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# Eating disorders in sport: Review of prevalence, risk factors, and studies of eating disorders in highly competing athletes

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## Abstract

In today's society, where thinness is idealized and correlates with good personal characteristics, people resort to different actions in order to comply with social norms. Athletes do not differ; they face the same issue of body image and weight concerns as the rest of the society. In addition to general factors of eating disorders, they have an extra pressure from their sport environment to maintain certain body weight and body measurements. This type of pressure puts them in the high-risk zone for developing clinical eating disorders (Brownell, 1991; Byrne & McLean, 2002; Rodin & Larson, 1992; Smolak, Murnen, & Ruble, 2000). Numerous studies investigated this problem related to variety of risk factors (Krentz & Warschburger, 2011; Picard, 1999; Sundgot-Borgen, 1994). This paper is focused on reviewing the available and newest literature on prevalence, risk factors, and consequences of eating disorders in sport, specifically among elite athletes.

**Key words:** eating disorders, eating disorders in sport, sport psychology.

## **Eating disorders**

Western cultures' social and cultural pressure of an ideal and unrealistic body type is blamed as the reason for developing eating disorders. Mainly, the reason for that assumption was the fact that until 20<sup>th</sup> century, the episodes of eating disorder have been recorded only in the Western culture (Makino, 2004). It is a serious, potentially life-threatening condition that affects person's emotional and physical health. According to National Eating Disorders Association (2012), almost 30 million people in the US (20 million women, 10 million men) and 70 million worldwide of different ages and genders suffer from eating disorders, including anorexia nervosa, bulimia nervosa, binge eating disorder or EDNOS (Eating Disorder Not Otherwise Specified), which is now recognized as Other Specified Feeding or Eating Disorder in DSM-V (American Psychiatric Association, 2013). Eating disorders-related hospitalizations increased by 18 percent from 1999–2000 to 2005–2006 (HCUP, 2009). Levine, and Smolak (2006) estimated that eating disorders affect approximately 10–15% of girls and women between the ages of 9 and 19 years. Over one half of teenage girls and nearly one-third of teenage boys use unhealthy weight control behaviors such as skipping meals, vomiting and taking laxatives (Neumark-Sztainer, 2005). According to findings of survey (Merikangas, He, Burstein, Swendsen, Avenevoli, Case, Georgiades, Heaton, Swanson, & Olfson, 2011), 2.7% of teens aged between 13-18 years old struggle with an eating disorder; females are more prone (3.5%) than males (1.5%) to eating disorders.

According to the classification in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, “feeding and eating disorders are characterized by a persistent disturbance of eating or eating-related behavior that results in the altered consumption or absorption of food and that significantly impairs physical health or psychosocial functioning” (American Psychiatric Association, 2013). The included categories are Pica, Rumination Disorder, Avoidant/Restrictive Food Intake Disorder, Anorexia Nervosa, Bulimia Nervosa, Binge-Eating Disorder, Other Specified Feeding or Eating Disorder (e.g., atypical anorexia nervosa, low frequency and/or limited duration bulimia nervosa and binge-eating disorder, purging disorder, night eating syndrome), Unspecified Feeding or Eating disorder (American Psychiatric Association, 2013).

## **Eating disorders in sport**

Nowadays in the society athletes are viewed as idols of healthy lifestyle and generally as good role models for the young people (Thompson, Campbell, Thompson, & Campbell, 2011). Exercising was reported to increase positive well being as well as reduce psychological distress, depression, confusion, fatigue, tension, and anger (Bartholomew, Ciccolo, & Morrison, 2006). Nevertheless, professional sport is not as it may appear, it has its own risks and negative outcomes on both physical and mental health, and one of the harmful consequences athletes may face is eating disorders (Smolak, Murnen, & Ruble, 2000). Study conducted in Norway by Sundgot-Borgen and Torstveit (2004) on 1620 elite athletes and 1696 Norwegians from the general population showed that athletes were more prone (13.5%) to develop eating disorders than the control group (4.6%). Study performed on 131 male college lightweight football players (DePalma, Koszewski, Case, & Oliaro, 1993) stated that 42% of participants implied a pattern of dysfunctional eating, whereas 9.9% were involved in binge-purge behavior to the degree that it might represent an eating disorder.

## **Predisposing factors**

### ***Perfectionism***

Perfectionism refers to a multidimensional construct of unrealistic personal standards (Hewitt & Flett, 1991) and those different dimensions of perfectionism are supposed to affect body dissatisfaction, which may lead to attempts to increase exercise or restrain calories intake to achieve societal beauty-ideal (Brannan, & Petrie, 2008). Even though this trait is met in general population, it is more common among athletes who need to relate to sport demanding standards and societal standards at the same time (Brannan, Petrie, Greenleaf, Reel, & Carter, 2009). Brannan and colleagues (2009) in their meta-analysis reported that one dimension of perfectionism (concern over mistakes) was linked to the body dissatisfaction consequently leading to bulimic symptoms.

