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Influence of Competitive Sports on Disordered Eating Behaviors in Young Female Athletes

A thesis

presented to

the faculty of the Department of Counseling and Human Services

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In partial fulfillment

of the requirements for the degree

Masters of Arts in Counseling, concentration in Clinical Mental Health

by

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ABSTRACT

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by

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The field of treating and learning about eating disorders in athletes is a growing field that continues to flourish as more knowledge is acquired. The purpose of this study is to examine the influence that length of time in the sport, age at which an individual starts a competitive sport, level of competitiveness, and type of sport (leanness vs. non-leanness focused) has on disordered eating behaviors. The participants were college students who were involved in at least one competitive sport in their life. They completed the EAT-26 questionnaire as well as a basic questionnaire. There was not enough data collected to conduct a logistic regression so descriptive statistics are reported. This remains an area to be further explored as there is a gap in the literature on the age at which individuals begin competitive sports and the length of time in sports and how that relates to disordered eating behaviors.

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CHAPTER 1

INTRODUCTION

Historically, eating problems were present in Greece, Rome, and Arabia as early as 45 BC (Vedul-Kjelsås & Gøtestam, 2004). During the Middle Ages, anorexia nervosa was linked to achieving spiritual perfection, which is of stark contrast to how individuals now seek bodily perfection. The diagnosis of anorexia nervosa was first used by Sir William Gull in 1874 while the term bulimia nervosa was used in 1979. The recognition of eating disorders continued to grow and develop through the Diagnostic and Statistic Manual (DSM) which was created in 1952. Throughout the recent years, the DSM has been updated to include more accurate knowledge based on research carried out on the different eating disorders. The context of eating disorders will be examined with the four most prevalent eating disorders according to the DSM-5. This includes anorexia nervosa (AN), bulimia nervosa (BN), binge eating disorder (BED), and other specified feeding or eating disorder (OSFED) (Vedul-Kjelsås & Gøtestam, 2004)..

Background to the Study

This study was based on the multiple aspects model as described by Treasure, Schmidt, and Furth (2003). The first part of this model includes predisposing factors which is a factor that makes one more vulnerable to a disorder. For eating disorders this includes genetic factors, personality traits, and trauma. The next part of the model includes precipitating factors or any factors that can trigger or cause a response. This relates to social class, level of industrialization and level of urbanization. Other precipitating factors relating to eating disorders include the influence of coaches and teammates. The last factor includes maintaining factors which is anything that enables to disorder to progress. In treatment this would appear in addressing maladaptive thinking patterns and distorted behaviors (Treasure, Schmidt, & Furth, 2003).

Since the field of eating disorders is so extensive, emphasis will be focused on eating disorders as it relates to youth and adolescents. Children will be defined from birth to 12 years old, while adolescents will be defined from ages 13 to 18. The age range discussed in this paper ranges from children to adolescents, as the average age of onset is 12.3 years old (Swanson, Crow, Le Grange, Swendsen & Merikangas, 2011). With the average age of onset being 12.3 years old, there are some individuals who develop an eating disorder prior to this age in childhood. Therefore, it is important to address both children and adolescents in relation to the development of eating disorders.

An important dilemma in the field of eating disorders is that the age of onset for eating disorders has been decreasing. Without more research, preventative measures, and awareness, the age of onset could decrease even further. This would rob children of the ability to have a safe childhood free of the obsessive nature that can occur when an eating disorder becomes one's sole focus. Since there are detrimental effects to having an eating disorder, these young children could have lasting impacts to their health as well as psychological impairment.

The study also looks at female participation in sports. From 2017 to 2018, the NCAA reports that there were 494,992 students competing in the NCAA according to Schwarb (2018). There were more female teams competing in the NCAA when compared to previous years. The number of women's teams has grown by 64% (Schwarb, 2018). Current literature and statistics indicate that persons who identify as female are most likely to develop an eating disorder (McNicholas, Dooley, McNamara, N, & Lennon, 2012; Swanson et al., 2011; Smink, Hoeken, & Hoek, 2012; Thompson & Sherman, 2011).

Significance of the Study

This study seeks to examine how engagement in competitive sports during early development can impact disordered eating behaviors. There are implications for earlier intervention strategies and requires taking a deeper look at the treatment strategies for healing eating disorders in younger children. Many treatment centers focus on treating adolescents, but do not have specific programs geared towards children. For many children, the onset of an eating disorder is a predictor of future illnesses (Nicholls, Lynn, & Viner, 2011).

Future research could help to identify techniques for early detection of eating disorders as well as how to effectively treat younger adolescents and children. This study could also have implications for coaches involved in competitive sports by emphasizing a need for different styles of coaching. It could also bring awareness to parents/guardians who have a child engaged in a competitive sport and who is displaying disordered eating behaviors.

Definition of Terms

This section will focus on defining key terms in this paper. First, a leanness focused sport is a sport that has a focus on maintaining a lower body weight and a lean muscular figure in order to increase performance (e.g., swimming, dance, track). The opposite is true for a non-leanness focused sport which is any sport that does not have a focus on a lower body weight or in having a lean muscular figure (e.g., golf, soccer, basketball). There are also weight class sports, which have a pattern of losing weight quickly through restricting food intake, excessive exercise, and dehydration techniques to meet a weight class and then binging after a weigh-in and before the match (e.g., boxing, judo, wrestling).

This paper will focus on disordered eating behaviors which is a term for behaviors that do not fully meet the requirement for a DSM-5 (American Psychiatric Association, 2013) eating

disorder diagnosis but the person presents with behaviors such as excessive dieting, using diuretics, binge eating, self-induced vomiting, misuse of medications, fasting, and laxatives. These features need to have significant impairment on the individual's social, occupational, or other areas of functioning to be classified as a disordered eating behavior. Disordered eating behaviors will be compared to participation in competitive sports. A sport at the elite level includes performing or competing at a national or international level while training greater than or equal to 12 hours per week. A sport at the recreational level includes performing or competing at a national, state, invitational, or local (advanced, intermediate, novice, or amateur) level while training less than or equal to 12 hours per week. A non-competitive sport includes no participation in competitions and training less than 12 hours per week.

CHAPTER 2

LITERATURE REVIEW

In this chapter, there will be a review of the literature on disordered eating behaviors as it relates to youth and athletics. First, diagnosis and symptomology of eating disorders will be discussed, followed by information on the different frameworks and theories behind the etiology of eating disorders. This will include internal issues, family dynamics, genetic aspects, heritability, evolutionary aspects, and puberty and development. Following this will be an overview of the theoretical model used for the conceptualization of the study. Next, the consequences that may develop from having an eating disorder at a young age will be identified. After discussing this material, sports will be described with the categorizations of types of sports as well as the benefits and risks of being involved in a competitive sport. The chapter concludes with an integration of eating disorders, athletics, and age as well as the current gap in the research and need for the study.

Diagnosis and Symptomology

The primary criterion for determining if an individual has an eating disorder is by the constant striving for thinness and a fear of gaining weight as defined by Bloodworth, McNamee, and Tan (2015). This can be manifested by either eating too much, not eating enough, or by doing harm to the body in order to decrease the amount of calories that the individual previously consumed. Having an eating disorder is an all-encompassing disorder that is not limited to oral intake and compensatory behaviors. This maladaptive disorder influences the thoughts and behaviors of the individual with the eating disorder. The four main diagnostic categories of eating disorders that will be examined are anorexia nervosa, bulimia nervosa, binge eating disorder, and other specified feeding or eating disorder (Bloodworth, McNamee, & Tan, 2015).

Anorexia Nervosa

In 2012, the researchers Smink et al. (2012) found that anorexia nervosa (AN) was primarily found in Western societies with the predominate ethnic group being White/Caucasian. In this study, approximately 90% of those who met the criteria for an eating disorder were females with the highest risk group being adolescents/young adults. Another common factor found was that individuals with an eating disorder were members of a high social class. The researchers concluded that it was probable that there was an increase in the incidence rate of AN in adolescents (Smink et al., 2012).

According to the American Psychiatric Association (2013) in the current edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM) there are three main characteristics that identify AN. The first defining factor is having a restriction in energy intake which is equivalent to weight loss. An individual with this disorder would have an abnormally low body weight compared to the normal ranges for age, sex, development patterns, and physical health. The second defining characteristic of AN is having an extreme fear of weight gain. While the individual may have a dangerously low weight or body mass index (BMI), he/she would still perceive themselves to be overweight in general or as having body parts that are too fat. The last defining criteria for AN is that there is a disconnect between the actual body weight of the individual and their perception of their physical body (American Psychiatric Association, 2013).

