82	51
Do you have an eating disorder?		
Yes	9	6
No	150	94

Data reflects those who responded to the items (missing values were excluded from the descriptive statistics).

[a] n = 160 athletic trainers

[b] Some percentages do not total 100% due to rounding

Table 4.2

Demographic Characteristics Continued

Items	M	SD
Age Range: 22-61 Years	36.9	10.0
Years as an athletic trainer Range: 1-43 years	15.2	9.1
Years at current institution Range: 1-38 years	10.9	8.9
Number of athletes at institution Range: 1200-45000	14532.2	10383.1

Data reflects those who responded to the items (missing values were excluded from the descriptive statistics).
N = 160 athletic trainers

Efficacy Expectation. Athletic trainers' efficacy expectations regarding dealing with female athletes with eating disorders was highest in the area of referring an athlete for help. The majority of athletic trainers (90%) felt confident in referring an athlete to a psychologist or a nutritionist (Table 4.3). However, only one in four (27%) felt efficacious in identifying an athlete with an eating disorder and only one in three (38%) felt efficacious in asking an athlete if she has an eating disorder. Percentages increased in the areas of effectively offering support (53%) and talking with coaches to determine if an athlete has an eating disorder (54%).

Athletic Trainers' Experience with Eating Disorders. While the overwhelming majority (91%) of athletic trainers had dealt with a female athlete with an eating disorder, one in four (25%) worked at an institution that did not have a policy on how to handle eating disorders (Table 4.4). Most trainers (89%) reported that their institution had had 1 to 10 cases of athletes with eating disorders in the past 12 months. Most (79%) felt it was not primarily the responsibility of the athletic trainer to care and treat athletes with eating disorders, rather it was a combined team effort among the staff, which may include a doctor, a psychologist, a dietician and an athletic trainer. The majority (68%) of institutions did not provide training on eating disorders to athletic trainers. However, the majority (59%) of institutions did provide training to the athletes on eating disorders. Most of these training sessions for athletes lasted 1 to 2 hours. Virtually all trainers' (93%) felt that more attention needed to be placed on the prevention of eating disorders in the athletic population.

Table 4.3

Athletic Trainers' Efficacy Expectation Regarding Female Athletes with Eating Disorders

Items	Strongly Agree n (%)[a]	Strongly Disagree n (%)[b]
I can identify an athlete with a eating disorder	43 (27)	10 (6)
I can ask an athlete if she has an eating disorder	60 (38)	18 (11)
I can effectively offer support to an athlete with an eating disorder	84 (53)	7 (4)
I can talk with coaches to help determine whether an athlete has an eating disorder	87 (54)	7 (4)
I can refer an athlete with an eating disorder to a psychologist or nutritionist	144 (90)	4 (3)

n = 160
[a]Strongly Agree = 6 or 7 on a seven point Likert scale
[b]Strongly Disagree = 1 or 2 on a seven point Likert scale

Table 4.4

Athletic Trainers' Experience with Eating Disorders

Items	n[a]	(%)[b]
Does your institution have a policy on eating disorders?		
Yes	111	69
No	40	25
Not Sure	9	6
Have you ever dealt with an athlete with an eating disorder?		
Yes	146	91
No	13	8
Not Sure	1	1
To the best of your knowledge, how many athletes have had an eating disorder in the past 12 months?		
1-10	116	84
10-20	10	7
20 plus	10	7
Is the athletic trainer primarily responsible for the care and treatment of athletes with eating disorders?		
Yes	28	18
No	127	79
Not Sure	5	3
If no, who is primarily responsible?		
Combined Team Effort	62	39
Doctor	43	27
Psychologist	19	12
Registered Dietician	7	4
Other	4	3

Table 4.4 (continued)

Items	n	(%)[b]
Was training on eating disorders offered to athletic trainers at your institution?		
Yes	46	29
No	108	68
Not Sure	6	4
How many hours was the training?[c]		
1-2	21	75
3-5	5	18
6 or more	2	7
Was training on eating disorders offered to athletes at your institution?		
Yes	95	59
No	49	31
Not Sure	16	10
How many hours was the training?[c]		
1-2	38	84
3-5	5	11
6 or more	2	4
In your opinion, is the percent of athletes with eating disorders increasing, decreasing, or staying the same?		
Increasing	84	53
Staying the Same	64	40
Decreasing	11	7
In your opinion, should more attention be placed in preventing athletes from developing eating disorders?		
Yes	149	93
No	9	6

Data reflects those who responded to these items (missing values were excluded from the descriptive statistics)
[a]n=160 athletic trainers
[b]Some percentages do not total 100% due to rounding
[c]Percentages for these items only pertain to those whose institution had offered training on eating disorders to athletic trainers/athletes.

