Article title: Examining multidimensional risk factors for all populations affected by eating disorders

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Examining multidimensional risk factors for all populations affected by eating disorders

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Abstract

Decades of studies conducted on eating disorders have given researchers a better understanding of the risk factors of eating disorders. Nevertheless, the complexity of eating disorders results in studies only being able to test a limited sample population, making it difficult to generalize results to the general public. Research must also actively investigate the effect of ongoing technological advancements that have transformed the way people interact with one another on the development of eating disorders. The current study used a literature review style approach to address these current limitations in eating disorder research by analyzing all populations that are affected by eating disorders and the involved risk factors. The research question that this study sought to answer was why only a certain group of individuals develop eating disorders when the entire population is exposed to risk factors. The main hypothesis of this study was whether the internalization of an ideal body style different from the one that an individual currently had while using maladaptive ways to achieve this ideal body image was sufficient to developing an eating disorder. The results supported the hypothesis, as the common theme among all sample populations was that the idealized body style, shape, and size was simply different from the one that individuals currently had. The extent to which this different body style was internalized as well as the extent to which maladaptive measures were taken to achieve this ideal body image was associated with increased vulnerability and likelihood of developing an eating disorder.

Key words: eating disorders, risk factors, thin ideal internalization, social media, adolescent, college, athlete, celebrities, intervention, prevention.

Introduction

The eating disorders continuum

Eating disorders fall under the category of psychiatric disorders that involve pathological eating habits and changes in lifestyle patterns. These lifestyle patterns include changes in thoughts and behaviors regarding food. The three main types of eating disorders are anorexia nervosa, bulimia nervosa, and binge-eating disorder. Anorexia nervosa is an eating disorder characterized by weight loss or the difficulty in maintaining a healthy weight for the individual's height, age, and stature. Anorexia nervosa is usually associated with the restriction of certain types of foods, especially those that are high in fat and calories. Bulimia nervosa is an eating disorder characterized by episodes of extreme overeating, which then leads to depression and a sense of guilt, ultimately leading to self-induced vomiting. Lastly, binge-eating disorder is characterized by irregularly eating large amounts of food and an overwhelming sense of a lack of control.

These three main eating disorders are seen as clinical eating disorders; however, there are also many other cases of subclinical eating disorders (Becker et al., 2011; Coelho et al., 2014; Greenleaf et al., 2009; Knapp et al., 2014). These subclinical eating disorders are oftentimes undetected in the general population because symptoms of eating disorders may not be as prevalent or as severe, therefore not meeting the diagnostic criteria of clinical disorders. Nevertheless, both clinical and subclinical cases of eating disorders have been proven to be equally damaging to the daily lives of these individuals. Research is now acknowledging that eating disorders fall under a continuum of the varying degrees of eating disordered habits, which contribute to eating disorders (Knapp et al., 2014; Peck et al., 2008). It is important to note that the prevalence rates of these eating disorders differ depending on age, gender, and lifestyle of the population of interest. Prevalence rates may also not take into account the prevalence rates of subclinical eating disorders in the population. Ultimately, the prevalence of clinical and subclinical eating disorders is predicted to be higher than what the research shows.

The need to study eating disorders

Food and water are the foundational basis at the heart of survival in a human. In other words, the human's body and brain are wired to survive and these eating disorders attack the basic survival mechanisms of a human. This ultimately results in eating disorders having the highest mortality rates among all psychiatric disorders (Coelho et al., 2014). Despite this fact, however, countries around the world view this issue with varying levels of gravity and seriousness, and some do not consider this an issue at all. Such attitudes have lasting consequences, including a lack of resources for eating disordered individuals or health advocates to increase awareness and to prevent eating disorders. This causes people with eating disorders to have more problems and delays with their process of getting better. Due to the difficulty of getting better, there are higher chances of relapse in individuals who have been previously treated (Arthur-Cameselle et al., 2014; Becker et al., 2011; Guarda et al., 2015). Recent studies have shown that higher rates of relapse in eating disorders are similar to the patterns of high relapse in substance abuse, ultimately revealing how easily and frequently individuals with eating disorders can relapse (Guarda et al., 2015).

Risk factors for developing eating disorders

Considering how the fundamental mechanism of survival is targeted in eating disorders and how high mortality rates are, there are also a number of risk factors that contribute to the

development of eating disorders. The most common factors include stress and societal norms of the environment. Stress has been the basis of eating disorders in any given population (Diest et al., 2013; Gluck, 2006; Klatzkin et al., 2018; Monteleone et al., 2011; Naumann et al., 2018; White et al., 2016). Societal norms and certain standards of beauty have also been a major contributing factor to the development of eating disorders (Bamford et al., 2009; Meier et al., 2014; Petrie et al., 2009). At risk individuals may participate in obsessive and harmful behavior in order to fulfill their desire to achieve this societal standard of beauty.

