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High School Coaches' Knowledge of Disordered Eating Behavior in Female Athletes

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Honors Paper

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High School Coaches' Knowledge of Disordered Eating Behavior in Female Athletes

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April 30, 2007

Abstract

The purpose of this study was to discover more about high school coaches' knowledge of disordered eating behavior in female athletes. In a sample of 98 coaches from Minnesota, it was found that the majority of coaches were not familiar with the Female Athlete Triad, a phenomenon describing three interrelated health problems: disordered eating, amenorrhea, and osteoporosis. However, coaches provided valuable insights regarding how to approach athletes exhibiting signs and symptoms of eating disorders, as well as how to deemphasize the importance of leanness within the athletic environment. Perhaps the most encouraging finding was coaches' overwhelming support of receiving further education on topics related to disordered eating behavior in female athletes. Ultimately, coaches' suggestions in this study will serve as a foundation for creating workshops to better educate coaches on the signs and symptoms of eating disorders as well as the severity of the Triad.

In memory of:

Alex DeVinney

May your love of running and sunny disposition always be remembered.

Acknowledgments

I would like to thank my Advisor, Professor Jaine Strauss for her enthusiasm, support, and guidance throughout the duration of my project. I would also like to express my gratitude toward Professor Joan Ostrove and Head Athletic Trainer Paula Natvig for their vital suggestions which enabled me to bring this paper to a new level.

Preface

Throughout my years of participation in track and cross-country I have grown to truly appreciate what it means to be a female athlete. I take great pride in this experience and feel fortunate to have had supportive teammates, coaches, friends, and family. However, in addition to these encouraging experiences, I have observed some disturbing trends among female athletes. Though I have never personally struggled with an eating disorder, I have seen its debilitating effects dramatically alter the lives of many fellow athletes. I have been interested in the effects of eating disorders on female athletes because I feel the occurrence is often overlooked in favor of discussing team rankings and individual achievements. While it is easy to focus on the positive aspects of training and competition, ignoring signs and symptoms of eating disorders would be turning a blind eye to a very real and pervasive phenomenon.

I would like to share a personal story that compelled me to explore the impact of eating disorders on high school female athletes in an effort to educate coaches on the severity of these issues. As a sophomore in high school I remember going to a meet and watching a freshman set a meet record in the two mile run. Aside from her extremely emaciated appearance, I was impressed by her athletic feat. What I didn't understand at the time—and still do not to this day—was why she allowed to compete in the first place.

At the age of 15, she appeared developmentally like a 9 year old—and a malnourished one at that. In my first few encounters with an athlete who I presumed to have a very serious eating disorder, I asked myself a series of questions. I wondered, wouldn't permitting an athlete who is clearly unhealthy compete simply *reinforce* the disorder? Who was looking out for the athlete's overall mental health? Why was it so important for a freshman in high school to perform at such an elite level at the expense of her long term health? Generally, when an athlete

finds success they will continue to pursue habits that improve performance. Unfortunately, an athlete's perception of herself at times becomes distorted and the pursuit of excellence comes at a cost. I believe in situations like these, the responsibility lies in individuals close to the athlete to step in when she loses the ability to look out for her best interest.

At the time I wondered about her future in running, not to mention her life in general. Looking back on the situation, it is unsettling how skewed my own vision of the "normal" distance runner became. Seeing this young athlete perform so well with little awareness of what was happening behind the scenes led me to believe that she was somehow an anomaly. There must have been some way she was able to fuel herself properly and look the way she did. How else would she continue to train and perform so well without raising enough concern from doctors, coaches, family, and friends to pull her from the sport?

She continued to compile a list of achievements, including a state championship in the two-mile run her junior year of high school. When I graduated high school and moved on to college running, I no longer followed the local happenings in high school track and cross country. Yet every once in a while I thought of Alex DeVinney. I wondered what had become of her. Why hadn't I heard about her running at some university? One afternoon I got the answer to this question unexpectedly as I searched through current events in the world of women's distance running on the website: <http://www.fast-women.com>. To my horror, one of the headlines read: Runner Alex DeVinney Dies of Anorexia at Age 20. It only took me a second to register what it meant. I was shocked that this she was someone I actually knew and worried about during my high school years.

Even though I was devastated to hear the news and the whole incident still doesn't sit quite well with me, something positive ultimately came of the experience. It seemed like the

incident sort of fell into my lap. I now recognized that this issue was something I could no longer ignore. I found out about Alex's death about a month before my proposal for doing an Honors Project was due. I took this shocking event as a sign that I needed to take action. I had spent much of my young adult life wondering, asking why, and making assumptions about what was being done to assist athletes dealing with eating disorders. I decided that whatever current actions being taken were simply not enough. The opportunity to design my own study was the chance I had been waiting for. This study enabled me to take an active stance and do everything in my power to prevent this horrible situation from happening again.

Perhaps even more helpful in giving my project a specific direction was an article published in the New York Times during September of 2006. The article featured Alex DeVinney and highlighted issues related to the Female Athlete Triad and menstrual irregularity. In the article her coach had mentioned that he did not realize how someone with anorexia "...would be capable of making decisions that were not in her best interest..." This statement fueled my desire to find out exactly what coaches do and do not know regarding disordered eating behavior. Based on my personal experiences and the opinions expressed in the article, it was unclear what coaches really understood. Given that coaches are considered such influential figures in athletes' lives, they have the power to look out for their health and well-being. Overall, this article got to the heart of what I truly wanted to study.

I am grateful to have had the opportunity to partake in an educational mission that draws attention to an issue that has been ignored far too long.

Chapter 1

Risk Factors of Developing an Eating Disorder in Female Athletes

An important step in determining the overall occurrence of eating disorders in the female athlete population would be to examine factors within the competitive athletic environment that may differentiate athletes from the general population. Likewise, looking at prevalence rates in different sports may help us better understand how the disorder affects athletes in various sports (Johnson et al., 1999). Many researchers propose that participation in sports may contribute to the onset of disordered eating behavior, which could result in clinically significant eating pathology (Berry & Howe, 2000).

Specifically, Beals and Manore (1994) suggest there is distinct pressure on female athletes to perform and to possess the ideal body type for the sport, in addition to the socio-cultural pressure to be thin. The nature of the athletic environment may contribute to the goal of reaching an unrealistic “ideal” body type through dangerous weight restriction attempts. In particular, lean sport athletes are at an increased risk for developing an eating disorder (DeBate & Thompson, 2005). Lean sports emphasize a low body weight and thin build, which puts pressure on athletes to improve performance and meet aesthetic ideals of sport (Beals & Manore, 1994). Some of these sports include: distance running, gymnastics, figure skating, cheerleading, swimming and diving, and crew (Sherman & Thompson, 2004). The sought-after unattainable level of leanness and unrealistic cultural expectations converge to produce a sense of pressure on young athletes to reduce and eliminate body fat.

Individuals participating in sports which emphasize a thin body build demonstrate increased instances of body image distortions and dieting behaviors. In general, athletes in thin-build sports (such as gymnastics, synchronized swimming, ballet, figure skating, and running)

are significantly thinner, show an increased drive for thinness, and report a greater desire to lose weight than athletes participating in sports *not* characterized by leanness (field hockey, basketball, volleyball, and downhill skiing) (Beals & Manore, 1994). Unfortunately, this negative attitude toward body fat is exacerbated by coaches, teammates and parents (Stoutjesdyk & Jevne, 1993).

In lean sports weight loss is often viewed positively, making the identification of at-risk athletes difficult. The stereotypic athlete for a particular sport is more likely to go unnoticed than an individual whose body type appears uncharacteristic of the sport. For example, a gymnast or distance runner who is heavier than the norm is more noticeable than one who may be underweight (Sherman & Thompson, 2001). Researchers have demonstrated a relationship between food restriction and participation in particular sports. For instance, food restriction in gymnastics has been associated with enhanced performance (Engel, Johnson, Powers, Crosby, Wonderlich, Wittrock & Mitchell, 2003). This is just one example of how over-exercising and restricted caloric intake may become equated with an athlete's willingness to work hard to improve performance in the athletic environment (Sherman & Thompson, 2001).

A distorted view of "normal" exercise is perpetuated by coaches, teammates and parents. Many coaches hope to have athletes who desire to work harder than their teammates, ignore pain and injury to compete, strive for nothing less than perfection, and exhibit a readiness to lose weight in order to perform at a higher level. Sherman and Thompson (2001) suggest that within the context of competitive collegiate athletics, there tends to be a focus on winning rather than an individual's development as a person, which may exacerbate eating disorders among athletes.

Coaches' Knowledge of Disordered Eating Behavior in Female Athletes

A female's participation in high school athletics can be an empowering, irreplaceable experience. However, the rigors of training at this level and the complexities of the competitive athletic environment are often associated with disordered eating behavior. Although steps are currently being taken to ensure athletes are being monitored and provided with referrals to healthcare professionals when necessary, the prevalence of eating disorders among female elite athletes is alarming. Disordered eating behavior is a trend that, when ignored, can lead to serious long-term health consequences in the athlete, but, when diagnosed early, can be effectively treated.

Despite efforts to reduce instances of disordered eating behavior within the context of female competitive athletics, prevention and intervention remain complicated. To date, there is no standard protocol for intervention. Due to each individual's unique set of psychological and social circumstances, it is difficult to ascertain when a person's behavior crosses the fine line between "normal" and "pathological" and necessitates intervention. Additionally, once intervention becomes imperative, the athletic department personnel are not always accurately informed or easily accessible in terms of proceeding with the vital steps needed to ensure an athlete's well-being.

Within the athletic setting in particular, a myriad of individuals oversee an athlete's competitive season(s), including coaches, trainers, physicians and nutritionists. Research does not suggest that coaches directly promote unhealthy eating habits (Heffner, Ogles, Gold, Marsden, & Johnson, 2003). However their influence can potentially make these detrimental health practices better or worse (Sherman & Thompson, 2001). Studies suggest that athletic trainers, teammates and coaches are involved in identifying at-risk athletes (Sherman,

Thompson, Dehass, & Wilfert, 2005). A coach's ability to accurately discern symptomatic athletes necessitates that the coach is well versed on the manifestation of subclinical disordered eating behavior and clinical eating disorders. Unfortunately, this is not often the case.

It is important for coaches to use their authority to assist athletes in making decisions that are beneficial to their health (Sherman, Thompson, Dehass, & Wilfert, 2005). In this study I will examine coaches' knowledge of disordered eating behavior and their role in identifying athletes with disordered eating behavior, and make suggestions for referring these individuals to healthcare professionals.

To set the stage for this investigation, I will present an overview of the research on disordered eating behavior in female athletes. Most studies I refer to in this section explore eating disorders among collegiate female athletes, while others focus exclusively on the high school level of competition. I will first examine the coaches' ability to identify at-risk athletes. Then I will cover the ambiguities in the prevalence of eating disorders based on differing levels of competition. Next I will present the unique pressures female athletes experience which puts them at-risk for developing an eating disorder. Then I review an in-depth analysis of the social influences on disordered eating, as well as suggestions from a variety of different athletes and athletic personnel for how to deemphasize leanness within the sport of gymnastics. Following that particular study, I reveal important information on body size and how it relates to perceived ability in sport performance. Then I conclude the analysis by explaining the long term health consequences of low energy intake and discussion of the severity of the Female Athlete Triad.

The Coaches' Role in Identifying At-Risk Athletes

Coaches may feel tentative about approaching an athlete about body image attitudes and behaviors they feel are detrimental to the athlete (Smith & Ogle, 2006). Smith and Ogle (2006) found that coaches indicated feeling uneasy about approaching the athlete, exhibiting “deferential avoidance.” One coach reported worrying that the athlete might misunderstand his intention and view the coach-athlete interaction as a “negative review of the self” or cause the athlete to view herself poorly. In other words, sometimes athletes may interpret a particular conversation to mean something other than what the coach had intended. Differing perceptions of how to handle coaching interactions can be seen in the following example of two cross country coaches from the same high school team.

“Jim,” in an effort to convey his concern for athletes’ healthfulness and to demonstrate their dedication to the team, suggested his athletes avoid candy, soda, and sugar. His suggestion created a foundation for healthfulness, emphasizing that these foods do not fuel the body as efficiently as foods high in nutrients. The other co-coach in this dyad, “Debbie,” advised he not use this statement, suggesting any type of message directly involving food may be distressing for an image-conscious young woman already strongly influenced by socio-cultural pressures to be thin (Smith & Ogle, 2006). In this scenario, both coaches appeared to be aware that their comments could possibly influence unhealthy eating behaviors, indicating an understanding of their authority position and ability to make an impression on their athletes. Additionally, this situation showcases their individual uncertainties about how to act.

Heffner et al. (2003) examined factors specifically related to the coach’s role in an athlete’s life including: coaches’ weight control management, monitoring of eating behavior, awareness of nutritional health issues, access to prevention/or intervention services for athletes at

their institution, experience dealing with athletes exhibiting disordered eating and body image dissatisfaction, and perception of their sport's emphasis on eating habits and weight consciousness in the sport. This study covered six collegiate sports (NCAA Divisions I, II, III, and NAIA): gymnastics, swimming, basketball, softball, track, and volleyball. Only coaches of female athletes participated in the study based on the higher prevalence of disordered eating behavior among female athletes as compared to their male athlete counterparts.

They discovered, that although about 1/3 of the coaches reported that they had not received formal training in nutrition or diet (Heffner et al., 2003), most stated that they were monitoring or managing their athletes' weights and felt they had sufficient knowledge of eating disorders and could effectively identify at-risk athletes. Not only did coaches report diagnosing their athletes, but they also attempted to treat them (Sherman et al., 2005).

Other interesting findings included the number of eating disorders the coaches identified throughout their coaching careers. About 18% of coaches reported that they had never identified an athlete exhibiting disordered eating behavior or an eating disorder, approximately 75% of coaches had acknowledged three or fewer athletes with disordered eating behavior or an eating disorder, and 26% of coaches indicated that they knew of at least one athlete who had exhibited symptoms of an eating disorder but had not been identified during her competitive career. Clearly, coaches can play a vital role in identifying and referring athletes for treatment, but the extent to which they should be part of the intervention process remains unclear.

Prevalence of Eating Disorders Among Female Elite Athletes

Despite considerable research, studies have not been able to produce consistent findings about the prevalence of eating disorders in the female athlete population. Some studies suggest

symptomatology is increasing, while others assert that it is decreasing (Johnson, Powers, & Dick, 1999; Sherman & Thompson, 2001). There are many explanations for these conflicting findings. Johnson et al. (1999) suggest that these discrepancies can be attributed to limitations in research methodologies implemented in many studies.

For example, Ryujin, Breaux, and Marks (1999) hypothesized that there would be higher eating disorder symptomatology in elite athletes than recreational athletes. Specifically, they studied elite female distance runners in comparison to recreational or more “typical” runners. Contrary to their hypotheses, they found *fewer* eating disorder symptoms among the elite runners than the control or normative group.

Currently, a persistent problem in these studies is the absence of a standard operational definition of “elite.” This study operationally defined “elite” as participation in national or international competition and running more than 40 miles per week. However, this particular definition excluded runners at the collegiate level and those running less than 40 miles per week. In other words, while some studies consider collegiate female distance runners as part of the elite population, this study did not.

Other problems highlighted by this study include small sample sizes, which lack generalizability to the entire female athlete population, and the use of self-report measures (Ryujin et al., 1999). For example, administering the EDI-2 may be misleading since there is a potential for dishonesty in any self-report measure. Stoutjesdyk and Jevne (1993) suggest that individuals taking a questionnaire may respond in a socially desirable way, particularly if their participation in their sport is called into question; an athlete may be aware that she will have to cease participation in her sport if an eating disorder is detected. This possible dishonesty may result in a large discrepancy between the amount of disordered eating behavior reported and the

actual prevalence of eating disorders in female athletes. By acknowledging the shortcomings of their studies, the authors consider their research merely a starting point to generate larger, more expansive studies in the future. Despite these limitations, the study may be an accurate depiction of the prevalence of eating disorders given that elite athletes may lose their elite status if debilitated by an eating disorder.