Knowledge. The knowledge section was divided into three sections: 1) risk factors for eating disorders, 2) warning signs of eating disorders and 3) potential long-term problems of eating disorders. Therefore, each of these knowledge sections will be discussed separately.

The majority of athletic trainers correctly identified risk factors for eating disorders. These included low self-esteem (94%), being encouraged to lose weight by a coach (90%), participating in sports demanding leanness (90%), being a perfectionist (89%), and having family problems (70%) as being risk factors for eating disorders (Table 4.5). However, two responses that had been identified in the professional literature as risk factors for eating disorders were not correctly identified as such by a sizable percentage of athletic trainers. Competing in college athletics and having early involvement in sports were incorrectly listed as "non-risk factors" by 61% and 88%, respectively.

Warning signs for eating disorders was the second knowledge section. The majority of the athletic training population correctly identified the warning signs of eating disorders which included losing menstrual cycles (93%), having an intense fear of becoming overweight (93%), exercising beyond normal training (93%), having significant weight loss (88%), having unusual eating habits (71%), wearing layers of clothing (61%), and having very rigid daily living habits (54%) (Table 4.6). One warning sign that did not receive a correct response from the majority of trainers was being overly sensitive to the cold (38%).

Table 4.5

Athletic Trainers' Knowledge of Risk Factors for Eating Disorders

Items	Risk Factor [a]	Correct n	Correct %
Having Low Self-Esteem	Yes	151	94
Being an Only Child	No	143	89
Being Perfectionistic	Yes	142	89
Being Poor	No	157	98
Competing in College Athletics	Yes	63	39
Encouraged by a Coach to Lose Weight	Yes	144	90
Having Family Problems	Yes	112	70
Being of Minority Status	No	155	97
Participating in Sports Demanding Leanness	Yes	144	90
Having Early Involvement in Sports	Yes	19	12

N= 160 athletic trainers

[a] Risk factors were determined based on a comprehensive review of the literature

Table 4.6

Athletic Trainers' Knowledge of Warning Signs of Eating Disorders

Items	Warning Sign[a]	Correct n	Correct %
Having Significant Weight Loss	Yes	140	88
Losing menstrual Cycles	Yes	149	93
Being Vegetarian	No	133	83
Having Unusual Eating Habits	Yes	113	71
Having Very Rigid Daily Living Habits	Yes	87	54
Wearing Layers of Clothing	Yes	97	61
Being Overly Sensitive to The Cold	Yes	60	38
Eating Occasional Desserts	No	153	96
Avoiding Eating in Public	Yes	130	81
Experiencing Frequent Outbreaks of Acne	No	141	88
Having an Intense Fear of Becoming overweight	Yes	148	93

Table 4.6 (continued)

Items	Warning Sign[a]	Correct n	Correct %
Exercising Beyond Normal Training	Yes	149	93

n= 160 athletic trainers
[a]Warning signs were determined based on a comprehensive review of the literature.

The final knowledge section was potential long-term problems of eating disorders. Most trainers correctly identified the following as potential long term problems: osteoporosis (94%), death (92%), dental problems (90%), electrolyte imbalances (89%), stomach problems (88%), and heart problems (79%) (Table 4.7).