Past research has shown general categories of risk factors that both influence and interact in individuals who develop eating disorders. These risk factors include psychological factors such as stress, low self-esteem, and dissatisfaction with body shape and size (Bamford et al., 2009; Blaase et al., 2001; Durso et al. 2011; Walker et al., 2015); biological factors that include predisposing factors such as having a family member with a history of eating disorders (Sundgot-Borgen et al., 1994); and lastly, sociocultural factors which include growing up in a culture that frequently exposes its members to thin ideals, and varying levels of social pressure to conform (Jung et al., 2016; Diest et al., 2013; Young et al., 2001). There is also the effect of lifestyle, including having a job that emphasizes physical appearance or participating in sports where physical appearance is evaluated (Becker et al., 2011; Bratland et al., 2013; Coelho et al., 2014).

Populations at risk for developing eating disorders

People all around the world have the possibility of developing an eating disorder due to this disorder's association with food, which all humans rely on for survival. Nevertheless, the population most at vulnerable to eating disorders are adolescents and young adults (Jung et al., 2016; Keel et al., 2013; Meier et al., 2014). Individuals who are adolescents or young adults are still in the process of forming and shaping their identities, which make them more susceptible to the environment they inhabit and more likely to be affected by surrounding influences. Adolescents in particular are in various stages of puberty, which results in more variable and sometimes impulsive decision making and unstable impulse control.

Just as the environment affects the probability of developing eating disorders, the lifestyle of a person also has a major effect on eating disorders. For instance, athletes, actresses, singers, idols, models, and other celebrity figures all have jobs that require them to focus on their public image. Individuals with jobs in the entertainment industry as well as athletes are pressured by the public environment to reflect the societal norms and ideals of attractiveness. Athletes involved in a sport from a young age can also be more susceptible to body image dissatisfaction and developing an eating disorder if their body develops in a way that no longer matches the ideal body image of their sport (Bratland et al., 2013; Coelho et al., 2014).

Women in general have a higher chance of developing an eating disorder; however, it is a misconception to believe that men are not at risk of developing eating disorders. As a result, more research has been devoted to studying women with eating disorders. Nevertheless, it is imperative for more research to be conducted on men with eating disorders.

Types of eating disorder research and limitations

The majority of eating disorder research has been correlational, and specifically cross-sectional or longitudinal, in design. While cross-sectional studies focus on observing the factors associated with eating disordered behaviors, longitudinal studies observe the factors associated with eating disordered behaviors at two different time points, with the follow-up study occurring one to five years later. An experimental research design is most reliable and informative in

establishing a causal relationship among variables. Nevertheless, cross-sectional or longitudinal studies have been used for the majority of eating disorder research due to ethical reasons. Assigning a specific eating disorder to participants would be impossible as well as unethical in official research settings.

There are a few social media influencers who have publicly conducted self-experiments related to eating disorders using platforms such as YouTube and Instagram. Some notable mentions include Stephanie Buttermore and ErikTheElectric on YouTube, and Morgan Spurlock through his 2004 film “Super Size Me.” Although these self-experiments have a sample size of one individual, and therefore their results cannot be generalized to the public, their insights should not be disregarded and potentially be used as inspiration for research that can be conducted on a larger scale.

Consequently, a non-experimental research design leads to the main limitation of eating disorder studies. Since most eating disorder research is based on correlational studies, researchers can only study the relationship or the association between certain factors or variables and eating disorder development or behaviors. Correlation does not imply causation, so researchers cannot determine which factors cause eating disorders. However, through correlational studies, researchers can still determine if a certain factor is a risk or an associating factor with eating disorder behavior.

Research on eating disorders has proven to be insightful and informative to scientists as well as the general public. However, another major limitation of eating disorder research is how data is collected since most studies have been conducted using self-report data (e.g., questionnaires). The limitation specifically stems from how self-report data is susceptible to memory recall bias and/or social desirability bias. Memory recall bias or an accuracy error caused by differences in the participants’ memory regarding past events or experience, and social desirability bias or the bending of truth and even lying at times to present a positive image of oneself, generally occur due to the fear of being judged. Ultimately, all of these factors have an effect on the reliability of research experiments as they can affect the accuracy of the data that is collected.

The gap in eating disorder research

Over the years, many studies and research have been done to better understand eating disorders. Nevertheless, there are certain gaps or not yet fully understood areas in eating disorders that require further research. These areas requiring further research can be categorized into four general groups: the effect of environment, gender, media, and lifestyle on the development of eating disorders. More specifically, further research must be conducted on the effect of one’s environment, including the influence of culture and the high school environment, on eating disorder development. The influence of culture should include the effect of tradition, the importance of physical appearance, and the different societal beauty standards set by the culture being studied. In addition, since most eating disorder research has been disproportionately focused on the female population, the effect of eating disorders on the male population must be further investigated.