The researchers Thompson and Sherman (2010) described distinct physical characteristics that may indicate that an individual is suffering from AN. Starting with skin pigmentation, individuals with AN are characterized as having pale or yellow skin due to the lack of nutrients. They would also usually have fine hair growth all over their body. Their appearance would be best characterized as gaunt to others, while the individual would still see themselves as

being fat or overweight. It is also characteristic of individuals with AN to wear baggier clothes in order to hide the fact that they have lost so much weight (Thompson & Sherman, 2010).

There are a multitude of health risks that may develop as a result of denying oneself the proper nutrients and substances that promote growth. Some of the risks that are associated with AN were analyzed by researchers Thompson and Sherman (2010). The potential risks included failure of organ systems, cardiovascular problems, hypothermia, gastrointestinal problems, metabolic problems, and bone loss. Cardiovascular problems could result from malnutrition and/or having electrolyte abnormalities. The gastrointestinal difficulties listed above include having constipation, delayed gastric emptying, and abnormal mobility due to excessive laxative use. Problems with the endocrine system were manifested by menstrual dysfunction, low levels of estradiol, luteinizing hormone, as well as follicle-stimulating hormone. The lower levels of estrogen and testosterone also impact bone health by leading to a reduction in bone density. Over time, the body also produces higher levels of cortisol and lower levels of triiodothyronine (Thompson & Sherman, 2010).

Bulimia Nervosa

Bulimia Nervosa (BN) is a disorder in which the individual is obsessed with being thin and also engages in a cycle of bingeing and purging (Warbrick, 2010). Bingeing is the act when an individual consumes a large amount of food uncontrollably while purging is any action taken to get rid of the food. The criteria for BN was described by the DSM-5 (American Psychiatric Association, 2013) as having reoccurring episodes of bingeing followed by compensatory behaviors at least once per week for three months. A bingeing episode was described as consuming a higher amount of food than what the majority of individuals would consume in two hours if under similar circumstances. Along with the high levels of food intake is the criteria of

feeling out of control while eating. As for compensatory behaviors, common examples include over-exercising, vomiting, laxatives, diuretics, and misusing enemas. The last criterion for BN is that the individual analyzes themselves by their body shape and weight. When distinguishing BN from AN, it is important to make sure that a diagnosis of AN binge-eating/purging type is ruled out. Another factor that is characteristic for BN is that individuals with BN are typically found to be within a normal weight and BMI for their age (American Psychiatric Association, 2013).

Thompson and Sherman (2010) described the possibility that an individual could have both anorexic and bulimic tendencies. For the individuals who met the criteria for both AN and BN, it was more common to have them primarily diagnosed with AN. If the individual was already diagnosed with AN, it was more common for the individual to progress towards BN as opposed to the unlikely occurrence that one would go from BN to BED. Patients with bulimia were not as easily identified because their weight could change rapidly from being underweight to overweight. Better indicators of if an individual had BN were if the individual had swollen salivary glands, teeth erosion, and/or marks on the back of their hands due to purging through vomiting. Individuals with bulimia were shown to have a lower risk for death but an increased risk in gastrointestinal problems if they engaged in purging through vomiting (Thompson & Sherman, 2010).

According to a summary of epidemiological studies conducted by Thompson and Sherman (2010), BN was primarily seen in Western societies among predominantly white ethnicities. The most common gender for individuals diagnosed with BN was female, however an accurate percentage was not found underreporting and sampling limitations. This disease was mainly seen in young adults and in some adolescents. There was also an even distribution between bulimia and social class (Thompson & Sherman, 2010).

Binge Eating Disorder

The third eating disorder, sometimes referred to as compulsive eating disorder, is recognized as binge eating disorder (BED) in the DSM-5 (American Psychiatric Association, 2013). The main difference in criteria is that an individual with BED would have bingeing episodes but no compensatory behaviors. The criteria for recurrent binge eating episodes are the same in both BED and BN. These episodes consist of eating quicker than the average pace, eating after one feels full, eating when not hungry, eating alone from embarrassment about the amount of food being consumed, and feeling guilty and/or disappointed about the binge. The individual would also have distinguishable stress that is related to the binge eating. As for occurrence, the binge episodes would have to occur at least once per week for three months. Lastly, the binge episodes need to exist separately from a case of AN or BN (American Psychiatric Association, 2013).

Since BED is a relatively newer diagnosis, there are fewer research studies that have been completed on this eating disorder. However, there has been some information gathered on dynamics related to culture. Incidences of BED were found in similar frequencies between the highest industrialized countries while also having comparable rates between non-Latino white, Latinos, Asians, and African Americans (American Psychiatric Association, 2013).

Other Specified Feeding or Eating Disorder/ Disordered Eating Behaviors

Not every person who presents with dysregulating eating behaviors will meet the requirement for AN, BN, or BED. Previously, this category was known as Eating Disorder not Otherwise Specified or EDNOS. In the DSM-5 this category is now known as Other Specified Feeding or Eating Disorder (OSED). The only qualification necessary to be diagnosed with OSED is that the individual does not meet the full criteria for any feeding or eating disorder

while still having features that significantly impair social, occupational, or other areas of functioning (American Psychiatric Association, 2013). This disorder has the highest lifetime prevalence of AN, BN, and BED with the prevalence rate being 4-5% of the population (Ortega-Luyando et al., 2015).

Some disordered eating behaviors (DEB) can indicate that an individual may have an OSED. Disordered eating behaviors are especially dangerous because it is highly likely that these behaviors will lead to a diagnosis of an eating disorder as well as having other impairments as described by Ortega-Luyando et al. (2015). Examples of DEB include dieting, using diuretics, binge eating, self-induced vomiting, misuse of medications, fasting, and laxatives. The behaviors can lead to physiological impairments include delayed puberty, teeth deterioration, ulcers in the esophagus and mouth, as well as digestive/urinary irregularities. Psychologically, individuals with disordered eating behaviors are more likely to have depression, low self-esteem, anxiety, suicide attempts, and substance abuse issues. Therefore, having a DEB puts one at higher risk for later problems in life as well as a diagnosis of AN, BN, or BED (Ortega-Luyando et al., 2015).

Lifetime Prevalence

There have been many different studies completed with the goal to have a comprehensive assessment on the incidence of eating disorders across a lifespan. There have been inconsistencies in the statistics found for incidence rates across various populations. This has made it difficult to get an accurate understanding of any significant changes over time. Another hindrance is due to the changes in the DSM criteria for eating disorders.

There were significant changes from the DSM-IV-TR to the DSM-5 in relation to the criterion needed in order to be diagnosed with a particular eating disorder. For example, to be currently diagnosed with AN according to the DSM-5 (American Psychiatric Association, 2013)

the individual would no longer need to show that they experience amenorrhea or loss of menstrual periods. The qualifications for having a low weight were also changed to having a body weight less than what was considered minimally normal and/or minimally expected. For BN, the new standard lowered the frequency of bingeing episodes as well as participation in compensatory behaviors. It changed from requiring the binge/purge cycle to occur twice per week to once per week. BED was finalized as a formal diagnosis resulting in less strict criteria for an individual to meet the qualifications for a diagnosis (American Psychiatric Association, 2013).

An example of how the different criteria requirements in the DSM affected incidence rates was found in a study conducted by Cossrow et al. (2016). This study compared the same data set across the DSM-IV-TR and the DSM-5 according to the criteria needed to diagnose an individual with an eating disorder. There was a slight increase in the number of individuals diagnosed with BED from 1.52% to 2.03% respective from the DSM-IV-TR to the DSM-5 (Cossrow et al., 2016). This change signified that the change from the DSM-IV-TR to the DSM-5 had an impact on the incidence rates.

Another way to demonstrate that lifetime prevalence rates have not always been consistent was found in different nationally representative studies conducted on eating disorders. The first nationally representative study conducted according to the DSM-IV took place in the United States from 2001-2003. The findings for lifetime prevalence rates for AN, BN, and BED were as follows: 0.6%, 1.0%, 2.8% (Hudson, Hiripi, Pope, & Kessler, 2006). In 2013, another nationally representative study was conducted through the National Epidemiologic Survey Alcohol and Related Conditions. A more accurate interpretation of the data demonstrated that in 2013 the lifetime prevalence rates for AN, BN, and BED were as follows: 0.8%, 0.28%, 0.85%

(Udo & Grilo, 2018). The comparison of the two nationally representative studies revealed that across 10 years some eating disorders gained prevalence while others declined.

Research that included adolescents and children found that the average age of onset for developing an eating disorder has been decreasing (Smink et al., 2012; Swanson et al., 2011). In 2011, the median age of onset for adolescents with eating disorders was as follows: 12.3 years old for AN, 12.4 years old for BN, and 12.6 years old for BED (Swanson et al., 2011). The average age of onset for BN has also been shown to be decreasing as demonstrated by researchers Smink et al. (2012). During the time frame of 1970-1972, the average age of onset for bulimia was 18.5 years old for adolescents in Italy. The average age of onset lowered from 1979-1981 to 17.1 years of age. Not only did the average age of onset decrease, but the highest risk group for individuals with BN also decreased. From 1985 to 1989, the highest risk group in a Dutch primary care study was composed of 25-29 years old. From 1995-1999, the average age for the highest risk group was lowered to 15-24 year olds (Smink et al., 2012).

