Program: Annual East Coast Female Athlete Triad Awareness Seminar

Target Population: Collegiate female athletes and coaching staff at Duke University, NC State University and UNC-CH.

Need

In 1997 The American College of Sports Medicine first described the female athlete triad, also referred to as triad, as a disorder that included disordered eating, amenorrhea, and osteoporosis. In 2007, the definition was updated to include a spectrum of dysfunction related to energy availability, menstrual function, and bone mineral density.1   The primary cause of Female Athlete Triad is energy deficiency, which results from imbalances between energy consumed and the amount of energy expended during exercise.2 This can involve conscious restrictions in food intake, body issue problems and a high drive for thinness.  Eating disorders are prevalent in 25-31% of athletes in thin-build sports compared to 5-9% in the general population.  Secondary amenorrhea is prevalent in 65-69% of competitive dancers and endurance runners compared to a prevalence of 2-5% in the general population.3 Women with the Triad are also at higher risk for low bone mass, which can lead to osteoporosis.  This bone density loss increases the risk of fractures, including stress fractures.2

Female athlete triad has a prevalence rate of 0-1.2% among U.S. high school and collegiate athletes. However, the prevalence of each individual disorder—menstrual dysfunction, disordered eating, and low bone density—is much higher at 23.5%, 18.2%, and 4.1%, respectively.1Research states that efforts should be focused on standardizing screening evaluations of female athletes who are at high risk for developing the Triad.1College female athletes are more at risk for disordered eating and eating disorders than non-athletes4, demonstrating a need to intervention focused on this population.   Pre-participation evaluation (PPE) is stated to be the most opportune time for screening these athletes. The NCAA requires all universities to perform a PPE. However only a third of the universities require an annual update, most do not use standardized PPE forms and over half of Division 1 universities are missing more than 50% of the required PPE forms for their athletes.1

Athletes who experience even just one of the three conditions have a greater chance of experiencing another at some point. Therefore a one-dimensional approach is not as effective as addressing this issue with multiple professionals.1 Out of 240 healthcare professionals surveyed in a major Midwestern metropolitan area that were asked to identify components of the Triad, less than 50% of physicians and physical therapists and less than 10% of coaches were able to do so1, establishing a tremendous need to increase educational efforts.  Educating students and coaches about the signs, symptoms and consequences of Female Athlete Triad syndrome increases awareness and understanding of all of the factors that play into the Triad.  Early identification not only shortens and eases the treatment process but also protects the athlete from the condition becoming chronic and causing the athlete more serious health consequences.4

Background

The prevention and management of the female athlete triad is a multidisciplinary effort that should include a physician, a registered dietician, a mental health professional, a physical therapists, coaches, and family members.1  Since this new definition of the Triad, girls’ conditions can fall anywhere along the spectrum of optimal energy availability to an eating disorder; menstrual regularity to athletic amenorrhea, and low bone mineral density to osteoporosis. The most critical intervention for coaches, families, and medical professions is one that is focused on prevention and early intervention with this population.1 Some of the most useful tools when considering preventative and treatment options within this population are adequate healthcare and coach education, establishing healthy weight maintenance habits, individualizing training and caloric regimens, and bringing attention to bone mineral density problems and contributing factors.

Coaches are in an excellent position to play a significant role in identifying and managing affected athletes as they spend so much time with and have opportunities to observe the athletes in many different scenarios.4 They are important to and have strong influences on their student athletes.  For this reason it is important to provide coaches with strategies to identify, manage and prevent the Female Athlete Triad.  Comprehensive education is imperative for coaches because of the variety of roles they may have to play with their athletes in relation to the triad. An article published in the *Wisconsin Medical Journal* states, “If the professionals who work with female athletes can learn to spot the signs of the Triad, in conjunction with the individual and her family, and provide a treatment plan, the end result of better athletic performance and lifelong beneficial ramifications for bone health will arise.”5 Once the Triad is identified, the coach plays an important role in the recovery process for an athlete.  In fact, athletes in treatment for disordered eating usually have greater success with recovery with encouragement and support from coaches.4 Coaches also must be educated on strategies to decrease the likelihood for development of the Triad.  A coach's recognition that the risk of emphasizing leanness to players is not worth the gains is imperative.  Coaches can focus on nutrition, sleep and rest, and psychological factors (cognitive and emotional) for improved performance and overall health of their athletes.4

Since the Triad is considered a continuum, it is important to understand that low energy availability is only a less severe form of an established eating disorder.1 It can be particularly difficult to identify girls on this continuum since low energy availability can exist in conjunction with a stable body weight.1 The Márquez and Molinero article states that “energy availability is the key aspect in the onset of the female athlete triad” and must be addressed upfront.6 By individualizing preventative and treatment methods, each athlete should be assessed for sufficient energy availability. The most desired approach to balance this energy storage is to improve energy intake, reduce exercise energy expenditure, or both, without dramatic changes in weight. By doing so and establishing a positive energy balance, the athlete has a greater potential to restore regular menstruation and prevent future bone loss.6

