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# A Survey of Student Coaches' Knowledge, Attitudes, Skills, and Behaviors Regarding the Female Athlete Triad

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A Survey of Student Coaches' Knowledge, Attitudes, Skills, and  
Behaviors Regarding the Female Athlete Triad

by

Jill W. Lassiter, B.S., ATC  
May 18, 2002

A thesis submitted to the Department of Health Science of the State University of  
New York College at Brockport, in partial fulfillment of the requirements for the  
degree of Master of Science in Education

A Survey of Student Coaches' Knowledge, Attitudes, Skills, and  
Behaviors Regarding the Female Athlete Triad

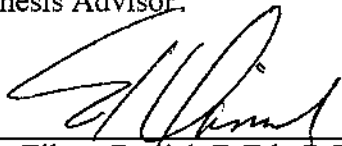
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## Abstract

The female athlete triad (disordered eating, amenorrhea, osteoporosis) is a severe and potentially fatal syndrome that affects many female athletes. This research described the preparedness of coaches to participate in primary prevention and intervention of the triad; specifically, senior Physical Education and Sport majors' (N = 61) current state of knowledge, attitudes, skills, and behaviors related to the triad were examined. Results indicated that the majority of student coaches lacked knowledge of the triad, appropriate attitudes and skills, and were not likely to participate in indicated behaviors. Comparisons found that female students had significantly more knowledge, appropriate attitudes and skills, and were more likely to participate in indicated behaviors than male students. Also, subjects who reported receiving training about the triad did not significantly differ in their knowledge, attitudes, and behaviors from those without training. These findings indicate the need for initial and continuing education of coaches.

## Chapter One

### *Problem Statement*

The female athlete triad, a serious syndrome composed of three closely related disorders, amenorrhea, disordered eating, and osteoporosis, can cause significant health problems and is potentially fatal to elite athletes as well as physically active girls and women (Burney & Brehm, 1998; Clairmont, 2000; Hobart & Smucker, 2000). The Youth Risk Behavior Surveillance System (YRBSS; a national survey of high-school students reporting prevalence of high-risk behaviors) reports that 48.5% of female high school students play on sports teams, and that 57.1% of female students participate in vigorous physical activity (Kann et al., 2000). This finding potentially means that nearly half of all adolescent females are at risk for developing the female athlete triad. Additionally, there are approximately 148,800 female students participating in college athletics (National Collegiate Athletic Association, 2001), all of whom are potentially at risk. Development of the triad can result in declining physical performance, increased risk of injury and illness, and the development of psychological disorders. Each component of the triad is related to costly health problems for many Americans, and when disordered eating, amenorrhea, and osteoporosis present together they can be even more costly and physically damaging.

Researchers are concerned that the number of female athletes suffering from amenorrhea and eating disorders is significantly higher than in the general population

(Burney & Brehm, 1998; Yeager, Agostini, Nattiv, & Drinkwater, 1993). Female athletes are often under tremendous internal and external pressure to maintain a small body type and to perform well which may contribute to the development of the disorders of the female athlete triad. This is especially true of athletes who participate in sports that emphasize a small body type or low body weight, such as gymnastics, figure skating, running, swimming, diving, tennis, volleyball, and cheerleading (Beals, Brey, & Gonyou, 1999). Coaches are an excellent resource for educating female athletes, however, currently there are very few educational resources about the female athlete triad that target coaches or athletes. A review of Medline, Infotrac Health, and PsycINFO reveals no studies examining coaches preparedness to address the triad, therefore an examination of “upcoming” coaches’ knowledge of, attitudes toward, and behaviors and skills needed for addressing the triad is necessary.

### *Significance of the Problem*

The significance of the problems associated with the female athlete triad can best be described through an examination of the prevalence and cost to the individual and society in each of the three components of the triad: disordered eating, osteoporosis, and amenorrhea. While these disparate entities alone do not constitute the female athlete triad, they are described separately below, as no prevalence data are available describing consequences of the triad as a collective problem.

Disordered eating is most often the first component of the triad to develop, and if not treated often will lead to the development of osteoporosis and amenorrhea.



Disordered eating refers to a broad spectrum of abnormal eating patterns, ranging from binge eating and fat reduction, to conditions such as anorexia and bulimia (Beals, 2000). Unfortunately, disordered eating is also the easiest component of the triad for athletes to hide. Objective 19 of Healthy People 2010 (Federally supported prevention agenda outlining objectives for the nation to improve health and decrease health care expenses) recognizes risks associated with disordered eating by setting health promotion and reduction of chronic disease associated with diet and weight as a goal (U.S. Department of Health and Human Services [USDHHS], 2000). Over 200 billion dollars each year are spent in medical expenses and lost productivity due to health conditions that are related to poor nutrition (USDHHS).

Abnormal eating patterns are associated with many medical complications, including psychological disorders such as anxiety and depression, and various physical conditions including but not limited to anemia, gastrointestinal disorders, dental problems, complications of the endocrine, skeletal, and metabolic systems, chronic fatigue, and compromised immune function (Beals et al., 1999; Beals & Manore, 1998). In addition to these health problems, two other health complications associated with disordered eating are amenorrhea and osteoporosis; the other two components of the female athlete triad (Beals et al.). Beals and Manore found that approximately half of the athletes in their study who suffered from sub-clinical eating disorders were not meeting the recommended daily allowances for calcium, a major risk factor contributing to decreased bone mass density. Adequate caloric and

nutrient intake is also necessary to maintain proper hormonal balance associated with eumenorrhea (normal menses). Lutter and Cushman (1982) found that high mileage runners with low body weight had statistically significantly fewer menstrual periods than normal weight runners, supporting the relationship between disordered eating and amenorrhea.

One percent of the general female population in the United States meets the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV, 1994) criteria for anorexia nervosa, and 1-3% meet the criteria for bulimia nervosa (Nattiv & Lynch, 1994). These serious eating disorders have an estimated mortality rate of 10% to 18% (Nattiv, Agostini, Drinkwater, & Yeager, 1994). Because no prevalence data exists for female athletes suffering from anorexia nervosa and bulimia nervosa, estimates of morbidity and mortality in this specific population are not possible. However, prevalence of disordered eating patterns are high in the athletic population, presenting in as many as 62% of female athletes; significantly higher than the general population (Yeager et al., 1993). The prevalence of disordered eating in athletes who participate in high risk sports has been found to be particularly high. For example, in a study of 182 varsity female athletes from two midwestern universities, Rosen, McKeag, Hough, and Curley (1986) found that 74% of gymnasts and 47% of distance runners participated in pathogenic weight-control behaviors. Similarly, in another study of college gymnasts from five teams in a major athletic conference, Rosen and Hough (1988) reported that 62% of the female gymnasts in the study were participating in

pathogenic weight-control behaviors and that *all* were attempting to diet. Dummer, Rosen, Heusner, Roberts, and Counsilman (1987), in a study of 487 competitive swimmers, found that more than 60% of swimmers had made unnecessary attempts at losing weight, and a review by Wilmore (1991) of small studies ( $n \leq 55$ ) on specific athletic populations reveals that up to 48% of female figure skaters and 33% of female ballet dancers have disordered eating.

In addition to the high prevalence of disordered eating in athletes, results from the YRBSS indicated that 7.9% of female high school students were overweight, however 67.4% of female students had attempted to lose weight or avoid gaining weight by exercising in the 30 days prior to participating in the survey research examining risky health behaviors of high school students (Kann et al., 2000). Over half (56.1%) of female students had attempted to lose weight by reducing their caloric, fat, or total food intake. Other female students had gone without eating for greater than 24 hours (18.8%), taken diet pills (10.9%), or vomited or taken laxatives (7.5%), all with the intention to lose or to avoid gaining weight (Kann et al.). Objective 19 in Healthy People 2010 emphasizes the importance of educating school-age children about good nutrition and particularly about the attitudes and skills needed to make healthful decisions about food, with an emphasis on following the Dietary Guidelines for America (USDHHS, 2000). Nutrition education provided by coaches concerned about their athletes could result in decreasing the incidence of adolescent females who develop eating disorders.

Similar to nutrition, osteoporosis is a national problem that has been addressed in Healthy People 2010 and affects millions of people, mostly women, in the United States. Osteoporosis is a disease that results from premature bone loss, causing decreased bone mass, bone tissue deterioration, and increased skeletal fragility (Otis, Drinkwater, Johnson, Loucks, & Wilmore, 1997). The goal of Objective 2 in Healthy People 2010 is to prevent illness and disability related to osteoporosis, rheumatic conditions (arthritis) and chronic back conditions (USDHHS, 2000). More than 25 million Americans are affected by osteoporosis each year and 1.5 million fractures annually are attributed to osteoporosis. Osteoporosis sufferers are especially susceptible to hip fractures, which is of particular concern. Half of all hip fracture patients will not be able to walk normally again without assistance and 24% of those age 50 and older will die within one year of the fracture. The cost of health care related to hip fractures was estimated at \$8.7 billion in 1995 (USDHHS). Although not all cases of osteoporosis are the result of the female athlete triad, the triad is a significant risk factor for developing osteoporosis, a costly and debilitating disease. By reducing the prevalence of the female athlete triad, the number of cases of osteoporosis may also be significantly reduced.

Women need to be particularly aware of osteoporosis because they are more susceptible to it than men due to their naturally lower bone density (USDHHS, 2000). Female athletes who have amenorrhea or oligomenorrhea have low concentrations of estrogenic hormones that lead to decreased bone mass, similar to the hormonal state

of postmenopausal women (Yeager et al., 1993). Up to 60% of normal bone mineral density is developed during adolescence, however amenorrhoeic athletes in their 20's may have a bone density resembling a woman in her 70's (Thrash & Anderson, 2000). This condition greatly increases amenorrheic athletes' risks for developing osteoporosis, as well as their risk of getting a fracture during athletic competition. In addition, the bone mass loss during this time may not be able to be reversed, leading to increased problems later in life (Drinkwater, Bruemner, & Chesnut, 1990; Otis et al., 1997; Reeder, Dick, Atkins, Pribis, & Martinez, 1996). Healthy People 2010 encourages education of adolescents about the primary prevention of osteoporosis because that is the time in life when most bone mass is built (USDHHS). This outcome will have both immediate and long term benefits by reducing the number of stress fractures that occur during athletic participation, and the risk for osteoporotic fractures and pain in adulthood.

Amenorrhea, the absence of menstruation, can occur in various forms. Most common in the female athlete are primary amenorrhea, secondary amenorrhea, and oligomenorrhea (Otis et al., 1997; Robert-McComb, Massey, & McTee, 1999). It is a serious problem among female athletes, and as VanDeLoo and Johnson (1995) point out, amenorrhea is reported in only 2% to 5% of the general population, but it has been reported in up to 66% of the athletic population. Amenorrhea has an adverse effect on bone mass development due to decreased estrogen levels and can lead to stress fractures and osteoporosis (Clairmont, 2000). Reeder and colleagues (1996)

reported that amenorrhoeic runners had up to 20% less bone mass than eumenorrhoeic runners, and that as many as 54% of amenorrhoeic ballet dancers had sustained stress fractures, associated with low bone density. Prolonged periods of amenorrhea may also contribute to detrimental effects on the cardiovascular system, reproductive organs and fertility (Lutter & Cushman, 1982; VanDeLoo & Johnson). In 1998 more than 500,000 women died of cardiovascular disease, and the total direct and indirect costs of cardiovascular disease in the United States is estimated to be \$298.2 billion in 2001 (American Heart Association, 2000). In addition, according to the 1995 National Survey for Family Growth, approximately 1.2 million women had sought infertility related medical-treatment in 1995 and 15% of women of childbearing age had received infertility services sometime in their life (Marks et al., 2000). Heart disease and infertility can be costly consequences of prolonged amenorrhea. They are both financially and emotionally costly, therefore it is important for coaches to initiate conversations with their athletes emphasizing the importance of maintaining normal menses and exploring intervention possibilities for those athletes who do have amenorrhea. Certainly not all cases of heart disease and infertility are the result of the female athlete triad, however the risk of developing these diseases increases in women who have amenorrhea and the female athlete triad. Prevention of the development of the triad can play an important role in decreasing the prevalence of these other serious and costly diseases.

Amenorrhea can often be prevented or treated through proper nutrition, proper activity levels, and hormone therapy (Otis et al., 1997). However, the consequences of prolonged amenorrhea, such as decreased bone mass, heart disease, and infertility, are often irreversible. Robert-McComb, et al. (1999) note that amenorrhea associated with the female athlete triad is most often seen in adolescents who participate in high-intensity sports, therefore it is important that coaches of adolescent athletes be sufficiently educated. Preventing amenorrhea in adolescent athletes will decrease their risks for serious and costly health problems in the future.

Both internal and external pressures to perform well in athletic competition and to maintain a particular body type and size contribute to the likelihood that females will develop the disorders of the triad (Otis et al., 1997). Participants in such sports as gymnastics, dancing, figure skating, running, swimming, and diving are at even higher risk due to the especially small physique and low body weight emphasized to excel in these activities (Clairmont, 2000; Otis et al.). Due to the relatively new definition of the female athlete triad and the secretive nature of eating disorders, prevalence of the triad is hard to determine (Nattiv et al., 1994). However, based on the high prevalence of amenorrhea and abnormal eating among female athletes (significantly higher than in the general population), and the large number of women and girls participating in sports, researchers are concerned that the female athlete triad is a notable problem (Burney & Brehm, 1998; Hobart & Smucker, 2000; Nattiv & Lynch, 1994; Wiggins & Wiggins, 1997).

Clearly, the three conditions of the female athlete triad are detrimental to the physical and psychological health of individuals afflicted with the triad and all have high costs to society . The conditions have both immediate and long-term consequences to health. It is anticipated that the female athlete triad can be prevented through primary prevention and early intervention (Beals et al., 1999; Nattiv et al., 1994; Nattiv & Lynch, 1994). Most often it is disordered eating that leads to the development of the other conditions of the triad, and disordered eating is a preventable condition, most successfully through education and primary prevention efforts. It is important that coaches be educated such that they can play an important role in primary prevention of the triad, as well as helping to recognize the signs and symptoms and intervene when necessary.

### *Purpose*

The purpose of this study is to examine student coaches' knowledge, attitudes, skill, and behaviors related to the female athlete triad. This is a first step in determining how competent coaches are to recognize and help prevent the female athlete triad in the women and girls that they coach. As many researchers state (Burney & Brehm, 1998; Nattiv & Lynch, 1994; Otis et al., 1997; Sanborn, Horea, Siemers, & Dieringer, 2000), one of the keys to prevention is education of athletes, coaches, and parents. Sanborn and his colleagues iterate the importance of directing educational programming about the female athlete triad at coaches as well as the athletes themselves in order to develop an effective prevention program. This



research will study the preparedness of coaches by surveying a group of senior physical education students finishing their student teaching semester.

### *Rationale*

Coaches of female athletes are an important population in the athletic community and can play a significant role in decreasing the prevalence of the female athlete triad. Coaches have tremendous influence on the athletes that they coach; through both their words and actions. In addition, they have constant access to and an intimate knowledge of female athletes who may be at risk of developing the female athlete triad. Coaches can be an excellent resource to help educate female athletes about the triad, however, they must first be educated themselves. According to Powers (1999), coaches who practice a positive (person-oriented) coaching style and are better educated, have fewer athletes with body dissatisfaction and the subsequent development of eating disorders in the athletes that they coach.