While it is uncertain whether or not the prevalence and incidence rates have increased across eating disorders, the average age of onset for eating disorders has been decreasing with the most prominent age group affected being young females (Smink et al., 2012; Swanson et al., 2011; Thompson & Sherman, 2010). BED has also been shown to be the most prevalent among adolescents (Thompson & Sherman, 2010). In the United Kingdom children under the age of 13 had an incidence rate of 1.2 per 100,000 people for BED (Thompson & Sherman, 2010). Another result of compiling the epidemiological studies was that in the U.S., the incidence rate for adolescents with BED was 10.1 per 1000 females and 6.6 per 1000 males in 2012 (Smink et al., 2012).

All three of the main types of eating disorders have common elements of body deterioration due to the harsh conditions that the body endures. While young adults are more likely to develop an eating disorder, there remains the possibility of developing an early childhood eating disorder. Next, the specific issues related to having an eating disorder as a child/adolescent will be discussed.

Eating Disorders in Youth

Since younger children and adolescents are being affected by eating disorders, there are different identifying factors in recognizing these disorders. If people were more aware of the characteristics commonly found in eating disorders, then children and adolescents could be diagnosed at an earlier age. Individuals who spend the most time with children and adolescents such as practitioners, teachers, coaches, and parents, should be aware of common characteristics and risk factors that could indicate that an eating disorder is developing.

Besides the common demographic characteristics previously discussed for AN, BN, and BED, there were other common risk factors specifically related to developing an eating disorder as described by Seddon and Crossen (2017). While there was no correlation to alcohol use, individuals with eating disorders were shown to have higher rates of smoking cigarettes. This was theorized to have occurred because smoking reduces the urge of hunger. Migration was also a risk factor due to having sudden changes in culture. In the family unit, individuals who had a mother with a history of disordered eating behaviors were also more likely to develop an eating disorder when compared to having a mother who did not struggle with an eating disorder. Thus, screening children to see if there is a maternal history of eating disorders could be effective in providing early care and diagnosing children. For mental health, a common risk factor in children and adolescents was having suicidal thoughts. Another common characteristic that was

found was having higher rates of premorbid medical conditions. In conclusion, providing a thorough screening for children in the medical realm could help with early detection and quick treatment for eating disorders (Seddon & Crossen, 2017).

There are multiple difficulties that general practitioners come across that can inhibit them from recognizing that some of their patients may have an eating disorder. One such problem could occur if the patient does not present with issues specifically related to food intake or weight. A child may present with unrelated complainants consisting of psychological issues, physical issues, and issues related to socioeconomic status (Rowe, 2017). Therefore, a patient may not always present with the common risk factors. Another hindrance to earlier detection rates is if the presentation of the symptoms is delayed. This could be due to shame, stigma about having an eating disorder, lack of knowledge of resources, low desire to change or seek help, and/or denial of a problem (Rowe, 2017).

There is also a lack of resources and knowledge for diagnosing children with eating disorders as shown by researchers Campbell and Peebles (2014). In this research study, pediatricians were identified as the first line of defense for diagnosing children. The researchers identified that there was a significant gap in the number of children who remained undiagnosed. This was either manifested by the child not receiving treatment, having only a partial recovery, or never recovering (Campbell & Peebles, 2014). Sometimes a practitioner may miss diagnosing a patient due to over-investigating and communication with specialists instead of directly communicating with the patient about the possibility of an eating disorder (Rowe, 2017).

In regards to athletes, there are specific early detection techniques that can help identify an eating disorder as described by researchers Coelho, Gomes, Ribeiro and Soares (2014). Before an individual is allowed to participate in a sport, a pre-participation physical examination

could be required. In order to maintain a non-defensive attitude, questions can be asked about nutrition, body image status, menstruation, and bone mineral density. By keeping questions non-specific to having an eating disorder, the athlete would be less likely to under-report symptoms. The main concern is that the athletes would lie because of the fear that they would be negatively impacted by self-disclosing. Another non-threatening approach is to request to have the athlete record their diet or give out a food frequency questionnaire. Questions that may help determine if an athlete is at risk for an eating disorder include asking about bingeing or purging behaviors as well as asking about family history. If the athlete answers positively, then a physical examination should be conducted (Coelho, Gomes, Ribeiro, & Soares, 2014).

As for long term effects related to having an eating disorder at a young age, researchers Swanson et al. (2011) described common impairments found. Within a 12 month span, out of those who were diagnosed with AN, BN, and BED, 97%, 78%, and 62.6% had experienced impairment. Out of those individuals, 24.2%, 10.7% and 8.7% had severe impairment. The most common impairment that was described was through strained social interactions due to the eating disorder. The impact of social impairment affected the child's relationship with their friends and how they related to family members (Swanson et al., 2011).

There were multiple other difficulties related to body function as a result of having an eating disorder in adolescence as described by Campbell and Peebles (2014). Experiencing malnutrition at such a young age could result in brain development impairments. Individuals with AN have been shown to have lower levels of brain tissue volume as well as problems with neuropsychological functioning. The most common area in the brain for deficits to occur was in the gray-white brain matter. There was also a decrease in the amount of cerebrospinal fluid in the

individuals affected. This is important because abnormalities in the brain could result in neurologic deficits and cognitive deficits (Campbell & Peebles, 2014).

If a child is diagnosed with an eating disorder at a young age, it is likely that they would struggle with body image later in life. Herpertz-Dahlmann, Dempfle, Konrad, Klasen, and Ravens-Sieberer (2015) found a strong positive correlation between individuals who had high disordered eating tendencies and the increased likelihood of being overweight or obese at a follow up six years later. Those who scored high in having a dysmorphic body image were more likely to have disordered eating behaviors in the future. Another aspect that related to youth was that individuals who had high weight concerns at a young age were more likely to develop an eating disorder in the following years (Herpertz-Dahlmann, Dempfle, Konrad, Klasen, & Ravens-Sieberer, 2015)

Another potential consequence of having an eating disorder as a child is the high risk of experiencing suicidal ideation and suicide attempts. Swanson et al. (2011) reported that children/adolescents with BN were more likely to have suicidal plans while children/adolescents with BN and BED were more likely to have attempted suicide. These researchers also demonstrated that more than half of the adolescents with BN experienced suicidal ideation and one third had attempted suicide (Swanson et al., 2011). There was also a correlation between having an eating disorder at a young age and having higher levels of depression and anxiety at follow-up appointments (Herpertz-Dahlmann et al., 2015).

Etiology of Eating Disorders

Throughout the years, many different theories have originated as to why an individual may develop an eating disorder. Brownell and Walsh (2017) described the history behind what people originally deemed was responsible for the development of an eating disorder. From the

1960's to the 1970's, it was believed that the family environment was the main determining factor for if an individual would develop an eating disorder. From the 1980's to the 1990's, it was thought that childhood trauma caused by sexual abuse was the strongest reason behind why an individual would develop BN. The most recent literature has focused on biological reasons for developing an eating disorder (Brownell & Walsh, 2017).

Multiple Aspects Theory

One model that is inclusive of many different factors is the multiple aspects model as described by Treasure, Schmidt, and Furth (2003). This model includes predisposing factors, precipitating factors, and maintaining factors. A predisposing factor is something that makes an individual more vulnerable to the specific disorder. Examples include genetic influences, personality traits, and experiences of trauma. Some specific personality traits that can lead to a higher likelihood of developing disordered eating behaviors include having low self-esteem, perfectionism, and traits of obsessiveness. These factors express themselves in sports through having high self-control, a strong drive and ability to sacrifice, and a tendency to strive toward goals. Another way to impact the development of an eating disorder is through precipitating factors. The precipitating factors depend on the context of the environment that the individual is in as well as other situations that can trigger or cause a specific response. Some contexts that could impact an eating disorder include social class, level of industrialization, occupation, and level of urbanization. The last factor involved in the multiple aspects theory model is having maintaining factors that enable the eating disorder to continue and progress. This would include psychological symptoms such as an individual's mindset as well as dysfunctional thinking patterns (Treasure, Schmidt, & Furth, 2003)

Personality Traits and Internal Issues

As demonstrated by Thompson and Sherman (2010), there were many different behavioral and psychological factors that were correlated to developing an eating disorder. One of the factors discussed was the need for control. An individual with the desire to control their life might also have characteristics of perfectionism, as well as a tendency to be obsessive (Thompson & Sherman, 2010). In a study completed by Arthur-Camesella and Quatromoni (2011), the two highest internal factors related to the onset of eating disorders were having negative mood states (82%) and low self-esteem (76%). Negative mood states were categorized by emotions such as grief, loneliness, stress, and depression. The eating disorder functioned as a protective factor against such emotions in order to make the individual feel better. These individuals had low self-worth as well as poor body image perception (Arthur-Camesella & Quatromoni, 2011).