To compute an overall knowledge score, each correct response to risk factors, warning signs, and long term problems of eating disorders was coded as one point. All incorrect responses were coded as zero points. Each section was then added together resulting in the total knowledge score. The potential range was 1 to 30. The actual range for athletic trainers was 8 to 30 (M = 23.9, SD = 3.2)

Demographic Interactions

A series of statistical analysis were conducted to identify potential demographic interactions with gender and whether the institution had a policy on eating disorders. T-tests were conducted for parametric data and chi squares were conducted for non-parametric data. The demographic variables examined included gender, age, years as an athletic trainer, years at current institution, number of students, and whether the athletic trainer worked at an institution with an eating disorder policy. Significant interactions were found among gender and age [$t(150)=7.47$, $p=.000$], gender and years as an athletic trainer [$t(157)=8.10$, $p=.000$], gender and years at the current institution [$t(157)=6.13$, $p=.000$], and institutional policy on eating disorders and number of students [$t(94)=2.17$, $p=.033$]. The demographic interactions were then subsequently controlled for in the hypothesis testing.

Table 4.7

Athletic Trainers' Knowledge of Potential Long-Term Problems of Eating Disorders

Items	Long-Term Problem [a]	Correct n	Correct %
Osteoporosis	Yes	150	94
Heart Problems	Yes	126	79
Hearing Disturbances	No	134	84
Stomach (Digestive) Problems	Yes	140	88
Dental Problems	Yes	144	90
Electrolyte Imbalances	Yes	142	89
Memory Impairments	No	107	67
Death	Yes	147	92

N = 160 athletic trainers

[a] Long-term problems were based on a comprehensive review of the literature

Hypothesis Testing

Hypothesis 1.1 Does working at a university with an institutional policy on eating disorders affect athletic trainers' knowledge about eating disorders?

An analysis of covariance (ANCOVA) showed that there was no significant difference between knowledge and whether an institution had a policy on eating disorders $t(2) = 1.0$, $p=.367$. Co-variants that were controlled for included age, years as an athletic trainer, and years at current institution. Therefore, the null hypothesis failed to be rejected.

Hypothesis 1.2 Does believing that it is the role of athletic trainers to identify female college athletes with eating disorders affect athletic trainers' knowledge about eating disorders?

An item on the survey identified whether athletic trainers' believed it to be their role to identify an athlete with an eating disorder. The overwhelming majority of athletic trainers believed it was their role to identify an athlete with an eating disorder (strongly agree = 52, strongly disagree = 10). Due to this discrepancy, no statistical tests were conducted.

Hypothesis 1.3 Does gender affect athletic trainers' knowledge about eating disorders?

An analysis of covariance which controlled for age, years as an athletic trainer, and years working at the institution, found no significant difference between knowledge and gender $t(4) = .16$, $p=.959$. Therefore, the null hypothesis failed to be rejected.

Hypothesis 2.1 Does working at a university with an institutional policy on eating disorders affect athletic trainers' perceived efficacy expectation in identifying female college athletes with eating disorders?

To determine whether a significant relationship existed between efficacy expectation and policy, a multivariate analysis of covariance (MANCOVA) was conducted. The variable controlled for was the number of students at each institution. The MANCOVA revealed that a significant relationship existed between efficacy expectation and policy [$F(5,153) = 3.870$, $p \leq .05$]. Therefore, the null hypothesis was rejected. More specifically, athletic trainers who worked at an institution with an eating disorder policy were significantly more likely than athletic trainers who worked at an institution with no eating disorders policy to feel confident in identifying an athlete with an eating disorder ($p=.002$), talking to an athlete with an eating disorder ($p=.036$), asking an athlete if he/she has an eating disorder ($p=.034$), effectively offering support ($p=.018$), and referring an athlete for professional help ($p=.003$). Therefore, the null hypothesis was rejected.

Hypothesis 2.2 Does believing that it is the role of athletic trainers to identify female college athletes with eating disorders affect athletic trainers' perceived efficacy expectation in identifying female college athletes with eating disorders?

An item on the survey identified whether an athletic trainer believed it to be their role to identify an athlete with an eating disorder. The overwhelming response was that athletic trainers did believe it to be their role (strongly agree = 52, strongly disagree = 10). Due to this discrepancy, no statistical analyses were conducted.

Hypothesis 2.3 Does gender affect athletic trainers' perceived efficacy expectation in identifying female college athletes with eating disorders?