Coaches must also be educated in order to help themselves realize the direct and indirect impact that their attitudes and behaviors have on their athletes. In one survey, 75% of college female gymnasts who were told by their coaches that they were too heavy resorted to pathogenic weight-control behaviors (Rosen & Hough, 1988). In addition to this, Wilmore (1991) found that female athletes were often afraid to report weight-control behaviors to researchers because they were afraid that their coaches would find out despite being reminded that their coaches would not have access to any data collected. These studies indicate that coaches can negatively

impact their athletes behaviors without even knowing it. More importantly they illuminate a potential avenue of intervention; since coaches can have a positive influence on their athletes' behaviors given the proper education.

Literature suggests that coaches need to be educated and that their actions should reflect certain knowledge and attitudes towards the female athlete triad (Beals, 2000; Burney & Brehm, 1998; Nattiv et al., 1994). Vast recommendations throughout literature for increased education of coaches about the female athlete triad (Beals, et al., 1999; Burney & Brehm, 1998; Nattiv et al., 1994; Sanborn et al., 2000; VanDeLoo & Johnson, 1995) and the American College of Sports Medicine's recent recognition of the triad as a composite syndrome (Yeager et al., 1993) necessitates an exploration of the state of coaches education related to the female athlete triad. There are many misconceptions held among the athletic population and professionals about weight, nutrition, and amenorrhea. For example, many physicians currently tell their athletic female patients that amenorrhea is a normal response to training, however in many cases this is not true (Burney & Brehm; Putukian, 1994). Additionally, athletes and coaches often believe that a low body fat percentage is ideal for optimum performance, despite research indicating otherwise (Nattiv et al.; Yeager et al.).

Because previous studies lack information regarding coaches preparedness to deal with athletes at risk for the female athlete triad (a review of Medline, Health Source, CINAHL, Infotrac Health and other databases reveal no previous studies of this nature) a survey of student coaches' knowledge, attitudes, and skills to participate

in primary preventative or intervention behaviors related to the female athlete triad is necessary. While this study will not statistically test the previously stated research questions, the findings will provide descriptions that will be compared to the literature recommendations. This study is important to help educators determine the state of knowledge, attitudes, skills, and behaviors of coaches related to the female athlete triad, so that appropriate supplemental educational programs can be developed to fill voids as necessary.

### *Research Questions*

Overriding Research Question<sub>1</sub>: What is the state of student coaches' knowledge, attitudes, skills, and behaviors related to awareness, prevention, and early intervention of the female athlete triad?

Research Question<sub>2</sub>: Do males and female student coaches significantly differ in their knowledge, attitudes, skills, and behaviors regarding the female athlete triad?

Research Question<sub>3</sub>: Do student coaches who coach only female athletes significantly differ from students who coach only male athletes or those who coach both male and female athletes in their knowledge, attitudes, skills, and behaviors regarding the female athlete triad?

Research Question<sub>4</sub>: Do student coaches with a greater length of coaching experience significantly differ from students with less coaching experience in their knowledge, attitudes, skills, and behaviors regarding the female athlete triad?

Research Question<sub>5</sub>: Do student coaches with a personal history of an eating disorder and students without a history of an eating disorder significantly differ in their knowledge, attitudes, skills, and behaviors regarding the female athlete triad?

Research Question<sub>6</sub>: Do student coaches who have received specialized training about the female athlete triad significantly differ in their knowledge, attitudes, skills, and behaviors regarding the female athlete triad than student coaches without this specialized training?

### *Definition of Terms*

The female athlete triad is a term used to refer to a group of conditions that are very closely related and commonly present themselves concurrently in female athletes. This group of conditions includes, disordered eating, amenorrhea, and osteoporosis (Otis et al., 1997). The components of the female athlete triad can be somewhat difficult to define since each tends to represent a broad spectrum of symptoms and there is often discontinuity of definitions among researchers. For that reason, the next few paragraphs will describe disordered eating, amenorrhea, and osteoporosis as they pertain to the female athlete triad and provide definitions for the purposes of this study.

Disordered eating is a broad spectrum of abnormal and harmful eating patterns that are used in a misguided attempt to lose weight or maintain an abnormally low body weight. The spectrum ranges in severity from limiting specific food groups to a clinical diagnosis of anorexia nervosa (self-starvation) and/or bulimia nervosa (binge

eating followed by self-induced vomiting or purging) (Beals et al., 1999). Eating disorders that do not meet the full criteria for anorexia and bulimia are captured in the DSM-IV's category, eating disorders not otherwise specified (American Psychiatric Association, 1994). This is what many female athletes suffer from, and will be referred to as disordered eating in this paper.

Amenorrhea, the absence of menstruation, presents in various categories. The types of amenorrhea that are most often associated with the female athlete triad are primary amenorrhea, secondary amenorrhea, and oligomenorrhea. Primary amenorrhea, also known as delayed menarche, is defined as, "the absence of menstruation by age 16 in a girl with secondary sex characteristics" (Otis et al., 1997, p.i). Secondary amenorrhea is the absence of three or more consecutive menstrual cycles after menarche has already started (Otis et al.). Oligomenorrhea is defined as, "menstrual cycles greater than 36 days in length" (VanDeLoo & Johnson, 1995, p.695).

Osteoporosis is premature bone loss and/or inadequate bone formation, resulting in low bone mass, bone deterioration, and increased skeletal fragility. It is quantitatively defined as having a bone mass density of more than 2.5 standard deviation below the mean of young adults (Otis et al., 1997). Osteopenia is a precursor condition to osteoporosis, characterized as having a bone mass density between 1 and 2.5 standard deviation below the mean of young adults. It is a

condition of reduced bone mass without demonstrative fractures and is a risk factor for osteoporosis (Otis et al.).

For the purposes of this study student coaches will refer to the specific sample of students recruited for this study. These students include senior and graduate Physical Education and Sport majors at the State University of New York at Brockport, all of whom have completed required course work and student teaching and have some coaching experience (minimum of 1-3 months).

### *Limitations*

The major limitation of this study is the use of a convenience sample which consists of senior Physical Education majors at the State University of New York College at Brockport who have completed student teaching, however, do not have extensive coaching experience. Therefore they may have idealistic or unrealistic notions regarding their potential behaviors when working with female athletes. In addition, these student all received their education from one particular university, therefore the results of this study can not necessarily be generalized to all coaches who come from different educational institutions. The coaches participating in this study are trained in K-12 education program, therefore may not have the same attitudes, knowledge, and skills of someone who coaches adults. Also, this sample consists of male and female coaches, with no regard to whether their educational focus or training experience was on coaching men's or women's sports. It is assumed

that all of the students received a similar education on women's health issues through the course work required by their major.

### *Assumptions and Delimitations*

This research is based on the assumption that knowledge, attitudes, and skills impact behavior. This paradigm is repeatedly seen in previous empirical research examining health behavior interventions (Blakeley & Ribeiro, 1997; Clark, Haverty, & Kendall, 1990; Clark, Kendall, & Haverty, 1987; Intrieri, Kelly, Brown, & Castilla, 1993) and is not formalized in actual theory.

### *Summary*

Osteoporosis, amenorrhea, and disordered eating are all national health problems. They are costly to the individual's health because they cause increased incidence of acute injury, psychological illness, and chronic disability that can lead to premature death. They are also economically costly, contributing to millions of health care dollars spent annually. There is a need for education about the female athlete triad, especially among those who can influence young female athletes to make healthy decisions, such as coaches. Recognizing, intervening, and preventing the female athlete triad is of most importance because the development of the triad as a young athlete greatly increase the risk of having many significant health problems as an adult, such as osteoporosis and heart disease. Decreasing the number of adolescents who have the female athlete triad will lead to a healthier athletic population, and will decrease the number of adults with related health problems as the

population ages. This research will help to recognize voids in the education of coaches related to the recognition and prevention of the female athlete triad. This research will conclude with recommendations for the future and continuing education of coaches, in turn leading to more primary prevention and decreased prevalence of the female athlete triad.



## Chapter Two

### *Introduction*

As discussed in chapter one, the female athlete triad has serious consequences and is highly prevalent among the female athletic population. Despite these facts, the female athlete triad is often denied or not recognized by coaches and athletes (Otis, Drinkwater, Johnson, Loucks, & Wilmore, 1997), and many physicians, coaches, and athletes do not even know what the female athlete triad is (Nattiv & Lynch, 1994; Putukian, 1994, Burney & Brehm, 1998). Furthermore there are relatively few educational resources available to help individuals learn about the triad.

A starting point to decrease the prevalence and serious consequences of the female athlete triad is primary prevention and early intervention. There are numerous individuals who can play an important role in preventing the female athlete triad including the athlete, parents, and coaches. Literature emphasizes coaches' roles, however, there are no studies evaluating whether or not coaches actually are taking part in prevention and early intervention efforts nor their preparedness to do so (Beals, 2000; Burney & Brehm, 1998; Otis et al., 1997; Sanborn, Horea, Siemers, & Dieringer, 2000). This descriptive study will examine student coaches' preparedness to address the female athlete triad.

### *Studies Examining Knowledge, Attitudes, Skills, and Behaviors*

A thorough review of the literature reveals no studies of coaches knowledge, attitudes, skills, and behaviors related to the female athlete triad. Empirical studies in other areas of health education demonstrate that professionals who are equipped with appropriate knowledge, attitudes, and skills are more likely to participate in educational and preventive behaviors that help decrease negative health behaviors in the target population. Blakeley and Ribeiro (1997) examined the knowledge, attitudes, and practices of pediatric and community health nurses regarding child sexual abuse. Their survey of 164 nurses working in community health and pediatric settings found that the nurses had inadequate knowledge of child sexual abuse, lack of confidence in their abilities to care for abuse victims, and as a result were not very likely to behave in a way to help victims and their families. The authors concluded that more education, including content knowledge and practice caring with child sexual abuse victims and their families, may enable nurses to participate more effectively in interventions on behalf of child sexual abuse victims.

In a study examining the effects of knowledge and skills based training on attitudes, Intrieri, Kelly, Brown, and Castilla (1993) had third-year medical students go through a six week training session focusing on different aspects of the aging process and social interaction skills with older adults. The students in the intervention group (n=45) showed significantly improved attitudes ( $p < .02$ ) towards,

and skills in working with, elderly patients when compared to the control group (n=51).

Clark, Kendall, and Haverty (1987) conducted an intervention to prepare nurses to participate in a health education role regarding smoking cessation with their patients. Twenty nurses participated in a two-day training program which provided pertinent knowledge, a framework on which to base their role as a health educator, and communication skills training. Results indicated that the nurses understood the factual information well and were demonstrating assessment skills in their patient interactions. Preliminary results in the target population (patients who smoked), post-nurse intervention, found a 15% smoking cessation rate 6-months following intervention, and reduction in smoking by an additional 30% of the patients. The nurses believed that the most beneficial parts of the training were the new knowledge and communication practice activities (role-play, analysis of tapes).

In another study of nurses, Clark, Haverty, and Kendall (1990) examined the role of nurses as smoking cessation educators for their patients and clients. Based on previous research that indicated nurses had a positive attitude about their educational role but felt limited in terms of knowledge and skills (Clark, Haverty, Elliott, & Kendall, 1985; Syred, 1981), Clark et al. (1990) addressed nurses deficit needs through a two-day training program. Sixteen nurses completed the training and participated in at least one smoking cessation intervention with a client or patient.

Results indicated a 17% smoking cessation rate one year following the intervention, which compares favorably to previous studies reporting only 5% to 15% cessation rates (Jamrozik, Fowler, Vessey, Wald, Parker, & VanVunakis, 1984; Russell, Wilson, Taylor, & Baker, 1979).

These studies, while not specific to coaches, exemplify the importance of examining health professionals' knowledge, attitudes, and skills as these impact behaviors that can lead to desired health outcomes in a target population. In the case of the female athlete triad, the health professionals and educators are the coaches. Coaches' primary prevention and early intervention responsibilities include educating athletes about the triad, monitoring athletes for signs and symptoms of the triad, and intervening with treatment referrals when necessary (Manore et al., n.d.).

Just as nurses are in a prime role to participate in health education with their patients because of their repeated contact (Clark et al., 1987), coaches can have a tremendous impact on the athletes that they train. Coaches have continuous, often meaningful contact with their athletes, and frequently eat meals and travel together. This gives them an excellent opportunity for intervention and monitoring. Because of the important role a coach can play in the life of an athlete, they are in a prime position to promote health in the athletes that they interact with. In addition, they are well-positioned to participate in prevention and early interventions activities related to the female athlete triad, however they must know what it is, perceive it as severe,

and believe that it is important to take action. This study will examine the state of student coaches' knowledge, attitudes, behaviors, and skills, with respect to the female athlete triad. Based on previous studies examining these constructs in other disciplines (Blakeley & Ribeiro, 1997; Clark et al., 1987; Clark et al., 1990; Intrieri, 1993), coaches appropriate knowledge, skills, and attitudes should impact prevention and early intervention behaviors.

Current research in the field of the female athlete triad provides many suggestions about what coaches should know, believe, and do, however none has surveyed coaches to examine these constructs (Beals, Brey, & Gonyou, 1999; Burney & Brehm, 1998; Manore et al., n.d.; Nattiv & Lynch, 1994; Otis et al., 1997; Sanborn et al., 2000; VanDeLoo & Johnson, 1995). This research will examine student coaches' knowledge, attitudes, skills, and behaviors based on these published recommendations. A survey of current physical education students in their final semester of student teaching will be used to examine these constructs as these students provide a gauge of future coaches' preparedness to address the female athlete triad.

### *Knowledge*

Numerous researchers have asserted that basic knowledge about the female athlete triad will enable coaches to educate their athletes about the triad and take part in prevention and early intervention efforts (Beals et al., 1999; Manore et al., n.d.;

Rosen, McKeag, Hough, & Curley, 1986; VanDeLoo & Johnson, 1995). Turk, Prentice, Chappel, and Shields (1999) stated that coaches who are more confident in their knowledge about eating disorders (the first to develop and a preventable component of the triad) will be more likely to participate in prevention of disordered eating among their athletes. However, their study of Division 1-A coaches (n=138) found that 34% of coaches scored below 69.5% correct on a test of eating disorders knowledge, and only 4.3% scored 90% correct or higher, emphasizing the need for increased knowledge of coaches about eating disorders.

Smith (1996) and Sundgot-Borgen (1993) found the prevalence of eating disorders to be highest among athletes competing in weight-dependant and appearance sports (e.g. gymnastics, ballet, figure skating, swimming, diving, track, and equestrian). In addition, Sundgot-Borgen found that coaches of weight-dependant sports had less formal training about eating disorders than coaches of other sports. Although the results of this study only demonstrate a correlation between coaches' education and prevalence of athletes' eating-disorders, it does highlight the importance of educating all coaches about eating disorders.

A thorough review of Medline, Infotrac Health, and PsycINFO reveal that there are no existing methods to assess coaches' knowledge of the female athlete triad. There are studies that assess the educational level of coaches (Sundot-Borgen, 1993), however these studies do not assess knowledge about a particular construct of

knowledge. Other studies have assessed coaches' knowledge of the specific sport that they coach using survey and observational methods (Saury & Durand, 1998), however these studies are also inapplicable to this research question. Basic knowledge to be examined in this study will include severity of the triad, components of the triad, and signs and symptoms of the triad.