Media has drastically changed over the years and it continues to change with advancements in technology. While there are a number of more recent studies that have studied eating disorders in the context of the Internet and social networking sites, the vast majority of eating disorder research has been studied in the context of magazine or television. The number of users on social networking sites will only continue to grow; therefore, future research must take

into consideration how such trends and advancements in technology have an impact on eating disorders.

Similar to how the effect of the Internet and social networking sites on eating disorders requires more extensive research, subclinical eating disorders need to be better understood. Understanding these subclinical eating habits and behaviors can better aid in the process of diagnosing individuals who are suffering from a range of eating disorders earlier on. Researchers around the world have already found various risk factors for the development of eating disorders; however, all of these factors affect individuals to a different extent depending on the specific lifestyle that the individual leads. While a great number of studies has been conducted on the effect of age on eating disorder development, the factor of lifestyle has not been investigated to the same extent. Researchers face the challenge of finding which of these unique, interacting factors influence the individuals of different groups and ultimately contribute to them developing eating disorders.

Purpose of the current study

Decades of research has been done to study eating disorders, resulting in the cumulative effect of better understanding the risk factors, causes, and prevention of eating disorders in people. However, eating disorder research comes with the limitation of being observational in design and only being able to test a sample population that meets a specific set of criteria. Limited sample populations make it difficult for the results of eating disorder research to be generalized to the public. In addition, a single study on eating disorders is limited in the scope of what it can analyze about this complex issue. Every single study that has been conducted on eating disorders has greatly contributed to what researchers know about this topic, but each study only captures a part of the whole story. Lastly, due to ongoing technological developments and advancements, the world that we live in is constantly changing. Research is catching up to better understand the effects that technological advancements have on eating disorders; however, more studies need to be conducted that are relevant to the times that we currently live in.

Therefore, the purpose of this current study was to address these limitations in eating disorder research by analyzing all populations that are affected by eating disorders and all the factors that are involved in contributing to the development of eating disorders in these populations. The research question that the current study sought to answer was why only a certain group of individuals develop eating disorders when the entire population is exposed to risk factors, such as thin ideal images. One of the goals of this study was to understand what caused these groups of individuals to develop an eating disorder and what were the interacting factors unique to each sample population. Another goal of this study was to draw an overall conclusion about the risk factors for developing eating disorders that were common across all these sample populations. The current study sought to use a literature review style approach to piece together all the “parts” that each eating disorder research article told in order to see and understand the bigger picture. The main hypothesis that this study tested was whether the internalization of an ideal body style that was different from the current one an individual had and using maladaptive ways to achieve this ideal body style were sufficient to make the individual vulnerable to developing an eating disorder.

Methods

Search engines such as Google Scholar, as well as journal databases including PubMed, JSTOR, and EBSCO, were used to access eating disorder research studies spanning from 2000 to

2021. Key words used to find relevant research studies were eating disorders, anorexia, bulimia, binge eating disorder, clinical eating disorders, subclinical eating disorders, risk factors, predisposing factors, depression, anxiety, stress, children, adolescent, females, males, athletes, nonathletes, social media, celebrities, models, screening, intervention, and prevention. The majority of research studies were conducted in the United States; however, a few studies that were conducted in European countries as well as South Korea were included in the current study. For each research article, the following factors were further analyzed: the sample population, the reported prevalence of eating disorders of that sample population, race and ethnicity of the sample population, the country and regions where the study had taken place, the factors that were studied, the questionnaires, interviews, and tests given to the sample population, and the overall conclusions.

Discussion

Eating disorders and social media

With the rise of social media usage in recent years, an increasing number of studies is investigating the effect that social media has on the development of eating disorders. Before modernity, people did not have the Internet to access social networking sites. Now, especially due to the recent COVID-19 pandemic, people's reliance on social media will continue to rise as it is the only safe way of communicating and interacting with one another. The rates of eating disorders are on the rise as well, which makes it more important to research how social media can be a risk factor for developing eating disorders.

Previous research has consistently shown that exposure to the thin ideal message is a risk factor for internalizing the thin ideal, developing body dissatisfaction, and eventually developing an eating disorder (Calogero et al., 2005). Before advancements in social networking sites, people were primarily exposed to the thin ideal message through television and magazines. Now there are numerous platforms that are being used to spread the thin ideal message. TikTok is a major social media platform that peaked in popularity in 2020, showcasing many different videos including a variety of content related to body image such as exercising regimes and "healthy" eating. Social media users who gain popularity from posting such videos are known as "influencers," but it is important to note that influencers may not always have a beneficial impact on the daily lives of viewers. For instance, in many of these videos, influencers show an inaccurate representation of what they eat in a day, contributing to misunderstanding among viewers. These misunderstandings can become dangerous if viewers compare themselves to influencers and find themselves lacking in comparison.