To determine whether a significant relationship existed between efficacy expectation and gender, MANCOVA was conducted. The variable controlled for was the number of students at each institution. The MANCOVA revealed that a significant relationship existed between efficacy expectation and gender, [$F(5,148) = 2.28$, $p \leq .05$]. Therefore, the null hypothesis was rejected. Female athletic trainers felt significantly more confident than male athletic trainers in identifying athletes with eating disorders ($p=.034$) and talking to athletes with eating disorders ($p=.002$).

Discussion

The results showed that the majority of athletic trainers felt it was their role to identify (Strongly Agree = 78%) and help (Strongly Agree = 97%) athletes with eating disorders. Most responded correctly to knowledge questions on risk factors, warning signs, and long-term problems of eating disorders. However, only 1 in 4 (27%) athletic trainers felt efficacious in identifying an athlete with an eating disorder and only 1 in 3 (38%) felt efficacious in asking an athlete if she had an eating disorder.

MANCOVA showed a relationship between efficacy expectation and gender. Female athletic trainers felt significantly more confident than male athletic trainers in identifying an athlete with an eating disorder. Also significant was efficacy expectation and policy. Those athletic trainers working at an institution with an eating disorder policy felt significantly more confident than athletic trainers working at an institution with no policy on eating disorders in identifying an athletes with eating disorders.

Chapter 5

Conclusions and Recommendations

Eating disorders affected 1% to 4% of all young women in the United States (American Psychiatric Association, 1994). Approximately, .5% to 1% of female adolescents and young female adults met full diagnostic criteria for anorexia nervosa and 1% to 3% met full diagnostic criteria for bulimia nervosa (American Psychiatric Association, 1994). Anorexia nervosa had increased to epidemic proportions making it rank among the major health problems in the United States (Taub & Blinde, 1992). Eating disorders led to severe health consequences such as osteoporosis, amenorrhea, electrolyte imbalances, heart problems, and even death (American Psychiatric Association, 1994).

The onset age of eating disorders was typically between 14 and 18, however, the prevalence of eating disorders among college-aged individuals (ages 18-22) was also quite problematic and had increased during the past decade (Johnston & Christopher, 1991). One in ten college women reported symptoms that signify clinical or near clinical eating disorders and seven in ten reported body dissatisfaction or the desire to lose weight (Todd, Nichols, Mahamedi, & Keel, 1995).

Among college females there was growing concern with eating disorders especially in college female athletes. A 1992 NCAA study found that 70% of responding institutions reported at least one case of an eating disorder with 90% of those cases occurring in female sports (Dick, 1993). This was a six percent increase from the same study conducted in 1990. The highest prevalence of eating disorders was reported in

gymnastics, cross country, swimming, and track. Such sports emphasizing body weight and size placed an athlete at increased risk for developing an eating disorder. Other risk factors included the level of competition, sport specific training started early in adolescents, and a sudden increase in training volume.

Female college athletes were in daily contact with coaches and often sought their respect and advice. Any critical statements or misguided advice offered by coaches regarding unhealthy eating practices may have increased the athlete's risk for developing an eating disorder. It was therefore important for coaches to be knowledgeable about eating disorders and to promote healthy eating habits. In 1999 a national study of college coaches in NCAA division I A schools found that there was great need for coaches to increase their knowledge about eating disorders in the areas of etiology, identification of signs and symptoms, management and treatment, risk factors, education, and prevention (Turk et al., 1999).

College athletic trainers also dealt with college athletes on a daily basis. Their primary responsibility was to assist athletes in maintaining optimal health. This responsibility included identifying athletes with eating disorders, identifying athletes at risk, preventing the development of eating disorders, and intervening when necessary. If such steps were missed or overlooked, then athletes with eating disorders may have failed to be detected and in turn fail to receive the help they needed. Researchers have asserted that the education of athletic trainers on the issue of eating disorders may be key in preventing future cases (Turk, Prentice, Chappell, & Shields, 1999). Therefore, college athletic trainers should be properly educated about the extent, etiology, and prevention of eating disorders. In addition, athletic trainers should feel knowledgeable of and self-

efficacious in identifying the risk factors for eating disorders. However, a comprehensive review of the literature revealed no published study examining college athletic trainers' knowledge of and perceived confidence in identifying athletes with eating disorders. Therefore, the purpose of this study was to assess Division IA and IAA college athletic trainers' knowledge and perceived efficacy expectation regarding female college athletes with eating disorders. Information gained from this population could be helpful in directing future professional preparation and continuing education of athletic trainers.