### *Severity of the triad*

Burney and Brehm (1998) stated that it is imperative for coaches to recognize that the female athlete triad is a severe syndrome that can have many negative health consequences, both acute and chronic. Potential acute risks include increased risk of fracture, fatigue, anxiety, dehydration, anemia, and decreased performance which can lead to injury (Beals et al., 1999). Chronic health risks associated with the triad that are potentially more severe include heart disease, gastrointestinal problems, low self-esteem, infertility, and even death (Beals et al.; Thrash & Anderson, 2000; Robert-McComb, Massey, & McTee, 1999).

The female athlete triad is a syndrome that can afflict young girls and women alike. Once a female athlete develops the triad, she may suffer life threatening health consequences that if not treated efficiently and effectively may continue after athletic participation is discontinued. Education about the triad is vital, and as part of their education, coaches must be aware of who is at risk and understand that risks can extend beyond athletic participation (Williams, 1998; Nattiv & Lynch, 1994).

### *Components of the triad*

Knowing the three components of the female athlete triad, disordered eating, amenorrhea, and osteoporosis, is also important for coaches to be able to take part in prevention and early intervention efforts (Beals et al., 1999; Manore et al., n.d.). Manore et al. stated that this knowledge will enable coaches to educate their athletes about the triad and will also make it easier for the coaches to learn and recognize the signs and symptoms of all three components. Not only must coaches know the three components of the triad, but it is key for coaches to be aware of the wide spectrum of disordered eating patterns and menstrual irregularities, and the adverse health and performance effects associated these (Williams, 1998). Disordered eating patterns not only include clinically diagnosed anorexia nervosa and bulimia nervosa, but also include a wide spectrum of pathogenic weight control behaviors. These range in severity from limiting fat and caloric intake to the use of laxatives and periods of self-starvation, which are categorized in the DSM-IV as 'eating disorders not otherwise specified' (American Psychiatric Association, 1994). Menstrual irregularities that occur most often in athletes are primary amenorrhea (absence of menstruation by age 16), secondary amenorrhea (absence of 3 or more consecutive menstrual cycles), and oligomenorrhea (menstrual cycles greater than 36 days; Otis et al. 1997; VanDeLoo & Johnson, 1995). Osteoporosis is characterized as premature bone loss resulting in



low bone mass density and skeletal fragility, however many young athletes may likely suffer from osteopenia, the precursor to osteoporosis (Otis et al.).

### *Signs and symptoms of the triad*

Researchers stress that coaches need to be aware of the signs and symptoms of the female athlete triad, especially the signs and symptoms of eating disorders as these are a potential gateway to developing the triad (Beals, 2000; Nattiv & Lynch, 1994; Manore et al., n.d.). Knowledge of signs and symptoms allows coaches to monitor their athletes for the triad and take an active role in early intervention if necessary (Manore et al.). Although the signs and symptoms are numerous, knowledge of the common ones will enable coaches to recognize suspicious behaviors and symptoms demonstrated by their athletes. Among the most blatant and potentially dangerous signs and symptoms of the triad are pathogenic weight control behaviors (e.g. skipping meals, binge eating and purging, use of laxatives), cessation of menstruation, multiple stress fractures and other injuries accompanied by slow recovery time, and psychological disorders (e.g. depression, anxiety; Manore et al.). Without knowledge of the signs and symptoms, coaches will not be able to participate in one of the most important preventative behaviors for the triad, monitoring (Beals).

### *Attitudes*

Research indicates that both internal and external factors predispose a female athlete to developing the female athlete triad (Beals et al., 1999; Nattiv, Agostini,

Drinkwater, & Yeager, 1994; Smith, 1996). Internal factors that make an athlete susceptible to the female athlete triad include a personal focus on thinness or achieving an ideal body weight (which may lead to pathogenic weight control behaviors), life stressors, family or relationship problems, and poor self esteem (Beals et al.; Nattiv et al.). These internal factors may be influenced by external factors such as pressure from peers, parents, and coaches to be thin and to perform well, lack of peer and familial support, harmful coaching strategies (e.g. team weigh-in's, negative reinforcement, weight criticism), abuse, societal pressures to be thin and dainty as well as strong and athletic, and participation in weight dependant or appearance sports (Beals et al.; Hobart & Smucker, 2000; Nattiv et al.). Intrinsic attitudes of an athlete can be greatly influenced by the external pressures and projected attitudes of coaches (Nattiv et al.).

#### *Coaches' attitudes*

Because the factors that contribute to the development of the triad are so closely related to intrinsic attitudes of athletes, which are influenced by coaches, researchers have stressed the importance of coaches' awareness of their own attitudes and how these can influence the athletes that they work with (Hobart & Smucker, 2000; VanDeLoo & Johnson, 1995). Coaches' attitudes can negatively influence both internal and external pressures on an athlete by projecting their perception of necessity for thinness and win at all costs (Manore et al., n.d.).

Sundot-Borgen (1994) suggested that it is important for coaches' attitudes to reflect the severity of the female athlete triad; communicating that they believe that the triad is severe and should be prevented. Beals (2000) stressed that coaches should have healthy attitudes towards body image, body weight, and athletic competition. Coaches who are personally obsessed with their own body weight and image or who place a large emphasis on how athletes look and what they weigh can negatively influence the athletes (Burney & Brehm, 1998). VanDeLoo and Johnson (1995) stated that it is important for coaches to be aware of how their personal attitudes are reflected in how they coach and interact with their athletes and that they can have an impact on their athletes even without doing so consciously. Excessive pressure to win can reflect an attitude of winning at all costs, including costs to the athletes' health (Manore et al., n.d.). Not only can this attitude hurt the athlete, according to the researchers, it can also hamper the coach's ability to monitor the health of the athletes that he or she coaches and influence the coaches idea of appropriate training and weight control behaviors. These findings indicate that it is important for coaches to be aware of their attitudes about issues relating to the female athlete triad, because their attitudes will be reflected in their behaviors, whether positive or negative.

A review of the literature finds no instruments developed to assess the attitudes of coaches towards the female athlete triad. The Eating Attitudes Test (EAT-26) is a questionnaire consisting of 26 Likert-type questions which has been

used to assess subjects' attitudes towards eating disorders (Garner, Olmsted, Bohr, & Garfinkel, 1982). This instrument has a reported internal validity score of .90 for individuals with anorexia nervosa (Garner et al.) and has been adapted by researchers to measure eating disorder attitudes of college students (Nelson, Hughes, Katz, & Russell, 1999) and children (Kelly, Ricciardelli, & Clark, 1999). This instrument will be used as a guideline for developing items assessing coaches' attitudes relating to the female athlete triad since many of the attitudes that need to be assessed are directly related to eating disorders and weight issues. In addition, other questions regarding competitiveness and perceived severity of the female athlete triad will be added to fully address coaches attitudes that might influence their athletes.

### *Behaviors*

A review of the literature reveals five categories of behaviors that coaches can engage in to assist in primary prevention and early intervention of the female athlete triad. These behaviors include educating the athletes, de-emphasizing weight-loss, requiring pre-participation physicals, monitoring for signs and symptoms of the triad, and intervening or referring to a professional for treatment when necessary.

### *Education*

Several research emphasized the importance of coaches educating their athletes about the triad and about proper nutrition and weight (Otis et al., 1997; Williams, 1998; VanDeLoo & Johnson, 1995). These reports indicated that effective

educational programs for athlete about the female athlete triad should include information about the components of the triad, risks involved with developing it, and how to recognize it. Therefore, coaches need to educate their athletes about what the triad is: amenorrhea, osteoporosis, and disordered eating, the potential acute and chronic health risks and negative effects on performance associated with developing the triad (Sanborn et al., 2000; Williams), and the signs and symptoms of it, such that they can recognize it in themselves and their teammates (Otis et al.; VanDeLoo & Johnson).

Because disordered eating is the component of the triad that usually presents first, leading to the development of amenorrhea and subsequently osteoporosis, nutrition education is an extremely important aspect of educational programming about the triad (Sanborn et al., 2000; VanDeLoo & Johnson, 1995). Facts about good nutrition, appropriate caloric intake for female athletes, and the importance of a balanced diet are important components of nutrition education (Sanborn et al.), especially because there are many prevailing myths about nutrition, body size and performance, which may cloud accurate information (Beals et al., 1999). Therefore, it is also important to dispel any myths, such as the idea that thinner is better for performance. In fact, just as being overweight may negatively affect athletic performance, so may being underweight (Sanborn et al.). Manore et al. (n.d.) and Smith (1996) emphasize that the relationship between thinness and improved

performance is a myth, and in fact, low body fat and weight loss can lead to negative performance and poor health. Unreasonably low caloric intake and low body fat percentage can lead to insufficient strength, power, and energy for optimal performance, while appropriate caloric intake can contribute to better performance without adding excessive body weight or fat (Beals, 2000; Sanborn et al.). Low energy intake (too few calories) can also have many negative health consequences, such as chronic fatigue, increased susceptibility to infection and poor healing after injury, anemia, menstrual dysfunction, osteoporosis, and cardiovascular disease (Beals). The final aspect is to provide education about food selection and preparation, ideally including hands-on learning (Sanborn et al.).

#### *De-emphasizing weight-loss*

Another behavioral category emphasized in the literature is related to issues of weight loss. Research indicates that coaches should not conduct team weigh-ins, give constructive criticism about weight, emphasize thinness, nor stress necessary or dramatic weight loss as a requirement for athletic participation or good performance (Beals et al., 1999; Hobart & Smucker, 2000). These actions are seen as counterproductive to prevention of the female athlete triad. According to a study by Rosen and Hough (1988) surveying female college gymnasts (n=42), 75% of the athletes who were told by their coach that they were too heavy started participating in pathogenic weight control behaviors. Criticism or comments from a coach about

weight can be taken very seriously by a female athlete and seen as a requirement to lose weight rather than a recommendation to watch her weight more carefully (Hobart & Smucker). Sanborn et al. (2000) and Sundot-Bogen (1994) suggested that if coaches do decide to recommend weight loss to an athlete, they should not do so unless they also provide nutritional education and guidance. In addition, if coaches talk to their athletes about weight loss they should encourage them to discuss nutrition and weight issues with a confidential contact person (Manore et al., n.d.). According to these studies, avoiding weigh-ins and weight criticism, and instead providing nutritional education and guidance, is key to preventing athletes from developing disordered eating.

#### *Pre-participation physical*

Another behavioral category emphasized in the literature focuses on athletes pre-participation physical examinations. If coaches require a pre-participation physical, this creates a prime opportunity for athletes to be screened by a physician for the three components of the female athlete triad (Beals, 2000; Beals et al., 1999, Nattiv & Lynch, 1994). Because many physicians still believe that amenorrhea is a normal response to physical training and athletic participation (Burney & Brehm, 1998), it is imperative that the physical be conducted by a physician who is trained to look for the signs, symptoms, and history of problems relating to the triad. The physician needs to ask detailed questions about dietary habits, weight-loss, menstrual

irregularities, musculoskeletal injuries, and psychological conditions (Beals et al.; Hobart & Smucker, 2000; Nattiv & Lynch). Questions that a physician trained to look for signs, symptoms, and a history of problems relating to the triad might ask include, "What have you eaten in the last 24 hours? Have you lost weight recently? What method did you use? What is the most and least you have weighed in the last year? What is your ideal body weight? Have you ever used laxatives, diet pills, or made yourself vomit? When did you start having your period and how regular is it? How many days per week and hours per day do you exercise? Have you ever had a stress fracture or any other fracture?" (Nattiv & Lynch, p.65). For athletes who have been identified as "at risk", Sanborn et al. (2000) suggested laboratory tests (urinalysis and blood chemistry), a resting EKG, measuring body composition in addition to height and weight, doing a psychologic and social history evaluation, and a dietary analysis. Nattiv and Lynch stated that many physicians may not be aware of the interrelatedness of the three components of the triad. Physicians who work with female athletes need to be educated about the female athlete triad, but because not all physicians screen for the triad, it is essential for coaches to take responsibility for ensuring that their athletes get a pre-participation physical from a qualified physician who will deliberately screen for the triad.



### *Monitoring*

Physicians are not the only ones who can play a role in identifying athletes who have signs and symptoms of the female athlete triad. Several researchers emphasized a need for coaches to participate in monitoring their athletes for signs and symptoms of the triad (Beals, 2000; Beals et al., 1999; Manore et al., n.d.). Coaches interact daily with their athletes and therefore can play an important role in monitoring their behaviors, moods, and physical appearance. Both the NCAA and ACSM have published lists of signs and symptoms of eating disorders that coaches should be familiar with and able to recognize (Beals, Manore et al.). Some of the signs and symptoms that coaches might notice are weight control behaviors such as skipping meals, binge eating and purging, use of laxatives or diet pills, sudden weight loss, stress fractures and other injuries, slow recovery time from injury and illness, depression, and anxiety (Manore et al.). In addition to seeing the female athletes that they coach daily at practice, coaches often eat meals and travel with their athletes which are excellent opportunities to take notice of potentially dangerous eating habits (Manore et al.).

### *Intervening*

If coaches notice that an athlete is exhibiting signs and symptoms of the female athlete triad, it is their ethical responsibility to intervene (Manore et al., n.d.; Burney & Brehm, 1998). According to the literature, intervention is the final

important behavior that coaches should participate in, although it may be difficult due to the personal, private, and secretive nature of the triad. Whether the coach personally confronts the athlete or refers her to a professional, it is important that the coach responds. Manore and colleagues emphasized the necessity for coaches to trust their "instincts" and when they feel something is abnormal to pay close attention and respond appropriately. When approaching an athlete about concerns for her health, the coach should secure the athlete's position on the team, eliminate unnecessary competition, and be supportive (Putukian, 1994). For some athletes, the coach's involvement during intervention may be felt as a threat, therefore their role in intervention should be carefully considered (Sanborn et al., 2000). Treating an athlete who has the female athlete triad is beyond the scope of coaches professional obligation and training therefore referring the athlete for professional treatment is imperative (Manore et al.). The responsibility of coaches is to recognize the signs and symptoms, intervene or refer for intervention, and know appropriate resources for help (Otis et al., 1997; Manore et al., VanDeLoo & Johnson, 1995).

Although there is a vast amount of literature to suggest that these behaviors are an important way to help prevent the female athlete triad, there are currently no studies assessing whether or not coaches actually do participate in these behaviors. Possible methods for measuring behaviors are surveys and observation. For the purposes of this study, observation of student coaches behaviors would be

unreasonable and impractical. Many of the behaviors to be assessed occur in private (e.g. intervening if an athlete shows signs of the triad), or are unobservable (e.g. monitoring others behaviors), therefore, this study will use a questionnaire that measures likelihood of engaging in the behaviors reviewed.

### *Skills*

#### *Communication self-efficacy*

Some of the recommended behaviors in the previous section require that coaches have high communication self-efficacy. Effective communication skills are necessary for coaches to educate their athletes about the female athlete triad, and especially important if they suspect that an athlete is developing the disorder and it is necessary for them to intervene (Putukian, 1994; Manore et al., n.d.).

Communication self-efficacy not only implies having accurate knowledge to pass on, it also requires coaches to have the ability and confidence to talk to female athletes about a sensitive subject. Coaches need to feel confident to communicate with their athletes, as a group and individually, in order to participate in education and intervention measures. Without communication self-efficacy, knowledge can not be shared and some important primary preventative efforts can not be completed (Brock, Beazley, and Richard, 1995).