The way individuals use social networking sites will determine if they have a negative or positive impact on users. Certain positive or adaptive ways of using social media is for communication or spreading positivity. However, negative or maladaptive ways of using social media is for reinforcing the thin ideal image, social comparisons, and "fat talk." Fat talk is usually observed in the conversations of people who have eating disorders or are self-conscious of how they look. Before the rise of social media, fat talk would take place in person. But now, social networking sites are additional platforms where individuals can continue to have these conversations, which are ultimately harmful to their wellbeing and how they view their bodies.

In addition, social media provides countless opportunities for individuals to engage in social comparisons. Social comparison can occur in many different contexts but more importantly, anyone can and do participate in social comparison. Individuals can compare their lifestyle, appearance, social status, and many other aspects of their lives to what they view on

social media as well as to other people in their social circle. When individuals begin to engage in social comparison of their body weight and shape on social media, it is consistently associated with greater thin ideal internalization, self-objectification, weight dissatisfaction, and drive for thinness (Bamford et al., 2009; Brown et al., 2016; Calogero et al., 2005; Hesse-Biber et al., 2006; Meier et al., 2014).

More research is studying the effect that different social networking sites have on the development of eating disorders and attitudes. These studies have investigated the effect of sites such as Facebook, Instagram, Pinterest, etc. and how different features on these sites can have both positive and negative effects related to eating disorders (Brown et al., 2016; Hummel et al., 2014; Meier et al., 2014; Pepin et al., 2015). Most of these studies are cross-sectional but a number of them have been longitudinal in design. Research is showing that simply spending a lot of time on social media does not predict the development of an eating disorder. Instead, the type of features that individuals use most often predicts if they will develop eating disordered attitudes or behaviors later on.

Features that were associated with eating disorders included using photo features for physical comparisons of body shape, engaging in conversations harmful to self-esteem (e.g., fat talk), and posting status updates related to physical appearance, weight gain or loss, eating habits and/or eating disorders (Hummel et al., 2014; Meier et al., 2014; Narduzzi et al., 2000; Walker et al., 2015). Individuals more vulnerable to developing eating disorders were more likely to compare their body shape and weight with those around them, especially with people on the Internet, leading them to become more obsessed with having a certain body shape or weight (Brown et al., 2016). As expected, this obsession can become increasingly harmful to the affected individuals' daily lives and or/relationships with people. Maladaptive communication among people with or vulnerable to eating disorders also cause them to view themselves more negatively, resulting in them collectively becoming more self-conscious and losing confidence in their body image (Hummel et al., 2014; Walker et al., 2015). Additionally, individuals who upload status updates with maladaptive content harm those around them as well as themselves, as these posts can affect the way people think and view various factors related to eating disorders.

Just as the aforementioned factors are related to people using social media in maladaptive ways, if social media was used in adaptive ways, the risk of developing eating disorders would decrease. In addition to building awareness of how to use social media in adaptive ways, early education in media literacy may also show positive results (Brown et al., 2016). While more research is being conducted to study the effect of social media on eating disorders, future research needs to be conducted in relation to new features and apps that are added to popular social networking sites. Studies must also study the effect of social media on a wider variety of participant populations as most research currently focuses on high school and college users of social media only. It is notable to mention that social media in the present time is starting to increase the spread of body positivity as top leading brands are slowly starting to break out of the thin body ideal by incorporating more plus sized models in their marketing. But there is still a long way to go before there will be an end to decades of thin ideal internalization.

Eating disorders in adolescent and college-aged individuals

Adolescents and individuals in their early twenties are generally more vulnerable to developing eating disorders due to their younger age and still developing sense of individuality (Hummel et al., 2014; Jung et al., 2016; Keel et al., 2013; Meier et al., 2014; Walker et al., 2015;

Young et al., 2001). Adolescents go through many phases in life, which usually occur around the time of puberty. When adolescents undergo puberty, they are simultaneously in the process of developing their sense of identity and individuality, making them more susceptible to be affected by external circumstances (e.g., social conformity). Adolescents are also impressionable, which makes it easier for them to be influenced and affected by a variety of factors. These influences can come from peer pressure or the thin ideal messages that are widely spread through media in the form of television, magazines, and social media, all of which almost every adolescent in the twenty-first century now has access to. For certain adolescents, they may have experienced past trauma (e.g., sexual harassment or abuse, bullying, loss of a family member, unstable family environment, homosexuality in young males, etc.) leading them to be more vulnerable to developing an eating disorder (Bratland-Sanda et al., 2013; Coelho et al., 2014; Young et al., 2001).