Conclusions

A 4-page questionnaire was sent to all Division IA and IAA head certified athletic trainers. Two mailings were sent both of which included a cover letter, a survey, a consent form, and a self-addressed stamped envelope. The response overall was 77%.

Results showed that the majority of athletic trainers felt it was their role to identify (Strongly Agree = 78%) and help (Strongly Agree = 97%) athletes with eating disorders. Most correctly responded to knowledge questions on risk factors, warning signs, and long-term problems of eating disorders. However, only 1 in 4 (27%) felt efficacious in identifying an athlete with an eating disorder and only 1 in 3 (38%) felt efficacious in asking an athlete if she has an eating disorder.

A series of MANCOVA tests were conducted to determine if there was a significant relationship between efficacy expectation and policy and efficacy expectation and gender. Results showed that athletic trainers who worked at institutions with a policy on eating disorders felt more confident than athletic trainers who worked at institutions without a policy on eating disorders in identifying an athlete with an eating disorder. In addition, female athletic trainers felt significantly more confident than male athletic

trainers in identifying athletes with eating disorders. Athletic trainers' knowledge of eating disorders did not differ significantly based on gender and policy.

Discussion

Nutrition was considered a core curriculum class which athletic trainers had to complete before applying to take the certification exam (Arnheim, 2000). However, simply having taken a nutrition course did not ensure that the course included information on recognizing and treating eating disorders. Also, due to other job responsibilities, athletic trainers were often too busy to provide necessary nutritional guidance to athletes (Short, 1994).

Knowledge of eating disorders did not differ significantly based on policy or gender in the present study. There were several possibilities why this result occurred: 1) All athletic trainers may have received the same basic educational competencies in training to become certified which included at least one class in nutrition; 2) The extent of nutritional information may vary between universities, however all athletic trainers were receiving the same basic nutritional information; 3) Most athletic trainers knew basic information on eating disorders, however not all felt comfortable in applying this knowledge in the practical setting.

In the area of athletic trainers feeling self-efficacious in dealing with eating disorders, there had been no previous research conducted. However, in this study females felt significantly more confident than male athletic trainers in identifying athletes with eating disorders. Females may have felt more confident due to the fact that eating disorders affected more females than males. Females were also more likely to have had a friend with an eating disorder perhaps resulting in their increased confidence in

identifying and helping athletes. Talking to the same sex about eating disorders and some of the issues involved with eating disorders such as loss of menstrual cycles was also a possible factor in females feeling more confident. Females also tended to more readily discuss emotional issues with peers than did males.

While nutrition was a part of the training, information on eating disorders may not have been included. Most training occurred before one obtained a job position, and employers often provided limited training on eating disorders. If no training was provided, additional information on eating disorders had to be learned through personal research. Personal research only occurred if the athletic trainer had an interest and considered eating disorders a priority. The athletic trainer had to make an effort to apply learned knowledge to the practical setting. Also, the NCAA provided institutions with materials on eating disorders, however the material was not always utilized.

Athletic trainers who worked at institutions with eating disorder policies were also more confident in identifying eating disorders than athletic trainers who worked at institutions without eating disorder policies. Little research had been done on policies regarding eating disorders. However, in a study by Grandjean (1991), policies, procedures, and behaviors of the athletic staff were examined to ensure that staff was not contributing to the development of eating disorders. Awareness of inappropriate behaviors and actions of the athletic staff reduced the risk of triggering an eating disorder. Not emphasizing weight as a factor on performance, never encouraging purging behaviors, and having private weigh-ins to reduce athlete anxiety were all actions that were recommended.