Although communication self-efficacy measurement tools have not been developed to assess coaches' self-efficacy about talking to their athletes, similar

instruments have been developed for other sensitive subjects, such as parents talking to their children about sexuality issues. Brock et al. (1995) created a questionnaire, based on the Health Belief Model, to assess parents self-efficacy about communicating with their teenagers about sex. DiIoria et al. (2000) assessed mothers' communication self-efficacy about sexual issues with their adolescent daughters. Their instrument, a 16-item questionnaire based on the social cognitive theory, asked mothers to respond to items on a Likert-type scale rating their confidence in talking to her daughters. Although these measurement instruments can not be used for the purposes of this study, they will be used as a reference for developing items measuring communication self-efficacy: specifically assessing coaches' self-efficacy in talking to female athletes about the female athlete triad.

### *Summary*

The female athlete triad is a severe syndrome that can result in many negative immediate and long-term health conditions, possibly even death (Burney & Brehm, 1998; Beals et al., 1999). It is also highly prevalent and affects many female athletes with some studies indicating that 62% of female athletes suffer from disordered eating, the most preventable component of the triad (Yeager, Agostini, Nattiv, & Drinkwater, 1993). Despite all of the literature suggesting that coaches can and should play an active role in preventing the triad from developing and participating in early intervention, there are no studies assessing whether or not they are prepared to

do so. This descriptive study will examine the state of student coaches' knowledge, attitudes, skills, and behaviors related to the female athlete triad. The questionnaire created for this study is based on the previously reviewed literature's suggestions and instruments examining other topics as a model when available.

## Chapter Three

### *Introduction*

Despite estimates indicating a high prevalence of the female athlete triad components among the athletic population, there are few educational resources available about the triad and many people do not even know what it is (Burney & Brehm, 1998; Nattiv & Lynch, 1994; Putukian, 1994). All three of the components of the female athlete triad, disordered eating, amenorrhea, and osteoporosis, are difficult to treat once they have progressed into advanced stages. Therefore, primary prevention and early intervention are the most promising way to decrease the prevalence of the triad and the negative health effects associated with it (Beals, Brey, & Gonyou, 1999; Nattiv, Agostini, Drinkwater, & Yeager, 1994). As literature suggests (Beals, 2000; Burney & Brehm, 1998; Otis et al., 1997; Sanborn, Horea, Siemers, & Dieringer, 2000), coaches can and should play an important role in preventing the athletes that they coach from developing the triad. However, despite these recommendations, there are no empirical studies examining whether or not coaches are involved in prevention and intervention activities nor if coaches are prepared to address issues related to the female athlete triad (Sanborn, Horea, Siemers, & Dieringer, 2000). Therefore, the purpose of this descriptive research study is to describe the state of coaches preparedness to participate in primary prevention and intervention of the female athlete triad.

There are four major constructs associated with coaches being able to help prevent the triad: knowledge, attitudes, behaviors, and skills. There are currently no standards that measure coaches' preparedness to deal with the female athlete triad, therefore this research will be a first step in developing an empirical base for describing the current state of student coaches' knowledge, attitudes, skills, and behavior related to the female athlete triad. The results of this study will help to determine where there are gaps in student coaches' preparedness to deal with the triad, so that educational programming can be developed to assist student coaches in being better prepared. If coaches are more equipped to participate in prevention and early intervention of the female athlete triad, and they engage in prevention and early intervention activities, a decrease in the prevalence of the triad and the many detrimental health effects associated with it will ultimately be seen.

### *Sample*

Students recruited for this sample were senior Physical Education and Sport (PES) majors at the State University of New York College at Brockport who had completed student teaching and were attending their PES senior student meeting. It was anticipated that approximately 70 students would be eligible to participate in this study. This convenience sample was intended to represent the target population of college-educated coaches, and more specifically, newly educated coaches. Although many of the students in this sample had limited coaching experience, they were all

studying to become coaches. Therefore, it was assumed that they had current and up to date knowledge about health issues (including the female athlete triad) related to coaching.

### *Instrument*

The instrument used for this research was a survey designed to assess each of the four constructs related to coaches' roles in preventing the female athlete triad: knowledge, attitudes, skills, and behaviors. The survey questions were developed based on a review of current literature about the triad and recommendations about what coaches should know, believe, and do related to prevention and intervention of the female athlete triad (see Chapter 2). In addition, a pilot survey was given to a panel of current coaches who gave feedback regarding content, clarity, readability, and format of the questions. The panel consisted of 21 coaches who were graduate students in the PES department at the State University of New York at Brockport. The coaches had a range of experience from 1 to 10 years, with a mean of 4.5 years of coaching experience. They represented coaches of male and female sports, from youth, high school, and college levels across 14 sports (basketball, baseball/softball, football, lacrosse, wrestling, soccer, track and field, volleyball, swimming/diving, gymnastics, tennis, cross country, field hockey). The survey was revised to increase clarity and readability of the questions based on written comments given by the panel of coaches.



The survey (see Appendix A) included basic demographics (gender, class year) and other variables that might impact the research questions (length of coaching experience, sports coached, specialized training about the triad, and personal history of an eating disorder or the female athlete triad). Thirty-four additional questions were designed to evaluate the specific aims of this research study examining the state of student coaches' knowledge, attitudes, skills, and behaviors related to the female athlete triad.

### *Knowledge*

Knowledge was operationally defined for this study as what a coach should know about the female athlete triad that will enable him or her to participate in primary preventative efforts of the triad. Specifically, the coach should know what the components of the triad are, signs and symptoms of it, and how severe the disease is. Student coaches were asked to name the three components of the triad, list resources that coaches can access for intervention assistance with athletes who develop the triad, and identify signs and symptoms of the triad via open-ended questions. Two items assessed student coaches' understanding of the severity of the triad in a true-false question format (e.g. "the female athlete triad can be fatal"). Finally, two multiple choice formatted items queried students' knowledge regarding at risk populations. For example, students were asked, "What group is most at risk of developing the female athlete triad?" Response options included, "young girls who

play sports, all females who are physically active, mature women who are physically active, all people who play sports.”

### *Attitudes*

Attitudes about the female athlete triad were operationally defined for this study as student coaches' personal beliefs about the severity of the triad, body weight and image, and competitiveness. A series of items assessed student coaches' attitudes about the female athlete triad by asking them to indicate their agreement with a variety of statements using a 5-point Likert-type scale, with 1 indicating strong agreement and 5 indicating strong disagreement. Statements examined students' attitudes regarding severity of the triad (e.g. “The female athlete triad is a severe disease”), personal body weight expectancies (e.g. “Personally, it is extremely important for me to maintain what I consider to be an ideal body weight”, “I don't feel distressed when my ideal body weight fluctuates by 5 to 10 pounds”), and competitiveness, (e.g. “It is my responsibility as a coach to do anything necessary to win”).

### *Behaviors*

According to the literature (e.g. Beals et al., 1999; Manore et al., n.d.; Otis, Drinkwater, Johnson, Loucks, & Wilmore, 1997; VanDeLoo & Johnson, 1995), there are five specific behaviors that coaches should participate in related to prevention and intervention of the female athlete triad: educating athletes about the triad and

nutrition, de-emphasizing weight-loss, requiring a pre-participation physical, monitoring athletes for signs and symptoms of the triad, and intervening or getting help for an athlete when necessary. Using a 5-point Likert-type scale, with 1 indicating very likely and 5 indicating very unlikely, the state of participation in preventative and intervention behaviors was examined by asking students to indicate how likely they, as a coach, would be to participate in a variety of specified behaviors (e.g. "I request that athletes that I coach participate in team weigh-ins", "I monitor athletes that I coach for signs and symptoms of the female athlete triad", and "I require athletes that I coach to have a pre-participation physical examination by a physician that I am sure screens for the female athlete triad").

Additional items queried students' anticipated levels of participation as a coach in the *education* of athletes *about the female athlete triad*. The statement, "Please check the statement that best describes your likely action as a coach" was followed by possible responses including, "I personally educate athletes that I coach about the female athlete triad," versus "I provide educational opportunities about the female athlete triad," "I encourage the athletes that I coach to become educated about the female athlete triad," "I do not discuss the female athlete triad with athletes that I coach." Those students who responded that they would personally educate or provide educational opportunities for the athletes that they coach were then asked how often (1=Always; 5=Never) specific elements (components of the triad, risks involved with

the triad, how to recognize the triad) were incorporated in to their educational programming.

Similarly, student coaches were asked about their anticipated level of participation in the *education* of athletes *about weight and nutrition*. Students were asked to "check the statement that best describes your likely action as a coach." Response options included, "I personally educate athletes that I coach about weight and nutrition, I provide educational opportunities about weight and nutrition, I encourage the athletes that I coach to become educated about weight and nutrition, I do not discuss weight or nutrition with athletes that I coach." Again, those students who responded that they would participate in educational opportunities were asked how often (1=Always; 5=Never) each of the following components would be incorporated into their educational programming: facts about good nutrition, recommendations for appropriate caloric intake, food selection and preparation, dispelling myths about weight and nutrition, and the effect of nutrition on athletic performance and health.

### *Skills*

The construct of skills was operationally defined for this study as the skills necessary for coaches to be able to participate in primary prevention and intervention of the female athlete triad, including communication self-efficacy. Items examining skills asked student coaches to indicate their agreement (1=Strongly Agree;

5=Strongly Disagree) with statements reflecting their comfort in talking to athletes about sensitive, personal, or controversial topics in a variety of different situations (i.e. in groups and individually). Examples of items include, "I feel comfortable talking to the athletes that I coach about sensitive/personal issues" and "I feel comfortable initiating private conversations about health issues with individual athletes."

### *Procedure*

Students were invited to participate in this study during a PES senior student meeting on Friday, December 14, 2001 at 11:30 am. The primary researcher, acting as the survey administrator, attended the meeting and invited all students to fill out the survey. The survey administrator distributed the two-part questionnaire, informed consent form (see Appendix B), and envelope and answered questions regarding informed consent. In order to standardize the procedure, the students were read the following script:

After signing the informed consent form, you are asked to fill out a two-part questionnaire. Please begin with the [blue] page titled Part One. Fill out this part of the survey completely, following the directions printed on the top of the page. When you are finished with Part One place it in the envelope provided. Next proceed to filling out the [yellow] section of the survey labeled Part Two. Follow the directions printed on the survey and when you

are finished with Part Two place it in the envelope with Part One and hand it to me. Please do not go back to Part One during or after looking at Part Two.

The student coaches were given approximately 15 minutes of time during the class meeting to complete the survey. Detailed directions about how to answer specific questions were printed directly on the survey. All students who wished to receive a report summarizing the findings of the study were instructed to print their permanent home address on the bottom of the informed consent form.

## Chapter Four

### *Introduction*

Because this thesis was exploratory in nature, the majority of the results in this section simply describe the current state of student coaches' knowledge, attitudes, behaviors, and skills related to the female athlete triad. In addition, t-tests and chi-square statistics were used to determine if there were differences across responses when examining several variables. For example, this study examined whether those with extensive coaching experience or who have had specialized training on the triad differ in their responses from those with less coaching experience or who have never had any specialized training. All of these analyses will help to answer the overriding research question: what is the state of student coaches' knowledge, attitudes, behaviors, and skills related to awareness, prevention, and early intervention of the female athlete triad.

### *Demographics*

A total of 64 student coaches, all of whom were Physical Education and Sport majors at the State University of New York College at Brockport and had completed student teaching participated in this study. Surveys from three student coaches not providing demographic or coaching experience information were eliminated from analyses resulting in a final sample of 61 student coaches. At the time of the survey, 95% (n=57) were seniors and 5% (n=3) were graduate students. The sample

consisted of slightly more males than females; 56% (n=34) and 44% (n=22) respectively. Only two students (3%) reported having had the female athlete triad, and five students (8%) stated that they have had an eating disorder. Because incidence of student coaches with a history of an eating disorder was low (n=5), analysis examining differences based on this variable could not be conducted.

### *Coaching Experience and Specialized Training*

All students reported at least 1-3 months of coaching experience; none were without a history of coaching. The distribution of coaching experience indicated that 46% (n=28) had 1-3 months experience, 25% (n=15) had 4-11 months experience, 20% (n=12) had 1-4 years of experience, and 10% (n=6) had 5 or more years of experience. Because the majority of students had less than one year of coaching experience, the latter two classifications were collapsed to allow for comparisons across these categories in subsequent analyses (new categories are 1-3 months, 4-11 months, and 1 year or more).

Students reported experience coaching a variety of sports, as shown in Table 1. Across these sports, 39% of students (n=24) indicated that they coached only male athletes, 33% (n=20) coached only female athletes, and 26% (n=16) coached both male and female athletes.

Finally, 11% (n=7) of the student coaches said that they had received some type of specialized training about the female athlete triad. The trainings specified by



these students included college course work, professional conference, hospital training, video and handouts, and training provided by the school district where student teaching.

*Table 1 Sports Coached*

<i>Sport</i>	<i>% Who Currently Coach</i>			<i>% Who Previously Coached</i>		
	Men	Women	Co-ed	Men	Women	Co-ed
baseball	2		2	15		
racquetball			2			
skiing			2			2
volleyball		5	2	2	8	2
cross country/track		3	3			3
basketball	11	10	2	15	13	2
bowling		2				2
swimming/diving		2	2		2	5
soccer	5	10		5	18	3
field hockey		2			3	
football	8			26		
ice hockey	2					
golf				2		
softball		2			10	
lacrosse		2			3	
gymnastics		2				
tennis					2	
wrestling	7			5		

### *Knowledge*

Student coaches' responses to items assessing overall knowledge of the female athlete triad indicated deficits in the knowledge domain. Students were generally unable to name the components of the triad or to discriminate among a list of correct and incorrect signs and symptoms of the female athlete triad. Specifically, student coaches were asked to name the three components of the female athlete triad and 31% were able to correctly identify disordered eating, 26% amenorrhea, and 8% osteoporosis. Only four students (7%) correctly identified all three components of the female athlete triad, and an additional six students (10%) correctly identified two of the three components. Almost one-fourth (23%, n=14) wrote in the spaces provided that they *did not know* the components, 7% (n=4) left the question blank, and 21% (n=13) gave three incorrect answers.

A further examination of these responses revealed significant differences across gender of coach and gender of athletes coached. Female student coaches were able to name significantly more components ( $m=1.00$ ,  $s=1.07$ ) than male student coaches ( $m=.38$ ,  $s=.65$ ;  $t(58.911)=2.402$ ,  $p<.05$ ). Also, post hoc comparisons revealed that coaches of only female athletes were able to name significantly more components ( $m=1.10$ ,  $s=1.17$ ) than coaches of only male athletes ( $m=.33$ ,  $s=.64$ ;  $F(59)=4.353$ ,  $p<.05$ ). There were no significant differences in knowledge of the three

components of the triad found across differing levels of coaching experience nor across those with and without specialized training.

When student coaches were asked which group is most at risk for developing the female athlete triad, 46% correctly answered "all females who are physically active." The most common misperception held was that only "young girls who play sports" are at risk (31%). Other misperceptions included "all people who play sports" (13%) and "mature women who are physically active" (8%). Responses to this item were collapsed to represent correct and incorrect responses in order to perform comparison analyses, however no significant differences were found across gender of coach, gender of athletes coached, length of coaching experience, or those with and without specialized training.