Genetic Determinants & Heritability

Family studies are one way that researchers have sought to understand the role that genetics can have in the development of eating disorders. Thornton, Mazzeo, and Bulik (2011) assessed what the potential risks were for the general population and for family members of individuals diagnosed with eating disorders. Having a genetic relationship to someone who has been diagnosed with AN can increase the likelihood that you will develop an eating disorder by 11.3 times. For individuals with BN, first degree relatives were anywhere from 4.4 and 9.6 times more likely than the control group to have an eating disorder. For BED, an individual would be between 1.9 and 2.2 more times likely to have an eating disorder when compared to the control subjects who did not have a relative with BED (Thornton, Mazzeo, & Bulik, 2011). A limitation with family studies is that you cannot prove that the increased risk was solely caused by genetics.

Thus, adding twin studies and adoption studies can increase the control between genetic and environmental effects.

Twin Studies & Adoption Studies

Studying monozygotic twins (MZ) and dizygotic twins (DZ) was another method used to distinguish between genetic and environmental etiology theories of individuals with eating disorders. Brownell and Walsh (2017) argued that since MZ twins share 100% of their genes, any difference in the likelihood of developing an eating disorder would be solely caused by the environment. Dizygotic or fraternal twins that share only 50% of their genes would have 50% of their differences due to the environment and 50% due to genetic influences. Thus, if the MZ twin pair had a higher rate of developing an eating disorder when compared to the DZ twin pair, genetics would have the greatest influence in developing an eating disorder (Brownell & Walsh, 2017). In 2011, out of the 30 twin studies that had been conducted, twenty-eight of the studies demonstrated that genetics had a significant impact on eating disorders (Klump, Suisman, Burt, McGue & Iacono, 2009).

In a meta-analysis on twin studies, Thornton et al. (2011) found that there was a significant genetic link in eating disorders. The first couple of studies completed on twins found that there were shared genetic factors between 58%-88% for twins with AN. The authors concluded that studies with multiple waves of measurement would increase the reliability of these studies. Comparatively, the first study which used multiple waves of measurement found that when studying the development of BN, 83% of the factors were due to genetics while the second study showed that 59% was due to genetic factors (Thornton et al., 2011). Studies with a stricter definition of the requirements for AN and BN found that 79% of the eating disorder was caused by genetic factors (Brownell & Walsh, 2017).

Adoption studies provide another way to explore the different impacts that genetics and the environment can have on the development of an eating disorder. In adoption studies, the subjects would include an adopted sibling placed in an adoptive home and a second sibling placed in the same home who was not genetically related to the adopted child. This type of study would be difficult to conduct due to the challenge of identifying and recruiting participants who fit the inclusion criteria for the study. One of the only ones to have been conducted was done by Klump et al. (2009). The researchers found that there was a heritability link from 59% to 82% in disordered eating symptoms which indicated a significant shared genetic factor (Klump et al., 2009).

Puberty and Development

It is vital in the field of treating eating disorders to specifically study the role that puberty has on the development of an eating disorder. Moore, Mkone, and Mendle (2016) found that there was a slim chance for a child to develop disordered eating behaviors if they had not yet begun to show physical signs of going through puberty. The collective impact of having shifts in hormones, changes in physical appearance, and changes in social interactions has the possibility to create a negative atmosphere for the child. The child may develop a low self-esteem as well as an increase in judgement against one's own physical appearance. Another factor was that puberty creates natural increases and fluctuations in weight that could result in a significant gap between an individual's self-image and their actual body image (Moore et al., 2016).

McNicholas, Dooley, McNamara, and Lennon (2012) found that going through puberty was a higher risk factor for females when compared to males. Females who went through puberty had lower self-esteem ratings and lower body satisfaction when compared to pre-menarche girls. This study also demonstrated that in Ireland, adolescents had a significant

negative correlation between the younger the age of onset of puberty and the higher the level of eating concerns. These females not only had higher EAT-26 scores, but also had a higher drive for thinness, lower body satisfaction, and displayed more bulimic symptoms (McNicholas, Dooley, McNamara, & Lennon, 2012).

A study by Moore et al. (2016) demonstrated that the prevalence of eating disorders and outcomes later in life were related to how the girls perceived the physical changes that occurred during puberty. Another important factor was how well informed the child was about the effects of puberty and if the child had accurate expectations about what puberty would be like. Having negative experiences surrounding puberty were far more powerful than any protective factors that a child may have had (Moore et al., 2016).

As an individual goes through pubertal development, there is an increase in environmental influences from peers and through social media as shown by Wade et al. (2013). Some examples of environmental influences included an increased awareness of one's weight through bullying, internalized pressure to be skinny, and messages presented in the media about body image. When testing the differences between genetic and environmental risk factors, Wade et al. (2013) demonstrated that shared environmental factors were important from ages 12-16. Some of the shared environmental factors that were found to have significance included high parental expectations, life events, society influences, and the culture in which one lived in. More of these environmental factors were present in children from ages 12 to 13 which indicated an increase in environmental pressures starting at 12 years old (Wade et al., 2013).

When children in this study reached the age range of 13 to 15 years old, a new genetic variance was present. This indicated that the start of puberty has a significant effect on children. Epigenetics was also important to consider because the added environmental stressors could

potentially cause a specific gene to be activated. There are some genes which are believed to be related to disordered eating, but are not directly associated with it. What has been shown through studies on epigenetics is that environmental factors can influence brain-derived neurotrophic factors and gonadal hormones (Wade et al., 2013).

Biologically, the onset of puberty is accompanied by the release of estradiol. The release of estrogen mimics the activation of the genetic effects on disordered eating symptomology. Before puberty, there are only low levels of estrogen which would indicate that the release is why most genetic effects are increased around mid-puberty. The reason the study of estrogen has been so important is because estrogen regulates gene transcription as well as protein synthesis. Both the genes regulated in the serotonin system and brain-derived neurotrophic factor (BDNF) have been shown to be strongly correlated to eating disorders. Therefore, having higher levels of estrogen at the time of puberty can add to genetic risks (Klump, 2013).

Competitive Sports

Benefits of Involvement in Sports

There are many potential benefits that can occur as a result of participating in a sport as a child (Blom, Bronk, Coakley, Lauer & Sawyer, 2013; Merkel, 2013; Clark, Camiré, Wade, & Cairney, 2015). Merkel (2013) summarized that athletics can help contribute to positive physical, physiological, and social health. Some of the physical benefits evolved from learning to improve gross motor skills in order to increase performance in the sport. Sport involvement was also connected to higher academic achievement in schools. Involvement in sports also helped to reduce health related diseases such as heart disease, diabetes, and osteoporosis. Being involved in a sport as a child also decreased the likelihood that the individual would become obese later in life. Some physiological benefits included a decrease in suicidal thoughts and actions as well as

an improved ability to have emotional control. Regarding social benefits, being a part of a team contributed to developing positive social skills and building support networks (Merkel, 2013). Involvement in sports is also associated with positive psychological and social outcomes in relationship to alcohol and drug use (Clark et al., 2015).

There have been specific reasons for why some children have positive outcomes from involvement in sports while other children may have had negative outcomes. Positive outcomes have been linked to the organization of the sport, the child's relationships with their parental figure or figures, relationship with peers, and coaches, how the child created meaning from the sport, and the integration of the sport and other parts of the child's life (Blom et al., 2013). Another important consideration before enrolling a child in a competitive program was to consider their age, readiness to be in a competitive sport, and their level of skill development. Failure to address if the child was fully ready to participate in the sport led to anxiety, stress, and a higher rate of dropping out of the sport (Merkel, 2013).

Risks of Involvement in Sports

While growing up, children go through serious developmental changes in their bones, growth plates, muscles and joints. These developmental changes have resulted in a high rate of injuries and concussions in young athletes (Merkel, 2013). Injuries present as a strong risk factor since many young athletes who get injured do not properly rehabilitate the injury. Not getting proper treatment for an injury as a child could result in chronic pain, dysfunction and repeated injuries in the future. Injuries also impact psychosocial functioning through increased depression, mood swings, and disconnection from peer groups (Merkel, 2013). There were also risks found relating to social and psychological functioning. A collective review of the literature on sport participation found higher levels of anxiety, an increase in risk taking, and an altered perception

of competence (Clark, Camiré, Wade, & Cairney, 2015). Risks associated with coaching and teammates will be discussed in the following sections.