The skeletal component of the Triad also follows the continuum framework, ranging from optimal bone health to osteoporosis.1 Osteoporosis in young female athletes refers to premature bone loss and inadequate bone formation.6 With these two components comes a plethora of complications such as micro deterioration, low BMD, increased skeletal fragility, and increased risk of stress fracture.6 As mentioned previously, low energy availability is often the precursor to developing the other components of the Triad. Research indicates that low energy availability and hypoestrogenism (commonly seen with amenorrhea) are independent and detrimental to bone health.1 Since there is no long-term evidence that bone health can be restored once normal reproductive status and eating habits are restored, it is critical to educate young women on the implications of their lifestyle choices.6 In attempt to monitor BMD, athletes with evidence of menstrual dysfunction or history of stress fractures should be assessed by dual energy X-ray absorptiometry (DXA).6

With this condition being relatively new in terms of a solid definition, there are many gaps in the literature and preventative measures being taken.  First and foremost, the lack of education and implementation of screening done by coaches and physicians is astonishing. In one study, they found that when faced with suspected eating disorders only 33% of discussions by orthopedic surgeons focused their concern as opposed to 80% of family physicians discussions.7 There is also concern that the true prevalence for this condition is unknown due to improper identification. The NCAA Coaches Handbook suggests that any athlete with signs or symptoms of any one component of the Triad should be evaluated regarding the other two.4 Lastly, the literature fails to recognize the long term effects that the Triad may impose on these young individuals. There are many studies that suggest treatment to improve menstruation and available energy levels, however the reversal of low BMD in young athletes remains unknown5.  While many of the biological markers and scientific researchers are still exploring this condition’s implications, the most instrumental aspect of preventing this condition is education.4

These gaps in the literature can be related back to the Health Belief Model. Since the literature and health advocacy for this condition lag behind, many of the perceived threats go unnoted.  This proposed seminar will expose both female collegiate athletes and their coaches to severity, benefits, susceptibility, and barriers of the triad. The implementation of this program will act as a call to action improve self-efficacy of those present.8

Objectives

*Program Implementation*

* Establish a professional multidisciplinary team that commits to presenting at three seminars annually--each made of two parts. Commitments will be secured within 3 months of proposal approval to establish a well-rounded program and positive reputation within the community.
* Each healthcare professional will agree to participate in post-seminar evaluation that will be designed to improve the program for following years. This agreement will be conjoined with each individual’s commitment.
* Leaders of this initiative will set up meetings with an athletic department liaison of UNC, Duke, and NC State two weeks after proposal approval for a program overview and to initiate signing of agreement contracts to allow the professional multidisciplinary team to move forward in the development of this seminar.
* Facilitate the creation of a Female Athlete Triad screen at each school to capture 100% of collegiate female athletes by the start of 2014-2015 school year.
* Each university will require participation from 100% of coaches of female athletic teams and female athletic team members by the start of the 2015-2016 school year.

*Program Outcomes*

* Decrease the rate of graduating athletes who screen positively for female athlete triad by 25% by the end of the 2016-2017 school year.
* Obtain 85% satisfaction on surveys administered to participants on site at the time of course completion.
* Obtain 60% of post seminar electronic surveys aimed to assess material retention and understanding of the female athlete triad. The e-survey will be sent to coaches and female athletes associated with Duke University, North Carolina State University and UNC-CH two weeks after course completion. A gift card incentive will be included in survey invitation to be entered upon completion.

Methods

The seminar will consist of two parts.  The first session will be a half-day educational class about Female Athlete Triad for players and coaches together. The second session will be a full day with lunch provided and involve screenings, individualized meetings with nutritionists, athletic trainers and/or physical therapists, psychiatrists and physicians for players.  The site will be provided by Duke, NC State or UNC-CH. The educational class will consist of information about potential risk factors, signs and symptoms of the triad, implications of a diagnosis, potential long-term effects, and who to seek help from if the triad is suspected.  Handouts and pamphlets will be provided to athletes and coaches with all of this information so they will have easy access to it after seminar completion.  Screenings will be written questionnaires completed by athletes and later reviewed by medical professionals.  These questionnaires will include physical and/or medical and psychological and/or behavioral signs and symptoms of disordered eating, questions about menstruation, diet and questions about occurrence of fractures.4 Information obtained during these initial screenings will help determine which medical professionals the athletes will meet with personally, if necessary.

The outline of this program will be designed to address the six components of the Health Belief Model--susceptibility, severity, benefits, barriers, cues to action, and self-efficacy. Each component will be related to the triad itself as well as the indications for intervention, seen below.