Four true/false questions also surveyed student coaches' knowledge of the female athlete triad. The first item asking if "women over the age of 25 are at greater risk of developing the female athlete triad than women under the age of 25" was accurately answered as false by the majority (84%) of students. The next item asked if "the female athlete triad can be fatal", and 89% correctly answered that it is true. The statement that "the female athlete triad only affects athletes' health while they are playing sports" was correctly identified as false by 82% of student coaches. The final true/false item stating that "signs and symptoms of eating disorders are also risk

factors for developing the female athlete triad" was accurately identified as a true statement by 92% of the students.

An examination of differences using chi-square analyses across gender of coach, gender of athletes coached, length of coaching experience, and specialized training for these four true/false items found few significant differences, however these results must be interpreted with caution as the number of cells with a small N exceeded 20% (Pavkov & Pierce, 1997). Female coaches correctly identified that the female athlete triad *does not* only affect athletes health while they are playing sports more often than male coaches (96% and 76% respectively;  $X^2(1, N=59)=4.680$ ,  $p<.05$ ). In addition, student coaches with specialized training correctly identified that the female athlete triad can be fatal *less* often than student coaches without specialized training (67% and 94% respectively,  $X^2(1, N=59)=5.321$ ,  $p<.05$ ).

Presented with a list of 16 signs and symptoms (12 correct and 4 incorrect), students were asked to identify which were possible signs and symptoms of the female athlete triad. Only 5% identified all 12 correct signs and symptoms, 49% identified at least 8 (8-12), and 67% identified at least half (6-12) of the correct signs and symptoms. Each of the twelve correct signs and symptoms and the percentage of students who accurately identified them is presented in Table 2. The four incorrect signs and symptoms were hyper-activity, frequent coughing, eumenorrhea, and weight gain. Almost half (46%) of the student coaches accurately left all four of the

incorrect signs and symptoms blank and 77% accurately left 3 or 4 blank. The incorrect signs and symptoms are presented in Table 3 with the corresponding percentages of students who accurately left them blank. Four students (5%) did not respond to this item. No significant differences in accurate identification of the signs and symptoms of the triad were found across gender of coach, gender of athletes coached, length of coaching experience, or specialized training.

*Table 2 Correct Signs and Symptoms*

<i>Sign or Symptom</i>	<i>% Accurately Identifying</i>
amenorrhea	56
anxiety	70
bloated cheeks	14
cessation of menses	53
depression	68
fatigue	81
lightheadedness	54
rapid weight loss	83
skipping meals	68
slow recovery after injury	58
stress fracture	65
use of laxative	40

*Table 3 Incorrect Signs and Symptoms*

<i>Sign or Symptom</i>	<i>% Accurately Leaving Blank</i>
eumenorrhea	60
frequent coughing	90
hyper activity	81
weight gain	83

The final item surveying student coaches' knowledge of the female athlete triad asked them to name three possible resources that coaches can access for intervention assistance with athletes who may have the triad. Results indicated that only 18% (n=11) of student coaches could name three resources, 26% (n=16) could name two resources, and 23% (n=14) could name one resource. The most common resource named was the Internet (40%), followed by parents (21%), doctor(15%), and counselor(11%). The remaining 33% (n=20) of student coaches either wrote "I don't know" in the space provided, left this item blank, or named inappropriate resources (e.g. hotline, 911, television, media, and communication). Analyses showed no significant differences across gender of coach, gender of athletes coached, length of coaching experience, or specialized training.

#### *Attitudes*

When examining attitudes related to the female athlete triad, most responses, reflected moderate agreement in accordance with attitudes indicated by literature, and moderate disagreement with contraindicated attitudes. Two exceptions to this trend

are student coaches disagreed that their "personal beliefs about body image affect the athletes that they coach" ( $m=3.33$ ,  $s=1.30$ ) and student coaches also tended to disagree with the statement "I don't feel distressed when my ideal body weight fluctuates by 5 to 10 pounds" ( $m=2.70$ ,  $s=1.31$ ). See Table 4 for a complete listing of attitudes and their associated means.

Table 4 Student Coaches' Attitudes

Attitudes	Total	Gender		Athlete Gender		
	M (SD)	Male (SD)	Female (SD)	Male (SD)	Female (SD)	M & F (SD)
The female athlete triad is a severe disease.	1.95 (1.05)	2.03 (1.09)	1.85 (1.01)	1.83 (.82)	1.95 (1.08)	2.19 (1.33)
It is the responsibility of coaches to help prevent the athletes that they coach from developing the female athlete triad.	2.22 (.87)	2.30 (1.05)	2.11 (.58)	2.08 (.93)	2.00 <sub>a</sub> (.46)	2.73 <sub>a</sub> (1.03)
It is extremely important for me to maintain what I consider an ideal body weight.	2.22 (.99)	2.12 (1.07)	2.35 (.89)	1.92 (.88)	2.37 (.96)	2.44 (1.15)
Extreme weight loss measures are appropriate for an individual who is not at what they consider their ideal body weight.	3.77 (1.23)	3.74 (1.21)	3.81 (1.42)	3.96 (1.27)	4.05 (1.28)	3.31 (1.14)
I don't feel distressed when my ideal body weight fluctuates by 5 to 10 pounds.	2.70 (1.31)	2.44 (1.28)	3.04 (1.29)	2.50 (1.18)	2.95 (1.43)	2.69 (1.40)
My personal beliefs about body image affect the athletes that I coach.	3.33 (1.30)	2.97 (1.27)	3.78* (1.22)	2.83 <sub>b</sub> (1.27)	4.15 <sub>b</sub> (.88)	3.19 (1.28)
It is my responsibility as a coach to do anything necessary to win.	4.13 (1.16)	3.70 (1.33)	4.67*** (.55)	3.96 (1.16)	4.63 (.60)	3.75 (1.48)

Note: Agreement was indicated on a 5-point scale (1 = strongly agree, 5 = strongly disagree). Significant differences using T-test comparisons are indicated by \* p < .050, \*\* p < .010, \*\*\* p < .001. Means sharing subscript<sub>a</sub> differ at p < .05 in the Tukey honestly significant difference comparison. Means sharing subscript<sub>b</sub> differ at p < .01 in the Tukey honestly significant difference comparison.



Examining student coaches' attitudes across gender revealed a couple of significant differences (see Table 4). Specifically, female student coaches 1) more strongly disagreed that it is their responsibility as a coach to do anything necessary to win than male student coaches ( $p < .001$ ), and 2) were more disagreeable than males with the attitude that their personal beliefs about body image affects the athletes that they coach ( $p < .05$ ).

There were also significant differences found across gender of athletes coached (see Table 4). In post hoc analyses, coaches of only female athletes 1) more strongly disagreed with the statement that their personal beliefs about body image affect the athletes that they coach than coaches of only male athletes ( $p < .01$ ) and 2) more strongly agreed that it was their responsibility as a coach to help prevent their athletes from developing the female athlete triad than coaches of both male and female athletes ( $p < .05$ ). Analyses found no significant differences in student coaches' attitudes across length of coaching experience or specialized training.

### *Behaviors*

#### *Prevention and intervention behaviors*

When reporting their likeliness to participate in prevention and intervention behaviors related to the female athlete triad, although responses did not indicate that they would be opposed to participating in prevention and intervention behaviors, they did not strongly endorse this likelihood either. As illustrated in Table 5, most

students said that they were somewhat likely or unsure if they would participate in preventative behaviors (e.g. "I monitor athletes that I coach for signs and symptoms of the female athlete triad") and were somewhat unlikely or unsure if they would participate in contraindicated behaviors (e.g. "I request that athletes that I coach participate in team weigh-ins"). Table 5 provides a detailed listing of all behaviors and their associated means.

*Table 5 Student Coaches' Prevention and Intervention Behaviors*

<i>Behavior</i>	<i>Total</i>	<i>Gender</i>		<i>Athlete Gender</i>		
	<i>M</i> ( <i>SD</i> )	<i>Male</i> ( <i>SD</i> )	<i>Female</i> ( <i>SD</i> )	<i>Male</i> ( <i>SD</i> )	<i>Female</i> ( <i>SD</i> )	<i>M &amp; F</i> ( <i>SD</i> )
I require athletes that I coach to have a pre-participation physical examination by a physician that I am sure screens for the female athlete triad.	2.17 (.98)	2.15 (.93)	2.19 (1.01)	2.13 (.99)	2.16 (1.07)	2.25 (.93)
I monitor athletes that I coach for signs and symptoms of the female athlete triad.	2.44 (1.07)	2.60 (1.12)	2.23 (.99)	2.61 (.99)	2.11 (1.05)	2.63 (1.20)
I talk to any athletes that I believe is exhibiting signs and symptoms of the female athlete triad.	2.24 (1.10)	2.63 (1.13)	1.77** (.86)	2.45 (1.14)	1.74 <sub>a</sub> (.87)	2.63 <sub>a</sub> (1.09)
I refer any athlete that I believe is exhibiting signs or symptoms of the female athlete triad to an appropriate health professional.	2.07 (1.01)	2.38 (1.07)	1.69** (.79)	2.32 (.99)	1.68 (.82)	2.19 (1.17)
I request that athletes that I coach participate in team weigh-ins.	3.73 (1.32)	3.21 (1.29)	4.38*** (1.06)	3.09 <sub>b</sub> (1.20)	4.32 <sub>b</sub> (1.00)	3.88 (1.50)
I give athletes that I coach advice/recommendations about their weight.	2.98 (1.24)	2.79 (1.25)	3.24 (1.20)	2.58 <sub>a</sub> (1.21)	3.05 (1.18)	3.60 <sub>a</sub> (1.18)
I discuss body size and weight with the athletes that I coach.	3.08 (1.12)	2.91 (1.16)	3.31 (1.05)	2.71 (1.04)	3.37 (1.07)	3.38 (1.20)
I require athletes that I coach to meet team weight requirements.	3.88 (1.42)	3.35 (1.47)	4.58*** (.99)	3.25 <sub>b</sub> (1.39)	4.58 <sub>b</sub> (1.02)	3.94 (1.53)
When I recommend that athletes lose weight, I help them to develop a diet plan and monitor their weight loss process.	2.69 (1.26)	2.61 (1.22)	2.81 (1.33)	2.43 (1.16)	2.84 (1.46)	2.88 (1.20)

Note: Likelihood was indicated on a 5-point scale (1 = very likely, 5 = very unlikely). Significant differences using T-test comparisons are indicated by \*  $p < .050$ , \*\*  $p < .010$ , \*\*\*  $p < .001$ . Means sharing subscript<sub>a</sub> differ at  $p < .05$  in the Tukey honestly significant difference comparison. Means sharing subscript<sub>b</sub> differ at  $p < .01$  in the Tukey honestly significant difference comparison.

As indicated in Table 5, several items were significantly different across male and female student coaches. Specifically, females were 1) more likely to talk to athletes that they believe are exhibiting signs and symptoms of the female athlete triad, 2) more likely to refer athletes that they believe are exhibiting signs and symptoms of the triad to an appropriate health professional, 3) less likely to request that athletes participate in team weigh-ins, and 4) less likely to require athletes to meet team weight requirements than their male counterparts ( $p < .01$  for all).

In addition, several items were significantly different across gender of athletes coached (also shown in Table 5). In post hoc analyses coaches of both male and female athletes were more likely to talk to athletes that they believe are exhibiting signs and symptoms of the female athlete triad than were coaches of only female athletes ( $p < .05$ ). Also, coaches of both male and female athletes were also more likely than male athletes to give athletes that they coach advice or recommendations about their weight, a contraindicated behavior ( $p < .05$ ). Coaches of only females athletes were significantly less likely to request that athletes participate in team weigh-ins or to require athletes to meet team weight requirements ( $p < .01$  for both) than coaches of only male athletes.

Finally, analyses examining differences across levels of coaching experience and specialized training found only one significant difference. Student coaches who had received specialized training regarding the female athlete triad ( $m = 1.67$ ,  $s = .52$ )

were more likely to talk to athletes they believe are exhibiting symptoms of the female athlete triad than coaches who had not received specialized training ( $m=2.29$ ,  $s=1.14$ ;  $t(11.935)=-2.375$ ,  $p<.05$ ).

#### *Behaviors related to education*

Students were asked about their likeliness to provide educational programming in two areas: 1) the female athlete triad and 2) weight and nutrition. Three people (5%) did not answer these questions. Analyses examining responses regarding the female athlete triad indicated that 22% would personally educate their athletes about the female athlete triad, 19% indicated that they would provide educational opportunities about the female athlete triad, 19% said that they would encourage their athletes to become educated about the triad, and 40% said that they would not discuss the female athlete triad with their athletes. Those student coaches who stated that they would personally educate or provide educational programming about the triad were asked how often they would incorporate three important elements into their educational programming (rated on a 5-point scale with 1 indicating "always", 3 indicating "sometimes", and 5 indicating "never"). These three elements include information about the three components of the triad ( $m=1.78$ ,  $s=0.85$ ), risks involved with the triad ( $m=1.73$ ,  $s=0.88$ ), and how to recognize the triad ( $m=1.82$ ,  $s=0.96$ ).

Chi-square analyses showed no significant differences in whether or not student coaches would educate their athletes about the triad across gender of coach, gender of athletes coached, length of coaching experience, or specialized training. However, among those student coaches who indicated that they would educate their athletes about the female athlete triad, there was a significant difference across males and females in how often they would incorporate important elements into their programs. As indicated in Table 6, female student coaches indicated that they would incorporate risks involved with the triad ( $p < .01$ ) and how to recognize the female athlete triad ( $p < .05$ ) significantly more often than male student coaches.

*Table 6 Student Coaches' Behavior Related to Education*

<i>Element of Educational Program</i>	<i>Total</i>	<i>Gender</i>		<i>Athlete Gender</i>		<i>M &amp; F</i>
	<i>M</i> ( <i>SD</i> )	<i>Male</i> ( <i>SD</i> )	<i>Female</i> ( <i>SD</i> )	<i>Male</i> ( <i>SD</i> )	<i>Female</i> ( <i>SD</i> )	
Components of the female athlete triad.	1.78 (.85)	2.08 (.90)	1.45 (.69)	1.88 (.99)	1.63 (.74)	1.83 (.98)
Risks involved with the female athlete triad.	1.73 (.88)	2.17 (.94)	1.20** (.42)	2.00 (.93)	1.43 (.79)	1.67 (1.03)
How to recognize the female athlete triad.	1.82 (.96)	2.25 (1.06)	1.30* (.48)	1.88 (.99)	1.57 (.79)	2.00 (1.26)
Facts about good nutrition	1.28 (.51)	1.43 (.59)	1.06* (.25)	1.38 (.50)	1.25 (.62)	1.20 (.42)
Recommendations for appropriate caloric intake, food selection and preparation.	1.57 (.69)	1.64 (.66)	1.47 (.74)	1.67 (.72)	1.64 (.81)	1.30 (.69)
Dispelling myths about weight and nutrition.	1.59 (.86)	1.82 (.96)	1.27 (.59)	1.67 (.90)	1.45 (.69)	1.70 (1.06)
The effect of nutrition on athletic performance and health.	1.27 (.51)	1.41 (.59)	1.07* (.26)	1.33 (.49)	1.18 (.40)	1.30 (.67)

Note: Frequency was indicated on a 5-point scale (1 = always, 5 = never). Significant differences using T-test comparisons are indicated by \*  $p < .050$ , \*\*  $p < .010$ , \*\*\*  $p < .001$ .