Sports and Eating Disorders

One such risk as a result of participation in athletics as a child is the development of disordered eating behaviors and eating disorders. Research has shown that competitive athletes have higher rates of eating disorders when compared to non-athletes (Martinsen & Sundgot-Borgen, 2013; Thompson & Sherman, 2010; Krentz & Warschburger, 2011). Another study found that an increase in level of competitiveness from recreational to competitive to elite had an increase in the rate of disordered eating behaviors (Sundgot-Borgen & Torstveit, 2004).

Teammates and Coaches

One unique aspect to being an athlete is having the influence of both teammates and coaches. The athlete's teammates and coaches could either serve as a protective factor, or they could be detrimental to the athlete's health. According to a qualitative interview by Bloodworth, McNamee, and Tan, J. (2015) friendships with teammates contributed to an increase in disordered eating behaviors. Each individual team also developed their own standards for what the ideal weight and shape was for the sport. These ideals were communicated both verbally to the other teammates and were expressed indirectly. The younger children in the competitive sport idealized and watched the actions and behaviors of the older athletes. This resulted in the younger athletes developing some of the same distorted norms as the older athletes. Another example of the high pressures put on each athlete was the desire to not let the team down. One teammate described the teammate relationships and communication as follows:

There's not really anyone who's super—the right shape yet, and no one's in their competition shape yet so no one's like getting angry with anyone about their weight

really. There's some girls are bigger and need to lose more than others but I think, I think they know that, I'm not really sure we don't really tell—I mean we talk about it, like about the people who need to lose more than others but I think they know. (Bloodworth, McNamee, & Tan, 2015, p. 883)

Another direct influence in the athlete's life could come through the coaches. Coaches have a direct impact on an athlete's perception of their body by weighing the athlete, taking body compositions, and/or deliberately stating what the ideal weight and body shape would be for that specific sport (Smolak & Levine, 2015). By having preset expectations for the ideal body type, a coach could influence an athlete to place more importance on physique. Disordered eating behaviors can occur when an athlete does not measure up to the ideal body shape for their sport (Smolak & Levine, 2015).

Type of Sport/ Leanness

Each sport has unique factors that focus on different body shapes and sizes depending on the emphasis on aesthetics, power, endurance, weight-class, or ball sports (Treasure et al., 2003). One specification in categorizing sports is through specifying the sport by having a leanness or a non-leanness focus (Thompson & Sherman, 2010). Thompson and Sherman (2010) found that athletes in a leanness focused sport were at a greater risk for an eating disorder due to the emphasis on a maintaining a lower body weight. The sports classified as leanness focused sports included aesthetic (e.g., cheerleading, dance, gymnastics), endurance (e.g., swimming, soccer, cycling), and weight-class sports (e.g., wrestling, boxing). Some of these sports also have higher risk factors if the individual would be judged, such as in diving, figure skating, and gymnastics (Thompson & Sherman, 2010). Sports with an emphasis on appearance (e.g., ballet,

cheerleading) and sports that require revealing attire (e.g., swimming, volleyball) were also noted to have an increased risk for developing disordered eating behaviors (Yager & Powers, 2007).

A study completed by Krentz and Warschburger (2011) examined the most influential variables related to leanness sports. The research stated that athletes have an increase in their desire to be lean when there were high social pressures to increase their performance. Increased desire for leanness resulted in a decrease in body satisfaction. These athletes were also more likely to engage in unhealthy dieting. The next finding was that the high environmental pressures were directly related to an increase in disordered eating. Thus, the desire to be leaner in order to have a better athletic performance was a strong predictor for developing disordered eating behaviors (Krentz & Warschburger, 2011).

Disordered eating behaviors are often normalized in weight class sports due to the need to have a competitive body size (Thompson & Sherman, 2010). In sports such as boxing, judo, and wrestling, athletes have a time period before the weigh-in to lose a certain amount of weight. The cycle of losing weight before competition and then binge eating is highly comparable to an individual with a diagnosis of bulimia (Thompson & Sherman, 2010). Yager and Powers (2007) described the process that an athlete goes through in order to move weight classes. It was a common occurrence for athletes to move down one or two weight classes below the athlete's regular weight. They would accomplish this by restricting food intake, excessively exercising, and using dehydration techniques. After a weigh-in and before a match, the athlete would binge eat and consume more water in order to resume their normal weight (Yager & Powers, 2007).

Cultural/Historical Perspectives of the Ideal Athletic Body

The ideal athletic body is always evolving and has also changed significantly over time. Calogero, Boroughs and Thompson (2007) offered a review of historical beauty standards and

what is expected in present times. From 1400's-1700's, the standard of female beauty was to have a fat and full figure. In the 19th century, corsets became popular as a way to contort the body into appearing fuller in figure. Towards the mid-19th century, the ideal body shape started to change towards a more fragile and thin figure. The change toward a slender figure was seen in the Miss America pageants where the winning women were slender and used diets and exercise to lose weight. With the start of the 20th century came the new ideal body type of having a slender waist and legs as well as having athletic features. The new standard of having a more muscular appearance was seen by having broad shoulders and toned muscles while maintaining a lean figure with a flat stomach, thin waist, and long legs (Calogero, Boroughs, & Thompson, 2007)

Meeting the feminine ideal body type while being in a sport culture of muscularity has led to difficulties with female athletes as described by Krane, Choi, and Baird (2004). Athletic women have to figure out how to maintain the socially acceptable feminine body while distancing from masculine like behavior. Some of the traits that are associated with masculinity are strength, assertiveness, independence, and competitiveness. A lot of female athletes in the study were satisfied with how their body appeared related to performance in their sport but were not satisfied with their body in a social context (Krane, Choi, & Baird, 2004).

Gap in the Literature

Numerous studies have confirmed the positive relationship between participation in athletics and a higher likelihood of developing an eating disorder. However, there have been few quantitative studies that have investigated the onset of eating disorders in young and competitive female athletes. Most of the studies have been completed on women in their late 20s to 40s

(Athur-Cameselle & Quatromoni, 2011). Thus, these findings may not be as applicable to younger females.

This study was modeled after research by Kong and Harris (2015) with participants who were Australian females ages 17-30. The measures included demographic questions, the Eating Attitudes Test (EAT), and the Figure Rating Scale (FRS). ANOVA was used to find differences between the groups consisting of demographic characteristics, disordered eating symptomology, and body shape perception. They used a two by three design with sport type (leanness vs. non-leanness) by sport level (elite, recreational, non-competitive). There were more disordered eating behaviors with the participants who were in an elite and leanness focused sport (Kong & Harris, 2015). The present study did not include non-competitive athletes nor was the FRS used. There were two additional independent variables that were added: the length of time in sport and the age at which one began the competitive sport.

The present study seeks to find how certain variables influence disordered eating behaviors. These variables include the age at which an individual starts a sport, the level of competitiveness, leanness vs. non-leanness centered sports, and length of time in the sport. By addressing younger athletes, this study will be able to examine the influence that these variables have on the development of disordered eating. This study aims to fill the identified gap in the literature related to length of time in sport and the age at which an individual starts a sport.

CHAPTER 3

METHOD

In the original study, the effects of age at which one begins a competitive sport, length of time in sport, type of sport and level of competitiveness on the development of disordered eating behaviors were going to be explored. We intended to use a logistic regression to investigate how these factors contributed to disordered eating behaviors. However, the small number of completed survey responses made this impossible. Instead, descriptive statistics were found based off of the original research question.

Methodology

The original research question was to understand how disordered eating is affected by the age at which an individual starts a sport, the classification of the sport's competitiveness, and the length of time spent in the sport. Originally the purpose of the study was to examine and explain the variance between disordered eating behaviors and length of time in sport, age at which one began a competitive sport, type of sport (leanness vs. non-leanness) and level of competitiveness.

This study is framed by the multiple aspects model, which identifies predisposing, precipitating, and maintaining factors as described by Treasure et al. (2003). These factors are discussed with how they impact disordered eating. One of the hypotheses was that the younger an individual started a competitive sport, the higher the likelihood for disordered eating behaviors. This fits into the model as a predisposing factor because the age one starts a sport could make them more vulnerable to developing an eating disorder. Another hypothesis was that the length of time in sport would increase the likelihood of developing disordered eating behaviors. This would go into the model as a precipitating factor since it has to do with the context that impacts the disordered eating behaviors. In this case, the context would be how long

the individual stays in the sport. It could also be a maintaining factor because staying in the sport would allow for the distorted thinking behaviors to continue and further develop. The third hypothesis was that those in a higher level of competitiveness would have higher levels of distorted eating behaviors compared to those in a lower level of competitiveness (elite vs. recreational). In light of the multiple aspects model this hypothesis would fit into the precipitating factor since the level of competitiveness depends on the context of the sport. The last hypothesis was that those in a leanness focused sport when compared to a non-leanness focused sport would have higher levels of distorted eating behaviors. This would also be a precipitating factor because it is the context of the sport (Treasure et al., 2003).