There were several potential reasons why having an institutional policy in place could have contributed to athletic trainers feel more confident in identifying athletes with eating disorders. First, a policy provided a guideline that athletic trainers could refer to and use as a reference tool. Second, someone on staff created or helped create the policy and thus had an understanding of eating disorders. This person could also be used as a reference for athletic trainers. Also, with the development and implementation of an eating disorder policy, the athletic staff would most likely have reviewed and discussed the issues of eating disorders. This may have enhanced athletic trainers' knowledge and awareness of the problem and increased their feelings of confidence in dealing with eating disorders.

Institutions found the role of a sports nutritionist very beneficial in the realm of nutrition and eating disorders. A sports nutrition program was beneficial when the nutritionist understood the athletic culture, physiological milestones, and life stressors involved with the athletic population (Vinci, 1998). By having a sports nutritionist on staff, an athletic trainer possibly felt more confident in dealing with an athlete with an eating disorder. The athletic trainer also potentially felt more confident in talking to an athlete with an eating disorder knowing the athlete could be referred to the nutritionist.

In a study by Nagel, Black, Leverenz, and Coster (2000) a new screening test was developed called the Athletic Milieu Direct Questionnaire (AMDQ). The test was developed to detect female college athletes with eating disorders. Prior to this study no instrument had been developed in screening college female athletes for eating disorders. This tool could possibly be helpful to a sport nutritionist or during pre-participation physical examinations.

Recommendations

Recommendations for Practice. The following recommendations could be helpful in increasing athletic trainers' confidence regarding eating disorders: 1) All universities should develop and implement an eating disorder policy; 2) Training on eating disorders should be provided by all universities and made available to all athletic trainers, coaches, and athletes; 3) A registered dietitian should be placed on staff of all university athletic programs; 4) If a dietitian is not able to be placed on staff, one should be provided on campus and used as a reference and referral source for athletic trainers; 5) Screening for eating disorders should occur at pre-participation physical examinations. The AMDQ screening test may be a useful tool in detecting those female athletes with eating disorders (Nagel et al, 2000). Pre-participation physical examinations could be helpful to athletic trainers in identify those at risk for eating disorders before the season or training begins; 6) For male trainers who do not feel confident or comfortable in helping female athletes with eating disorders a second party, preferably a female, may be brought in to help with the situation. Male sensitivity classes may be helpful to athletic trainers uncomfortable with the situation. 7) Role playing situations may help an athletic trainer feel more confident in dealing with an athlete with an eating disorder. This can be conducted as part of job training or part of the educational process at universities. 8) Using resources available to the athletic trainer such as NCAA eating disorder videos would also be helpful.

Recommendations to Improve this Research. To improve the present study the survey administered could have been sent to more than just the head athletic trainer.

There are typically several trainers on staff at a university and the study would have been more inclusive had more trainers been included. Having a higher response rate would have also helped to improve the results. Finally, having better timing of the survey distribution could have improved the response rate. The survey was sent out around Thanksgiving and the final games for football season and the beginning of basketball season. This is a busy time for athletic trainers and the response rate may have been higher had the seasonal timing been different.

Recommendations for Further Research. From what has been determined from the present study, additional studies which investigate athletic trainers' perceptions of eating disorders are warranted. Determining how much educational material is provided to athletic trainers in undergraduate and graduate classes on eating disorders could be helpful in determining if information needs to be added to the curriculum. Also, identifying the extent of eating disorder training athletic trainers receive while at a job may be helpful in determining the need for continuing educational sessions and their components. Doing this study on coaches would also be helpful.

Further research on the most effective approaches to helping an athlete with an eating disorder are encouraged. Policy has shown to be a key factor in athletic trainers helping athletes with eating disorders. Studying policies on eating disorders in use and the policy's effectiveness could help determine what future policies on eating disorders should include.

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Appendix A: Eating Disorders and College Athletes

Directions: The questions in this survey are about eating disorders among female college athletes. Your participation is crucial to this study and is greatly appreciated. All responses will be kept strictly confidential.