Based on the limitations of previous studies, the National Collegiate Athletic Association (NCAA) Study sought to heighten understanding of pathological eating habits of athletes of both genders competing in Division 1 NCAA institutions (Johnson, Powers, & Dick, 1999). This study attempted to uncover the prevalence of pathological eating behavior and attitudes using a more rigorous methodological process. Johnson et al. (1999) concentrated their efforts on employing a more effective sampling procedure and obtaining a larger, more representative sample of the most competitive U.S. amateur athletes. The researchers selected 11 schools from various locations throughout the United States to create a better representation of all regions of the country. Additionally, the sample included athletes from 11 sports: football, basketball, track, swimming, gymnastics, wrestling, cross-country, crew, tennis, Nordic skiing, and volleyball. The study was conducted with the utmost precision, in that each member of the school's athletic personnel was contacted. The process started by providing an explanation of the study to the president of the NCAA, followed by the administration of participation request forms to athletic directors.

The athletic director was then responsible for agreeing to the school's participation. Coaches within each institution also signed consent forms and the individuals conducting the study administered the questionnaires at the schools at testing sessions. Coaches were not present during the session and the athletes were told the purpose of the study and urged to

answer questions truthfully. The items in the questionnaire were selected by the coaches, trainers and other athletic personnel familiar with risk factors unique to student athletes (Johnson et al., 1999).

By conducting their study in this manner the research team of Johnson et al. (1999) was able to survey a more representative sample. Ninety percent of 1,445 athletes on rosters filled out questionnaires, which is a dramatically larger sample size than in earlier studies. The NCAA Study produced results indicating that symptomatic eating behavior and attitudes are lower in the female athlete population than in the general population of non-athletes. While these data may suggest a more accurate estimate of the prevalence of eating disorders due to a more rigorous sampling procedure, larger sample size, and stringent method for the level of athlete participating, there are still other factors to consider.

The NCAA administration of questionnaires could have been both beneficial and detrimental to the accuracy of the results. Since the study was conducted as a collaborative effort with the NCAA, participants were aware that the NCAA would not disclose information as to the size and quality of the athletic departments participating in the study. Therefore, the anonymity of participants was protected, making it more likely that they would answer honestly.

Although coaches and school representatives did not deliver surveys, nor were they present during testing sessions, athletes may have downplayed the severity of their problems in hopes of protecting the reputation of their athletic department (Johnson et al., 1999). This is a plausible explanation considering the amount of power the NCAA wields over athletic institutions.

If we assume the results are valid, we can reach several interesting conclusions. This study surveyed a more elite caliber of athlete compared to some previous studies which focused

more on Division II institutions. Based on their findings, Johnson et al. (1999) suggest that eating disturbances could be higher among lower tiered athletes. However, few studies have explored the difference between the sizes of athletic programs and no research to date supports this conclusion.

Overall, Johnson et al. (1999) imply that the results of the NCAA Study are a conservative estimate of disordered eating behaviors at this level of competition. More than likely, athletes tend to underreport eating disturbances given the nature of self-report questionnaires, as mentioned previously. Therefore, it would be important to conduct follow-up interviews in combination with questionnaires to attain a more accurate prevalence estimate. The NCAA Study and the American College of Sports Medicine assert that a true prevalence of eating disorders in female athletes has not been discovered. However, there is no evidence that the instances are decreasing, emphasizing the need for more in-depth analysis (Sherman & Thompson, 2001).

Kerr et al.'s Analysis of Social Influences on Disordered Eating

Given that females in aesthetic sports are more susceptible to body image dissatisfaction and disordered eating, coaches' comments can also contribute to the maintenance of disordered eating in athletes. One study analyzed social influences on the development and maintenance of eating disorders in gymnasts (Kerr, Berman, & De Souza, 2006). Since most gymnasts under the age of 19 live at home, it is necessary to look at parental behavior in the development of eating disorders. Also, elite gymnasts tend to spend a great deal of time with their coaches—sometimes more than their parents—suggesting that coaches have tremendous influence over their athletes.

Judges in the sport of gymnasts likewise offer an important perspective with regard to weight control. Even though they are not involved in gymnasts' daily lives, they provide a more objective perspective by interacting with them while traveling to competitions. Research suggests that judges may have an influential role in overseeing both technical performance and a gymnast's physical being, but this role has not been analyzed in previous studies. Finally, the study assessed the opinions of retired elite gymnasts, because they provide a vital perspective after being removed from the sport for some time.

Kerr et al. (2006) administered surveys to current gymnasts, retired gymnasts, parents, coaches, and judges. The mean age of retired gymnasts was 20, with the mean age of retirement 15 years old. The researchers were interested in the perceptions of eating and weight control practices and not prevalence rates, so they focused on creating surveys that encouraged individual opinions, instead of basing them off of clinical diagnostic criteria. Some examples of questions were, "As a gymnast, rate how satisfied you usually are with your body? (with 1 being very satisfied and 10 being very dissatisfied)," and "Yes or no—Do you think you need to lose weight? If so, how much? ___." There were also qualitative questions such as: "Do you think there is anything the sport of gymnastics should do differently with respect to weight control or body image? If so, please comment."

The results were reported separately for each participant category: parents, judges, coaches, current gymnasts, and retired gymnasts. The majority of parents (92%) did not believe their daughters had an eating disorder, but 34% were concerned about their daughter's eating habits, in particular how little they ate. Many parents (82%) believed that coaches managed body weight control issues appropriately. Other interesting findings were revealed in the qualitative section where parents expressed their recommendations for changes in the sport of

gymnastics. Many parents suggested that the sport of gymnastics confront issues related to body image, promoting inclusiveness of gymnasts with differing body types. Parents also indicated a desire for further education of coaches, athletes, and parents in nutrition, growth and development, body image, and psychological well being (Kerr et al., 2006).

Another important suggestion from parents was a need for more “balance” in the sport of gymnastics. One parent stated, “Coaches need to remember there is life after gymnastics—it is a sport that ends at a relatively young age. Gymnasts should be encouraged to pursue a more ‘balanced’ lifestyle” (Kerr et al., 2006). Other parents expressed their responsibility in monitoring and facilitating this balance by suggesting their daughters participate in other activities as well. Overall, while some parents expressed their satisfaction with coaches’ appropriate handling of body image issues in their athletes, other parents felt some coaches still abused their position of control. One parent shared a desire for a change in coaching style related to weight control behavior and in the idea that coaches should have ultimate authority and parents should have none.

Thirty-five percent of judges reported observing unhealthy eating or weight control behaviors such as self-induced vomiting among gymnasts when they traveled with the teams (Kerr et al., 2006). Additionally, judges also indicated seeing coaches encouraging unhealthy eating or weight monitoring practices. For instance, judges described coaches doing such things as removing butter from the gymnast’s plates and restricting their athletes’ meals to minimal amounts of fruits and vegetables. Sixty percent of judges felt their jurisdiction should include taking preventative steps to reduce detrimental health practices. They suggested that they should be able to intervene when coaches overstep their boundaries of control by influencing the judging system to decrease the emphasis on appearance and to serve as advocates for athletes.

In terms of what gymnastics could do differently with regard to weight control measures, judges suggested that they were concerned with the role of the coach. Specifically, they stated that in addition to excessive control over the athlete, coaches also exhibited a general level of negativity toward their athletes. The judges recommended that more education be provided for coaches, parents, athletes, and judges regarding nutrition, body image, and pubertal changes. Finally, the judges taking the survey indicated that the overall perception of the female gymnast at the international gymnastics level needs to be re-evaluated. Additionally, they suggested that society needs to alter the common perception that the tiny, prepubescent gymnast body is the “norm” (Kerr et al., 2006).

Of all groups taking the surveys, coaches had the lowest response rate (28/147). While only 19% responded, 18 of 28 coaches shared a concern for gymnasts’ eating and weight control practices. In particular, these coaches were concerned that their athletes consumed too much junk food (processed and fast foods) and did not eat enough balanced meals. Fifty-four percent (15/28) coaches indicated that they had determined an athlete’s need to lose weight based on her physical appearance alone.

There were wide discrepancies among the weight control behaviors exhibited by coaches. While none of the coaches reported using regular weighing methods to assess their athletes, 82% (23/28) reported that other gymnastics coaches practice regular weigh-ins. None of the respondents claimed to weigh their athletes publicly. However, 43% (12/28) revealed that others engage in public weighing and 64% (18/28) mentioned that other coaches keep private records. One coach indicated assessing body fat and 75% (21/28) said that other coaches employ this method (Kerr et al., 2006).

In terms of the qualitative information provided by coaches, they indicated a desire for more education in the areas of sports medicine, nutrition, sport psychology, and coaching adolescent females in particular. According to coaches, the sport governing body does not offer specific guidelines for coaches to follow. They indicated that the complexities of the athletic environment necessitate a better kind of support system (Kerr et al., 2006).

The responses of the current gymnasts were interesting in that the average body mass index (BMI) was in the normal range. However, one-third of these athletes reported a desire to lose weight, on average 11 pounds, which would cause them to have a dangerously unhealthy BMI of 17.5. Fifty-seven percent of gymnasts believed their weight was greater than the ideal gymnast's body. While only 3% of athletes indicated having an eating disorder, 18% believed they currently have or have previously exhibited some type of disordered eating behavior. Also, many gymnasts indicated a preoccupation with weight concern as 30% usually weighed themselves and 12% restricted food and fluid intake (Kerr et al., 2006).

In addition to their own concerns, 12% of gymnasts stated that a coach had told them to lose weight. A staggering 44% of respondents indicated that their coach had made negative comments about gymnasts' bodies. To assess whether or not these body-related comments would be related to eating behaviors in the athletes, a variable, 'Negative Body Comments' was calculated. The results indicate that gymnasts who had received or heard negative body-related comments (71%) were more likely to believe they needed to lose weight in comparison to those who had not received or overheard these comments (23%) (Kerr et al., 2006).

Similar to judges' and parents' responses, current gymnasts suggested that coaches recognize that athletes possess different body types and that they should stop pressuring athletes to be small and skinny. Some examples of athletes' statements included, "The coaches shouldn't

be allowed to talk to their athletes about being ‘fat’” and “Coaches should stop weighing gymnasts in front of other gymnasts and coaches.” In regards to body image dissatisfaction, some athletes perceived this as individual weaknesses; therefore, according to this perspective the sport of gymnastics is not responsible for, and can do little to change, these individual beliefs. Other athletes felt the problem came from within the athletic environment (Kerr et al., 2006).

Some of these athletes’ outlooks were not that optimistic. While this statement clearly does not represent all gymnasts’ perceptions, one athlete offered a particularly radical recommendation. She suggested, “They could have no international level gymnastics so it wouldn’t matter how we looked or competed.” Others demonstrated their disdain with comments like, “Even though I know a lot about eating disorders and their consequences, I still want that ‘perfect body’ ” and “Gymnastics is a sport all about image so there will always be eating disorders.” Clearly, these respondents were dramatically impacted by the competitive athletics environment but seemed to feel there was little they could do to change the situation (Kerr et al., 2006).

Other interesting perspectives came from the retired gymnasts. While the sample size was small, 40% (6/15) of former gymnasts were told by a coach to lose weight at some point during their athletic careers, 20% (3/15) believed they had or currently have a clinical eating disorder, and 73% (11/15) said that they currently exhibit disordered eating behavior or have done so in the past. Retired gymnasts were asked to report how frequently they had engaged in weight control practices on a Likert scale. Seventy three percent (11/15) reported *usually* weighing themselves. Nearly half of the athletes surveyed (47%) indicated *usually* recording food intake and weight, and about 33% *usually* restricted their food intake. These findings

suggest that former gymnasts, after spending time away from the sport, were cognizant of the impact of these detrimental health practices (Kerr et al., 2006).

Like the other groups surveyed, the retired gymnasts indicated suggestions for how the sport of gymnastics could handle weight control and body image differently. Many athletes called a coach's perceived role into question and suggested that they exercised too much control over their athletes with statements like: "I wish coaches could have been more fun to train with," "Some of the coaches thought they could say or do whatever they wanted in what they thought would 'motivate us'" and "The coaches had way too much control over the gymnasts psychologically" (Kerr et al., 2006).

Other gymnasts' responses had to do with long-term ramifications of participation in a highly body image conscious sport. Some participants said, "Gymnastics didn't do anything to build self-esteem confidence for me," "I'm not sure if it is possible to leave this sport without weight/shape issues" and "Self-acceptance is absolutely not compatible with behaviors designed to change the body." These statements clearly indicate that retired athletes are concerned about the excessive emphasis on physique appearance and weight related issues and how this detrimentally affects the gymnast's perception of herself in the long run (Kerr et al., 2006).

The unique perspectives of the different groups of people surveyed provide valuable insights that could not be examined when studying strictly coach or athlete interpretations. The highest response rate (67%) came from the retired gymnasts, which is not surprising considering that there would be fewer consequences associated with their participation in the study. In fact some athletes indicated that their coaches had strongly urged them not to fill out the surveys, which could have affected the results (Kerr et al., 2006).

The differences between behaviors coaches reported about themselves versus the reported behaviors practiced by other coaches was also illuminating. For example, few coaches reported using unhealthy weight management procedures like regular weigh-ins, but they indicated that other coaches engaged in this practice. However, one cannot draw conclusions from these findings since there was a low response rate. There may have been a selection bias in that coaches who chose to respond to the questionnaires did not use weight control methods.

Also interesting were the discrepancies between the responses given by current gymnasts and retired gymnasts. Perhaps retired gymnasts are able to reflect on their athletic careers and have more perspective after being removed from the athletic environment for some time. Perhaps retired coaches are more apt to question the practices they may have accepted in the past, because they are no longer liable to lose their coaching position in the sport of gymnastics as a repercussion of revealing their practices. Current gymnasts may be less likely to respond if they have disordered eating behaviors, fearing that their response will put a stop to their career (Kerr et al., 2006).

A more global observation was that every group besides coaches promoted the idea of changing the “mind-set” of the appropriate body type for female gymnasts. Kerr et al. (2006) suggest that the athletes’ best interests need to be kept in mind and retired gymnasts could possibly offer their perspectives on this situation. Overall this study emphasizes the tremendous authority coaches have over their athletes. Kerr et al.’s (2006) study stresses the need to educate coaches not just on eating disorders and their symptomology but more importantly the entire realm of issues related to eating pathology: nutrition, child development, female adolescent development, body image, and the psychological aspects related to elite gymnastics. All groups emphasized the need for education, necessitating the consideration of these topics in hopes of

creating better preventative and intervention strategies to emphasize the health of female athletes.

Body Size and Relation to Perceived Sport Performance

Research suggests that the physical characteristics of female athletes may be a substantial social stimulus for coaches, especially in sports where body size is thought to be related to performance (Cumming, Eisenmann, Smoll, Smith, & Malina, 2005). In some situations coaches may believe body size is indicative of one's ability or potential in the athletic arena. Some of these sports include aesthetic sports, such as gymnastics and figure skating, and sports that stress leanness, such as distance running. This also applies to sports where a larger size is considered an athletic advantage: basketball, volleyball and swimming. Because there is such an emphasis on excellence in competitive athletics, coaches might act more positively toward athletes who possess the "ideal" body size for a particular sport.