Participants were recruited from two universities in the Southeastern United States. All participants were college students between the ages of 18 to 24 years old who were currently enrolled one of the universities. The participants were required to be involved in either intramural athletics, varsity athletics, or club sports. Participants were recruited through an online survey distributed to the athletes through their campus e-mail address. Part of the inclusion criteria was to have a gender identity of female. The participant also needed to be an enrolled university student who is currently involved in intramural athletics, varsity athletics, or club sports. The individual also needed to have been involved in at least one competitive sport as a child. The exclusion criteria consisted of if the participant was diagnosed with an eating disorder before they began the competitive sport. Another exclusion criteria was if the participant identified as any gender identity other than female.

Original Procedure

First, the athletic directors at the two southeastern universities were contacted by the primary investigator to inquire if they were interested in partnering to complete this research

study. The directors for the club and intramural teams for each school were also contacted to inquire about participation. Directors for club and intramural teams were contacted in order to reach a larger population of students who potentially had a background in competitive sports. It is very likely that those who are currently involved in recreational or lower level competition teams in college have had a background in competitive sports.

Once the primary investigator received permission from the athletic/club directors, the researcher sent an already composed e-mail with the intended subject and body message to the directors. The directors then sent the pre-made email to all of the athletes on their registry. Participation in the survey would not be required by any course or athletic director. The pre-composed e-mail was sent out three times; once in May at the beginning of the summer semester and twice at the beginning of the fall semester.

Before the participants took part in this study, they had to agree to the consent form which provided the procedure as well as potential risks and benefits. The consent form also stated the requirements for participating in the study and the exclusion criteria. If the participant had ever to their knowledge been diagnosed with an eating disorder according to the DSM-5, this would result in the participant not meeting the requirements for the study. If the participant did not meet the requirements as stated in the consent form or did not desire to complete the survey, they clicked “I do not agree” and were taken to the end page of the survey. If the participant did meet the requirements and desired to complete the survey, they clicked “I agree” and moved on to the next page.

Another part of the consent form included available resources for if the participant experienced any distress or desired support regarding disordered eating behaviors. This included the campus counseling centers at the respective universities as well as the health clinic for both

of the universities. It also included the contact information for the National Eating Disorder Hotline. The online survey was designed to be completed quickly with the process taking approximately 15-20 minutes from the consent page to the end of the survey.

The first part of the survey consisted of demographic questions as well as questions regarding the athletic history of the participant. The participant provided information for each competitive sport that they have been involved in. The level of competitiveness needed to be either recreationally competitive or elite with the requirements for each listed in the survey. For each sport they filled out the name of the sport, how old they were when they started, the level of competitiveness, and how long they participated at the competitive level. The second part to the survey included a modified EAT-26 survey. The total time taken to complete the informed consent to the end was estimated to take between 15-20 minutes if filled to completion. This study was approved through the institutional review boards at each university where participants were recruited.

Measures

Informal Assessment Questions

The participants who were in the study were asked to select their current age, racial background, and gender identity. The participants also recorded their past participation in competitive sports. As discussed previously this included the age at which they began a competitive sport, the time frame in which they were competitive, and the level of competitiveness. By allowing for multiple submissions for the different competitive sports, this study was more inclusive and collected more accurate data.

The levels of sport were determined by hours spent training and involvement in competitions. This information was an objective way to measure the level of competitiveness for

each sport in which the athlete was involved. The criteria to determine the degree of involvement in each sport were drawn from Kong and Harris (2015) who utilized the three levels of elite, recreational, and non-competitive (Kong & Harris, 2015). If the sport was determined to be at the non-competitive level, then that sport was not be recorded in the first part of the survey per the directions provided to participants.

In order to determine which sport is leanness focused and which sport is non-leanness focused, definitions will be used from a study conducted by Martinsen, Bratland-Sanda, Eriksson, and Sundgot-Borgen (2010) as well as from a study conducted by Thompson & Sherman (2010). The leanness sports were classified as such if leanness and/or low weight was important. The non-leanness sports were classified if these factors were not as important.

Eating Attitudes Test

The measurement used was the Eating Attitudes Test (EAT-26; Garner & Garfinkel, 1979). The EAT-26 is a shortened version of the original 40 item test. The EAT-26 has been shown to have a test-retest reliability of .87 and an internal consistency reliability of .86 (Gleaves, Pearson, Ambwani & Morey, 2014). This test is able to distinguish between dieting/anorexia, bulimia, and oral control. Some examples of statements in this assessment are “I am terrified about being overweight” and “I vomit after I have eaten.” The scale is on a 5-point Likert-type scale with 1 meaning never and 5 meaning always. A score ≥ 20 is representative of having disordered eating behaviors and the participant has a high probability of having an eating disorder (Kong & Harris, 2015). The EAT-26 was modified for this survey to better understand the history of the participant with eating attitudes. Instead of answering from the perspective of current attitudes, the instructions asked “In the past have you experienced this

and to what extent?” The behavioral questions were changed from in the past 6 months to “if you have ever experienced this and to what extent”.

Statistical Analyses

The operational definition of disordered eating behaviors was comprised of two parts. The first aspect was if the individual has a score of 20 or greater on the EAT-26 then they had a high likelihood of having an eating disorder. The second factor is if the participant indicated that they had been previously diagnosed with an eating disorder in part one of the survey.

The logistic regression that was to be completed with the data was going to help determine the relationship between the independent variables and the dependent variable of disordered eating. However, due to the low response rate, we were unable to complete the logistic regression. Instead, the data was examined from the perspective of the participants who met the criteria for disordered eating.

CHAPTER 4

RESULTS

After three rounds of data collection, the number of participants who fully completed the study was 35 people. Due to the low number of respondents, a logistic regression was not feasible so descriptive statistics will be reported here. Logistic regression would have allowed the researcher to look at the relationship between the independent variables and the dependent variable of disordered eating. There are numerous potential reasons for why the response rate was low which will be discussed in the limitations section.

Instead of answering the research question by the logistic regression, descriptive statistics were run for each independent variable. In this manner, individual means were found for the age at which one began a competitive sport, length of time in sport, level of competitiveness, and leanness vs. non-leanness focused sports. The frequencies and responses to certain parts of the survey were also analyzed to get a comprehensive overview of the athletes and the measure of disordered eating behaviors.

Out of 35 participants, the average age was 19.7 years old. There were 26 participants who were white, four participants who were mixed ethnicity, two participants who were Asian, one participant who was Hispanic/Latina, one participant who was Black/African American, and one participant who was native Hawaiian or other pacific islander. There were multiple different sports that were reported, including: soccer, cycling, wrestling, softball, weightlifting, gymnastics, tennis, swimming, track and field, taekwondo, field hockey, cheerleading, dance, lacrosse, volleyball, golf, equestrian, cross-country, and basketball. Out of these sports, the leanness focused sports were cycling, wrestling, weightlifting, gymnastics, swimming, track & field, taekwondo, cheerleading, dance, and cross-country. The non-leanness focused sports were

soccer, tennis, field hockey, lacrosse, volleyball, golf, equestrian, basketball, and softball. The average age that the participants began competing in competitive sports was 10.56 years old.

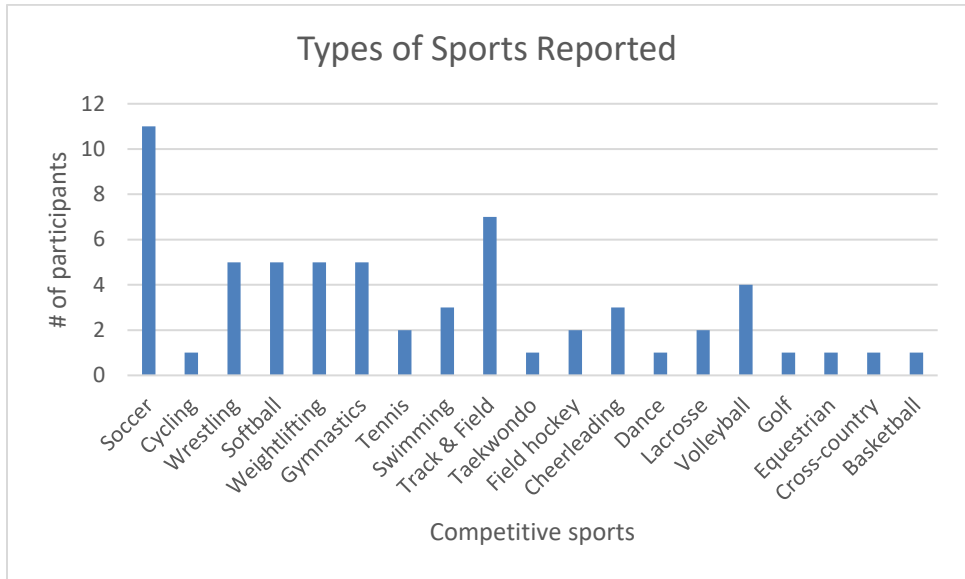


Figure 1: Types of Sports Reported

Out of the 35 participants, seven met criteria for disordered eating according to the previously mentioned criterion. This included the participant’s EAT-26 score and if they developed a diagnosable eating disorder after beginning the sport. Approximately 42.86% of the participants who had disordered eating were involved in non-leanness sports while 57.14% of those participants were involved in a leanness focused sport. Out of those who met criteria for disordered eating, 85.71% were involved at the elite level when compared to 14.29% who were at the recreationally competitive level. All the participants were involved in these sports for longer than four years. Out of the participants who had disordered eating, two of the participants were engaged in multiple other sports. The average age for beginning a competitive sport for those who met criteria for disordered eating was 6.71 years old.