Although college-aged students may have a stronger sense of identity, the social environment of college increases the risks of developing an eating disorder. These social environments can include having roommates or living with sorority members who currently have an eating disorder (Crandall et al., 1988). While these kinds of social environments may not be harmful to some, there are always a number of individuals who are negatively impacted by these external factors and ultimately lead them to developing an eating disorder as well.

Eating disorders in athletes

A growing number of studies has been conducted on eating disorders in female athletes. It is important to note that there is a subclinical eating disorder specific to athletes called anorexia athletica (Coelho et al., 2014; Sundgot-Borgen et al., 1994). This condition was first recognized among athletes who would restrict their nutrient consumption but not to the point of being diagnosed with anorexia nervosa. Individuals who have anorexia athletica would maintain a state of reduced energy intake and body mass despite having high levels of physical performance, all of which is a sign of a subclinical eating disorder. The unique set of risk factors that athletes face contributes to their risk of developing anorexia athletica in addition to clinical eating disorders.

The prevalence of eating disorders in female and male athletes are higher compared to the general public due to the lifestyle and nature of being an athlete. Specifically, previous studies have shown that the prevalence of eating disorders is higher in female athlete populations compared to that of the general female public population; likewise, the prevalence of eating disorders is higher in male athlete populations compared to that of the general male public population (Coelho et al., 2014; Knapp et al., 2014; Sundgot-Borgen et al., 1994). In particular, female athletes are vulnerable to the health risks of eating disorders, which is known as the female athlete triad, comprised of low energy availability (with or without an eating disorder), decreased bone mineral density, and menstrual dysfunction (Becker et al., 2011; Knapp et al., 2014). Although these health effects of eating disorders may not be as detrimental to a non-athlete, athletes practice an average of six days per week for several hours each day. This results in a significant number of calories being used up during exercise but not enough energy to maintain such high levels of activity, ultimately causing injuries or future problems for the athlete (Coelho et al., 2014).

It is important to note that athletes have different levels of commitment to their sport and this affects how detrimental eating disorders will be to their health. Past research has studied athletes ranging in age from high school all the way up to the 40s age range. The level of

commitment and exercise athletes are involved in on a regular basis also varies depending on whether they are playing the sport recreationally or professionally. The majority of eating disorder research have been conducted in collegiate female athletes, usually from universities with NCAA Division I or III teams (Arthur-Cameselle et al., 2014; Greenleaf et al., 2009; Knapp et al., 2014; Petrie et al., 2009). In these female college athletes, certain characteristics such as perfectionism and competitiveness may be encouraged or seen as necessary to have a successful athlete career (Coelho et al., 2014). But having these characteristics in the general public are seen as risk factors for developing eating disorders. Therefore, better criteria and screening methods are needed to accurately determine which athletes are at risk (Knapp et al., 2014).

Additionally, past studies have categorized sports in different ways; the most common way of categorizing sports is into “lean” and “non-lean” groups. Examples of lean sports include gymnastics, cheerleading, figure skating, diving, etc. Examples of non-lean sports include basketball, soccer, volleyball, weightlifting, etc. Another factor to consider in lean and non-lean sports is how much pressure is put on the athlete to fit the “ideal body type” in order to perform at the most optimal level; in order to achieve the best performance, athletes are encouraged to lose weight and build muscle for exceptional results (Becker et al., 2011; Knapp et al., 2014; Petrie et al., 2009). The constant need to achieve this standard results in an obsessiveness to regulate their weight and body image (Tackett et al., 2016). The attire of athletes also has an impact on their sense of body image as more form-fitting uniforms result in greater exposure to the public audience, causing athletes to be more aware of how they look in other people’s eyes (Greenleaf et al., 2009; Sundgot-Borgen et al., 1994; Zucker et al., 1999). This is especially true in the cases of lean sports such as gymnastics and divers who need to wear form-fitting and body shape exposing attire for their sports.

Along with the pressure of being exposed to the public audience, female athletes have to confront changes in their body shape and size as their body develops throughout the process of puberty. Puberty is defined as the process of physical change through which a child’s body matures into an adult body. Although this may be a natural process to non-athletes, it has an additional and significant impact on an athlete. Female athletes fear getting their first menstruation too early as athletes want to be able to maintain their performance and to further develop their skills (Sundgot-Borgen et al., 1994). As an athlete’s body shape changes during puberty, the athlete may find it difficult to learn new skills; when this tension continues for long periods of time, it may affect the athlete mentally as well as physically. In addition, athletes who start training competitively at an early age are more at risk for developing eating disorders (Bratland-Sanda et al., 2013; Coelho et al., 2014). As a result of puberty, if an athlete’s body changes so that her body does not fit the ideal body type of the sport, this is a risk factor correlated with disordered eating attitudes and behaviors.