With this knowledge, Cumming et al. (2005) explored the relations among body size, perceived coaching behaviors, and attitudes toward the coach and sport in female athletes between the ages of 14 and 18. They predicted that body size would be correlated to coaches' interactions with athletes, as demonstrated by athletes' views of their coaches' positive and negative coaching behaviors. In this particular study, the researchers looked at gymnasts, predicting that stature, mass and BMI would negatively correlate with the perceived frequency of positive coaching behaviors involving reinforcement and encouragement from the coach.

The researchers also predicted that among basketball players, stature, but not body mass or BMI, would positively correlate with the perceived frequency of positive coaching behaviors and negatively correlate with negative coaching behaviors. Because this study was based on

information which suggests that coaches act more positively toward athletes whose physical appearance fits the norm for a particular sport, and that body size is related to one's liking for the coach and the sport, Cumming et al. (2005) came up with two additional hypotheses. For gymnasts, they predicted that stature, body mass and a greater BMI would be negatively associated with one's liking for the coach and sport. The researchers also surmised that a basketball player's stature would be positively associated with liking for a coach and the sport, but mass or BMI would be unrelated (Cumming et al., 2005).

The results revealed that body size was correlated significantly with several perceived coaching behaviors. Taller gymnasts, those who weighed more, and those who had a higher BMI felt their coaches were less likely to engage in positive coaching behaviors and more likely to demonstrate negative coaching behaviors. Based on these findings, it makes sense that stature and body mass were negatively associated with one's liking for the sport (Cumming et al., 2005).

However, the results of this study did not support the author's hypotheses for basketball players. Stature was not related to one's perception of a coach's frequency of positive and negative coaching behaviors. However, one of the subscales, Nonreinforcement, was correlated to body mass and BMI, suggesting those with a higher body mass perceived their coaches as less likely to provide reinforcement following good performances. Even though these correlations were low, they suggest that athletes do exhibit some degree of preoccupation with body mass and how coaches will perceive it. Unlike gymnasts, a basketball player's body size was unrelated to her liking for the sport or coach. Overall, the results support previous research which suggests that body size may be a significant social stimulus for coaches (Cumming et al., 2005).

Coaches may view puberty as a sign that one's time to improve is limited (in certain sports), and therefore perceive athletes who are taller, larger, or carry a greater mass-for-stature

as having less potential for success. They may feel these athletes are less likely to be able to adapt to biomechanical issues as a result of the maturation process, which consequently could produce a lack of improvement. However, athletes' self-perceptions and their feelings associated with growth and maturation may affect how they interact with coaches. Gymnasts who feel inadequate about their body type in relation to the sport may feel hesitant to interact with their coaches. These gymnasts may lack confidence in their abilities and think that their coaches perceive them more negatively.

In comparison to the results for gymnasts, body size did not appear to have much stimulus value for basketball coaches. Basketball coaches may be more likely to evaluate or interact with athletes on the basis of technical knowledge of the game as opposed to size. Even though greater stature and body mass could be an advantage to the athlete, game performance must rely on technique and strategy. There may be a difference between team sports, which typically emphasize technical expertise rather than physical characteristics. The authors of this study acknowledge that the individuals participating in this study were not competing at an elite level, leaving open the question of whether size serves as a social stimulus for coaches at an elite level.

Another study examined the differences between elite and non-elite athletes, suggesting that more competitive athletes may not differ in the type of disordered eating behaviors, they may just exhibit them more frequently (Engel, Johnson, Powers, Crosby, Wonderlich, Wittrock, & Mitchell, 2003). There are many other factors to consider when determining risk factors that contribute to the development of disordered eating in female athletes. While athletic personnel may put pressure on an athlete, this may not be the reason an athlete demonstrates disordered eating behavior. An athlete's family history and comments made by parents are important

factors to examine. Parents may play a significant role in exhibiting negative attitudes towards one's body and urging an athlete to lose weight.

Eating disorder symptomology may also be a coping mechanism used by athletes to alleviate pressure caused by the athletic environment. The relationship between the individual and disordered eating may actually have nothing to do with the sport (Sherman & Thompson, 2001) but instead may be associated with a lack of self-esteem, preoccupation with weight, dieting concerns, body image dissatisfaction, feeling overweight, perfectionistic tendencies, an eagerness to please others, and difficulties in expressing negative emotions (Debate & Thompson, 2005).

Energy Expenditure vs. Energy Intake in Female Athletes

Considering the unique concerns of female athletes compared to their non-athlete counterparts, researchers are acknowledging the need to examine distinctions among levels of athleticism (Beals & Manore, 1994). While many women restrict calorie intake and engage in other unhealthy dieting practices, female athletes may feel an additional pressures from the athletic environment. Studies suggest that the pressure they experience is based on the combination of two factors. One of these variables is the sociocultural expectation that women need to strive to achieve and maintain the ideal body type.

In addition, female athletes also feel pressure to improve performance and attain the desirable body type for their sport. For example, some athletes such as distance runners, swimmers, and sprinters may associate a low body weight with a competitive advantage. Other athletes such as gymnasts, figure skaters, divers, and ballerinas see weight as an important component of performance but are also cognizant of the importance of appearance. As a result,

body image concerns and dieting may become the focus of many athletes' experiences. This constant emphasis on enhancing performance and meeting aesthetic ideals of sport contributes to the development of clinical eating disorders in female athletes.

Beals and Manore (1994) performed a study examining the prevalence and consequences of subclinical eating disorders in female athletes and scrutinized the definition of eating disorders in the DSM-III¹ (Beals & Manore, 1994). Researchers questioned the DSM-III criteria, emphasizing that those who are not diagnosed with a clinically significant eating disorder may still be at risk for developing severe long-term health consequences.

An athlete with a subclinical eating disorder may show signs of disordered eating, but fail to meet the DSM-III criteria for an eating disorder. Athletes may restrict food intake but not to the extent that required for a diagnosis of anorexia nervosa. Likewise, a person may binge and purge periodically but not for the duration needed to be diagnosed with bulimia nervosa.

Sundgot-Borgen (1994) describes this phenomenon as anorexia athletica, or an extreme fear of gaining weight or becoming fat even though an athlete is 5% below the recommended weight for her age and height according to the general female population.

These athletes may also demonstrate psychological characteristics common among those with clinical eating disorders, such as "high achievement orientation, obsessive-compulsive tendencies, and perfectionism" (Sundgot-Borgen, 1994). However, these personality traits are perceived as normal and often necessary for successful competition. More severe emotional disturbances and specific psychopathologies that extend beyond weight and eating concerns are typically not present in females with subclinical eating disorders such as anorexia athletica.

¹ The DSM-III was the primary diagnostic volume when this study was written. Many of their concerns still apply to the latest version of the DSM.

Sundgot-Borgen (1994) provides an exploratory list of criteria to more accurately identify athletes with subclinical eating disorders. Some of these items include: preoccupation with food, calories, body shape, and weight indicated by a score of greater than or equal to 20 on the Eating Attitudes Test; a distorted body image, demonstrated by a score greater than or equal to 14 on the Body Image Dissatisfaction Scale; an intense fear of gaining weight or becoming fat even when the athlete is slightly or significantly underweight; and menstrual dysfunction (such as primary amenorrhea, secondary amenorrhea, or oligomenorrhea). Since few studies have specifically examined these distinctions between subclinical and clinical eating disorders, the prevalence of subclinical eating disorders is yet to be determined. However, research suggests the prevalence is quite high, especially in sports that stress a low body weight.

Increasing evidence for subclinical eating disorders can be gathered from studies of the prevalence of clinical eating disorders in athletes. For example, many of these studies utilized the Eating Attitudes Test (EAT) or the EAT-26. However, these scales alone do not provide sufficient information to diagnose athletes. These scales were not developed with the intent of clinically diagnosing anorexia nervosa or bulimia nervosa. Instead, they provided the possibility for screening attitudes and behaviors in nonclinical settings.

Research suggests that the EAT or the short EAT-26 may offer a more accurate diagnosis of *subclinical* eating disorders. Studies indicate that subclinical eating disorders in female athletes may be better defined by creating subdivisions in three areas: studies measuring energy expenditure in female athletes (such as dieting and exercise habits), studies looking at amenorrheic and eumenorrheic athletes on several measures, and studies scrutinizing the relationship between body image attitudes and energy intake in female athletes specifically (Beals & Manore, 1994).

Typically, studies measuring energy intake of female athletes show caloric intakes significantly lower than recommended or expected based on one's energy expenditure (Beals & Manore, 1994). One study compared the daily energy intakes of female marathoners, recreational runners, and sedentary controls (Prior, Vigna, Schechter, & Burgess, 1990, as cited in Beals & Manore, 1994). Researchers discovered that energy intakes between groups did *not* differ significantly, although all were considered quite low. They reported intakes of 1,571, 1,708, and 1,720 kcal/day for the controls, recreational runners, and marathoners respectively. However, as previous studies have demonstrated, each group differed significantly in energy expenditure. Weekly mileage totals for marathoners, recreational runners, and sedentary controls averaged 89, 34, and 2 miles respectively. Perhaps the most prominent finding was that recreational runners and marathoners reported almost identical energy intakes even though marathoners were running approximately three times as many miles per week. While marathoners in this study exhibited what is typically considered "low energy intake," they still maintained stable body weights (Beals & Manore, 1994).

Beals and Manore (1994) suggest these findings may indicate that female athletes are underreporting energy intake. Or perhaps these results could be related to physiological adaptations associated with increased energy efficiency, enabling female athletes to function normally and sustain energy balance while consuming fewer calories than recommended based on body size and level of physical exertion. In general, studies on this topic have produced inconsistent results due to differences in reported average weekly mileage, and reported energy intakes of female athletes. Researchers have often perceived low energy intakes in female athletes to be an indication of subclinical eating disorders. Some studies suggest the nutritional status of female athletes is characterized by inadequate energy intakes while other studies imply

higher energy intakes. Future studies would need to scrutinize the reporting of energy intake and energy expenditure to replicate these findings (Beals & Manore, 1994).

Long-term Health Consequences of Inadequate Energy Intake

Few researchers have examined the effects of subclinical eating disorders on the nutritional status of female athletes. In other words, studies have not discovered whether or not this inadequate energy intake puts athletes at an increased risk for nutrient deficiencies. Beals and Manore (1998) studied this very phenomenon and found that females with subclinical eating disorders have significantly lower protein and fat intakes than recommended for highly active individuals. The amount of carbohydrate intake among groups did not differ significantly, but those with subclinical eating disorders were consuming far less than recommended for active females. Also, mean fat intake was lower for those with subclinical eating disorders.

While mean levels of micronutrient intakes between groups equaled or exceeded respective RDAs in general, those with subclinical eating disorders were more likely to consume less than the RDA for the micronutrients studied. Athletes with subclinical eating disorders were ingesting less than two thirds of the RDA of calcium, iron, magnesium, zinc, niacin, vitamin B-6, and vitamin B-12 derived from food, food supplements and/or sport foods (such as sport bars, protein drinks, carbohydrate and electrolyte replacement drinks). Research suggests that athletes in training consume between 7 and 10 g carbohydrate per kilogram body weight per day to replace muscle glycogen and prevent early fatigue during physical exertion. However, many females with subclinical eating disorders report low carbohydrate intakes, which when combined with intense training, may result in low glycogen stores and lead to increased exhaustion and risk of injury (Beals & Manore, 1998).

Even though on average none of the athletes with subclinical eating disorders exhibited severe nutritional deficiencies, many reported inadequate energy intakes for highly active females. Research has yet to explore the effects of low nutrient intake and a high level of exercise extensively in longitudinal studies. However current research suggests that many long-term health consequences may arise, such as: chronic fatigue, diminished immune function, poor or slowed healing from injury, anemia, electrolyte imbalances, cardiovascular deficiencies, endocrine abnormalities, and bone density loss yet this finding is still highly ambiguous. It is important for dietitians and nutritionists to find effective ways of educating athletes on proper ways to fuel one's body (Beals & Manore, 1998).

Research indicates that chronic energy restriction can have a tremendous impact on female athletes' performance and health. Low energy intake in combination with excessive exercise can lead to suboptimal athletic performance (Beals & Manore, 1994). Currently, it is difficult to measure insufficient energy intake because many athletes are not monitored closely over extended periods of time. While it is hard to infer a causal relationship between long-term energy deficiency and performance, in general, research supports the idea that chronic energy restriction does not enable athletes to maintain performance based on rigorous levels of training.

Overall, Beals and Manore (1994) suggest that research should begin to focus on factors related to subclinical eating disorders in female athletes. They suggest the need for more large-scale studies utilizing consistent measures and discovering the prevalence of subclinical eating disorders in female athletes participating in a variety of sports, identifying sports that put athletes at the greatest risk for developing eating disorders, looking more carefully at the psychological predisposition that makes female athletes more likely to develop eating disorders, studying a

variety of ability levels in various sports (ranging from recreational to elite), determining the degree to which subclinical eating disorders (such as anorexia athletica) increase the likelihood of female athletes developing a clinical eating disorder, and finally analyzing the long-term health consequences of subclinical eating disorders (Beals & Manore, 1994).

An Analysis of the Female Athlete Triad

A significant problem in diagnosing eating disorders in athletes is related to a phenomenon called the Female Athlete Triad: disordered eating, amenorrhea, and osteoporosis (Sherman & Thompson, 2004). Disordered eating is defined along a spectrum from dieting to clinically diagnosed eating disorders. This component of the Triad is crucial to understand, because an athlete can experience amenorrhea and osteoporosis when disordered eating is at the subclinical level.

The second part of the Triad, amenorrhea, or the absence of menstrual functioning for three cycles in a row, is not completely understood in female athletes (Waldrop, 2000). Athletic amenorrhea can be secondary amenorrhea—cessation of menses post menarche—but often, young girls reach high levels of competition at early ages, which may delay menarche—primary amenorrhea. Overall, it is thought to be related to the association between energy deficits, physical stress and psychological distress.

Insufficient energy intake combined with amenorrhea can lead to a premature decrease in bone density. Typically, the osteoblasts, cells which form bones, and osteoclasts, cells that reabsorb bone, function normally in healthy individuals. In amenorrheic females, this process is interrupted by a decrease in estrogen. Thus, more bone gets reabsorbed instead of forming more

bone (Mehler, 2003 as cited in Sherman & Thompson, 2004). Amenorrheic athletes have lower bone mineral density than athletes whose menstrual cycles are normal.

Overtraining can be one of the first warning signs of the Triad (Sherman & Thompson, 2004). There is thought to be a connection between restricted eating and exercise, so when these two factors are combined, they may lead to more serious health consequences for the female athlete. If one is eating too few calories for their level of physical activity, this restricted level of consumption could disrupt or cause cessation of the menstrual cycle altogether.

These types of signs in an athlete should warrant a medical evaluation. In order for a female to regain menstrual functioning, she should increase caloric intake or reduce level of physical activity, or a combination of both. Usually, menstruation returns within two to three months. However, sometimes individuals are uninformed about appropriate calorie levels based on their energy expenditure, so it is necessary that healthcare professionals provide them with the necessary information. Individuals may resist getting help, so more specialized and extensive treatment may be required (Sherman & Thompson, 2004).

If left unsupervised, disordered eating behavior and loss of menstrual functioning may lead to osteoporosis, the third component of the Triad. Over time, low calcium intake when combined with menstrual dysfunction may contribute to decreased bone mineral density (Beals & Manore, 1998). Deterioration of bone tissues may increase the likelihood of developing stress fractures and osteoporosis later in life. Studies examining the bone mass density (BMD) in amenorrheic and eumenorrheic athletes discovered that the vertebral mineral density decreased in amenorrheic athletes (Sherman & Thompson, 2004). A diagnosis of osteoporosis in these individuals often occurs after an unexpected fracture. A loss of bone density can occur as early as adolescence in amenorrheic athletes.