### ***Elite sport as a moderator***

“Elite athlete” is a committed athlete who gained success on the national and international level (Lesyk, 1998). Committed athletes live for sport, they devote their time and money as well as most of their energy in order to develop their skills and achieve high goals. These athletes may face problems with balancing their sport career and life, as well as they are prone to problems regarding anxiety, self-esteem, depression, perfectionism, or eating disorders (Lesyk, 1998). This issue was addressed by Christy Picard (1999); she carried out a study examining the relationship between the level of competition and eating disorders patterns. 78 female college athletes of Division I (high level of competition) and Division III (low level of competition) participated in the study. The results argued that athletes from Division I scored higher on EAT (Eating Attitude Test) and EDI-2 (Eating Disordered Inventory-2) than athletes from Division III, indicating that the level of competition affects vulnerability to fostering eating disorders related behaviors.

### ***Elite aesthetic and weight centered sport***

Eating disorders may be developed by athletes involved in aesthetic sports (e.g. gymnastics, ice skating, ballet), where the physical appearance plays a major role (Sundgot-Borgen, 1994). An investigation of sport-specific factor of eating disorder was conducted by Krentz and Warschburger (2011). A cross-sectional study on 96 elite athletes from aesthetic sports and 96 non-athletes revealed that elite athletes from aesthetic sports had a higher risk of developing eating disorders especially in order to get thinner to increase the performance and by being under social pressure of the environment. Another research (Scoffier, Paquet, & d'Arripe-Longueville, 2010) found that almost 37% of the athletes with eating disorders are engaged in such disciplines, for which weight control is central. In Kurashvili's study (2010) jockeys, wrestlers, swimmers and athletes involved in bodybuilding were found to be the group mostly exposed to eating disorders.

### ***Influence of the environment***

Sundgot-Borgen (1994) conducted a study on 522 elite female athletes. Athletes with eating disorders were asked if they had suggestions why they developed an eating disorder. 34% of participants reported prolonged period of dieting, 30% reported change of a coach, 23% stated injury or illness as a reason, and 19% proposed casual comments about weight as a trigger factor. Dieting turned out to be the main factor in developing eating disorder and in this study reasons for dieting were also examined; all of the participants stated that the main reason was to enhance their performance, in case of the majority of participants, dieting was

recommended by a coach or relatives. It can be concluded that the social factor plays a major role, and very often the athletes want to satisfy others.

### ***Gender as a mediator***

Stoutjesdyk and Jevne (1993) reported that female athletes were more than twice at risk for developing eating disorders than male athletes. Female athletes are also prone to “female athlete triad” syndrome. The syndrome is a combination of three interrelated conditions that are associated with athletic training (Nazem, & Ackerman, 2012): menstrual dysfunction, decreased bone mineral density, and low energy availability.

It is however worth mentioning, that male athletes are also prone to developing eating disorders. Dedication to exercise may be a contributing factor for risk behaviors of eating disorders in young men (Fortes, Almeida, & Ferreira, 2014). Chatterton and Petrie (2013) conducted a study on 732 male collegiate athletes. It turned out that athletes in weight class sports were more prone to engage in pathological eating and weight control behaviors in comparison to male athletes in endurance sports or ball game athletes. Even though the triad syndrome is considered to be a female related syndrome, there is some evidence suggesting that male athletes may also experience analogous issues related to it. Tenforde, Barrack, Nattiv, and Fredericson (2015) stated that male athletes, especially in leanness sports, experienced low energy availability (with or without disordered eating), hypogonadotropic hypogonadism (reduction in sex hormones), and low bone mineral density possibly leading to bone stress injuries. More research on eating disorders in male athletes needs to be conducted, as this issue is in danger of being missed (Baum, 2006).