Out of the 35 participants, 28 did not meet the criteria for disordered eating. Out of these participants the average age at which the individual started the sport was 10.07 years old. For the

participants who did not meet criteria for disordered eating, 64.29% were elite athletes and 35.71% were recreationally competitive athletes. Approximately 57.14% of the participants were involved in a leanness focused sport while 42.86% were involved in a non-leanness focused sport. For the same participants who did not meet criteria for disordered eating, 82.14% spent longer than four years in the sport while 17.86% spent fewer than four years in the sport.

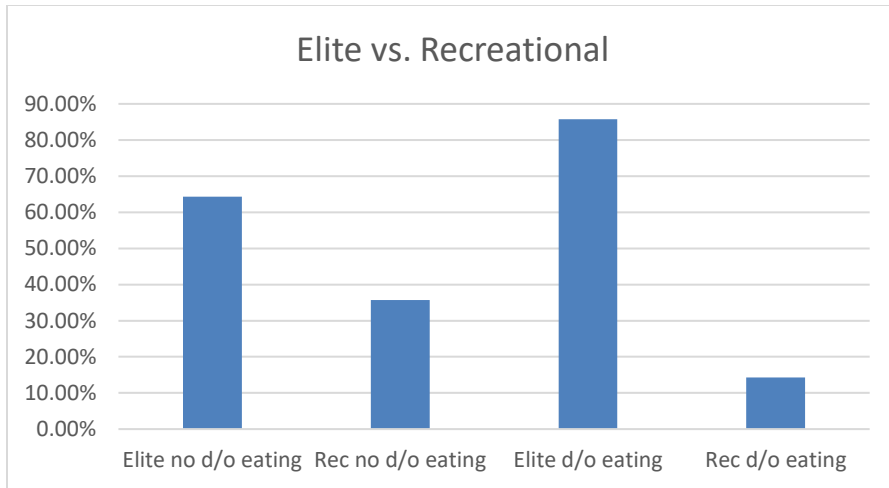


Figure 2: Elite versus recreationally competitive

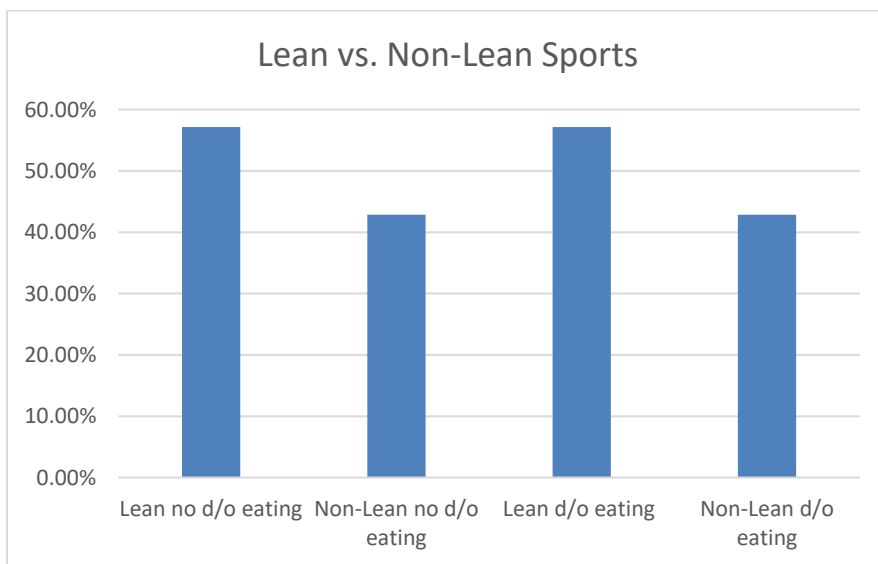


Figure 3: Leanness focused sports versus non-leanness focused sports

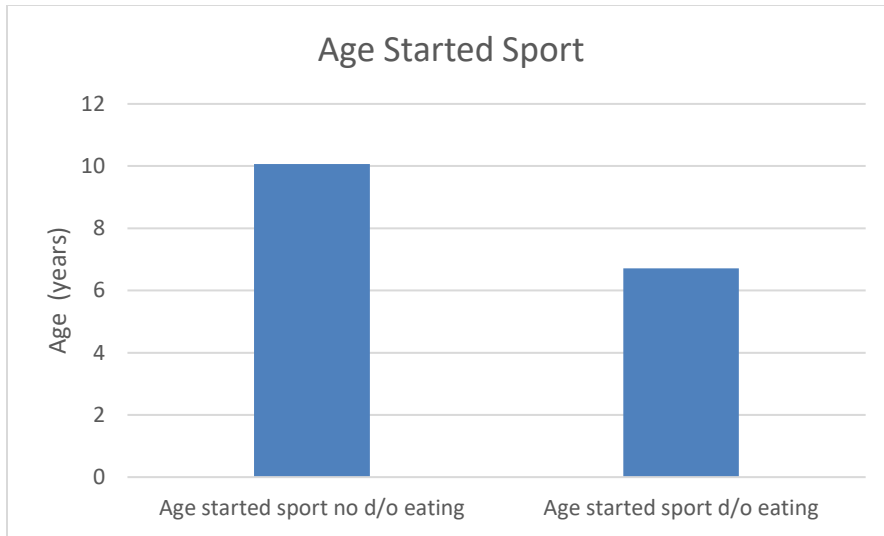


Figure 4: Age individual started competitive sport

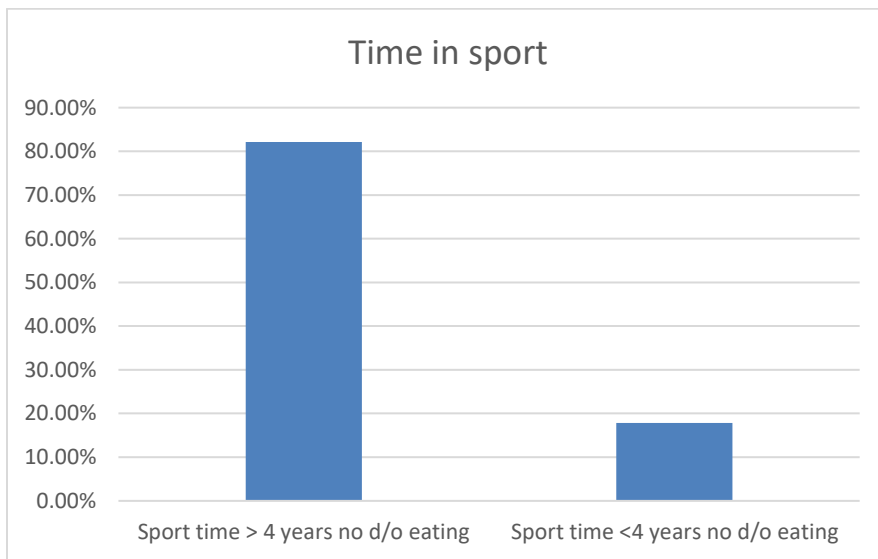


Figure 5: Length of time in sport

Another comparison of interest was looking at individuals who played a leanness sport at the elite level. Out of those with disordered eating behaviors 42.86% were in elite and leanness focused sports. This is compared to 32.14% who were in elite and leanness focused sports and did not exhibit disordered eating. Of those who reported disordered eating behaviors, none were

in a non-leanness focused, recreationally competitive sport. In the opposite category, 10.71% of the participants were in non-leanness focused sports and were recreationally competitive with no disordered eating behaviors.

Out of those who exhibited disordered eating behaviors, the slight majority reported being in a leanness focused sport as compared to a non-leanness focused sport. The slight majority reported being in an elite focused sport as compared to a recreationally competitive sport. For those who did not exhibit disordered eating behaviors the findings were the opposite. These findings need to be considered with the information that more participants reported being involved in leanness focused and elite sports. The participants who had disordered eating behaviors started the competitive sport at a younger age when compared to those who did not exhibit disordered eating behaviors. They were also involved in the sport longer when compared to those who did not meet criteria for disordered eating behaviors. In the next chapter, these results will be discussed in consideration of where it fits within the overall research literature.