There are additional factors that athletes face putting them at risk for developing eating disorders. Competitive athletes are constantly comparing themselves with their teammates in terms of body shape and skill level. Athletes are constantly socializing with their teammates whenever they practice and go to meets, which creates more opportunities to participate in comparisons with each other as well as comparisons with athletes from different teams. When an athlete is insecure about how she is performing, engaging in comparison may lead the athlete to place the blame on her physical attributes. Perfectionism in athletes can have both positive and negative effects on their performance. This quality is what drives athletes to perfect their skills and to perform their best; however, it can be pursued to an extreme extent which can ultimately harm the athlete.

Other factors that can affect athletes and their performance are weight fluctuations, dieting, injuries, and coaching style. Weight fluctuation is an everyday occurrence that most people do not pay attention to. However, athletes who are sensitive towards their weight may notice even a half-pound difference in their weight. They may not realize that the apparent weight gain is due to post-exercise bloating or swelling and incorrectly attribute it to weight gain from food consumption. In addition, depending on the situation, athletes may have to resort to dieting on a frequent basis. For weight-class sports, athletes must be a certain weight in order to compete. These athletes may have to resort to extreme measures to meet a certain weight level (Tackett et al., 2016). To gain weight, they may overeat to the point of discomfort, and to lose weight, they may not drink water or exercise with extra layers of clothing to promote more sweating. In addition to these extreme measures, the most common practice observed among athletes is dieting. Unless an athlete's team has access to a professional nutritionist and dietitian, athletes most likely do not have reliable sources or techniques to lose weight in healthy ways. Some athletes may only have access to information online, which may give unrealistic diet plans for the athlete's body shape and lifestyle.

Female and male athletes may participate in different unhealthy behaviors to reach a certain body shape and weight (Sundgot-Borgen et al., 1994). A majority of female athletes tend to risk their health by restricting too many calories while expending calories through exercise. Having low energy availability contributes to additional risks for injuries during exercise as well as osteoporosis. Male athletes have been reported to resort to steroids to gain muscles and to reach their ideal body image standard, which will have devastating side effects including cataracts, osteoporosis, and high blood sugar levels leading to diabetes, if the steroids are taken for long term (Bratland-Sanda et al., 2013).

Furthermore, coaching style and getting injured are additional risk factors for athletes (Bratland-Sanda et al., 2013; Quatromoni et al., 2016). Just as there are different teaching styles among teachers and professors, sports coaches also have different coaching styles. Some coaches may be more encouraging and supportive, which has been shown to reduce the risk of eating disorders. Other coaches may be more critical with an athlete's performance and preoccupied with body weight, which has shown the opposite effect of increasing body image anxiety, dieting, and fear of fatness. A coaching style that incorporates both encouragement and criticism would be most ideal; however, a coach's teaching style may not deviate much from the way the individual was taught to coach. Depending on the type of relationship that the athlete has with his or her coach, athletes may or may not hide that they have an eating disorder. The fear of getting caught by the coach and being forced to not participate in the sport may be great enough that the athlete would go to extreme lengths to keep their eating disorder a secret (Arthur-Cameselle et al., 2014). However, the fear of discovery and keeping an eating disorder a secret is dangerous for an athlete because it can either cause problems concerning their future career as athletes and their health in general.

Injuries are an occurrence that can happen to anyone, whether you are an athlete or not. But to an athlete, an injury can either be a temporary setback or have a significant impact on their lives as athletes (Sundgot-Borgen et al., 1994). Athletes usually gain weight while recovering from an injury since they cannot exercise as much as they usually do. Once they recover, having to retrain their bodies in addition to losing weight may add too much pressure on the athlete, which can make them more vulnerable to developing an eating disorder. In some ways, injuries can be seen as a "failure" to athletes since they are expected to know how to keep their own bodies safe from harm. Therefore, when an athlete is injured the blame is most often

placed on the athlete. Injuries can also cause permanent damage, which can prevent the athlete from being able to further develop their skills (e.g., physically hurting, mental block). With all the restrictions that come after the injury, the athlete can start to lose confidence, which ultimately affects how the athlete views themselves and their bodies.