### ***Age as a mediator***

Most of the studies concentrate on adult athletes. However there is a suggestion that adolescents and young athletes are more prone to develop eating disorders patterns. There are few studies exploring this age range of athletes. The findings of the study conducted by Martinsen and Sundgot-Borgen (2013) revealed a high prevalence of eating disorders among adolescent elite athletes. An analysis done on 6048 young athletes (Kalnina, Sauka, Timpka, Dahlström, Nylander, Selga, Ligere, Karklina, Priedite, & Larins, 2015), aged 10–17 years reported that 19.2% of boys and 15.1% of girls (most of them from aesthetic sports) had a percentage of body fat value below the recommended levels. In order to prevent negative outcomes on health in youth athletes, body fat should be controlled and assessed regularly. Another study (Giel, Hermann-Werner, Mayer, Diehl, Schneider, Thiel, & Zipfel, 2016) investigated 1138 German elite adolescent athletes on disordered eating symptoms. Body weight, weight control behavior, body acceptance, depression and anxiety were assessed. As in previous studies, female athletes, athletes of weight dependent sport, athletes who scored high on negative emotionality, male athletes competing in endurance, technical or power sports were in high risk zone for developing eating disorders. Additionally, depression and anxiety levels were higher in athletes who demonstrated disordered eating patterns. Adolescents are extremely sensitive to environmental influence; therefore youth athletes should be taken care of with a special vigilance and accuracy.

### **Prevention and reduction of risk factors**

Another aspect that has been broadly discussed in the past few years is the effectiveness of prevention and recovery programs applied to athletes. Study performed by Arthur-Cameselle and Quatromoni (2014a) investigated interesting question that the literature on eating disorder in sport lacked. They examined the factors that initiate recovery from

eating disorders among athletes. 16 National Collegiate Athletic Association (NCAA) female athletes who were diagnosed with an eating disorder participated in the study. Factors that stimulated the desire to recover were relatively few in number across athletes in the sample. The fear of negative consequences was one of the strongest motivators for recovery. Specifically, these athletes were motivated by a desire to be healthy to compete in their sport. Emotional stability also played a role in the recovery; athletes demonstrated better motivation to recover when they left their environment or after important figure, like coach, confronted them. After the recovery, athletes reported that the change in their attitude helped them to avoid relapse. Another research was also conducted by Arthur-Cameselle and Quatromoni (2014b). It addressed the question of identifying factors that help female athletes to recover from eating. 47 females aged 18-28 years old, collegiate athletes of 14 different sports of the National Collegiate Athletic Association (NCAA) took part in the study. Each participant experienced at least one period of “recovery”. 34% of athletes reported that will to regain their strength and ability to participate in sport was a motivational factor for the recovery. 28% of responses were shift in value and beliefs as moderate factor, and 9 of the participants stated that they have found other ways to cope with pressure and stress. Also leaving non-supportive environment contributed to the recovery. Area of prevention program was addressed in the study done by Rodriguez, Salar, Carretero, Gimeno, and Collado (2015). The goal of the study was to verify the hypothesis that an adequate diet plan can decrease eating disorders related behaviors in contact sports athletes. It was revealed that athletes who were practicing contact sports with weight categories were at the risk zone. Based on the study, it can be suggested that adequate dieting plan can prevent from eating disorders. Coaches’ method of helping athlete deal with eating disorder was also recently investigated (Plateau, Arcelus, McDermott, & Meyer, 2015). 11 experienced coaches were interviewed; most of them stated that they have lack of knowledge and resources to deal with eating disorders. The authors emphasized the importance of teaching coaches how to recognize the first symptoms of developing eating disorders.

## **Conclusion**

This paper addressed questions regarding risk factors and the prevalence of eating disorders in the sport population. The researches conducted in the sport field suggested that athletes are generally in a higher risk for developing eating disorders than the normal population. Overall, there are plenty of studies investigating risk factors and prevalence of eating disorders in sport, as well as examinations of differences between sport types and competition level (Kong & Harris, 2014; Krentz & Warschburger, 2011; Sundgot-Borgen, 1994; Wollenberg, Shriver, & Gates, 2015).

However, there are still several aspects that lack thorough research and coherent literature. One of them is the precise examination of factors that may relate to the development of eating disorders in male athletes. Several studies reported that psychological and personality factors that can contribute to disordered eating patterns may differ in male and females athletes (Galli, Petrie, Greenleaf, Reel, & Carter, 2014; Haase, Prapavessis, & Glynn Owens, 2002), supposing, thus, that the athletes should be tested separately. As for the future research, it might be helpful to investigate psychological variables that are more related to male athletes in order to apply correct treatment (Galli et al., 2014; Papatomas & Lavallee, 2006). In addition, factors that affect female and male athletes are reported to differ to some extent, hence, measurement of these factors is supposed to vary. So, another aspect that needs

future examination is measurement tools that are used to assess eating disorders, especially in the field of sport.

Finally, the majority of the studies was conducted on adult athletes. What should be examined in the future is the relationship between youth athletes and eating disorders pattern, as well as all factors that may cause the development of disordered eating, such as sport type, parental over-involvement (Holt, Tamminen, Black, Sehn, & Wall, 2008; Knight, Boden, & Holt, 2010; Martinsen, Bahr, Børresen, Holme, Pensgaard, & Sundgot-Borgen, 2014).

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