CHAPTER 5

DISCUSSION

While the original statistical analysis was not able to be performed, the study illustrates areas that need to be further explored. While there have been many studies completed on eating disorders and sports, there remains more to learn regarding the experiences of athletes with disordered eating and how it may be impacted by participation in competitive lean sports at an early age. In this chapter I will discuss the findings of the present study, the significance of the study, limitations, future research and the conclusion.

Disordered Eating

Athletes in a leanness focused sport are more likely to have an eating disorder when compared to athletes in non-leanness focused sports (Thompson & Sherman, 2011). Out of the seven participants who met criteria for disordered eating, 57.14% were in a leanness focused sport. The data showed that there were more participants who had disordered eating in the leanness focused sports like gymnastics, wrestling, and track and field. The type of sport (leanness vs. non-leanness) is a factor that depends on the context of the sport in the multiple aspects model (Treasure et al., 2003). Future research could explore the difference between weight-class sports and leanness focused sports since wrestling is both a weight-class sport and a leanness focused sport.

Another finding that was interesting was the difference between levels of competitiveness. Levels of competitiveness depends on the context of the environment which is a precipitating factor (Treasure et al., 2003). Previous research has found that an increase in the level of competitiveness has an increase in the rate of disordered eating behaviors (Sundogt-Borgen & Torstveit, 2004). In the present study, 85.71% of the participants who met criteria for

disordered eating were competing at the elite level. Although a relationship cannot be assessed in this case, this statistic possibly reflects a similar trend as was reported by Sundogt-Borgen and Torstveit (2004). This could be another area of study where it would be helpful to examine the relationship between levels of disordered eating and the levels of competitiveness in sport. Future research could be done on athletes in non-competitive sports as well. The average age that the individuals who reported disordered eating started the sport was 6.71 years old. This is a predisposing factor because it makes the athlete more vulnerable to developing disordered eating behaviors (Treasure et al., 2003). The finding is notable because the data shows that eating disorders are being found in younger and younger athletes (Swanson et al., 2011). These athletes started competing at a young age which increases their potential to have disordered eating earlier in life if prevention measures are not taken.

No Criteria for Disordered Eating

While those who met criteria for disordered eating reported sports matched the literature, the individuals who were not classified as having disordered eating did not match the literature. Rather, they had the opposite trend from what the data has previously shown. There were more participants in the elite category when compared to the recreational category for those who did not have disordered eating. It is interesting that there were more athletes that were engaged in leanness focused sports that did not have disordered eating. These same participants also were engaged in the sport for over four years. This could be a maintaining factor because being involved in a sport for a long amount of time can allow for the distorted thinking and maladaptive behaviors to continue (Treasure et al., 2003). Based on previous research, the expectation was to see participants without a history of disordered eating participate in

recreationally competitive sports and with less time in the sport. This finding might be a result of having more athletes that were in leanness sports.

Additional Key Points

Another interesting factor is that those who met criteria for disordered eating started their competitive sport at a younger age (6.71 years old) when compared to those who did not meet criteria for disordered eating (10.07 years old). As stated previously in the literature review, puberty and development has a role in how one starts developing disordered eating behaviors. Concerning these factors, having an earlier onset of puberty had higher levels of eating concerns according to McNicholas et al. (2012). Pre-menarche females had higher levels of self-esteem and body satisfaction when compared to females who had entered into puberty (McNicholas et al., 2012). Further research into the role that puberty has on disordered eating behaviors would be beneficial.

The combination of having participants in both the elite and leanness focused sport ended up being higher in those who met criteria for disordered eating when compared to those who did not. It has been shown that both a higher level of competitiveness and lean vs. non lean sports both have an increase in disordered eating behaviors so it is fascinating that the data may also imply this. As for recreationally competitive and non-lean, it was expected to have a fewer amount of participants with disordered eating. Given that no participants met criteria for disordered eating with recreationally competitive and non-leanness focused sports, this is a key finding. It is interesting that there was a bigger percentage for those in recreationally competitive sports and non-leanness focused sports who did not have disordered eating. This indicates a need for future research done comparing relationships between both the level of competitiveness with the leanness vs. non-leanness factor.

Significance of the Study

In addition to providing additional data on the experiences of athletes who were engaged in competitive sports and had disordered eating, this study points toward several areas of needed future research. There is a gap in the literature on the length of time that an individual is in a sport. This could be important because it could indicate that if an individual participates in a sport for a long amount of time they would have a higher likelihood of developing disordered eating behaviors. There is also a gap in the literature about the age at which one begins a competitive sport and how that affects disordered eating. This could be important because younger individuals are developing eating disorders (Swanson et al., 2011), and it is not known if earlier participation in a sport is a possible risk factor for disordered eating. Relationships between these variables could have implications for improving prevention and points of interventions for the betterment of the mental health of athletes.

Not many people responded to the survey even though it was sent out three separate times during two different semesters. There was a wide pool to work with as the e-mail was supposed to reach the varsity athletes and club athletes at two universities. One university has approximately 250 student athletes who are on female teams. The other university has a total of 113 female student athletes in varsity sports and approximately 78 females in club sports. This comes to a total of 441 participants that were reached with only 35 people that responded. The low number of respondents could be a result of low student participation in online surveys, thus making it more difficult to conduct statistical analysis beyond descriptive statistics.

Limitations

There are many different limitations that need to be identified. The low sample size presents major limitations because there was not enough data to run the logistic regression. This

limits the types of findings that could be examined and reported as well as the generalizability of the research to the overall population of athletes. The low sample size could have been due to a number of factors including the email not reaching the intended participants. Another possibility for the low sample size could be due to the timing of when the e-mail was sent out. The first e-mail was sent at the beginning of the summer semester while the second and third e-mails were sent toward the beginning of the fall semester. Students beginning the summer semester may not want to answer a survey due to being on break. In the same manner, students in the beginning of the fall semester may not want to answer a survey due to being too busy adjusting to being back at school. It is also possible that the athletic directors did not send the e-mail as it was intended at the specific times. This could have also resulted in the low response rate.

Another type of limitation regards how the participants react toward being asked about their eating behaviors. The individuals who are participating may not be aware of their maladaptive eating behaviors. It is likely that they will not want to admit to themselves that they have a problem thus under reporting the severity of their behavior. Even though the questionnaire is anonymous, the participants still may not answer honestly for fear that they would be identified or due to feelings of shame and/or embarrassment. Another limitation is that the participants are being asked about their current eating behaviors. It is possible that a participant may have met criteria for an eating disorder in their youth and no longer demonstrates any symptoms. As for the EAT-26, changing the questions could also have an impact on the reliability and validity of the survey.

Future Research

There are multiple different possibilities for future research based off of this study. Out of the students who qualified for disordered eating, six out of seven were involved at the elite level.

This points toward future research done comparing elite athletes and disordered eating behaviors as well as eating disorders. There could also be future research done on the average age of onset for disordered eating by looking at the ages at which the participant begins the competitive sport. This could be accomplished through looking at younger athletes to see when the disordered eating behaviors begin. Another area for future research is how the length of time in sport affects disordered eating and eating disorders. All of the participants who had disordered eating behaviors were engaged in a competitive sport for longer than four years. While we cannot comment on a relationship between these variables, it is interesting that the data reflects that those who had disordered eating were in a competitive sport for a longer amount of time and started playing sports at a younger age. Future longitudinal studies could track individuals across a lifespan or across multiple years to enrich our understanding of these experiences.

The results from this study may indicate the need for early interventions and for better treatment for eating disorders for younger children. Many treatment centers focus on treating adolescents but do not have specific programs geared toward children. Prevention programs are also areas that could be improved to prevent children from developing disordered eating behaviors. For many children, the age of onset of an eating disorder is a predictor of future illnesses (Nicholls, Lynn, & Viner, 2011). Future research could help to identify techniques of early detection of eating disorders as well as how to effectively treat younger children. This study could also have implications for coaches involved in competitive sports by emphasizing a need for different styles of coaching. It would also be interesting to delve further into gender differences in eating disorder tendencies.

Conclusion

Eating disorders affect the individual's body and mind. The importance of this research was to raise awareness of disordered eating, as well as look into the need for preventative measures. The high number of athletes who have eating disorders is evidence of that. Parents need to know how to detect disordered eating behaviors in their children as well as professionals in the school systems. Coaches also need to be aware of how they are coaching their recreational, competitive, and elite athletes and the impact that they can have on the way that the individual views their body and the sport.

In conclusion, this study indicates a continued need for research done on disordered eating behaviors in athletes. While no direct conclusions could be made, the data from the participants who had disordered eating aligned with the previous literature. However, the data from the participants who did not have disordered eating behaviors did not match the literature. This warrants further research to find evidence that these patterns have relationships of significance. There are many different ways to study disordered eating and this study only goes into four of the variables that were thought to be of importance. This is an extensive field and multiple other areas need to be studied.

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