1. Please circle how strongly you agree or disagree with each of the following statements.

	Strongly Disagree						Strongly Agree
I can identify an athlete with an eating disorder.	1	2	3	4	5	6	7
I can talk with coaches to help determine whether an athlete has an eating disorder.	1	2	3	4	5	6	7
I can ask an athlete if she has an eating disorder.	1	2	3	4	5	6	7
I can effectively offer support to an athlete with an eating disorder.	1	2	3	4	5	6	7
I can refer an athlete with an eating disorder to a psychologist or nutritionist.	1	2	3	4	5	6	7
If I identify an athlete with an eating disorder, it will increase the chances that she will receive the needed help.	1	2	3	4	5	6	7
If I talk with coaches to determine whether an athlete has an eating disorder, it will increase the chances that she will receive the needed help.	1	2	3	4	5	6	7
If I ask an athlete if she has an eating disorder, it will increase the chances that she will receive the needed help.	1	2	3	4	5	6	7
If I effectively offer support to an athlete with an eating disorder, it will increase the chances that she will receive the needed help.	1	2	3	4	5	6	7
If I refer an athlete with an eating disorder to a psychologist or nutritionist, it will increase the chances that she will receive the needed help.	1	2	3	4	5	6	7
If an athlete with an eating disorder receives the needed help, it will decrease the chances that she will continue having the eating disorder.	1	2	3	4	5	6	7
As an athletic trainer, one of the most important things I can do is to identify an athlete with an eating disorder.	1	2	3	4	5	6	7
As an athletic trainer, one of the most important things I can do is to insure that an athlete with an eating disorder receives the needed help.	1	2	3	4	5	6	7
One of the most important things a college athletic department can do is to establish a policy on identifying and treating athletes with eating disorders.	1	2	3	4	5	6	7

2. **Please circle how strongly you agree or disagree with each of the following statements.**

	Strongly Disagree						Strongly Agree
I believe that an athlete with an eating disorder is solely responsible for bringing it on herself.	1	2	3	4	5	6	7
I believe coaches play an important role in whether an athlete develops an eating disorder.	1	2	3	4	5	6	7
I believe athletic trainers play an important role in whether an athlete develops an eating disorder.	1	2	3	4	5	6	7
I believe it is a responsibility of the athletic trainer to identify athletes with eating disorders.	1	2	3	4	5	6	7
I believe it is a responsibility of the athletic trainer to help athletes with eating disorders.	1	2	3	4	5	6	7
I believe that treatment for an eating disorder should be left to the athlete to initiate.	1	2	3	4	5	6	7
I believe that my educational background has adequately prepared me to effectively deal with an athlete who has an eating disorder.	1	2	3	4	5	6	7
I would like more training on how to effectively deal with an athlete who has an eating disorder.	1	2	3	4	5	6	7
I believe that a full-time registered dietician should be on the athletic department staff to help prevent eating disorders from developing in athletes.	1	2	3	4	5	6	7

3. **Please answer the following questions by checking the most appropriate box and filling in the blank when appropriate.**

A. Does your institution have a policy on how to deal with an athlete who has an eating disorder? ☐ Yes ☐ No ☐ Not Sure

B. Has an educational session on eating disorders been offered to athletic trainers at your institution within the past 12 months? ☐ Yes ☐ No ☐ Not Sure
If yes, how many hours of training were provided? _____

C. Has an educational session on eating disorders been offered to athletes at your institution within the past 12 months? ☐ Yes ☐ No ☐ Not Sure
If yes, how many hours of training were provided? _____

D. Have you ever dealt with an athlete who had an eating disorder? ☐ Yes ☐ No ☐ Not Sure

E. To the best of your knowledge, how many athletes at your institution had/have had an eating disorder in the past 12 months? _____
How many of these athletes were female? _____

F. Is the athletic trainer at your institution primarily responsible for the care and treatment of athletes with eating disorders? ☐ Yes ☐ No ☐ Not Sure
If no, who is primarily responsible?
☐ Registered Dietician ☐ Doctor ☐ Psychologist ☐ Other (specify) _____

4. **Please answer the following questions by checking the most appropriate boxes.**

Which of the following are risk factors for eating disorders? (check all that apply)

- ☐ Having low self-esteem
- ☐ Being an only child
- ☐ Being perfectionistic
- ☐ Being poor
- ☐ Competing in college athletics
- ☐ Encouraged by a coach to lose weight
- ☐ Having family problems
- ☐ Being of minority status
- ☐ Participating in sports demanding leanness
- ☐ Having early involvement in sports