When asked about their likeliness to provide educational programming *about weight and nutrition*, 35% of student coaches indicated that they would personally educate the athletes that they coach, 35% would provide educational opportunities, 16% expressed that they would only encourage their athletes to become educated about proper weight and nutrition, and 16% would not discuss weight and nutrition. Using the same 5-point scale previously described, students who indicated that they

would personally educate or provide educational programming about weight and nutrition were asked how often they would incorporate the following four elements: facts about good nutrition ( $m=1.28$ ,  $s=0.51$ ), recommendations for appropriate caloric intake, food selection, and preparation ( $m=1.57$ ,  $s=0.69$ ), dispelling myths about weight and nutrition ( $m=1.59$ ,  $s=0.86$ ), and the effect of nutrition on athletic performance and health ( $m=1.27$ ,  $s=0.51$ ).

Chi-square analyses showed no significant differences in whether or not student coaches would educate their athletes about weight and nutrition across gender of coach, gender of athletes coached, length of coaching experience, or specialized training. However, among those student coaches who indicated that they would educate their athletes about weight and nutrition, two significant differences were found. As indicated in Table 6, female student coaches indicated that they would incorporate facts about good nutrition and the effect of nutrition on athletic performance and health into educational programming more often than male student coaches ( $p<.05$ ). Furthermore, coaches with the greatest length of coaching experience (one or more years;  $m=1.08$ ,  $s=.28$ ) were also significantly more likely to incorporate facts about good nutrition into educational programming than those only 1-3 months ( $m=1.53$ ,  $s=.64$ ;  $F(22)=1.007$ ,  $p<.05$ ). There were no significant differences found across gender of athletes coached or across those with or without specialized training.



### *Skills*

Overall, the majority of student coaches indicated uncertainty (on a 5-point scale with 1 indicating “very likely”, 3 indicating “unsure”, and 5 indicating “very unlikely”) in their comfort initiating conversations necessary for prevention and intervention of the female athlete triad (e.g. “I feel comfortable initiating private conversations about health issues with individual athletes”). Few students strongly agreed with any of the statements endorsing communication self-efficacy (e.g. “I feel comfortable initiating group conversations about health issues with athletes”), with the exception to the statement that they would be comfortable talking to athletes about the female athlete triad *if* they had more knowledge about it. Table 7 provides a detailed listing of items assessing communication skills and their related means.

*Table 7 Student Coaches' Skills*

<i>Skill</i>	<i>Total</i>	<i>Gender</i>		<i>Athlete Gender</i>		
	<i>M</i> ( <i>SD</i> )	<i>Male</i> ( <i>SD</i> )	<i>Female</i> ( <i>SD</i> )	<i>Male</i> ( <i>SD</i> )	<i>Female</i> ( <i>SD</i> )	<i>M &amp; F</i> ( <i>SD</i> )
I feel comfortable talking to the athletes that I coach about sensitive/personal issues.	2.28 (1.19)	2.61 (1.37)	1.89* (.80)	2.43 (1.31)	1.95 (.94)	2.50 (1.32)
I feel comfortable talking to the athletes that I coach about controversial health topics.	2.00 (1.00)	2.24 (1.16)	1.70* (.67)	2.13 (.90)	1.75 (.85)	2.13 (1.31)
I feel comfortable initiating private conversations about health issues.	2.25 (.94)	2.35 (.92)	2.11 (.97)	2.25 (.79)	2.05 (.94)	2.50 (1.15)
I feel comfortable initiating group conversations about health issues.	2.23 (1.06)	2.38 (1.10)	2.04 (.98)	2.29 (.95)	1.95 (.89)	2.50 (1.37)
I feel comfortable talking to the athletes that I coach about the female athlete triad.	2.67 (1.12)	2.94 (1.28)	2.33* (.78)	2.88 (1.23)	2.25 (.79)	2.81 (1.22)
I would be comfortable talking to the athletes that I coach about the female athlete triad if I had more knowledge about it.	1.84 (1.10)	2.12 (1.17)	1.48* (.89)	1.92 (.97)	1.65 (1.14)	2.00 (1.26)

Note: Agreement was indicated on a 5-point scale (1 = strongly agree, 5 = strongly disagree). Significant differences using T-test comparisons are indicated by \*  $p < .050$ , \*\*  $p < .010$ , \*\*\*  $p < .001$ .

As shown in Table 7, many items related to communication skills were significantly different across gender of the student coaches. Specifically, female student coaches felt more comfortable talking to their athletes about sensitive or personal issues *and* about controversial health topics than male student coaches ( $p < .05$  for both). Females also felt significantly more comfortable talking to athletes

about the female athlete triad than males did, and females indicated that they would feel even more comfortable talking to athletes about the triad if they had more knowledge about it ( $p < .05$  for both). There were no significant differences found across gender of the athletes coached when examining items measuring skills

Analyses examining differences across length of coaching experience found a significant difference in comfort talking to athletes about the female athlete triad ( $F(60) = 3.621$ ,  $p < .05$ ), however Tukey's post hoc analysis (a more conservative test) revealed no significant differences across the levels of coaching experience. Finally, student coaches without previous specialized training ( $m = 1.86$ ,  $s = .69$ ) indicated that they would be less comfortable talking to the athletes that they coach about the female athlete triad than coaches with specialized training ( $m = 2.77$ ,  $s = 1.14$ ;  $t(58) = -2.072$ ,  $p < .05$ ).

## Chapter Five

This study provides an initial examination of the state of student coaches' knowledge, attitudes, behaviors, and skills related to the female athlete triad and a first step in determining whether or not coaches are prepared to participate in prevention and intervention behaviors related to the triad. Results indicate that the direction of student coaches responses, for the most part, aligned with the recommendations from current literature (e.g. student coaches moderately agreed that it is the responsibility of coaches to help prevent athletes from developing the triad, were somewhat likely to monitor athletes for signs and symptoms of the triad, and were somewhat unlikely to request athletes to participate in team weigh-ins). However, the weakness of magnitude across the majority of responses indicate that there is room to strengthen students' attitudes, behaviors, skills, and increase their knowledge. Without exception, responses were never strong in the direction indicated by literature and most were only neutral or unsure in their convictions. Appendix C describes direction of responses indicated by literature.

There were several cases where student coaches' knowledge, attitudes, behaviors, and skills were counter to recommendations in the literature. For example, student coaches tended to be unsure about whether their personal beliefs about body image affects the athletes that they coach. Literature strongly emphasizes that coaches' personal beliefs do affect the athletes that they coach, and that it is an

important reality for coaches to be aware of (Burney & Brehm, 1998; VanDeLoo & Johnson, 1995). Additionally, student coaches' held the attitude that it is extremely important to maintain an ideal body weight and indicated distress when their ideal body weight fluctuates by five to ten pounds. These attitudes, coupled with an unawareness that their attitudes affect the athletes that they coach, create a dynamic that potentially puts athletes at risk for developing the female athlete triad.

Although numerous researchers have asserted that knowledge about the female athlete triad will enable coaches to educate their athletes about the triad and take part in prevention and early intervention efforts (Beals, Brey, & Gonyou, 1999; Manore et al., n.d.; Rosen, McKeag, Hough, & Curley, 1986; VanDeLoo & Johnson, 1995), student coaches lacked basic knowledge of the female athlete triad. Strikingly, only 7% of student coaches were able to name all three components of the triad and 57% could not name a *single* component of the triad. Additionally, 44% could not identify half of the twelve signs and symptoms of the triad listed. Interestingly, while students were unsure whether or not they would feel comfortable talking to their athletes about the female athlete triad, they indicated that they would feel comfortable *if they had more knowledge* of the syndrome. These responses highlight the important relationship between knowledge and communication self-efficacy. Inadequate knowledge of the triad is a major deficiency in preparedness that can be a

serious restraint to coaches taking an active role in prevention and intervention activities (Beals et al.; Manore et al.; Rosen, et al.; VanDeLoo & Johnson).

While recall of the triad components was poor and recognition of the signs and symptoms was marginal, true/false assessments of knowledge regarding the female athlete triad fared better. Almost all (92%) students recognized that the signs and symptoms of eating disorders are related to the female athlete triad. Although this recognition is high, more in depth knowledge is evidently needed for coaches to feel comfortable engaging in prevention and intervention activities.

One encouraging attitude reflected by student coaches is their moderately strong belief that it is not their responsibility as a coach to do *anything* necessary to win. This response implies that student coaches see the detriment of a “win-at-all costs” attitude, and may be willing to participate in behaviors that will benefit their athletes’ health even if it may result in a weaker team (a misperception often associated with “competitive body weights”; Manore et al., n.d.; Smith, 1996). This result suggests that curricular foci are not solely on winning, but integrate concern for athlete’s health as well. Assimilation of other health issues for athletes, including the female athlete triad, into future curriculums is a next step in complementing this healthy attitude.

When given a range of behavioral options for educating athletes about the triad (including personally educating them, providing educational opportunities,

encouraging athletes to pursue education through their own efforts, or not discussing the triad at all) 40% of the student coaches chose the least proactive option (not discussing the triad with their athletes). Educating athletes is frequently cited as a behavior necessary for preventing the female athlete triad (Otis, Drinkwater, Johnson, Loucks, & Wilmore, 1997; Williams, 1998; VanDeLoo & Johnson, 1995), however it is contingent on possessing knowledge, appropriate attitudes, and skills which findings of this study indicate to be lacking. Minimally, coaches need to encourage athletes to seek out their own education. Ideally, coaches would have sufficient knowledge, motivating attitudes, and communication self-efficacy such that they would personally provide education to their athletes.

Comparisons of the responses across gender of student coaches, gender of athletes coached, length of coaching experience, and across those with and without specialized training revealed numerous differences. The greatest number of significant differences were found across gender of the student coaches. For the most part, female student coaches had more knowledge, more appropriate attitudes, more skills, and were more likely to participate in more prevention and intervention behaviors than male student coaches. For example, female student coaches indicated that they would be more comfortable talking to the athletes that they coach about sensitive/personal issues and controversial health topics in general, as well as the female athlete triad specifically, than male coaches. Additionally, female student

coaches' responses suggested a greater likeliness to participate in two indicated prevention and intervention behaviors surveyed (talk to athletes that they believe are exhibiting signs and symptoms of the female athlete triad, refer athletes that they believe are exhibiting signs and symptoms of the female athlete triad to an appropriate health professional), and less likely to participate in two contraindicated behaviors than their male counterparts (request that athletes participate in team weigh-ins and require athletes to meet team weight requirements). These findings are encouraging because female coaches are very likely to be coaching female athletes. All of the female coaches in our sample coached female or co-ed sports. However, it is not unusual for male coaches to also coach female athletes (29% of the male student coaches in our sample coached female or co-ed sports), therefore educational programs about the triad need to address both female and male coaches.

Significant differences were also found across gender of the athletes coached. While student coaches of only female athletes had a few more positive responses than those coaching only males or co-ed athletes, there was no particular group of coaches (coaches of only females athletes, only males, or both genders) whose responses consistently indicated greater overall preparedness than other groups. For example, coaches of only female athletes had more knowledge (e.g. were able to name more components of the triad) than coaches of only male athletes and were more likely to participate in selected behaviors (e.g. talk to athletes they believe to be exhibiting



signs and symptoms of the triad) than coaches of both males and females. However, coaches of both male and female athletes were less likely to participate in some contraindicated behaviors (e.g. give athletes advice about their weight) than coaches of only male athletes, and coaches of only male athletes had some more appropriate attitudes (e.g. were more agreeable that their personal attitudes about weight affect the athletes their athletes) than coaches of only female athletes. This variety of differences demonstrates that gender of athletes coached does not foretell desired knowledge, attitudes, behaviors, and skills necessary to participate in prevention and intervention of the triad, and that all coaches (regardless of gender of athletes coached) need more education.

There were only two statistically significant differences across length of coaching experience. Evidently, length of coaching experience in this sample does not greatly impact participation in prevention and intervention behaviors.

Although not many statistically significant differences were found across student coaches with and without specialized training on the female athlete triad, these findings may have been under represented given that only 7 (11%) students reported having ever received any type of specialized training. Interestingly, in the knowledge domain, students with specialized training responded *incorrectly* more frequently than students without any previous training that women over age 25 are at greater risk of developing the female athlete triad than women under 25. Although

there were no other statistically significant differences found in this domain, it is intriguing to note that of the seven students who had received training, only one named all three components of the triad, two named one component, and four could not name a single component of the triad.

In the skills domain, student coaches who had received specialized training did indicate more communication self-efficacy, more comfort talking to athletes that they coach about the female athlete triad, and were more likely to talk to athletes that they believe were exhibiting signs and symptoms of the triad than those without any training. These findings may indicate that various training programs about the female athlete triad are effective in increasing coaches' communication self-efficacy and likeliness to communicate with their athletes, however they are not as effective in increasing knowledge, appropriate attitudes, or behaviors (no differences found in the latter two domains).

Many researchers highlight the need for coaches to be involved in preventing the development of the female athlete triad (Beals, 2000; Burney & Brehm, 1998; Otis et al., 1997; Sanborn, Horea, Siemers, & Dieringer, 2000), however the findings from this study demonstrate that this sample of coaches are still deficient in necessary knowledge, and lack strength in the recommended attitudes, behaviors, and skills to optimally participate in prevention and intervention activities. These deficiencies and the finding that only 11% of students have participated in any type of specialized

training related to the female athlete triad, indicate that there is an immediate and pressing need for initial education about the female athlete triad (primary education of coaches in college), as well as a need for continuing education so that coaches who have completed their course work (such as the ones who participated in our study) can also get the necessary training to address the triad. Ideally, education about the female athlete triad would be incorporated into undergraduate coaching curriculums, such that all students are exposed to the information and training prior to entering their coaching careers. Once these curricula are in place, future research may want to evaluate these specialized training programs to ensure that content aligns with research suggestions and that the information translates into effective application.

This study examined a limited sample of student coaches' preparedness to participate in prevention and intervention of the female athlete triad. Additional research examining the knowledge, attitudes, behaviors, and skills of a larger sample of *current* coaches would be an appropriate next step. While a larger sample would provide more stability of analyses, it would also allow targeting at-risk sports (i.e. gymnastics, swimming, diving, cross country running) to see if these coaches are more prepared in the domains examined. Additionally, logistic regression analyses to determine the knowledge, attitudes, and skills that predict prevention and intervention behaviors could be explored. This examination could assist in creating standards to

determine whether or not coaches are prepared to participate in prevention and intervention of the female athlete triad.

The major limitation of this study is that the subjects used were a convenience sample. This sample represents the curriculum of a single university's student coaches. Coaches graduating from other universities may be more or less educated than those who participated in this study, therefore caution must be made in generalizing to the population of college educated coaches. In addition, the sample size is relatively small, which created problems with statistical power and limited comparisons across certain variables, specifically those coaches who do and do not have a history of an eating disorder. Another limitation is that the large number of statistical tests performed increases the overall alpha level, therefore increasing the chance of committing a Type I error.

This research suggests that student coaches are deficient in their knowledge, and lacking in attitudes, skills, and behaviors that facilitate prevention and intervention of the female athlete triad. There are many suggestions throughout literature that coaches should play a primary defensive role against athletes developing this syndrome (Beals, 2000; Burney & Brehm, 1998; Manore et al., n.d.; Otis et al., 1997; Sanborn et al., 2000), and research has laid the foundation for developing educational programs for coaches, indicating what knowledge, attitudes, behaviors, and skills are necessary for coaches to have for effective prevention and

intervention of the triad. However, whether from lack of opportunity or lack of student initiative to take advantage of educational opportunities, students are not being prepared to take this role. Student coaches showed weaknesses of knowledge, conviction, and action in all four of the domains. The evidence supporting that the female athlete triad is a potentially fatal syndrome with detrimental physical and psychological effects (Burney & Brehm, 1998; Beals et al., 1999, Manore et al., n.d.), coupled with results as found in this study, call for increasing the prevalence and depth of educational opportunities available which focus on this important issue.