Unfortunately, the onset of eating disorders occurs at a time when individuals are developing their peak bone mass. Decreases in BMD occur because estrogen levels are lower in females exhibiting amenorrhea. Estrogen prevents calcium reabsorption, which allows calcium to be deposited into bones. The longer an athlete does not menstruate, the greater BMD loss, the effects of which may not be reversed easily (Waldorp, 2000). Lower BMD does not appear to be entirely reversible, which could result in a lower BMD for life.

Research indicates that, currently, high schools are not adequately screening for the triad and schools lack sufficient programs to educate athletes and coaches. Beals (2003, as cited in De La Torre & Snell, 2005) studied the implementation of these interventions at the Division I collegiate level. She discovered that only 24% of the programs surveyed used a questionnaire examining comprehensive menstrual history, and fewer than 6% used a formal interview or validated eating disorder questionnaire. The study revealed that 73% of schools had menstrual dysfunction and disordered eating education available, but only 41% of these institutions required it.

However, most research to date on the Female Athlete Triad has been performed on older women, collegiate athletes, and elite athletes. Therefore, generalizations cannot currently be made about female athletes in middle and high school. More studies need to be performed on the effects of the Female Athlete Triad in younger athletes (De La Torre & Snell, 2005). Overall, research suggests that it is important to discover more about the Triad, as it may pose a serious threat to the health and emotional well being of female athletes. Fortunately, the Female Athlete Triad can be prevented with early identification and proper treatment from healthcare professionals.

De La Torre and Snell (2005) surveyed 91 schools in a large school district and specifically examined sports which emphasize a low body weight (cross country, swimming, cheerleading, gymnastics, and track). They used a questionnaire created 17 open-ended and close-ended questions involving the type and spectrum of disordered eating, menstrual dysfunction screening, education and treatment programs. It was originally designed to evaluate collegiate programs, but was used in this study with permission to look at the high school level (De La Torre & Snell, 2005).

The results show that 67% of high schools surveyed do not have existing screening programs for female athletes for menstrual dysfunction. The other 33% of schools provided minimal screening, using questionnaires with few, general inquiries such as: "Is your period regular?" and "Have you ever skipped a period?" Three percent of schools indicated having a standard treatment guideline for treating athletes with menstrual dysfunction, which include referring the athlete to her primary physician, and 30% of these schools prohibited the athlete from participating if her doctor requested so. Only 18% of schools had a specific treatment protocol for athletes exhibiting eating disorders. Typically, schools that provided this assistance did so on a case-by-case basis by referring the athlete to a physician (44%), to a psychologist or counselor (42%), eating disorder specialist (24%), or a registered dietitian (15%), or talking to the athlete's parents (12%).

Thirty-two percent of schools said that athletes diagnosed with eating disorders were restricted from participation in their sport. Thirty-three percent of high school provided educational programs to athletes (including individual counseling, group seminars, videos/films, and written materials). However, fewer than 9% of these schools required attendance at these possible educational opportunities. Additionally, education about the Female Athlete Triad was

available to 24% of coaches, but only 15% of these schools required coaches attend. Overall, the results of this study suggest that high school athletic programs may not be sufficiently screening for components of the Triad. The American Academy of Pediatrics (AAP) suggests that the following be evaluated: dietary practices, exercise intensity, duration, frequency, and menstrual history (De La Torre & Snell, 2005). Without this information, high schools cannot accurately screen for disordered eating behavior and menstrual dysfunction.

Chapter Summary

Clearly, the topics discussed in this chapter are vital to understanding the manifestation of eating disorders in female athletes. Research shows that the coach plays an integral role in identifying at-risk athletes which can aid in the prevention and intervention process.

Understandably, these warning signs are difficult to identify since the prevalence of eating disorders among female athletes remains a largely unexplored topic. Inconsistencies in current research emphasize the need to perform future studies examining athletes of a variety of ability levels.

The distinct pressure on lean sport athletes to attain a thin build has led researchers such as Kerr et al. (2006) to search for ways to deemphasize the importance of leanness within the context of sport. Studies suggest that body size often becomes equated with sport performance, which may indirectly encourage female athletes to develop unhealthy eating habits. Research exploring energy expenditure in relation to energy intake implies long term health consequences related to the Female Athlete Triad. Currently, studies are beginning to highlight the importance of coaches' awareness of the Triad and its severity, in addition to screening for the Triad as early as high school.

Chapter 2

Coaches may be confronted with difficulties in identifying at-risk athletes. Coaches who are uninformed about the specific health and nutritional needs of female athletes and health consequences related to the Female Athlete Triad may be unable to recognize signs and symptoms of eating disorders in their athletes. They may not recognize the severity of the components of the triad and related health abnormalities that may lead to more detrimental repercussions in the future of the athlete's life.

Due to the emphasis on attaining the "expected" lean body types for particular sports, the line between appropriate training and excessive exercise becomes blurred, making the distinction between normal appearances and symptomatic athletes seemingly impossible at times. While some coaches have received particular instruction about appropriately approaching athlete's exhibiting disordered eating behavior, others may not know how to proceed with handling the situation once an athlete has been identified. Consequently, many athletes go unnoticed or simply remain in a cycle of disturbed eating and training practices, causing their overall health to worsen, which can lead to a diagnosis of a clinical eating disorder in the not so distant future.

The purpose of this study is to gain a better understanding of high school coaches' overall knowledge of female athlete health and nutrition, including whether or not they have received formal training on this subject, how they monitor athletes' behaviors, their understanding of the Female Athlete Triad, their personal experiences handling athletes exhibiting disordered eating behavior, their perception of how other coaches handle the situation, suggestions they have regarding how athletes should be approached, and their willingness to receive further education on eating disorders and how they affect the female athlete population. It is especially important

to consider high school coaches' input since many studies have exclusively focused on collegiate or post-collegiate professional athletes.

I will use the information gained from this study to create a preliminary strategy for prevention, intervention and treatment for female athletes exhibiting disordered eating behavior at the high school level. This intervention model will build upon coaches' responses and recent developments in psychological literature on physiologic screening tests. This increased knowledge base can help to effectively assist females not just in enhancing their athletic performance but more importantly improving their overall health and well-being.

Method

Participants

The Minnesota State High School League website (a coaching contact information database in the state of Minnesota) was used to recruit high school coaches of female varsity athletes of the following lean sports: track and field, cross country, dance team, cheerleading, swimming and diving, and gymnastics. Coaches were then notified via email about an online survey available through Survey Monkey. The email informed coaches that their participation in the study was voluntary. In the Consent Form participants were notified that their identity would remain anonymous, and they were free to decline participation in the study at any point if they felt uncomfortable. Approximately 30% of coaches who were contacted filled out the survey (98/329).

The sample from which coaches were drawn represented the following sports: track and field, cross country, gymnastics, swimming and diving, Nordic skiing, cheerleading, dance team, volleyball, basketball, soccer, softball, and tennis. Originally, this study sought to exclusively examine the responses of coaches of lean sports. However, most participants indicated coaching

a second *non-lean* sport in addition to the lean sport they were initially recruited for. Coaches did not typically reveal which sport they were referring to in their answers, making it difficult to look at differences within lean sports. Of the coaches contacted, 98 filled out the questionnaire pertaining to their knowledge of disordered eating behavior in female athletes. Of these coaches, 55 were females, and 38 were males. The majority of coaches worked at public schools (79/98). Roughly the same number of coaches were employed full time (46/98) and part time (47/98). Participants varied in years of coaching experience ranging from less than a year to 34 years. The ages of coaches were as follows: 36/98 coaches were 21-30 year old, 30/98 coaches were 31-40, 17/98 were 41-50, 8 of coaches were 51-60, and 2/98 coaches were over the age of 60.

Procedure

Coaches filled out a questionnaire to assess their knowledge of disordered eating behavior in female athletes in several categories: their general understanding of female athlete health and nutrition, their personal practices monitoring athletes' eating habits and training regimen, their ability to identify athletes exhibiting signs and symptoms of an eating disorder, their perceptions of other coaches' handling of similar situations, their education experience on female athlete health and nutrition, their suggestions for the kind of training coaches *should* be receiving on this topic, and their willingness to receive further education and training. Coaches were first asked to indicate which sports they coach, since this questionnaire was designed to focus on coaches of lean sports.

For all open-ended responses, I compiled a list of participants' comments. In consultation with a doctoral level psychologist, I developed a series of discrete categories for each question based on these comments. Ideally, I would have asked another rater sort the items into categories to establish inter-rater reliability, but this not occur due to time constraints.

Nonetheless, the coding system is quite simple and I believe the inter-rater reliability would have been high. I provide quotes to further explain open-ended coding in sections where it may be confusing.

To assess coaches' general knowledge of female athlete health and nutrition, coaches were asked about their familiarity with the Female Athlete Triad and to describe their comprehension of the topic. Coaches were also asked "Do you think it is it important for coaches to know about their athlete's menstrual cycles?" on a 4-point Likert scale with 1 being *Not at all important*, and 4, *Very Important*. Then coaches were asked to select the best fit for the question "Do you think it is normal for female athletes to have irregular menstrual cycles?" The following choices were available: i. "Yes, I consider this normal for highly active women," ii. "Menstrual irregularity is worrisome for some athletes, but not others," and iii. "No, menstrual irregularity is problematic." Coaches then reported their estimate of the prevalence of eating disorders among female high school athletes.

To gain a better understanding of coaches' personal practices monitoring their athletes eating and training habits, coaches were asked to report the frequency of the following behaviors on a 4-point Likert scale (1: *Never*, 2: *Rarely*, 3: *Sometimes*, 4: *Often*) including: "I weigh my athletes," "I inquire about my athletes eating habits," "I ask athletes to record their food choices," "I am aware of my athletes' exercise habits outside of practice time," and "I adjust each athlete's training regimen in accordance with her needs." Coaches were also given the option of *Other*. Coaches' responses to *Other* were either an elaboration of their multiple choice answers or different ideas they had not expressed in the multiple choice categories. Their responses to *Other* were coded as follows: "Do not openly discuss eating/training habits," "I only inquire if there is a problem," "I provide nutritional lessons to all athletes," "I adjust practices to

accommodate athletes' needs," and "Miscellaneous" if their answer did not fit in another category.

They also were asked, "Is there anything your sport could do or is currently doing to deemphasize the importance of leanness and body image in sport performance? This question was taken from a questionnaire developed by Kerr et al. (2006). Coaches' responses to this question were then coded in several categories. Responses such as "I point out strong, healthy runners and encourage my athletes to gain muscle mass" and "My sport requires a lot of energy for the athletes so it is critical that I stress to all my athletes that they are eating all of their meals..." were coded as *Focus on fuel/strength to enhance performance*. Answers such as "Cheerleading at this time is doing a good job at deemphasizing the importance of leanness by changing the uniform so that they (sic) will look good on all body shapes and sizes" and "It's hard in swimming, because every day you have to put on a swimsuit, and as a high school girl, some days that is hard" were categorized as *Uniform sizing*. Other examples such as "We have kids of all weights and sizes. In swimming it doesn't matter as much as in gymnastics" and "Weight does not matter in dance team—it is whether or not you are able to keep up and perform with other dancers" were characterized as *Emphasis on acceptance of all body types*. Responses such as "Keep the stress level down on performance" and "We focus on health training ie. proper nutrition, proper sleep, mental and physical readiness to compete or practice" were considered *Emphasis on overall well-being*. It was common for coaches' answers to fall into several categories.

Coaches who commented "It is so ingrained in the culture—even if the best gymnast is of average size and skilled, the girls will resort to how 'fat' she is" and "Society puts body image on every cover of every magazine. It is very hard not to be influenced by what is supposed to be

the norm” were coded as *Society must change to make this possible*. Those who answered “I think just train kids at a young age to fuel their bodies correctly, with a focus on nutrition” and “We encourage healthy eating were considered *Focus on general nutrition*. Miscellaneous answers included “I think the coach needs to be supportive and encourage the individual and not make comments that are negative to that individual” or “I think this is the wrong approach. In running, being lean IS a benefit...It takes a certain kind of personality (pleaser, perfectionist) in combination with a certain kind of coach (pushes too hard, demands too much, not accepting of who the athlete is) to bring these disorders on. It’s more than just body image.”

To discover more about coaches’ experiences identifying athletes with signs and symptoms of an eating disorder, coaches were asked to explain how they approach athletes exhibiting signs and symptoms of eating disorders. Coaches’ responses were then coded into several categories. All responses fit into two main categories, Indirect or Direct. Examples of Indirect categories were: *Addressed issue of nutrition in general with the whole team*, *Coach made him/herself available to the athlete*, *Talked about nutrition in relation to performance*, *Kept tabs on someone with risk factors/warning signs*, *Consultation with athlete addressing possible contributing factors* and *Miscellaneous*. Coaches often provided answers which fit into several categories.

Coaches who answered “I brought the athletes in a conference room and talked about what I noticed...” and “I first addressed the whole team to talk about nutrition. I even hired a nutritionist to talk to the girls...” were coded as *Addressed issues of nutrition in general with the whole team*. Those who answered “...opened the door for discussion if interested” and “When I saw the athlete I would talk about how things were going, if there was anything I could do, and anytime you needed help just call” were coded as *Coach made him/herself available to the*

athlete. Coaches who said “Talked about dietary needs in regards to training and performance” and “...talked about their training and how they needed to make sure they were getting enough calories into their system to achieve their goals were coded as *Talked about nutrition in relation to performance*.

Coaches who responded “I had an eating disorder myself, so I knew what to look for and I know the trick that people do with an eating disorder...” and “I observed her behavior in performance and at practice” were coded as *Kept tabs on someone with risk factors/warning signs*. Those who answered “Asked about how she was handling stress, asked about how she was feeling and if anything was bothering her. Never mentioned weight” and “...[I] Went into the more ‘personal’ side of things about what was going on in their lives. It’s not about food—it’s about a whole lot more!” were coded as *Consultation with athlete addressing possible contributing factors*. A *Miscellaneous* response included “Because my assistant coach directly coaches this athlete and had a prior relationship from coaching the athlete in cross country, I let her handle the situation and also keep me informed.

Direct categories included: *Consultation with athletes* (either privately or in small groups), *Commented on athlete’s weight loss*, *Instructed athlete to keep a food journal*, *Conversation with parents*, and *Miscellaneous*. Coaches who said “I asked the young women if they were feeling well...” and “I approached the individual in private to avoid any shame/embarrassment within the peer group...” were considered *Consultation with athletes*. Those who said “When the problem persisted I had them keep a food journal for me and we would talk about it every week” and “I also brought in a psychologist/trainer to talk about how to do their journals” were coded as *Instructed athlete to keep a food journal*. Coaches who indicated “Discussed with both parents in advance, then inquired about concerns I had with the

child...” and “I discussed it with the parents first...” were coded as *Conversation with parents*. A *Miscellaneous* response included “She approached the coaching staff after having been evaluated by a therapist. Pulled herself from the sport with help of her mother...”

Next coaches were asked to reflect on what they personally found most difficult about the process of approaching athletes with signs and symptoms of eating disorders. Coaches answers were coded into several categories: *Difficulty in expressing genuine concern*, *Coach feared athlete’s response*, *Denial of the parents*, *Denial of the athlete*, *Not difficult*, and *Miscellaneous*. Coaches who responded “It was difficult to word my thoughts in a proper manner,” and “It is difficult to approach to approach a person about something that personal” were coded as *Difficulty in expressing genuine concern*. Participants who answered “The hardest part is the concern that by informing them of the behavior and symptoms that are present, having them feel that there is no issue, close off to me and the team, and hide their behaviors more” and “Most difficult—not wanting to offend the individual” were coded as *Coach feared athlete’s response*.