Eating disorders in models and celebrities

Certain jobs in the world are known to have specific body shape and size requirements to be able to have a successful career. One of these cases are models and celebrities. Models around the world are pressured to meet specific body sizes and ideals in order to display clothes that are designed for the runway or photoshoot. This is perpetuated by the fact that companies produce sample clothes in a very limited range of sizes to increase their profit gain. When they do not meet these standards, models are either forced to lose weight through whatever means necessary or lose their runway or photoshoot job. The nature of this occupation to fit a certain body ideal makes models vulnerable to developing eating disorders. Celebrities share a similar pressure with models. When celebrities become more famous or well known in either their country or internationally, they are in the spotlight of attention and immense pressure is placed on them to maintain a certain image publicly as well as physically. The constant need to reflect a certain ideal body image makes celebrities vulnerable to eating disorders as well.

Models and celebrities alike are more subject to receiving negative feedback from the general public, especially through social media where they are connected to their followers. The main difference between models and celebrities is how much of their personal information is readily available to the public. Celebrities tend to be more open about sharing their personal life and lifestyle to the public, which may humanize them more and lessen the pressure that is placed on them. Unlike models Gigi Hadid, Bella Hadid, Kendall Jenner, etc. who are celebrities as well as models, regular models may be more readily objectified and exposed to harsher criticism.

The social environment and culture that these celebrities and models come from also have a significant impact on whether they are vulnerable to eating disorders or not. Certain countries around the world are known to be more critical as well as judgmental when it comes to viewing people with public profiles. For instance, South Korea's 2018 Miss Korea model was severely cyberbullied for her weight despite looking fit and being in a healthy weight range. This is mainly due to cultural differences in how models and celebrities are viewed in different countries and regions of the world.

There are a limited number of studies conducted on eating disorders in models and celebrities. The research that has been done mainly involve case studies of a famous individual and his or her struggle with an eating disorder. Therefore, future studies that are cross-sectional or longitudinal in design must be conducted to better understand the unique set of interacting factors that are associated with and can predict eating disordered attitudes and behaviors in the population of models and celebrities.

Eating disorders and ethnicity

The factor of ethnicity must also be taken into consideration in any given population. It is important to note that the thin ideal image that dominates western countries is not the universal beauty standard. There are countries in the world with different ethnicities that idealize larger body sizes. One study conducted on Black women in Curacao were protected from developing anorexia nervosa due to their traditional values which embrace a larger body ideal (Hoek et al., 2005). The effect of internalizing either a thinner or larger body ideal was observed in a

fascinating study conducted on a population of “media-naïve” Nicaraguan men and women. After dividing the population into two groups, photographs of either thin or plus sized fashion models were shown to both groups. Each group’s exposure to med images shifted their ideal female body size, either to a thinner ideal if the group was previously shown images of thin models or to a larger ideal if the group was previously shown images of plus sized models (Jucker et al., 2017). Therefore, globalization can become a risk factor as many beauty standards around the world are increasingly affected by westernization (Diest et al., 2013; Jung et al., 2016; Keel et al., 2013; Young et al., 2001). This phenomenon has been studied in South Korea, where the country as a whole has adapted and internalized western beauty standards, resulting in an increase of breast and buttock augmentation surgeries (Jung et al., 2016).

Further research must be conducted to study the effect of globalization on ideal body standards especially if people live in a heterogenous society exposed to conflicting ideal images. Therefore, is it important to study ethnicity as an additional factor in future studies since it has a major impact on people’s vulnerability to developing eating disorders. The representation of diverse ethnicities is not usually seen in the majority of studies conducted on adolescent, college-aged, or athlete populations. These studies tend to have sample populations in which the majority of participants are Caucasian. Future studies can control for the variable of ethnicity by recruiting participants of diverse ethnicities and attempting to represent them equally.

Interventions and solutions for individuals with eating disorders

Some promising solutions to address eating disorders in the general population involve a combination of early education, early intervention, and more accurate screening methods. Recent preliminary studies have shown that students who were encouraged to attend workshops about eating disordered attitudes and behaviors during college orientation reported increased awareness about risk factors and knowledge of how to receive help for intervention. Studies are further showing that educating children as early as nine years of age regarding healthy eating habits and body image are important for developing a positive attitude towards their body weight and size.

Body positivity and media literacy education should be incorporated into children’s education whenever possible. Especially now as people rely more heavily on the Internet and social networking sites to safely interact with one another during the pandemic, media literacy education must be prioritized from an early age. Educating children and adolescents, even adults, about how to decode the reliability of media messages, to analyze and understand the influence of such messages, and to create media messages responsibly will have a lasting, positive impact in multiple ways (Meier et al., 2014). Media literacy would enable children and adolescents to think critically when using the Internet and help to prevent thin ideal internalization and maladaptive use of the Internet (Brown et al., 2016). Parents and guardians should also be involved throughout these processes. Workshops and seminars geared towards educating parents and guardians about eating disorders in their children would allow them to be involved in early intervention as well as to not subconsciously contribute to the development of eating disorders.