Specific recommendations for future research would include:

- Examine a larger sample of student coaches from a variety of coaching programs
- Examine *current* coaches knowledge, attitudes, skills, and behaviors
- Examine knowledge and attitudes of educators of coaches and the coaching curriculum
- Specifically examine the knowledge, attitudes, skills, and behaviors of coaches of at-risk sports (ie. gymnastics, swimming, diving, cross country running) and dance instructors and coaches
- Examine whether knowledge, attitudes, and skills predict prevention and intervention behaviors

# APPENDIX

## Appendix A

### Part One

Please read each question carefully and answer as completely as possible to the best of your knowledge. You may choose not to answer any question. Thank you for your participation.

1. List the three components of the female athlete triad:

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2. What group is most at risk of developing the female athlete triad? (check one)

- young girls who play sports  
 all females who are physically active  
 mature women who are physically active  
 all people who play sports

3. Women over the age of 25 are at a greater risk for developing the female athlete triad than women under the age of 25:

- True  
 False

4. Please check all possible signs and symptoms of the female athlete triad (check all that apply):

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> stress fractures           | <input type="checkbox"/> eumenorrhea       | <input type="checkbox"/> anxiety         |
| <input type="checkbox"/> cessation of menses        | <input type="checkbox"/> depression        | <input type="checkbox"/> bloated cheeks  |
| <input type="checkbox"/> hyper activity             | <input type="checkbox"/> rapid weight loss | <input type="checkbox"/> skipping meals  |
| <input type="checkbox"/> fatigue                    | <input type="checkbox"/> weight gain       | <input type="checkbox"/> amenorrhea      |
| <input type="checkbox"/> frequent coughing          | <input type="checkbox"/> use of laxative   | <input type="checkbox"/> lightheadedness |
| <input type="checkbox"/> slow recovery after injury |  |  |

5. The female athlete triad can be fatal:

- True  
 False

6. The female athlete triad only affects athletes' health while they are playing sports (once they discontinue training for competitive athletics the triad no longer affects them):

- True  
 False

7. Signs and symptoms of eating disorders are also risk factors for developing the female athlete triad:

- True  
 False

8. Name three possible resources that coaches can access for intervention assistance with athletes who may have the female athlete triad?

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## Part Two

Using the scale below, please indicate your agreement with the following statements by circling the corresponding number:

- 1 means STRONGLY AGREE
- 2 means AGREE
- 3 means UNSURE
- 4 means DISAGREE
- 5 means STRONGLY DISAGREE

	Strongly Agree				Strongly Disagree
1. The female athlete triad is a severe disease.	1	2	3	4	5
2. It is the responsibility of coaches to help prevent the athletes that they coach from developing the female athlete triad.	1	2	3	4	5
3. Personally, it is extremely important for me to maintain what I consider an ideal body weight.	1	2	3	4	5
4. Extreme weight loss measures are appropriate for an individual who is not at what they consider to be their ideal body weight.	1	2	3	4	5
5. Personally, I don't feel distressed when my ideal body weight fluctuates by 5 to 10 pounds.	1	2	3	4	5
6. My personal beliefs about body image affect the athletes that I coach.	1	2	3	4	5
7. It is my responsibility as a coach to do anything necessary to win.	1	2	3	4	5
8. I feel comfortable talking to the athletes that I coach about <u>sensitive/personal issues</u> (e.g. menstruation, individual eating habits, etc.).	1	2	3	4	5
9. I feel comfortable talking to the athletes that I coach about <u>controversial health topics</u> (e.g. eating disorders, drugs abuse, etc.).	1	2	3	4	5
10. I feel comfortable <u>initiating private conversations</u> about health issues (sensitive/personal and/or controversial topics) with <u>individual athletes</u> .	1	2	3	4	5
11. I feel comfortable <u>initiating group conversations</u> about health issues (sensitive/personal and/or controversial topics) with athletes.	1	2	3	4	5
12. I feel comfortable talking to the athletes that I coach about the female athlete triad.	1	2	3	4	5
13. I would be comfortable talking to the athletes that I coach about the female athlete triad if I had more knowledge about it.	1	2	3	4	5



Using the scale below, please indicate how likely you, as a coach, would be to participate in the following behaviors by circling the corresponding number:

- 1 means VERY LIKELY
- 2 means SOMEWHAT LIKELY
- 3 means UNSURE
- 4 means SOMEWHAT UNLIKELY
- 5 means VERY UNLIKELY

	Very Likely				Very Unlikely
14. I require athletes that I coach to have a pre-participation physical examination by a physician that I am sure screens for the female athlete triad.	1	2	3	4	5
15. I monitor athletes that I coach for signs and symptoms of the female athlete triad.	1	2	3	4	5
16. I talk to any athlete that I believe is exhibiting signs or symptoms of the female athlete triad.	1	2	3	4	5
17. I refer any athlete that I believe is exhibiting signs or symptoms of the female athlete triad to a doctor, counselor, or other appropriate health professional.	1	2	3	4	5
18. I request that athletes that I coach participate in team weigh-ins.	1	2	3	4	5
19. I give athletes that I coach advice/recommendations about their weight (weight loss, body size, dieting, etc.).	1	2	3	4	5
20. I discuss body size and weight with the athletes that I coach.	1	2	3	4	5
21. I require athletes that I coach to meet team weight requirements (if they don't meet requirements they are suspended/reprimanded).	1	2	3	4	5
22. When I recommend that athletes lose weight, I help them develop a diet plan and monitor their weight loss process.	1	2	3	4	5

23. Please check the statement that best describes your likely action as a coach:
- I personally educate the athletes that I coach about the female athlete triad. (Go to question 23a)
  - I provide educational opportunities about the female athlete triad for the athletes that I coach. (Go to question 23a)
  - I encourage the athletes that I coach to become educated about the female athlete triad. (Go to question 24)
  - I do not discuss the female athlete triad with the athletes that I coach. (Go to question 24)

23a. Which do you incorporate into educational programming about the female athlete triad?

1 means ALWAYS

2 means ALMOST ALWAYS

3 means SOMETIMES

4 means ALMOST NEVER

5 means NEVER

	Always					Never
	1	2	3	4	5	
a. components of the triad	1	2	3	4	5	
b. risks involved with the triad	1	2	3	4	5	
c. how to recognize the triad	1	2	3	4	5	

24. Please check the statement that best describes your likely action as a coach:
- I personally educate the athletes that I coach about weight and nutrition. (Go to question 24a)
  - I provide educational opportunities about weight and nutrition for the athletes that I coach. (Go to question 24a)
  - I encourage the athletes that I coach to become educated about proper weight and nutrition. (Go to question 25)
  - I do not discuss weight or nutrition with the athletes that I coach. (Go to question 25)

24a. Which do you incorporate into educational programming about weight and nutrition?

1 means ALWAYS

2 means ALMOST ALWAYS

3 means SOMETIMES

4 means ALMOST NEVER

5 means NEVER

	Always					Never
	1	2	3	4	5	
a. facts about good nutrition	1	2	3	4	5	
b. recommendations for	1	2	3	4	5	
c. dispelling myths about weight	1	2	3	4	5	
d. the effect of nutrition on	1	2	3	4	5	

The following are questions about your education and experiences:

25. Your Gender:  
 male  
 female
26. What year are you?  
 freshman  
 sophomore  
 junior  
 senior  
 graduate student
27. During your student teaching did you teach physical education, health, or both?  
(check one)  
 Physical Education  
 Health  
 Both
28. Are there any required courses for the PES major that you have not yet completed?  
(if so please check the ones that you have not completed)  
 PES 305 (Significance of Physical Activity)  
 PES 315 (Fitness for Healthful Living)  
 PES 325 (Kinesiological Bases for Exercise and Sport)  
 PES 335 (Physiological Bases for Exercise and Sport)  
 PES 345 (Skill Acquisition and Performance)  
 PES 3XX (Advanced Performance)
29. What is the length of your coaching experience, including any experience during student teaching? (check one)  
 no coaching experience  
 1 - 3 months  
 4 - 11 months  
 1 - 4 years  
 5 or more years
30. What sport(s) do you currently coach?  
\_\_\_\_\_ men's \_\_\_\_\_ women's \_\_\_\_\_ co-ed \_\_\_\_\_  
\_\_\_\_\_ men's \_\_\_\_\_ women's \_\_\_\_\_ co-ed \_\_\_\_\_  
\_\_\_\_\_ men's \_\_\_\_\_ women's \_\_\_\_\_ co-ed \_\_\_\_\_  
 I am not currently coaching

31. What sport(s) have you coached in the past?
- |       |       |       |         |       |       |       |
|-------|-------|-------|---------|-------|-------|-------|
| _____ | men's | _____ | women's | _____ | co-ed | _____ |
| _____ | men's | _____ | women's | _____ | co-ed | _____ |
| _____ | men's | _____ | women's | _____ | co-ed | _____ |
- \_\_\_\_\_ none
32. Please estimate the percentage (0-100%) of athletes that you currently coach that have the female athlete triad:
- \_\_\_\_\_ %
- \_\_\_\_\_ I don't know
- \_\_\_\_\_ I am not currently coaching
33. Please estimate the percentage (0-100%) of athletes that you currently coach that are at risk for developing (have signs and symptoms of) the female athlete triad:
- \_\_\_\_\_ %
- \_\_\_\_\_ I don't know
- \_\_\_\_\_ I am not currently coaching
34. Have you ever had the female athlete triad?
- \_\_\_\_\_ Yes
- \_\_\_\_\_ No
35. Have you ever had an eating disorder?
- \_\_\_\_\_ Yes
- \_\_\_\_\_ No
36. Have you ever received specialized training on the female athlete triad?
- \_\_\_\_\_ No
- \_\_\_\_\_ Yes, please specify \_\_\_\_\_

**Thank you for your participation in this research project.**

## Appendix B

### Statement of Informed Consent

The purpose of this research study is to determine the preparedness of coaches to address issues related to the female athlete triad. The attached survey will be used to measure the four constructs of knowledge, attitudes, skills, and behaviors related to the female athlete triad. This research project is also being conducted in order for me to complete my masters thesis for the Department of Health Science at the State University of New York College at Brockport.

You have been selected to participate in this research study because of your class and major. You are not required to participate, however your participation would be greatly appreciated. In order to participate in this study your informed consent is required. You are being asked to make a decision whether or not to participate in the research project. If you want to participate in the project, and agree with the statements below, please sign your name in the space provided at the end. You may change your mind at any time and discontinue the completion of the survey without penalty, even after you have begun to fill out the survey.

I understand that:

1. My participation is voluntary and I have the right to refuse to answer any questions.
2. My confidentiality is guaranteed. My name will not be written on the survey. There will be no way to connect me to my written survey, once the researcher has received it. If any publication results from this research, I would not be identified by name.
3. There will be no personal risk because of my participation in this project.
4. My participation involves reading a written survey and answering each question in writing. It is estimated that it will take 20 minutes to complete the survey.
5. Approximately 67 people will take part in this study. The results will be used for the completion of a masters thesis by the primary researcher.
6. When the thesis has been accepted and approved, all consent forms will be destroyed.

I have read and understand the above statements. All of my questions about participation in this study have been answered to my satisfaction. I agree to participate in the study, realizing that I may withdraw without penalty at any time during the survey process. If you have any further questions you may contact:

Primary Researcher  
Jill Lassiter, ATC

Faculty Advisor  
Celia Watt, PhD

Please print your name: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

If you wish to receive a summary report of the findings, print your permanent address below:

\_\_\_\_\_  
\_\_\_\_\_



## Part Two

Using the scale below, please indicate your agreement with the following statements by circling the corresponding number:

- 1 means STRONGLY AGREE
- 2 means AGREE
- 3 means UNSURE
- 4 means DISAGREE
- 5 means STRONGLY DISAGREE

	Strongly Agree		Strongly Disagree		Direction Scored	
1. The female athlete triad is a severe disease.	1	2	3	4	5	positive
2. It is the responsibility of coaches to help prevent the athletes that they coach from developing the female athlete triad.	1	2	3	4	5	positive
3. Personally, it is extremely important for me to maintain what I consider an ideal body weight.	1	2	3	4	5	negative
4. Extreme weight loss measures are appropriate for an individual who is not at what they consider to be their ideal body weight.	1	2	3	4	5	negative
5. Personally, I don't feel distressed when my ideal body weight fluctuates by 5 to 10 pounds.	1	2	3	4	5	positive
6. My personal beliefs about body image affect the athletes that I coach.	1	2	3	4	5	positive
7. It is my responsibility as a coach to do anything necessary to win.	1	2	3	4	5	negative
8. I feel comfortable talking to the athletes that I coach about <u>sensitive/personal issues</u> (e.g. menstruation, individual eating habits, etc.).	1	2	3	4	5	positive
9. I feel comfortable talking to the athletes that I coach about <u>controversial health topics</u> (e.g. eating disorders, drugs abuse, etc.).	1	2	3	4	5	positive
10. I feel comfortable <u>initiating private conversations</u> about health issues (sensitive/personal and/or controversial topics) with <u>individual athletes</u> .	1	2	3	4	5	positive
11. I feel comfortable <u>initiating group conversations</u> about health issues (sensitive/personal and/or controversial topics) with athletes.	1	2	3	4	5	positive
12. I feel comfortable talking to the athletes that I coach about the female athlete triad.	1	2	3	4	5	positive
13. I would be comfortable talking to the athletes that I coach about the female athlete triad if I had more knowledge about it.	1	2	3	4	5	positive

Using the scale below, please indicate how likely you, as a coach, would be to participate in the following behaviors by circling the corresponding number:

- 1 means VERY LIKELY
- 2 means SOMEWHAT LIKELY
- 3 means UNSURE
- 4 means SOMEWHAT UNLIKELY
- 5 means VERY UNLIKELY

	Very Likely			Very Unlikely		Direction Scored
14. I require athletes that I coach to have a pre-participation physical examination by a physician that I am sure screens for the female athlete triad.	1	2	3	4	5	positive
15. I monitor athletes that I coach for signs and symptoms of the female athlete triad.	1	2	3	4	5	positive
16. I talk to any athlete that I believe is exhibiting signs or symptoms of the female athlete triad.	1	2	3	4	5	positive
17. I refer any athlete that I believe is exhibiting signs or symptoms of the female athlete triad to a doctor, counselor, or other appropriate health professional.	1	2	3	4	5	positive
18. I request that athletes that I coach participate in team weigh-ins.	1	2	3	4	5	negative
19. I give athletes that I coach advice/recommendations about their weight (weight loss, body size, dieting, etc.).	1	2	3	4	5	negative
20. I discuss body size and weight with the athletes that I coach.	1	2	3	4	5	negative
21. I require athletes that I coach to meet team weight requirements (if they don't meet requirements they are suspended/reprimanded).	1	2	3	4	5	negative
22. When I recommend that athletes lose weight, I help them develop a diet plan and monitor their weight loss process.	1	2	3	4	5	positive



23. Please check the statement that best describes your likely action as a coach:
- I personally educate the athletes that I coach about the female athlete triad. (Go to question 23a)
  - I provide educational opportunities about the female athlete triad for the athletes that I coach. (Go to question 23a)
  - I encourage the athletes that I coach to become educated about the female athlete triad. (Go to question 24)
  - I do not discuss the female athlete triad with the athletes that I coach. (Go to question 24)

23a. Which do you incorporate into educational programming about the female athlete triad?