To better understand the intervention and treatment process, coaches were asked, “If applicable, please describe what steps were taken by other healthcare professionals and athletic personnel to assist the athlete.” Their answers were then coded into several categories: *Informal monitoring*, *Involvement of healthcare personnel*, *Referral of athlete to treatment program*, *Parental involvement*, and *Miscellaneous*. Coaches who responded “Came to agreement about what weight should be at. Took measures to weigh and monitor at school and at home,” and “Constant observation by coaching staff and continual talking with athlete and parents” were coded as “*Informal monitoring*.” If coaches answered “I believe she was referred to our school counselor and her eating was monitored” and “They would generally meet with dietitians and therapists to deal with the underlying issues” were coded as *Involvement of healthcare personnel*.

Coaches who answered “They were monitored—some in-patient care, some out-patient care—by doctors” “...In the second case, hospitalization” were considered “Referral of athlete to treatment program.” Coaches who said “Parent(s) were called and took over for direct care of the athlete” and “The parents of the athlete involved sought help” were coded as *Parental involvement*.

Coaches were also asked to reflect on their perception of other coaches’ handling of athletes exhibiting signs or symptoms of an eating disorder. They described how they have observed other coaches effectively approaching athletes and how they perceive coaches to deal with these issues in negative ways. For each of these statements, coaches were asked to report how frequently effective and negative approaches occur on a 4-point Likert scale with 1 being *Never*, and 4 being *Often*. Participants were then asked to explain whether or not most coaches’ intervention strategies are consistent with their beliefs about how athletes should be approached and directed toward treatment for eating disorders.

To assess the formal education coaches have received on the topic of female athlete health and nutrition, they were asked to check all that apply: 1, “I have attended workshops and/or meetings on the topic of women’s health and/or nutrition,” 2, “My degree is related to health/exercise performance, 3, I have read literature on the topic of women’s health and nutrition,” 4, “Other—please specify.” Participants were then asked to report what type of training coaches think they should receive. Finally, coaches reported their willingness to attend workshops if they were available to coaches and athletic personnel on a regular basis with 1 being *Very Unlikely*, and 4 being *Very Likely*.

Several demographic questions were included at the end of the questionnaire including: coaches' gender, their school setting (public or private), whether they coach full or part time, the number of years they have been coaching, and their age.

A few additional questions were included in the survey but were not analyzed in the results. They include "Have you yourself approached an athlete whom you suspected had an eating disorder?" If they answered *Yes*, then they were asked to respond to how many different athletes they have identified. They were also asked to answer the question, "If the athlete received treatment, did she continue to participate in practice and/or competition while receiving treatment for an eating disorder?" If the coach had not yet encountered an athlete with an eating disorder, they were asked to skip ahead and explain how they would hypothetically address the situation. Coaches were also asked if other coaches' approaches are consistent with their beliefs on how the situation should be addressed.

Chapter 3

Results

The purpose of this study was to gain a better understanding of coaches' knowledge of issues encompassing disordered eating behavior in general and their strategies for prevention and intervention. To better comprehend how coaches assess the health and nutritional status of female athletes, the following topics were analyzed: coaches' estimates of the prevalence of eating disorders among female high school competitive athletes, how coaches monitor athletes' eating and training habits, coaches' awareness of the Female Athlete Triad, and their knowledge of athletes' menstrual cycles.

To understand coaches' practices in action, analyses were performed to discover the typical ways in which they approach athletes exhibiting signs and symptoms of eating disorders and the difficulties associated with these interactions. In addition to personal experiences, coaches revealed their perceptions of other coaches' dealing with similar situations and the presumed effectiveness or ineffectiveness of these strategies.

I sought to reveal the type of formal education that coaches have received related to female athlete health and nutrition and their personal suggestions for the kinds of training coaches should receive on this topic. Finally coaches indicated their interest in attending informative workshops on related issues and their opinions regarding how to deemphasize leanness within the context of their sport. All percentages are out of the total number of respondents (98).

Coaches' Estimates of the Prevalence of Eating Disorders Among High School Female Competitive Athletes

About a third (37.8%) of coaches perceived the prevalence of eating disorders among high school female athletes to be “moderate” while 33.7% of coaches thought the prevalence was “low,” and 10.2% of coaches estimated the prevalence to be “high.” While few coaches answered on either extreme (7.1% indicated “very low” and 5.1% said “very high”), the prevalence of eating disorders among high school female athletes remains very ambiguous.

It is also interesting to mention that there were significant gender differences in coaches' responses to the prevalence of eating disorders. The majority (50.0%) of female coaches indicated an estimated prevalence of eating disorders to be “moderate,” while 26.3% of males perceived the prevalence to be “moderate.” Similarly, 24.1% of females estimated the prevalence to be “low” while 52.6% of male coaches thought that the prevalence was “low.” There were also a greater number of females thought the prevalence was “high” (14.8%) and “very high” (7.4%), compared to 5.3% and 2.6% respectively for males. An even greater difference was observed between males and females who indicated “very low” in response to this question. While 13.2% of males answered “very low” only 3.7% females gave the same response ($\chi^2(4)=13.61, p=.009$). I next calculated average scores and performed a t-test to compare male and female coaches' responses. The average female answer was 2.98, (sd=.921) indicating that most females thought that the prevalence was moderate, while most males indicated the prevalence being low, 2.32, (sd=.873), ($t(90)=3.49, p=.001$).

Monitoring Athletes' Eating and Training Habits

Coaches revealed several consistent responses regarding how they monitor their athletes' eating and training habits. According to the results, about 91.8%² of coaches never weigh their athletes. The results indicated there were significant differences between genders in their responses to whether or not they weigh their athletes, $\chi^2(6)=13.17, p=.046$. an interesting finding was that 100% of female respondents indicated that they "never" have weighed their athletes.

Slightly over half of respondents (55.1%) indicated inquiring about their athletes' eating habits "sometimes." However, the majority (71.4%) of coaches have never requested that athletes record their food choices. As several coaches pointed out in their open-ended responses, some fear that openly discussing eating habits may exacerbate already existing eating disturbances or possibly elicit them in other athletes. One coach commented, "There are too many girls that are easily influenced by anorexia and looking good that food and weight remain out of conversation." This coach mentioned that she does however, encourage girls to eat what is healthy for their own bodies and emphasizes the importance of fueling themselves properly "...on days of practice and competitions so that they do not feel sick."

Other coaches take similar precautionary steps in their efforts to monitor athletes' eating habits. In the open-ended portion of the survey, a small group (6.1%) shared that they only address eating concerns if a problem arises. For example, coaches said they would approach an athlete "If I feel that they are not taking in enough calories or I see eating habits that are common with anorexia and/or bulimia" or if there is evidence of a "...decline in their ability to perform." So while coaches may avoid monitoring of their athletes' eating habits by suggesting keeping a

² Numbers will not be used (N/98) to denote how many coaches answered each question. Percentages estimate the number of individuals based on a sample size of 98.

food log, they seem to employ other methods of regulating athletes' eating and training behaviors.

Another common response involved awareness of athletes' exercise habits outside of in-season practice and competition. Over half of coaches surveyed (54.1%) indicated "sometimes" being aware of their athletes' post-season exercise regimens, while 36.7% of coaches reported "often." In addition to being cautious about how they approach athletes about eating habits, coaches also seem to have a good grasp of how athletes are taking care of their bodies physically in the off-season. In addition, most coaches adjust their athletes' training regimens in accordance with their needs "sometimes" (37.8%) and "often" (46.9%).

Some coaches (4.1%) incorporated nutritional lessons into their practice schedules several times a season addressing all athletes at once. Several commented that guest speakers were invited to share information regarding proper nutrition. For instance, one coach mentioned, "I try to include information about healthy eating habits, etc. during my team talk."

A number of coaches offered individual examples of how they promote healthy choices on their teams. In addition to providing necessary information to their athletes, several coaches made sure to provide snacks that set an example for how to fuel athletes' performance. One coach mentioned, "If I have snacks available (to help them get through 3 hours of practice) they are as healthy as I can buy." The idea of limiting the consumption of carbonated drinks was mentioned by two coaches.

Another coach explained that in order to promote peak performance, the team encourages healthy choices especially during the most pivotal time of the season in addition to talking about nutrition now and then. For instance, the team captains encourage a 'no soda/pop' rule that many athletes follow during the season..." Another coach reiterated the idea of setting

nutritional examples. The individual indicated, "I also watch what I eat when I am around them and I am careful what I say about food. I realize that they are watching to see if I eat junk food, talk about being fat etc...I consciously eat a little fat or sugar around them so they see that it's OK to eat it [fat and/or sugar] every now and then."

Coaches' Awareness of the Female Athlete Triad

Coaches were asked about their familiarity with the Female Athlete Triad. The vast majority of coaches (71.9%) were *not* able to describe the three components of Triad. Some of these individuals had never heard of the term before, while others could not recall what it meant. Only 22.9% of the 98 coaches surveyed could explain the Triad in its entirety, the other 5.1% demonstrated partial knowledge of the Triad. Knowledge of the Triad did not vary as a function of gender, age, or years of coaching experience.

Coaches' Knowledge of Athletes' Menstrual Cycle

Coaches were asked whether or not they thought it was important for coaches to know about their athletes' menstrual cycles and whether they perceived menstrual irregularity to be normal. Over half of coaches (52.6%) felt that it was "somewhat important" to have knowledge of their athletes' menstrual cycles, and another 23.7% of coaches considered knowledge of the menstrual cycle to be "important."

The responses for whether or not it is normal for female athletes to have irregular menstrual cycles were as follows: 25.8% felt that this was "normal for active women," 59.8% considered this "worrisome for some athletes but not others," and 14.4% felt that menstrual

irregularity is “problematic.” There were no significant differences in responses based on age, gender, or number of years coaching.

Addressing Disordered Eating Behavior in Female Athletes

When asked how they address athletes exhibiting signs or symptoms of an eating disorder, some of the coaches reported more indirect approaches while others reported direct strategies. Indirect approaches included any of the following: addressing the issue of nutrition in general with the whole team, the coach making him/herself available to the athlete, talking about nutrition in relation to performance, keeping tabs on someone exhibiting risk factors/warning signs, and having a consultation with the athlete addressing possible contributing factors, but not discussing eating habits specifically. Direct approaches on the other hand consisted of any of the following: the coach having a private conversation with the athlete, commenting on the athlete’s weight loss, instructing the athlete to keep a food journal, and having a conversation with the parents.

Most coaches mentioned several of these steps, demonstrating that they do not typically rely on a single method but take a combination of steps in their approach to addressing the issue of disordered eating. While some coaches used indirect methods at first, many progressed to using a more direct approach when the situation worsened. The vast majority of coaches (62.1%) reported using direct methods (at some point), while 34.5% of coaches used exclusively indirect approaches.

A recurring indirect approach expressed by coaches (11.2%) was having an “open-door policy” meaning that they let their athletes know they are available to talk to. One coach indicated that in addition to talking about dietary needs in relation to performance, that “[I]

Asked questions...listened. Made suggestions...opened the door for discussion if interested.”

Another coach mentioned engaging in casual conversation with athletes saying, “When I saw the athlete I would talk about how things were going, if there was anything I could do, and anytime you needed help just call.”

Other coaches (9.2%) commented specifically on how low calorie intake can decrease one’s energy and detrimentally affect one’s performance. One coach mentioned, “I sat down with both individuals and talked about their training and how they needed to make sure they were getting enough calories into their system to achieve their goals.” Another coached expressed similar concerns saying, “In a roundabout way I talked about the importance of food as a source of energy and nutrition; without good nutrition, our bodies don’t have the fuel to perform at their highest levels.”

A similar percentage of coaches (7.1%) consulted the athlete to address possible contributing factors *besides* eating behaviors. One coach asked how an athlete “...was handling stress, asked about how she was feeling and if anything was bothering her. Never mentioned weight.” Another coach stressed the need to address issues other than eating, and that it can be quite a complicated process. This person said, “We talked about everything else. Analysis of the home situation. Academic, perfectionist attitude...etc...so they will gradually open up and trust us and admit they have a weakness or issue that will hinder their life and their performance in the long term.”

Another common indirect approach (6.1%) expressed in open-ended responses involved talking to the team as a whole to educate athletes on proper nutrition. One coach mentioned hiring a nutritionist to talk to the team about nutrition and also brought in a psychologist/trainer

to talk about how to do food journals. Others emphasized not only nutrition in general but how it affects performance.

Of all direct and indirect approaches, the most common (32.7%) was consulting with athletes (privately or in groups). Some coaches felt it was necessary to talk privately with the individual athlete so as to be sensitive to her feelings and not come across as accusatory. One coach said “[I] brought up the subject in casual conversation to avoid having the athlete feel as though I was attacking her and singling her out as having a problem.” Another coach replied similarly stating, “I talked to the athletes in private. Described their behavior I had noticed. Noted the lack of energy in practice. I didn’t accuse, just made observations. I offered my assistance.”

Another high percentage of coaches (23.5%) indicated talking to athletes’ parents in their open-ended answers. One coach stated he or she “Discussed [eating concerns] with both parents in advance, then inquired about concerns I had with the child, explained the dangers of poor eating habits including injuries, menstrual cycle disruption, and further problems (including child bearing).” Another coach described difficulty in first approaching the athlete, then deciding it was necessary to contact her parents—who were also somewhat resistant at first. The individual said, “She denied problem. Talked to parents. After some delay, they also recognized the problem and got her professional help.”

In this consultation with athletes several coaches (6.1%) expressed their concern for an athlete’s weight loss. One coach said, “[I] sat the dancer down, told her I noticed a weight drop. Asked her about her eating habits and if they had changed.” Another coach expressed worry over an athlete’s eating habits and how they may contribute to other issues affecting her life. The individual “...wrote her a letter explaining that her behavior and eating habits at school

might suggest a deeper issue—basically just feeling out the waters and letting the student know I was available to talk to.”

Difficulties Addressing Eating Disorders in Athletes

Getting the athlete to recognize she had a problem once the situation had been addressed was noted as problematic by 13.3% of coaches. One coach stated, “The most difficult in most situations was the athletes not understanding how much fuel they need to train at the level they are training at. The weight loss was a result of the pursuit of excellence.” This coach’s response helps address a major ambiguity in the athletic field: the fine line between “normal” and an athlete who is on the brink of developing some serious health problems. Given that those exhibiting eating disorders may be very secretive in nature, it may be a struggle for coaches to identify athletes who are affected and need extra assistance. A coach explained this dilemma well saying, “The most difficult part is that people tend to be very secretive about eating issues, and have a hard time being open and honest about it.”

Coaches (9.2%) also indicated denial of parents to be another significant problem in getting the family on board to realize the athlete may have a serious health problem. One coach mentioned it is hard “When parents don’t agree with your judgment that there may be an eating disorder.” Others discussed parents’ negative attitudes toward the coach for trying to express concern over an athlete’s health. One coach emphasized the importance of acknowledging eating disorders as a mental health disorder. The person indicated “I have known them to be difficult to address with the family and get proper treatment for.” Another coach stated, “The reaction of the athlete and parents—sometimes they were in denial and were angry with me for insinuating that their daughter had a problem.”

Naturally, hostile reactions from parents do not exactly reinforce a coach's desire to discuss these sensitive topics. However one coach also clarified that in general "...the athletes and their parents were very receptive." Yet in one case the eating disorder was brought to the attention of the coach by parents of the athlete making the coach feel somewhat helpless in the situation. The individual said, "The parents informed me of the eating disorder and asked that I act like I not (sic) inform the girl that I knew of her disorder. It was difficult not being able to say anything to the girl."