Early intervention is especially important for adolescents because due to their younger age, it is highly likely that they have been suffering from an eating disorder for a shorter period of time compared to adults who have an eating disorder. Adolescents who are at risk or show symptoms of subclinical or clinical eating disorders should immediately be encouraged to seek professional treatment and therapy before their symptoms worsen. For early intervention and accurate screening methods to be effective, pediatricians and primary care physicians should be encouraged to include in their annual physical assessments an additional evaluation of whether

or not their patients are at risk or showing signs of an eating disorder. Such a collaborative effort involving education, intervention, and involvement by professionals would make a long-term impact in preventing eating disorders as well as treating individuals who suffer from eating disorders.

Interventions and solutions specific to athlete populations

Although it is especially dangerous for athletes to develop an eating disorder, it is paradoxical in how the athletic environment can have negative effects but can also provide motivation for the athlete to recover from their eating disorder. Athletes who have suffered from eating disorders are at times motivated to recover because of their desire to be strong and healthy enough to give all of their efforts in performing their sport. Athletes are also motivated to recover and become healthy as they once were because of their devotion and love for the sport (Arthur-Cameselle et al., 2014). However, unless athletes realize that there is more to their sport than achieving an ideal body shape and weight, their recovery process will be negatively impacted, and it will be harder for them to acknowledge that they need to be fit and healthy to perform at their best (Becker et al., 2011).

Screening and intervention methods should be tailored to acknowledge and meet the unique needs and challenges of athletes (Coelho et al., 2014; Knapp et al., 2014; Quatromoni et al., 2016). Questionnaires to screen whether athletes have an eating disorder or not must be adapted from questionnaires to screen the general population because athletes not at risk for an eating disorder may display behaviors such as perfectionism, competitiveness, and high levels of exercise, which would likely be indicators of an eating disorder for a non-athlete (Ackard et al., 2002; Guarda et al., 2015). There is growing evidence that these questionnaires should be further adapted depending on the specific sport that the athlete is involved in, especially if it falls under the weight-class or lean sports categories. Athletes should be screened periodically by professionals as part of their mental and physical check-ups to increase chances of early intervention if signs of a subclinical or clinical eating disorder are discovered (Bratland-Sanda et al., 2013; Coelho et al., 2014; Reinking et al., 2005). Moreover, athletes who currently suffer from an eating disorder and are hiding it out of fear should receive the help, treatment, and therapy they need with the promise of being able to return to participating in the sport when they fully recover.

In addition, coaches should receive mandatory education regarding the development of eating disorders (Bratland-Sanda et al., 2013). Since coaches are responsible for the mental and physical wellbeing of their athletes, they should be educated regarding how certain coaching styles can contribute to athletes' vulnerabilities towards developing an eating disorder. Coaches who are trained to observe signs of an eating disorder would be able to provide early intervention and to help guide their athletes towards recovery rather than worsening their symptoms. Whenever possible, sports teams should either hire or give their athletes access to a certified nutritionist or dietitian (Coelho et al., 2014; Greenleaf et al., 2009). These professionals would be able to give athletes the proper resources and guidance to eat and exercise in healthy ways.

Furthermore, as research on eating disorders in athletes has mostly been conducted in female athletes, future research should include male athletes. Preliminary research is showing evidence of a male athlete triad, but more studies must be done before a conclusive set of factors can be associated with eating disorders in male athletes (Bratland-Sanda et al., 2013). Research has shown that the athletic environment as a whole does not cause eating disorders in athletes since only a certain percentage of athletes go on to developing a subclinical or clinical eating

disorder. There are a unique set of interacting factors that cause athletes to become vulnerable to developing eating disordered attitudes and behaviors, and specifically more longitudinal studies must be done to determine which factors are accurate predictors.

Conclusion

The purpose of this study was to better understand the risk factors unique to each sample population vulnerable to developing eating disorders in order to ultimately comprehend the bigger picture of what caused eating disorders in the general public. By better understanding the unique interacting factors that put the individuals of that population at risk for eating disorders, methods of intervention and solutions can be created to specifically target that population. This would allow such solutions to have a greater and more effective impact in both treating and preventing eating disorders for the specific population at hand. Moreover, the results supported the hypothesis of this study; the common theme among all the sample populations that were studied was that the idealized body style, shape, and size was simply different from the one that individuals currently had. Depending on the culture and society that individuals lived in, the media may have idealized a generally thinner or bigger body shape and size. Nevertheless, the extent to which this different body style was internalized and the extent to which an individual would try to achieve this ideal body style, especially if maladaptive measures were taken, was associated with increased vulnerability and likelihood of developing an eating disorder.

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