1 means ALWAYS

2 means ALMOST ALWAYS

3 means SOMETIMES

4 means ALMOST NEVER

5 means NEVER

	Always	Never	Direction Scored
a. components of the triad	1 2 3 4 5		positive
b. risks involved with the triad	1 2 3 4-5		positive
c. how to recognize the triad	1 2 3 4 5		positive

24. Please check the statement that best describes your likely action as a coach:
- I personally educate the athletes that I coach about weight and nutrition. (Go to question 24a)
  - I provide educational opportunities about weight and nutrition for the athletes that I coach. (Go to question 24a)
  - I encourage the athletes that I coach to become educated about proper weight and nutrition. (Go to question 25)
  - I do not discuss weight or nutrition with the athletes that I coach. (Go to question 25)

24a. Which do you incorporate into educational programming about weight and nutrition?

1 means ALWAYS

2 means ALMOST ALWAYS

3 means SOMETIMES

4 means ALMOST NEVER

5 means NEVER

	Always	Never	Direction Scored
a. facts about good nutrition	1 2 3 4 5		positive
b. recommendations for	1 2 3 4 5		positive
c. dispelling myths about weight	1 2 3 4 5		positive
d. the effect of nutrition on	1 2 3 4 5		positive

The following are questions about your education and experiences:

25. Your Gender:  
 male  
 female
26. What year are you?  
 freshman  
 sophomore  
 junior  
 senior  
 graduate student
27. During your student teaching did you teach physical education, health, or both?  
(check one)  
 Physical Education  
 Health  
 Both
28. Are there any required courses for the PES major that you have not yet completed?  
(if so please check the ones that you have not completed)  
 PES 305 (Significance of Physical Activity)  
 PES 315 (Fitness for Healthful Living)  
 PES 325 (Kinesiological Bases for Exercise and Sport)  
 PES 335 (Physiological Bases for Exercise and Sport)  
 PES 345 (Skill Acquisition and Performance)  
 PES 3XX (Advanced Performance)
29. What is the length of your coaching experience, including any experience during student teaching? (check one)  
 no coaching experience  
 1 - 3 months  
 4 - 11 months  
 1 - 4 years  
 5 or more years
30. What sport(s) do you currently coach?  
\_\_\_\_\_ men's \_\_\_\_\_ women's \_\_\_\_\_ co-ed \_\_\_\_\_  
\_\_\_\_\_ men's \_\_\_\_\_ women's \_\_\_\_\_ co-ed \_\_\_\_\_  
\_\_\_\_\_ men's \_\_\_\_\_ women's \_\_\_\_\_ co-ed \_\_\_\_\_  
 I am not currently coaching

31. What sport(s) have you coached in the past?
- \_\_\_\_\_ men's \_\_\_\_\_ women's \_\_\_\_\_ co-ed \_\_\_\_\_
- \_\_\_\_\_ men's \_\_\_\_\_ women's \_\_\_\_\_ co-ed \_\_\_\_\_
- \_\_\_\_\_ men's \_\_\_\_\_ women's \_\_\_\_\_ co-ed \_\_\_\_\_
- \_\_\_\_\_ none
32. Please estimate the percentage (0-100%) of athletes that you currently coach that have the female athlete triad:
- \_\_\_\_\_ %
- \_\_\_\_\_ I don't know
- \_\_\_\_\_ I am not currently coaching
33. Please estimate the percentage (0-100%) of athletes that you currently coach that are at risk for developing (have signs and symptoms of) the female athlete triad:
- \_\_\_\_\_ %
- \_\_\_\_\_ I don't know
- \_\_\_\_\_ I am not currently coaching
34. Have you ever had the female athlete triad?
- \_\_\_\_\_ Yes
- \_\_\_\_\_ No
35. Have you ever had an eating disorder?
- \_\_\_\_\_ Yes
- \_\_\_\_\_ No
36. Have you ever received specialized training on the female athlete triad?
- \_\_\_\_\_ No
- \_\_\_\_\_ Yes, please specify \_\_\_\_\_

**Thank you for your participation in this research project.**

### Survey Legend

Content	Question #
<b>Knowledge</b>	
Severity of disease	2,3,5,6 (from part-one)
Components of triad	1 (from part-one)
Signs and symptoms of triad	4,7 (from part-one)
<b>Attitudes</b>	
Believe it is severe/should be prevented	1,2
Personal attitudes towards body weight/image	3,4,5
Do you believe your attitudes affect your athletes	6
Competitiveness	7
<b>Behaviors</b>	
Educate athletes about the F.A.T. Components of F.A.T. Risks involved with F.A.T. How to recognize F.A.T.	23 23a 23a 23a
Educate athletes about nutrition/weight Facts about good nutrition (caloric intake, food selection and preparation) Dispelling myths How nutrition affects performance and health	24 24a 24a 24a
De-emphasize thinness Team weigh-ins Recommend weight loss Critique body type/size Have team weight requirements	18 19, 22 20 21
Require pre-participation physical by a physician that screens for F.A.T.	14
Monitor for signs and symptoms	15
Intervene Talk to athlete Refer to doctor, counselor...	16 17
Know resources for F.A.T. treatment/help	8 (from part-one)
<b>Skills</b>	
Comfortable initiating conversation	10, 11
Comfortable talking about athlete's health/behaviors	8, 9
Comfortable talking about the F.A.T.	12, 13

## References

- American Heart Association. (2000). *2001 heart and stroke statistical update*. Dallas: American Heart Association.
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders*. (4th ed.). Washington, DC.
- Beals, K. A. (2000). Subclinical eating disorders in female athletes. *Journal of Physical Education, Recreation, & Dance*, 71(7), 22-29.
- Beals, K. A., Brey, R. A. and Gonyou, J. B. (1999). Understanding the female athlete triad: Eating disorders, amenorrhea, and osteoporosis. *The Journal of School Health*, 69, 337-340.
- Beals, K. A. and Manore, M. M. (1998). Nutritional status of female athletes with subclinical eating disorders. *Journal of the American Dietetic Association*, 98, 419-425.
- Blakeley, J. and Robeiro, V. (1997). Community health and pediatric nurses' knowledge, attitudes, and behaviors regarding child sexual abuse. *Public Health Nursing*, 14, 339-345.
- Brock, G. C. and Beazley, R. P. (1995). Using the health belief model to explain parents' participation in adolescents' at-home sexuality education activities. *The Journal of School Health*, 65(4), 124-128.
- Burney, M. W. and Brehm, B. A. (1998). The female athlete triad. *Journal of*

*Physical Education, Recreation & Dance*, 69(9), 43-45.

Clairmont, M. A. (2000). Female athlete triad: Challenges in nutrition practice. *Healthy Weight Journal*, 14(4), 52-54.

Clark, J., Haverty, S., Elliott, K. and Kendall, S. (1985). *Helping people to stop smoking - The nurses' role* (Phase 1. Reports A, B, and C). London: Department of Nursing Studies, King's College, University of London.

Clark, J. M., Haverty, S. and Kendall, S. (1990). Helping people to stop smoking: A study of the nurse's role. *Journal of Advanced Nursing*, 16, 357-363.

Clark, J. M., Kendall, S. and Haverty, S. (1987). Helping nurses develop their health education role: A framework for training. *Nurse Education Today*, 7, 63-68.

DiIorio, C., Resnicow, K., Dudley, W., Thomas, S., Dongquing, T., VanMarter, D., Manteuffel, B. and Lipana, J. (2000). Social cognitive factors associated with mother-adolescent communication about sex. *Journal of Health Communication*, 5, 41-51.

Drinkwater, B. L., Bruemner, B. and Chesnut, C. H. (1990). Menstrual history as a determinant of current bone density in young athletes. *Journal of the American Medical Association*, 263, 545-548.

Dummer, G. M., Rosen, L. W., Heusner, W. W., Roberts, P. J. and Counsilman, J. E. (1987). Pathogenic weight-control behaviors of young competitive swimmers. *Physician and Sportsmedicine*, 15(5), 75-86.

Garner, D. M., Olmsted, M. P., Bohr, Y. and Garfinkel, P. E. (1982). The Eating Attitude Test: Psychometric features and clinical correlates. *Psychological Medicine*, 12, 871-878.

Hobart, J. A. and Smucker, D. R. (2000). The female athlete triad. *American Family Physician*, 61, 3357-3364.

Intrieri, R. C., Kelly, J. A., Brown, M. M. and Castilla, C. (1993). Improving medical students' attitudes toward and skills with the elderly. *The Gerontologist*, 33, 373-378.

Jamrozik, K., Fowler, G., Vessey, M., Wald, N., Parker, G. and VanVunakis, H. (1984). Controlled trial of three different anti-smoking interventions in general practice. *British Medical Journal*, 288, 1499-1515.

Kann, L., Kinchen, S. A., Williams, B. I., Ross, J. G., Lowry, R., Grunbaum, J., Kolbe, L. J. and Coordinators, S. a. L. Y. (2000). Youth Risk Behavior Surveillance -- United States, 1999. *Journal of School Health*, 70, 271-285.

Kelly, C., Ricciardelli, L. A. and Clarke, J. D. (1999). Problem eating attitudes and behaviors in young children. *International Journal of Eating Disorders*, 25, 281-286.

Lutter, J. M. and Cushman, S. (1982). Menstrual patterns in female runners. *The Physician and Sportsmedicine*, 10(9), 60-72.

Manore, M., Nattiv, A., O'Brien, R., Rolley, L., Smith, B., Varechok, S.,

Vochatzer, D., Joy, E. and Barzdukas, A. (n.d.) *The female athlete triad: A responsible approach for coaches, a consensus statement of the United States Olympic Committee and the American College of Sports Medicine.*

Marks, J. S., Wilcox, L. S., Parker, C. S., Schieve, L. A., Tatham, L., Jeng, G., Cicutello, R. A., Burnett, N. M., Fralish, C., Moir, P., Younger, J. B., McNamee, P. I., Hoffman, D. I., Mayer, J. F., Zeitz, J. G., Toner, J. P., Stovall, D. W., Steinkampf, M. P., Beaird, C. M., Scott, M. V., Hollister, M. R. and Clapp, D. (2000). *1998 assisted reproductive technology success rates: National summary and fertility clinic reports.* Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.

National Collegiate Athletic Association. (2001, September 1, 2001). *Composition of the NCAA: Approximate number of student-athletes.* Available: [http://www1.ncaa.org/membership/membership\\_svcs/membership\\_breakdown.html](http://www1.ncaa.org/membership/membership_svcs/membership_breakdown.html) [2001, September 15].

Nattiv, A., Agostini, R., Drinkwater, B. and Yeager, K. K. (1994). The female athlete triad: The inter-relatedness of disordered eating, amenorrhea, and osteoporosis. *Clinics in Sports Medicine*, 13, 405-418.

Nattiv, A. and Lynch, L. (1994). The female athlete triad: Managing an acute risk to long-term health. *The Physician and Sportsmedicine*, 22, 60-68.

Nelson, W. L., Hughes, H. M., Katz, B. and Russell, H. (1999). Anorexic



eating attitudes and behaviors of male and female college students. *Adolescence*, 34(135), 621-633.

Otis, C. L., Drinkwater, B., Johnson, M., Loucks, A. and Wilmore, J. (1997). American college of sports medicine position stand: The female athlete triad. *Medicine and Science in Sports and Exercise*, 29(5), i-ix.

Pavkov, T. W., & Pierce, K. A. (1997). *Ready, set, go: A student guide to SPSS for windows*. Mountain View, CA: Mayfield Publishing Company.

Powers, P. S. (1999). Athletes and eating disorders, *The Last Word* (pp. 249-255): Brunner/Mazel, Inc.

Putukian, M. (1994). The female athlete triad: Eating disorders, amenorrhea, and osteoporosis. *Medical Clinics of North America*, 78, 345-356.

Reeder, M. T., Dick, B. H., Atkins, J. K., Pribis, A. B. and Martinez, J. M. (1996). Stress fractures: Current concepts of diagnosis and treatment. *Sports Medicine*, 22, 198-212.

Robert-McComb, J. J., Massey, M. and McTee, A. (1999). Energy deficit and oligo/amenorrhea: Implications of the female athlete triad. *American Journal of Health Studies*, 15, 22-28.

Rosen, L. W. and Hough, D. O. (1988). Pathogenic weight-control behaviors of female college gymnasts. *The Physician and Sportsmedicine*, 16(9), 141-146.

Rosen, L. W., McKeag, D. B., Hough, D. O. and Curley, V. (1986).

Pathogenic weight-control behaviors in female athletes. *The Physician and Sportsmedicine*, 14(1), 79-86.

Russell, M. A. H., Wilson, C., Taylor and Baker, C. D. (1979). The effect of general practitioners' advice against smoking. *British Medical Journal*, 2, 231-235.

Sanborn, C. F., Horea, M., Siemers, B. J. and Dieringer, K. I. (2000). Disordered eating and the female athlete triad. *Clinics in Sports Medicine*, 19, 199-213.

Saury, J. and Durand, M. (1998). Practical knowledge in expert coaches: On-site study of coaching in sailing. *Research Quarterly for Exercise and Sport*, 69, 254-266.

Smith, A. D. (1996). The female athlete triad. *The Physician and Sportsmedicine*, 24(7), 67-73.

Sundgot-Borgen, J. (1993). Prevalence of eating disorders in elite female athletes. *International Journal of Sports Nutrition*, 3, 29-40.

Sundgot-Borgen, J. (1994). Eating disorders in female athletes. *Sports Medicine*, 17, 176-188.

Syred, M. E. J. (1981). The abdication of the role of health education by hospital nurses. *Journal of Advanced Nursing*, 6, 27-33.

Thrash, L. E. and Anderson, J. J. (2000). The female athlete triad: Nutrition, menstrual disturbances, and low bone mass. *Nutrition Today*, 35, 168-174.

Turk, J. C., Prentice, W. E., Chappel, S. and Shields, E. W. (1999). Collegiate coaches' knowledge of eating disorders. *Journal of Athletic Training*, 34, 19-24.

U.S. Department of Health and Human Services. (2000). *Healthy people 2010: Understanding and improving health*. Washington, D.C.: Government Printing Office.

VanDeLoo, D. A. and Johnson, M. D. (1995). The young female athlete. *Clinics in Sports Medicine*, 14, 687-707.

Wiggins, D. L. and Wiggins, M. E. (1997). The female athlete. *Clinics in Sports Medicine*, 16, 593-612.

Williams, N. I. (1998). Reproductive function and low energy availability in exercising females: A review of clinical and hormonal effects. *Journal of Dance Medicine and Science*, 2, 19-31.

Wilmore, J. H. (1991). Eating and weight disorders in the female athlete. *International Journal of Sport Nutrition*, 1, 104-117.

Yeager, K. K., Agostini, R., Nattiv, A. and Drinkwater, B. (1993). The female athlete triad: Disordered eating, amenorrhea, osteoporosis. *Medicine and Science in Sports and Exercise*, 25, 775-777.