Two other themes that appeared in coaches' responses included: difficulty in expressing sensitivity toward the athlete's situation (6.1%), and also feeling apprehensive of how the athlete might react (5.1%). One coach stated, "[I had] difficulty in making sure I didn't come across as accusatory, rather very concerned" and "My main concern was approaching the topic without causing any additional stress in the athlete." Other coaches expressed trouble clearly articulating their thoughts and also getting the conversation started. For example one coach said, "It was difficult to word my thoughts in the proper manner and getting them [the athlete] to open up about their eating habits." Another coach felt comfortable approaching the athlete, but was worried how she would interpret the communication. This person mentioned, "Talking to the individual about my concerns is not hard, the fear of the individual's response after the discussion concerns me the most."

Overall, the results indicate that the majority of coaches have great difficulty approaching athletes exhibiting disordered eating behavior; only a small minority (3.1%) felt comfortable initiating some form of communication. One coach described the dual role as a coach and school social worker: "The other team members told me she was vomiting after lunch. This was not difficult for me, because I am a school social worker as well." The individual was careful to

mention that "...It was hard to be in both roles, however." In a case where the coach was informed of the eating disorder by another person, it was easy to be encouraging of the athlete to become healthy, even if she was not able to participate in the sport for a while. This coach said "The hard part, as I see it was already done. The athlete was diagnosed and treatment was underway. Being supportive is the easy part, even if it means keeping the athlete off the team until they are healthy."

Steps Taken By Other Healthcare Professionals

In terms of what steps were taken by other healthcare professionals to assist the athlete, several common themes came up. The most common response indicated by coaches (24.5%) was the involvement of clearly stated healthcare personnel. When the coach said that the individual was not enrolled in a formal in-patient or out-patient program, but was being monitored by specified healthcare professionals on a regular basis, they were labeled as "monitored by professionals." This category consisted of any combination of the following individuals: dietitian/nutritionist, therapist, school nurse, doctor, and school counselor. One coach indicated the specific steps that were taken once the athlete was identified: "I believe she was referred to our school counselor and her eating was monitored. She had to keep a log of what she was eating. Her condition improved by the end of the season and she has not had problems since. I don't know if it was ever diagnosed as a specific disorder."

Another frequent plan of action included "parental involvement" (15.3%), although usually followed by intervention by other individuals to continue the process toward recovery. One coach indicated that a parent was extremely helpful in getting referrals for her daughter. The coach stated, "[The] Mother, who was a nurse, got a nutritionist and psychologist involved.

Athlete met regularly with them and developed a plan to return to normal weight.” Another coach mentioned a similar knowledge of their daughter’s disordered eating behavior when informed. This individual said, “Parents were called. Parents were aware. She had received treatment in the past. School nurse was notified.”

In addition to “monitored by professionals” and “parental involvement” was “referral of athlete to treatment program” (either in-patient or out-patient), identified by 6.1%. The final type of monitoring expressed by 5.1% of coaches was “informal monitoring.” This method consisted of any of the following: use food journals, weigh-ins, supervision of the athlete to restroom/lunch, and restricting/prohibiting an athlete from practice and/or competition. Often this type “informal monitoring” was by the coach or an unspecified person (such as parents).

As in previous sections, it was fairly common for coaches to indicate more than one type of assistance. For example one coach explained that several steps were taken to assist the athlete. “I have monitored weight, I know that our athletic trainer has worked with girls on daily calorie intake that is appropriate for them. I have also worked with parents very closely when the concerns have been validated.” This is just one example of how a sort of “management team” of individuals such as a coach, trainer, and parents can help assist the athlete. Another coach described a similar process saying “We get their parents involved so they can start with a nutritionist and then a doctor and then therapist and then a doctor and then enroll in a program.”

Coaches’ Approaching Athletes Exhibiting Disordered Eating Behavior

The most prominent response (36.7% of coaches) to the question regarding coaches’ knowledge of how their colleagues approach athletes exhibiting eating disorders was “don’t know.” Unfortunately, upon looking at the results, it became clear that the wording of this

question was ambiguous. Some coaches may have perceived this question to be asking about how they discuss disordered eating behavior with coaches from their own school, while others may have answered based on talking to coaches from other high schools. Despite this potentially confusing question, interesting results emerged. Even though some coaches are aware of how others handle this situation, many indicated never having conversed with others about this specific topic. For example, one person said “I have not talked to other coaches—not that it doesn’t happen but I just have not had an opportunity to do so.” Some coaches said they haven’t observed symptoms of an eating disorder in their experience coaching. Two common responses explaining this phenomenon were as follows: “I have not observed symptoms of an eating disorder in the athletic field” and “I haven’t observed many coaches having to deal with athletes exhibiting signs or symptoms of an eating disorder.”

On the other hand, some coaches were very aware of other coaches’ practices. Several indicated (20.4%) talking directly with their athlete. One coach said, “Most of our coaching staff approaches the athlete directly. Followed by a request for our school nurse and/or counselor to speak with the athlete.” Another coach mentioned how critical it is to approach the athlete first: “Talking to the athlete is always step one. By going behind the athlete’s back you lose all trust that you work so hard to gain during a season. If I still feel concerned about the athlete I will go to another coach to get their opinion on how I am reading the signs and contact their parents to give them a heads up on what I am observing.”

The other most common response (16.3% of coaches) was contacting parents; a similar tactic expressed in coaches’ individual answers about their own behaviors. One coach expressed the importance of contacting parents in addition to athletes saying, “Talking to both athletes and parents is crucial, considering the age of the athletes (high school) and the delicate issues

involving mental health and self-image.” Another coach indicated the importance of informing parents. This individual said, “They are very concerned and usually take proper steps of contacting parents and school personnel.”

Another common strategy (8.2%) coaches use is consulting other coaches for input as to how to address their athletes appropriately. One coach mentioned, “If a coach feels an athlete has symptoms of an eating disorder they are quick to make it known to other coaches (especially the head coach) and discuss the best way to go about talking to the athlete about their eating habits.” Another coach commented that while they are not considered healthcare professionals, they have ample experience dealing with these complex circumstances. “There are a couple of coaches at [school name] that are usually sought out to address these situations. We are not trained but we are educated in female athletes and have become a resource for the rest of the coaches especially male coaches of women’s sports.”

An equal percentage of coaches (8.2%) feel it is important to provide information that can assist the athlete. One coach mentioned, “Effective confrontation involves helping the athlete see that her choices are affecting her performance.” Another coach talked about educational materials provided to the athlete. This individual mentioned that other coaches have “...explained that certain foods are needed to maintain high performance.”

Other coaches (8.1%) observed their colleagues referring athletes to healthcare professionals. They indicated that in addition to private conversations with the athlete that the coach make “them see a counselor or advisor to be evaluated.” Another individual mentioned the importance of “close monitoring of athlete’s eating habits as well as guidance/counseling on nutrition and exercise. Intervention, information, and support when necessary.”

The majority of coaches (43.9%) estimated the frequency of effective interactions to “rarely” occur, while 39.8% of coaches felt that these communications occurred “sometimes.” One coach stated that most coaches just “play it safe” because of health and liability issues unless the case is severe—then the coach may withhold participation. In general, though, this coach characterized these interactions as “threatening and ineffective.” Another coach said “I have seen coaches be very frustrated with an athlete who has an eating disorder,” which consequently caused fear and confusion in teammates as to how to help the situation.

It is also interesting to note that there were significant gender differences in coaches’ response to the frequency of effective approaches, $\chi^2(98)=41.78, p<.001$. A high percentage (43.6%) of females perceived effective interventions to occur “rarely” compared to 50.0% of males on the same question. Also, 41.8% of females thought these positive interactions occur “sometimes” whereas only 34.2% of males responded this way. A similarly unexpected finding on the same question was that a higher percentage of males (10.5%) than females (7.3%) perceived these effective interactions to occur “often.”

In the section regarding coaches’ perceptions of negative interventions by their fellow coaches, about half (49.0%) of coaches were characterized as having “no experience.” Some coaches had never witnessed any negative approaches by their colleagues, and others were unsure of whether or not these negative approaches occur.

Overall, a common problem identified by 26.5% of coaches in the sample was ignorance altogether of signs and symptoms of eating disorders in athletes or minimizing the severity of the situation. One coach mentioned that a common reaction is to “Wish it would go away. Hope someone else would deal with it.” Overall, it can be said that coaches have a variety of experiences dealing with these issues and differing experiences in consulting other coaches. One

coach summed up this discrepancy in awareness saying, “The more educated the coaches are in nutrition, the better they address these issues...some other coaches who are not as educated likely do not realize that there could be potential issues.”

Other coaches believe their colleagues place too much emphasis on weight. One coach indicated “...the negative [approach] usually occurs when an athlete is too heavy. I have observed other coaches very firmly telling athlete that they must go on a diet.” Another coach likewise commented, “A big problem is that often an athlete receives praise for losing weight and that encourages them to lose more.”

Another response was that some coaches express negative emotions toward their athletes in an effort to get them to realize they have a problem. A coach said it is problematic when a coach tries to “Threaten, try to force consumption, displayed anger/frustration when it’s a control and internal issue only changeable by the athlete.” Another coach commented on a similar attitude expressed by coaches. This person’s observation was that coaches are “Not remaining discreet; demanding for large changes; not seriously handling the problem; pressuring for change; not motivating it.”

Overall, the majority of coaches (37.8%) perceived negative approaches to occur “rarely,” while 28.6% of coaches perceived these interactions to happen “never.”

Coaches’ Training in Female Health and Nutrition

Coaches have differing levels of education about female athlete health and nutrition, ranging from formal educational training to personal experiences. The most common response of coaches (12.2%) who answered this question indicated having received formal education on issues related to eating disorders in college. One person indicated having a major in kinesiology

and a minor in coaching. Other coaches gave answers including “My thesis was on female athletes,” and “I am a licensed clinical social worker and have extensive training in all mental health disorders” and another received “a masters degree with an emphasis on coaching the female athlete.” Another coach mentioned owning a health club and was a nationally certified aerobic instructor and teaches nutrition classes.

Though a somewhat small percentage (4.1%), a few women indicated dealing with these issues either personally or having knowledge of these issues based on their gender. One such person said, “I am a woman. I have learned through experience.” Another coach stated that she was a “Recovering anorexic (like alcoholism, it is a daily battle to stay on track)” while another had previously participated in Methodist Hospital’s eating disorder clinic outpatient treatment.

Kinds of Training Coaches Should Receive

When asked what kind of training coaches should receive, coaches responded along two dimensions: format and content. In terms of the format, the majority of coaches suggested informational sessions in the form of workshops. These training experiences could “include a class available each year at the coaches clinic,” a college courses that address gender specific coaching, sport specific training, presentations at coaches clinics specifically regarding eating disorders and treatment, and workshops given at all junior and high schools, including bringing in speakers. Another coach felt that her experience participating in the sport was sufficient saying that, “It depends on the sport and level they coach. With my sport, simply being a dancer all of my life is a good enough education.” Finally, a few suggested the necessity to “at least be well read on the topic.”

Regarding the content of training, coaches gave several consistent responses. Coaches felt the following topics should be covered: nutrition/health, warning signs of eating disorders, addressing the issue of control, and an action plan that could be followed should an athlete exhibit signs or symptoms of an eating disorder.

A rather high percentage of coaches (31.6%) felt that at a bare minimum a basic knowledge of proper nutrition should be considered and that courses should be offered on the topic of female health and nutrition. One person noted that coaches would benefit from knowing the recommended amount of carbohydrates, proteins, fat, and calories for female athletes in addition to information about proper hydration in athletes. Many coaches expressed that each sport requires different nutrition to adequately fuel one's performance. One coach commented that workshops should be available which inform coaches about the gender differences in nutritional needs of athletes. Others talked about the need for workshops on female health and exercise issues. A male coach stated that he has "...not had to deal with these issues therefore lacking experience and knowledge about women's health and exercise topics."

One coach suggested that coaches be taught specifically about the Triad stating that at this point it is probably not realistic, "but definitely necessary." Others stated that a nutrition class should be required of college coaching programs and that "...in all sports, it is becoming more and more important...I received my coaching degree about 15+ years ago, and I received very little information in the area of nutrition." Many coaches expressed feeling uninformed on the physical and mental health needs of female athletes.

Many female coaches perceive a difference between their knowledge in this area and their male coaching counterparts'. One female coach mentioned, "At the risk of sounding sexist, I do think that male coaches need more training than females. Female coaches should have

training on approaching their athletes and how proper health and nutrition can affect their athletic performance. Male coaches however may need more training on how female nutrition and health needs are different than males.” Many coaches do not recognize the drastic gender differences in adolescent nutrition. One coach stated, “I see many female coaches seeking this information on their own. However, there are too many men who coach young girls that believe that all athletes, male or female, should be treated the same way. This shouldn’t be happening.”

Other coaches (15.3%) focused more on being able to properly identify warning signs of eating disorders. One coach even suggested addressing this issue by talking to all parents at the pre-season meeting to address the topic of at risk girls in athletics without singling anyone out. Several coaches mentioned that a workshop would enable coaches to better identify signs and symptoms as well as ways to prevent eating disorders. “I think they should receive training on how to prevent and recognize eating disorders.” One coach emphasized, “I think coaches should have formal training on signs, intervention, and the diversity of eating disorders. This can help a coach realize that EVERY case is different and cannot be treated the same.” Overall, as one coach says, “Eating disorders are a growing problem in high school and college sports and coaches should be aware of how to recognize the problem and what steps need to be taken to help the athlete.”

In addition to addressing these nutritional needs, coaches (12.2%) suggested it would be helpful to have an action plan to follow when instances of eating disorders arise. A coach added that, “A healthcare professional discussing how to approach a girl or her parents would be beneficial.” Coaches felt that this action plan should be sport-specific to address not only general health and nutritional information, but gender specific, or “a chain of command, per se, that can be followed should health and emotional issues arise.”

Besides addressing nutrition and health issues, warning signs, control issues and creating an action plan, coaches gave an abundance of constructive perspectives. One coach mentioned that it is important to have, “Sensitivity training that teenage girls are supposed to GROW. That they can be really great athletes just as they are...That everyone is important and brings gifts to the table.” Another coach echoed this idea in recognizing developmental changes through puberty saying “All coaches should have a basic knowledge of anatomy and psychology. Especially high school and junior high athletes because the chemical changes going on in adolescents have such an effect on their performance and their perception of their performance, success and the body.” Another coach said perhaps it would be important to “adjust training according to the menstrual cycle.”

In terms of the type of format these informational sessions should take, coaches (42.9%) preferred training experiences. Coaches suggested that training should be mandatory and “should be part of the same training vein as Red Cross/CPR training.” Another coach felt that adequate training is available to coaches, “we just need to get people to attend.” Yet another coach suggested creating a “a website or online service for coaches to chat about cases they may be dealing with...kind of a support group on-line.” However, one coach cautioned this idea saying that mandatory workshops might be problematic since “Most high school coaches have only learned about the sport by playing in high school and maybe college. So, telling a coach he can’t coach will discourage more people from coaching.” Overall, the majority of responses were optimistic and suggested that coaches do care deeply about learning how to better accommodate their athletes’ physical and mental health needs.

Coaches' Suggestions for Deemphasizing Leanness

Ultimately the goal of this study was to get coaches' input in terms of how to better accommodate their athlete since they have the most direct contact with them. Many coaches (30.6%) mentioned that it is important for athletic teams to put a greater emphasis on the acceptance of all body types. One coach stated, "I believe it is changing. In gymnastics the level of tricks are getting more difficult. It takes a strong body (not the pixie style gymnast of the past) to be able to have the energy and strength. I also am careful to point out strong bodies - not necessarily the skinny bodies. When I see a very skinny girl and the girls comment on her I am also quick to point out that I think it's sad—that she must be hurting. They usually are no longer envious of the super skinny body." Another coach commented on coaches' responsibility to provide encouraging feedback to athletes regardless of their physical stature. The individual suggested, "Words from the coach on a regular basis help to make acceptance of all body types and abilities acceptable."