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| *Component of Health Belief Model* | *How this seminar will address these components* |
| Susceptibility | Educating athletes about potential risks for development of the triad. |
| Severity | Providing athletes information of the detrimental effects the triad has both at time of diagnosis and long term effects. |
| Benefits | Showing athletes that awareness of and action to prevent the triad will help to decrease their risk of it and can also improve outcomes. |
| Barriers | Openly discuss with all athletes the importance of weighing one’s health and well being with their sports career and performance on the field with a focus on the detrimental effects the triad has later in life to show that ignoring it now will not be beneficial in the long run. |
| Cues to Action | Empowering athletes with this information will hopefully cue them to act if they have suspicions or worries about the triad. |
| Self-efficacy | Helping to show each athlete that they are at the center of prevention. |

Coaches will be educated on the importance of making necessary changes to their coaching style if their current style poses threats to the female athletes. All of this will be done on an individual basis. Coaches and athletes will be encouraged to speak privately with medical professionals if concerns of the triad exist. If an athlete is found to have the triad or is at risk for developing the triad, referrals will be made to appropriate healthcare professionals for treatment or for more aggressive prevention.  A female athlete’s place on her respective team will be determined by the opinions of her healthcare professionals, coaches, and the athlete herself.

Assessment:

Primary evaluation will be established by sending out an electronic questionnaire to athletes and coaches two weeks post-seminar.  The evaluation will be short and simple and will assess knowledge of signs, symptoms and consequences of Female Athlete Triad. In addition to capturing the material retention of the attendees, assessment of their experience satisfaction will also be performed at the completion of the seminar with a paper questionnaire. Participants will be asked to turn in the paper form at the completion of day two. All questionnaires and forms will be anonymous. The attendance values and roster totals will be compared to capture percent participation of each university.

Limitations

The research on this topic is limited; therefore we are unable to fully understand the long-term effects of program implementation. While this program is aimed to establish a well-rounded and effective experience, there are some limitations. As the seminar attempts to address multiple types of athletes in one setting, it could be difficult to cover all necessary aspects specific to each sport. However, this design is flexible in that it can be adjusted as needed. This program will follow a pilot-like approach in that one seminar will be completed prior to starting at the next university. This will further improve the program’s flexibility. If after the first year it is evident that this would be more successful if done sport-specific, the program will shift accordingly. Secondly, since this educational seminar is mandatory, it may create an atmosphere of students and coaches feeling as though they are being ‘forced’ to attend. The attendees thoughts on the mandated protocol will be taken into consideration with our assessments.

Relevance:

A huge focus of this seminar is to advocate about Female Athlete Triad and increase awareness. This program will reach a large amount of athletes and will provide information and resources to athletes and coaches. The intended population has been identified to be at risk of Female Athlete Triad.  These female athletes at major universities such as Duke, UNC-CH and NC State may have extra pressure to perform at a highly competitive level. As this program flourishes it could easily be adapted and expanded to include more schools, both colleges and high schools, and further enhance awareness for this very serious condition.

References:

1. Female Athlete Triad and Its Components: Toward Improved Screening and Management Asma Javed, Peter J. Tebben, Philip R. Fischer, Aida N. Lteif  Mayo Clinic proceedings. Mayo Clinic 1 September 2013 (volume 88 issue 9 Pages 996-1009 DOI: 10.1016/j.mayocp.2013.07.001)

2.  Female Athlete Triad Coalition website.  (2013)<http://www.femaleathletetriad.org/who-we-are-2/>.  Accessed October 9, 2013.

3.  American College of Sports Medicine.  The Female Athlete Triad Position Stand 2007.  (2007)  <http://www.femaleathletetriad.org/wp-content/uploads/2010/03/FATC_Slideshow_2011.pdf>.  Accessed October 9, 2013.

4. Sherman R, Thompson R. Good nutrition, promotes health, enhances performance: Managing the female athlete triad. Princeton Web site.http://www.princeton.edu.libproxy.lib.unc.edu/uhs/pdfs/NCAA%20Managing%20the%20Female%20Athlete%20Triad.pdf. Updated 2013. Accessed September 15, 2013.

5. Troy K. Awareness and comfort in treating the Female Athlete Triad: are we failing our athletes?. *Wisconsin medical journal (Madison, Wis.).* 2006-10;105:21-4.

6.  Márquez S. Energy availability, menstrual dysfunction and bone health in sports; an overview of the female athlete triad. Nutrición hospitalaria : organo oficial de la Sociedad Española de Nutrición Parenteral y Enteral. 2013-07;28:1010-7.

7.  Mann BJ, Grana WA, Indelicato PA, O’Neill DF, George SZ. A survey of sports medicine physicians regarding psychological issues in patient-athletes. Am J Sports Med. 2007;35(12):2140-2147.

8. Janz NK, Champion VJ, Strecher, VJ. (2002). The health belief model. In K Glanz, FM Lewis, B Rimer, (eds.) *Health behavior and health education: Theory, research, and practice,* 3rd ed., San Francisco: Jossey-Bass Publishers.