Which of the following are warning signs of an eating disorder? (check all that apply)

- ☐ Having significant weight loss
- ☐ Losing menstrual cycles
- ☐ Being a vegetarian
- ☐ Having unusual eating habits
- ☐ Having very rigid daily living habits
- ☐ Wearing layers of clothing
- ☐ Being overly sensitive to the cold
- ☐ Eating occasional desserts
- ☐ Avoiding eating in public
- ☐ Experiencing frequent outbreaks of acne
- ☐ Having an intense fear of becoming overweight
- ☐ Exercising beyond normal training

Where do you obtain information on eating disorders? (check all that apply)

- ☐ Magazines
- ☐ Books
- ☐ Television
- ☐ Internet
- ☐ Nutritionist (Dietitian)
- ☐ Professional Journals
- ☐ Professional Conferences
- ☐ Friend
- ☐ Other (please specify) _____

Which of the following are potential long-term problems of eating disorders? (check all that apply)

- ☐ Osteoporosis
- ☐ Heart problems
- ☐ Hearing disturbances
- ☐ Stomach (digestive) problems
- ☐ Dental problems
- ☐ Electrolyte imbalances
- ☐ Memory impairments
- ☐ Death

5. **Please circle how strongly you agree or disagree with each of the following statements.**

	Strongly Disagree						**Strongly Agree**
If I suspected an athlete had an eating disorder I would . . .							
ask her if she had an eating disorder.	1	2	3	4	5	6	7
ask her friends if she had an eating disorder.	1	2	3	4	5	6	7
ask her parents if she had an eating disorder.	1	2	3	4	5	6	7
ask a psychologist or nutritionist to talk to her.	1	2	3	4	5	6	7
other (please specify) _____	1	2	3	4	5	6	7
If I found out that an athlete had an eating disorder I would . . .							
promise her that I will keep it a secret.	1	2	3	4	5	6	7
be caring and tell her that you will get her help.	1	2	3	4	5	6	7
refer her to a psychologist or nutritionist	1	2	3	4	5	6	7
Other (please specify) _____	1	2	3	4	5	6	7

6. **Please answer the following demographic questions by checking the box or filling in the blank.**

A. Your sex: ☐ Male ☐ Female

B. Your age: ____ years

C. Number of years as an athletic trainer: _____ years

D. Number of years at current institution: _____ years

E. Your race/ethnicity: ☐ African American ☐ Asian ☐ Hispanic ☐ White Other _____

F. Location of your school: ☐ Urban ☐ Suburban ☐ Rural

G. Number of students at your school: _____

H. Have you ever had a friend who had an eating disorder? ☐ Yes ☐ No

I. Have you ever had an eating disorder? ☐ Yes ☐ No

J. In your opinion, is the percentage of athletes with eating disorders increasing, decreasing, or staying the same? ☐ Increasing ☐ Decreasing ☐ Staying the Same

K. In your opinion, should more attention be placed in preventing athletes from developing eating disorders? ☐ Yes ☐ No

THANK YOU ☺

Appendix B

John Doe
Sample University
Cincinnati, OH 45221

Dear Mr. Doe,

I am currently a graduate student at the University of Cincinnati in the Department of Health Promotion and Education. For my thesis, I am conducting a survey on eating disorders. The purpose of this study is to assess Division I college athletic trainers' perceptions regarding female athletes with eating disorders. Information from this study will be helpful in directing future professional preparation and continuing education efforts with athletic trainers.

Participation in this study is voluntary. All information will be kept **confidential**. All data will be presented in a group format. Surveys will be destroyed upon completion of this study.

We appreciate you taking the time out of your busy schedule and thank you for your professional courtesy. The survey will take **no more than 8 to 10 minutes**. Also, for your convenience, a self-addressed stamped envelope has been enclosed in which you may return the completed survey. Please return the survey within one week of receiving it. Again, **thank you** for your participation.

Sincerely,

Jennifer Holmes, BS
Research Assistant

Keith A. King, Ph.D., CHES
Assistant Professor