In their free responses, about ¼ of coaches (28.6%) felt that it is necessary to emphasize the importance of viewing food as a source of fuel to enhance performance and develop strength rather than focus on body size and weight. One coach's comment highlighted this idea, "We emphasize nutrition and what is needed to keep the body going at the intensity of the training. We address changes in eating during the different phases of running training." Another coach mentioned, "On my team we talk a lot about fueling your body for performance. We also talk about how gaining muscle will change the appearance of your body, and how to embrace that." When thinking about sports that are typically associated with thinness and aesthetics like cheerleading and dance, certain images of unrealistically thin athletes come to mind. However, as one coach commented, "Cheerleading is an interesting sport. You would think that the girls

that are the flyers would have to be really skinny but we need athletes who are strong and have endurance.” Another coach seemed to challenge this common perception of aesthetic ideals of a sport. “We encourage the girls to understand an athletic body. No emphasis on the glamour girls, and a lot of emphasis on being strong and athletic.” Another response was, “I don't have an eating plan for my gymnasts I just let them eat what they want. And I have bigger bone gymnasts and they are my top gymnasts, so it shows other people that you don't have to be super skinny to be an excellent gymnast.”

On a related note, 22.4% of coaches suggested providing athletes with more information on proper nutrition in general. For instance one coach said, “Provide information on proper nutrition and not emphasize being in shape.” More specifically, one coach said, “We are constantly talking about eating well instead of not eating...the QUALITY of what one puts into their body versus the quantity.” Another coach talked about the benefits of having a speaker come to educate athletes on necessary nutritional information noting, “I make sure I let them know that they are athletes and they need proper nutrition. I have a nutritionist come yearly to visit with them.” A cross country coach said that as a team they cover all the bases of nutrition “...we emphasize a very balanced diet filled with protein and carbs, vegetables and fruits.”

Many coaches (16.3%) felt that coaches should foster the overall well-being of athletes as opposed to fixating on performance goals in the sport. One coach made an important observation, “Running is a sport that is dominated by lean people. To deemphasize this we need to focus on individual success. Personal goals that are healthy performance based goals.” Another observation included, “We emphasize proper nutrition, rest, hydration and overall image. We do not encourage athletes to lose weight or be as lean as possible. By encouraging our athletes to make healthy choices and have positive thoughts about themselves and their

performance we eliminate some of the pressures to be thin and lean.” One coach highlights this concept, suggesting one should “Talk about how important it is to be a strong person and point to examples of high achievement that hasn't come at the cost of nutrition.” While this response could fit into other categories, the part about achievement not being attached to unhealthy eating habits is relevant to emphasizing overall well-being. Another coach mentioned that in addition to stressing the importance of fueling one’s body properly, the team works on, “...body image and self-esteem. We make sure that both the boys and the girls team work on self-esteem. This seems important considering many coaches are interested in understanding mental health related issues which may affect eating behaviors. Similarly another coach made a connection between strength and emphasizing one’s “...personal strength’s and health. I talk about seeking healthful foods, instead of avoiding so-called 'bad' foods. I promote a healthy body image and portray that being stick thin or avoiding eating will cause girls to be 'benched'.” Finally, one coach’s simple words get at the heart of this issue and leave a lasting impression, “Keep the stress level down on performance.”

Many coaches (14.3%) suggested that teams should supply a variety of sizes in athletic apparel. Some coaches commented that currently many athletic teams do not provide adequate clothing sizes. In particular, uniforms are rarely supplied to fit athletes who are naturally of a larger build. One coach mentioned, “I feel the high school league’s requirements on costumes removes pressure to be excessively lean...” Another coach felt similarly stating, “Uniform choice is a direct link to body image for both of my sports [dance team, cheerleading]. As a responsible coach, I try to make sure that my uniforms are wearable for all body types on my team.”

Although most coaches did not answer this way, 5.1% of coaches indicated that changing the emphasis on leanness has to come from society at large in order to support changes made in the athletic environment. One coach didn't feel as optimistic as others about the athletic environment's ability to change the dominant perception of leanness without altering dominant images portrayed by the media. The person stated, "Nothing is currently being done that I am aware of. My experience is that sport performance is not the cause of body image problems but rather the cause of these problems are a result of popular media." Another coach indicated similar feelings saying, "I don't think there is anything different that my sport or any other sport could do. Right now there is so much emphasis in the media and in society right now about being skinny and skinny is in for the new year that it is very difficult to change the minds of the children. The most important is to make sure that they stay confident in themselves."

Likelihood of Coaches Attending Workshops

The question regarding the likelihood of coaches attending workshops produced promising results. The majority of coaches (57.6%) of coaches said that they would be "likely" to attend workshops if they were available on a regular basis. The next most common response (28.3% of coaches) was "very likely."

Chapter 4

Discussion

This study provided valuable information about coaches' knowledge of and approaches to female athletes' health. Coaches provided insightful suggestions which will serve as a valuable resource to improving their own understanding of disordered eating behavior as well as finding ways to better accommodate the health and well-being of female athletes. In this section I will focus on coaches' knowledge of the Female Athlete Triad, knowledge of athletes' menstrual cycles, how they monitor athletes' eating and training habits, the ways in which they approach athletes exhibiting disordered eating behavior, their estimates of the prevalence of eating disorders among high school female athletes, and their advice for how to better educate coaches on female athlete health and nutrition. Then I will propose an educational workshop where coaches will be informed about an action plan to assist athletes exhibiting eating disorders.

Coaches' Knowledge of the Female Athlete Triad

While coaches exhibit expertise in certain areas of the athletic environment, the majority of coaches were unfamiliar with the Female Athlete Triad. There are many plausible explanations for this phenomenon. First, because all coaches participating in this study were at the high school level, it is likely that many were not required to receive specific training on this topic. These findings may indicate that coaches at the high school level are not adequately educated about the intricacies of nutrition and health as they relate specifically to female athletes.

This suggestion is possible given that psychological research is just beginning to focus more on the severity of the components of Female Athlete Triad. It seems that, to date, there has

been little emphasis on making informational material available to coaches, particularly at the high school level. Or perhaps educational material *is* available, but coaches are unlikely to seek it out due to a lack of focus on targeting this specific audience. On the other hand, the lack of knowledge demonstrated by this study's coaches is somewhat surprising. The results are especially worrisome because presumably coaches choosing to fill out the survey would be *more* likely to know about these issues than the population at large given their interest in the topic and their career choice.

The results did not show any significant differences between years of coaching and knowledge of the Triad, suggesting the need for *all* coaches, regardless of age or experience, to be recipients of information regarding the Female Athlete Triad.

Coaches' Knowledge of Athletes' Menstrual Cycles

Overall coaches did not seem overly concerned with menstrual irregularity or the loss of menstruation in female athletes. This result is consistent with previous studies which suggest that the severity of the issue remains highly ambiguous. Coaches' indication that it is worrisome for some athletes and not others could be the case for several reasons. It seems that menstrual irregularity is an often misunderstood topic among both athletes and coaches. Some coaches believe that irregular periods are associated with excessive training, and are not aware of their long-term health implications.

This belief may be in part because menstrual irregularity *is* in many cases a common occurrence in female athletes of lean sports. Due to aggressive training regimens and an emphasis on being lean, many female athletes do not realize that a certain amount of calories are needed to sustain menstruation. (This would make sense particularly since many coaches are not

openly discussing this issue.) Perhaps menstrual irregularity has become more “socially acceptable”—at least in the athletic environment—because it happens so frequently. This trend may help explain how this phenomenon has come to be perceived as normal.

However, menstrual irregularity is a far more complex topic. Research suggests it is related to females not ingesting enough calories to match the level of their training. Over time this lack of caloric intake could lead to a significant loss in bone mineral density and osteoporosis in the future. Current research is still in the process of discovering whether or not it is even possible to return bone density to normal levels once it has been lost (Otis & Goldingay, 2000; Sherman & Thompson, 2004). Therefore, it seems that some coaches may have the tendency to overlook eating concerns as they may be contributing significantly to menstrual irregularity.

Coaches expressed some discomfort with the idea of inquiring about their athletes’ menstrual cycles. These findings seem reasonable given that male and female coaches may be concerned about liability issues due to the sensitive nature of this topic. Perhaps they feel that inquiring about their athletes’ menstrual cycles could be misconstrued as sexual harassment, when in reality coaches may be looking out for their athletes’ health and well-being.

These results raise some vital questions regarding the extent to which coaches should be informed about their athletes’ menstrual cycles. It seems important to balance respect for each athlete’s privacy with concern for the athlete’s long-term health. A possible remedy for this complicated topic would be to reserve any inquiries about athletes’ cycles for highly trained athletic personnel such as nutritionists or athletic trainers. Or perhaps parents could sign waivers to give consent for such health related inquiries to take place. These possibilities would ensure that someone is conversing with individual athletes and informing them about the potential for

long-term bone density loss leading to osteoporosis. Given coaches' lack of knowledge about the Female Athlete Triad, it would make sense that they might not necessarily perceive knowledge of athletes' menstrual cycles and menstrual irregularity to be indicative of a larger health issue.

Coaches' Regulation of Athletes' Eating and Training Behaviors

Coaches also provided valuable information about how they regulate athletes' eating and training behaviors. Coaches seem to be selective in the types of weight monitoring behaviors they engage in. This type of trend in monitoring could indicate a desire to steer away from exacerbating current symptoms.

The majority of coaches never weigh their athletes. This finding could be encouraging considering extensive research that suggests placing too much emphasis on weight could negatively affect female athletes' body image and eating behaviors. There were significant gender differences in coaches' responses to this question. All females in this study indicated that they have "never" have weighed their athletes. This finding may suggest that females may be more apprehensive about the ramifications of weighing athletes given the emphasis on having a lean physique and low body mass. They may be particularly cognizant of this phenomenon due to their experience as female athletes. However, while males have not experienced the same societal pressure to be thin themselves, it should be noted that very few males weighed their athletes. Also, several male coaches emphasized that they have only weighed athletes when they were concerned that an athlete was underweight, or to fit pole vaulting athletes with the proper sized pole for competition.

In open-ended responses several of these coaches mentioned that they only did so when they were concerned that the athlete was underweight. It is also possible that coaches interpreted the question to be inquiring about any weight monitoring practices—which may have been instated by a healthcare professional after an athlete had been identified as at-risk for developing an eating disorder, or was clinically diagnosed. In these cases, weight monitoring might be necessary in order to determine a healthy, sustainable weight for the athlete. Since some athletes were prohibited from competing while showing signs of an eating disorder, weighing could be a way of ascertaining whether or not the athlete was healthy enough to practice and compete. Overall this question did not specify whether this practice was aimed at high-risk athletes or all athletes. Therefore a limitation could be that some coaches answered about athletes they were concerned about, whereas others may have responded in terms of their general practices with all athletes.

Over half of coaches responded that they inquire about their athletes' eating habits "sometimes." While this type of question does not reveal specific practices, it may have both positive and negative implications. Currently few studies have focused on specifically examining the relationship between comments made about female athletes' eating habits and her actual eating behaviors. Perhaps coaches inquiring about their athletes' eating habits "sometimes" demonstrates coaches' general concern for their athletes overall health and well-being, but not to the point where they are becoming invasive and dictating what athletes must eat. However, coaches may have interpreted "sometimes" to mean that the topic *does* come up, but not consistently every season. This response could also indicate that coaches may need to consider the implications of inquiring about athletes' eating habits more often to ensure that they are continuing to fueling themselves properly

The majority of coaches have never requested that athletes record their food choices. Based on their open-ended responses, coaches seem to fear that openly discussing eating habits may exacerbate already existing eating disturbances or possibly elicit them in other athletes. Perhaps coaches feel that recording food choices may be problematic, because it might indirectly encourage athletes to develop an obsession with unhealthy eating practices such as counting calories and eliminating certain “bad foods” from their diets. Over time these unnecessarily rigid eating behaviors could develop into a clinical eating disorder. Future research might look at any possible effects of efforts to record food choices.

In addition most coaches seem to be making an effort to adjust their athletes’ training schedules in accordance with athletes’ needs. These findings are encouraging given that coaches are concerned with developing each athlete’s abilities so she can reach her potential. Also, adjusting practices to meet the needs of individual athletes may be another instance of coaches balancing their athletes’ long-term health and well-being with their performance goals.

While these findings may have positive implications, one cannot give too much weight to these results considering the ambiguities in the wording of the question. When asking about adjusting athletes’ training regimens it was unclear whether the question referred to athletes who were injured or exhibiting signs of eating disorders, or healthy athletes in general. Some coaches may have perceived this question to be inquiring whether each athlete has a different training schedule, which is not often the case. At the high school level, it is probably less common for coaches to develop a workout regimen for *each individual athlete*. Many coaches would probably feel this practice to be unnecessarily labor intensive. More likely, coaches develop several “levels” of workouts to accommodate groups of athletes rather than focus exclusively on each athlete’s needs.

In addition to providing necessary information to their athletes, many coaches are also careful to provide snacks to their athletes that set an example for how to fuel their performance. A coach explained that in order to promote peak performance, the team encourages healthy choices especially during peak performance at the end of the season in addition to talking about nutrition at other times. Team captains often encourage a 'no soda/pop' rule that many athletes follow during the season. Another coach reiterated the idea of setting nutritional examples by consciously eating a certain amount of fat or sugar around the athletes to emphasize the idea of moderation over depriving oneself of foods high in calories altogether. These findings imply that coaches are promoting healthy eating practices by providing nutritional examples for their team without coming across as invasive.

Addressing Disordered Eating Behavior in Female Athletes

When coaches were asked how they approach athletes exhibiting signs or symptoms of an eating disorder many indicated taking a more direct approach by conversing with athletes privately or informing the athlete's parents. However, many coaches expressed difficulties such as denial of the athlete or parent to recognize the athlete had a problem. The majority of coaches did not perceive these interactions to be easy.

Coaches also indicated speaking with athletes' parents often, which seems like a beneficial practice given the development of an eating disorder may be related to other issues outside of the athletic environment such as family dynamics. Coaches seem to realize that getting support from the parents is a vital step in assisting the athlete in the most complete way possible.

However, while it seems that coaches seem to have common perceptions about ways to approach instances of disordered eating behavior, many coaches expressed tremendous difficulty in getting both athletes and parents to recognize the problem. The fine line between “normal” and at-risk makes coaches’ jobs challenging. Given that those exhibiting eating disorders may be very secretive in nature, it may be a struggle for coaches to identify athletes who are affected and need extra assistance, and hostile reactions from parents don’t exactly reinforce coaches’ desire to discuss these sensitive topics. This suggests that parental support plays an integral role in a coaches’ ability to effectively approach athletes.

Coaches who knew about their colleagues’ practices revealed the use of similar strategies that they referred to in answers regarding their own behavior. The most common answers were talking directly with the athlete and parents. These could suggest some type of standard in terms of how coaches can most effectively address the problem of disordered eating behavior. However, the majority of coaches were not familiar with how their colleagues address athletes exhibiting disordered eating behavior, which could suggest a need for dialogue among coaches to make this issue more acceptable to discuss. Having minimal understanding of how their colleagues address this issue could cause assumptions to be made. In other words, coaches may think that their colleagues are approaching symptomatic athletes when in reality they are having similar troubles communicating with their athletes.

These results indicate that coaches are unsure of how to approach athletes exhibiting disordered eating behavior. The majority of coaches had little or no knowledge of their colleagues’ practices, making it difficult to determine the effectiveness or ineffectiveness of certain approaches. In other words, coaches who are unsure of how to address these situations are not able to rely on observing other coaches’ strategies to find out.

However, coaches did recognize the ignorance or the minimization of the severity of the situation to be a common negative approach. This indicates that while coaches differ in knowledge of other coaches' practices, they have a degree of awareness of problems that may arise when a situation goes unaddressed. These results imply that coaches are concerned with the ways in which athletes are approached, but they may not have a very complete understanding of how to do so.

Estimated Prevalence of Eating Disorders Among High School Female Athletes

The majority of coaches perceived the prevalence of eating disorders to be "moderate" and a similar amount thought it was "low" although some interesting gender differences appeared. Females thought eating disorders were more common than did males. As mentioned in earlier sections it is important to understand that males and females have different life experiences which may affect their opinions on this question. While few coaches indicated the prevalence as "very high," perhaps female coaches perceive eating disorders to be higher in general due to personal experiences with the societal pressure to be thin. Or perhaps if they haven't experienced this societal pressure themselves then they are simply more aware of and sympathetic about how it can affect female athletes. Thus, they may be more likely to identify symptomatic athletes than their male coaching counterparts.

There could be several explanations for the general estimate "moderate." Some coaches may have indicated "moderate" as a sort of catch-all answer, when they were uncertain whether the prevalence was higher or lower. This seems plausible since even extensive psychological research has not produced an answer on this topic. Some studies suggest the prevalence is increasing while others say it is decreasing. Not to mention there are differences between the

types of sports athletes compete in: those that emphasize leanness, and those that do not, and also the level of competition in the sport. There are likely differences among high school athletes, college athletes, and elite athletes of Olympic caliber that have yet to be explored.

Additionally, there may be differences between high school and college coaching practices that could affect the estimated prevalence at these levels of competition. As mentioned previously, studies such as Johnson et al. (1999) suggest that the prevalence of eating disorders may be higher in lower tiered athletes. If this phenomenon were true, one might surmise that college coaches could be overlooking signs and symptoms of eating disturbances for several reasons. One possibility might be that there is a lot more attached to a coaches' reputation at the collegiate level.

College coaches are typically employed full time as coaches, whereas high school coaches often have an additional job within the school system (such as a teaching or social work position). In this case, perhaps college coaches tend minimize the severity of an athlete's symptoms because they fear that losing a particular athlete's contributions to the team will affect their reputation as a coach. Coaches may fear that prohibiting a talented athlete from competition will affect their team's ranking and also hinder their status as a coach. It is possible that college coaches worry about their employment status being jeopardized if their team ceases to perform well. However, these ideas regarding differences in prevalence among high school and college athletes are merely conjecture and need to be explored in future studies.

It would be interesting to find out what each coach's definition of "moderate" was, because they might vary drastically. Some coaches may perceive moderate to indicate several instances of athletes exhibiting disordered eating behavior, but not warranting the kind of attention of a full-blown eating disorder. Other coaches may perceive moderate to mean that

many athletes exhibit symptoms of a clinical eating disorder. In other words, some coaches may perceive moderate to mean that athletes may be affected, but not at alarming rates, while other coaches see it as a substantial problem warranting serious medical attention.

Educating Coaches on Female Athlete Health and Nutrition

Overall this study produced very promising results based on coaches' willingness to receive further education on issues related to disordered eating behavior in female athletes. Findings indicate that coaches were overwhelmingly in support of attending workshops should they become available on a regular basis. They were able to provide suggestions as to the format and content. In general coaches suggested training experiences covering basic knowledge of proper nutrition, the ability to identify signs and symptoms of eating disorders in female athletes and also a suggested action plan to follow in case a coach is faced with an at-risk athlete.

Coaches' general lack of knowledge about pertinent health topics such as the Female Athlete Triad suggests the need for current research to focusing on coaches as a target audience for these educational topics. Fortunately, it seems that most coaches are in agreement that it is not sufficient to simply be well-read on the topic of female athlete health and nutrition. It is vital for future research to involve coaches in the exploration of topics related to the Triad such as: the effects of menstrual irregularity on the long term health of female athletes, the identification of signs and symptoms of eating disorders, and gaining a better understanding of the prevalence of eating disorders among female athletes (both at the subclinical and clinical level).

In the next section I will propose a workshop to educate coaches on the issues raised in this study. Ultimately, this training experience will enable coaches to develop a heightened

awareness of the complexities of female athlete health and nutrition and also a greater degree of comfort in discussing these topics.

Chapter 5

Action Plan

Coaches' suggestions form a strong foundation for designing an intervention plan to assist athletes suffering from eating disorders. Since coaches seem most willing to participate in workshops, it seems that this type of format would be most successful. Coaches expressed a desire to become educated about female athlete health and nutrition to properly fuel an athlete's training regimen, the ability to identify signs and symptoms of eating disorders in female athletes, and ideal action plans to follow in case coaches are faced with at-risk athletes.

Coaches' suggestions for deemphasizing leanness should be implemented in workshops to further educate coaches on related topics. Many coaches felt that it is vital to emphasize the importance of viewing food as a source of fuel to enhance performance and develop strength rather than focusing on body size and weight. Coaches also believe that athletes should be provided with information on proper nutrition and that coaches should focus on the overall well-being of athletes as opposed to fixating on performance goals in the sport. These topics will use the above-mentioned ideas to create a basis for preliminary workshops.

The workshop could begin with a general overview of the health and nutritional needs of female athletes and then progress to more specific information about food in relation to performance. Guest lecturers such as nutritionists and/or dietitians could start the presentation by providing coaches with necessary information on nutrition such as recommended daily value of carbohydrates, calories, protein, and iron. Waldrop (2005) suggests that athletes, parents, and

coaches need to receive appropriate education on issues related to the Female Athlete Triad such as nutrition and energy expenditure. Providing this information to coaches would be beneficial considering athletes may need more guidance and education on nutritional information than nonathletes because their energy expenditure is vastly different (Abood, Black, & Daid, 2000).

After discussing female athlete health and nutrition, coaches will then be informed by healthcare professionals (such as doctors or nurses) about the warning signs of eating disorders. Coaches will be instructed on how to best refer athletes to a physiologic screening test if the situation should arise. A screening system proposed by Waldrop (2005) emphasizes the importance of a physical examination in addition to assessing one's current health and performance, and health history.

However, given that parents and athletes are often in denial about the eating disorder, it is important for coaches to learn ways to express their concern and help the family understand they too play an integral role in the intervention process. Coaches will not be able to refer athletes to treatment if the family does not give consent. Research suggests the importance of establishing a management team consisting of the athlete, coaches, athletic trainers, and healthcare professionals (Sherman & Thompson, 2001). Sport personnel should be involved on a level in accordance with the athlete's specific needs (high or low depending on the role of the athletic environment in the athlete's disordered eating behavior). Sherman and Thompson (2001) suggest that the athlete must agree to the involvement of each member, a psychologist establishing treatment should direct members of the team, and the involvement of sport personnel should be therapeutic as determined by the psychologist.

Coaches in the workshop will then participate in simulations where they each play the role of a member in a hypothetical management team. By playing different roles coaches could

not only learn how they fit into the equation, but also understand the unique roles of the psychologist, doctor, nutritionist, parents and other individuals who assist athletes in the intervention process. This scenario will encourage coaches to develop an awareness of individuals to involve if they should need to approach an athlete with an eating disorder. Having an open dialogue would create a venue for members of the team to ask questions and address particular concerns. During this time, a licensed psychologist could educate members about the importance of confidentiality and that treatment must be the primary focus over athletic performance (Sherman & Thompson, 2001). Creating an opportunity for open dialogue about mental health issues among coaches and healthcare personnel will allow them to better understand the etiology of eating disorders and how to better intervene (Waldrop, 2005).

Suggestions for Future Research

This study provided a preliminary investigation to obtain a general understanding of coaches' knowledge on topics related to disordered eating behavior in female athletes. Coaches' responses also suggested areas needing further exploration to gain a more comprehensive understanding of the issues that surround eating disorders in the female athlete population.

It would also be important for future studies to examine the implications of coaches' knowledge of athletes' exercise regimens. Exploring these possibilities would be vital in learning more about how to help athletes who may be exhibiting eating disturbances and demonstrating the tendency to over-train. As mentioned before, at times there is such a fine line between "normal" and "excessive" that coaches may have difficulty differentiating healthy athletes from those who may be developing more serious health problems.

Although no gender differences were found in coaches' understanding of the Female Athlete Triad, it would be important for future studies to explore this issue further. Coaches mentioned that it might be vital to consider gender differences among coaches when developing educational material or workshops to inform them about the Female Athlete Triad. Gender could play a role in coaches' familiarity with issues surrounding the Female Athlete Triad. Some female coaches felt that experience coaching other females combined with their personal experiences were sufficient for developing an understanding of these issues. Several female coaches suggested that it might be beneficial for male coaches to receive additional training due to their differing life experiences. It is possible that male coaches may have more difficulty determining symptoms of the Triad, since these interrelated issues relate exclusively to females. Since males in athletics cannot personally experience the Triad, they may perceive different ways to manage the problem.

Female coaches' suggestions are definitely vital to understanding this issue further. However, females' observations suggesting that males generally lack knowledge about the Female Athlete Triad were not reflected in the results. The statistical data did not reveal any significant differences between genders in their knowledge of the Triad. The percentages of males and females who did not know about the Female Athlete Triad were nearly equal, suggesting a need for further research to educate both males and females on this topic. Even though the input of female coaches in this study has not been substantiated by any empirical studies, their suggestions get at an area of research that may have been overlooked in the past. Perhaps it is necessary for males and females to be educated about the Female Athlete Triad in different ways. Future research could discover ways to best educate coaches on this topic so that both males and females alike will understand the need for awareness on this issue.

Since there appears to be a lack of knowledge among the high school coaching population regarding the Female Athlete Triad, research needs to explore ways to provide coaches with necessary information, whether it be in workshops or educational literature. Research should continue to explore the severity of the Triad, particularly among high school athletes. Few studies to date have looked at the long term effects on athletes who have suffered from elements of the Triad during high school. Future studies should also look at ways to keep athletes and coaches informed about the severity of menstrual irregularity and how it relates to other components of the Triad. Developing a better understanding of the effects of the Triad on younger athletes will enable healthcare professionals to develop appropriate screening tests to monitor athletes more effectively.

Given that the prevalence of eating disorders in the general population is unknown, let alone in the female athlete population, this topic needs further investigation. There are likely differences among high school athletes, college athletes, and elite athletes of Olympic caliber that have yet to be explored. Future studies should examine differences in level of competition and how/if this affects instances of eating disorders. Furthermore, there may be differences between high school coaches' knowledge of the prevalence of eating disorders and those who coach more elite athletes. Additionally, this study only looked at the perception of high school coaches; but athletes may have a different estimate of the prevalence of eating disorders among their peers.

Also, the results of this study based on a relatively small, Midwestern sample size cannot be generalized to the entire population. Future studies should focus on a larger, more regionally diverse sample to explore prevalence further. It is possible that other studies would produce different results indicating that more high school coaches are informed about the Female Athlete

Triad. While the majority of research on eating disorders has focused on clinically diagnosed disorders such as Anorexia Nervosa and Bulimia Nervosa, it would be important for future studies to focus on disordered eating behavior at the *subclinical* level. Examining less severe eating disturbances will lead to increased prevention and earlier intervention. This approach would help improve athletes' health and exercise performance in the long-term.

Continuing to avoid discourse on eating disorders in female athletes, a controversial and often misunderstood topic, would be a blatant disregard for the severity of the disorder. Rather, by acknowledging the existence of this public health crisis and imparting knowledge to individuals in a position to make a difference we can increase the likelihood that female athletes suffering from eating disorders can receive proper treatment. Continued research on this topic will help ensure that coaches remain in a position to assist their athletes and feel comfortable approaching them.

References

- Abood, D., Black, A. & Daid, R. (2000). Health education prevention for eating disorders among college female athletes. *Journal of Health Behavior, 24*(3), 209-219.
- Beals, K. A., & Manore, M. M. (2000). Behavioral, psychological, and physical characteristics of female athletes with subclinical eating disorders. *International Journal of Sport Nutrition and Exercise Metabolism, 10*, 128-143.
- Beals, K. A. & Manore, M. M. (1998). Nutritional status of female athletes with subclinical eating disorders. *Journal of the American Dietetic Association, 98*(4), 419-425.
- Beals, K. A. & Manore, M. M. (1994). The prevalence and consequences of subclinical eating disorders in female athletes. *International Journal of Sport Nutrition, 4*, 175-195.
- Berry, T. & Howe, R. (2000). Risk factors for disordered eating in female university athletes. *Journal of Sport Behavior, 23*(3), 1-8.
- Cummings, S. P., Eisenmann, J. C., Smoll, F. L., Smith, R. E., & Malina, R. M. (2005). Body size and perceptions of coaching behaviors by adolescent female athletes. *Psychology of Sport and Exercise, 6*, 693-705.
- De La Torre, D. M. & Snell, B. J. (2005). Use of the preparticipation exam in screening for the female athlete triad among high school athletes. *Journal of School of Nursing, 21*(6), 340-345.
- Engel, S. G., Johnson, C., Powers, P. S., Crosby, R. D., Wonderlich, S. A., Wittrock, D. A., Mitchell, J. E. (2003). Predictors of disordered eating in a sample of elite Division I college athletes. *Eating Behaviors, 4*, 333-343.

- Heffner, J. L., Ogles, B. J., Gold, E., Marsden, K., & Johnson, M. (2003). Nutrition and eating in female college athletes: A survey of coaches. *Eating Disorders, 11*, 209-220.
- Johnson, C., Powers, P. S., & Dick, R. (1999). Athletes and eating disorders: The national collegiate athletic association study. *International Journal of Eating Disorders, 26*, 179-188.
- Kerr, G., Berman, E. & De Souza, M. J. (2006). Disordered eating in women's gymnastics: Perspectives of athletes, coaches, parents, and judges. *Journal of Applied Sport Psychology, 18*, 28-43.
- Ryujin, D. H., Breaux, C., & Marks, A. D. (1999). Symptoms of eating disorders among female distance runners: Can the inconsistencies be unraveled? *Women & Health, 30*(1), 71-83.
- Sherman, R. T. & Thompson, R. A. (2001). Athletes and disordered eating: Four major issues for the professional psychologist. *Professional Psychology: Research and Practice, 32*(1), 27-33.
- Sherman, R. T. & Thompson, R. A. (2004). The female athlete triad. *The Journal of School Nursing, 20*(4), 197-202.
- Sherman, R. T., Thompson, R. A., Dehass, D., & Wilfert, M. (2005). NCAA coaches survey: The role of the coach in identifying and managing athletes with disordered eating. *Eating Disorders, 13*, 447-466.
- Smith, P. M. & Ogle, J. P. (2006). Interactions among high school cross-country runners and coaches: Creating a cultural context for athletes' embodied experience, *Family and Consumer Science Research Journal, 34*(3), 276-307.
- Stoutjesdyk, D. & Jevne, R. (1993). Eating disorders among high performance athletes. *Journal*

of Youth and Adolescence, 22(3), 271-282.

Sundgot-Borgen, J. (1994). Risk and trigger factors for the development of eating disorders in female elite athletes. *The Norwegian University of Sport and Physical Examination*, 26(4), 414-419.

Waldrop, J. (2005). Early identifications and interventions for female athlete triad. *Journal of Pediatric Health Care* 19(4), 213-220.