Risk of Eating Disorders Among Female College Athletes Vs. Female Non-Athletes and the Influence of Social Media Usage

Tara Kibe

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RISK OF EATING DISORDERS AMONG FEMALE COLLEGE ATHLETES VS. FEMALE NON-ATHLETES AND THE INFLUENCE OF SOCIAL MEDIA USAGE

A Thesis
Submitted to the School of Graduate Studies and Research
in Partial Fulfillment of the
Requirements for the Degree
Master of Science

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This study investigates the risk of eating disorder among female college athletes versus female non-athletes and the influence of social media usage. Participants were randomly selected from Indiana University of Pennsylvania (IUP) as well as from the 10 female athletic teams at IUP. This study used demographics, the Eating Attitudes Test 26 (EAT-26), and a social media usage questionnaire to examine the relationship of eating disorder risk and social media usage with athlete status.

Previous research on this topic found mixed results when comparing female athletes and female non-athletes. However, Kirk, Singh, and Getz (2012) found that the female non-athlete group scored significantly higher on the EAT-26 than the female athlete group, scoring at a 20 or above, meaning more likely to be at risk for an eating disorder.

Participants in this study who were reported to be at risk for an eating disorder were mostly part of the female non-athlete group, finding significance in this study. There was also a relationship between age and social media usage among the two groups.
ACKNOWLEDGEMENTS

I would first like to express my gratitude to Dr. Richard Hsiao for his support and encouragement throughout this whole research process and encouraging me to do research involving the sport industry. In addition, I would like to express my deepest appreciation to Dr. Pao Ying Hsiao, who met with me weekly, allowing me to spend countless hours in her office and through email assisting me with the process and guiding me with my research. Thank you for taking the time and pushing me to do my best with this project. I would also like to thank my committee member, Dr. Yongtao Cao for assisting me with my statistics and meeting with me several times whenever needed constantly providing me encouraging feedback. Without you, I would not have been able to get the results that I did. Thank you all for your support and showing me that I can do anything if I take the time and effort to do so.

In addition, I would like to express my deepest appreciation to my family, closest friends, and the other graduate assistants in the Kinesiology Department for providing me support throughout the process and constantly reassuring me that I could do it.

Thank you,

Tara Kibe
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The number of female college athlete respondents versus female non-athlete respondents
CHAPTER I

INTRODUCTION

Although participation in sports should prevent athletes from developing eating disorders, there is evidence to support increased risk of eating disorders among college female athletes. In the past decade, the prevalence of eating disorders has increased tremendously (Kirk, Singh, & Getz, 2001). There have been female athletes and non-athletes who have lost their lives suffering from eating disorders, bringing awareness to this disease. In fact, it is estimated that 4% to 20% of females who are diagnosed with an eating disorder will eventually die because of unresolved symptomatology if full recovery is not achieved (Kirk, Singh, & Getz, 2001). There is lack of education provided to today’s college students about what exactly an eating disorder is. Many people believe that someone with an eating disorder can “pull themselves together if they wanted to” but that is not the case.

Today, professionals are becoming more aware of eating disorders as they consider them to be chronic conditions, frequently with poor outcomes (Duffy & Henkel, 2016). In fact, the mortality rate associated with anorexia nervosa (AN) is the highest among all mental disorders (Litmanen et al., 2017). Unfortunately, many people with an eating disorder are in denial and therefore, do not take the proper precautions. In the past decade, Becker et al. (2009), provided insight on why it can be challenging as a clinician to help someone with an eating disorder such as AN, or bulimia nervosa (BN). Results from the study found that, “behaviors that impact weight may be difficult for an individual with AN to recognize or endorse. When there is no clinical history provided by family, educators, other clinicians, or friends who can supplement data provided by the patient, a lack of symptom endorsement may be misinterpreted as an absence of symptoms and result in the missed opportunity to recognize a diagnosis of AN.”
Recently, students attending universities have been reported as being a population at high risk of developing an eating disorder. Radwan et al. (2018) believe that they are developing an unhealthy body image of themselves as well as introducing unhealthy eating behaviors.

“Emerging adulthood,” characterized by self-focus, is a period when young adults transition into a new life stage facing many challenges. Today, over-increasing use of social media among college students, is heavily influencing sociocultural expectations including body image (Vetri et al., 2015). College is especially a time when students feel pressure to avoid obesity to conform certainty with living up to college “standards for beauty” (Vetri et al., 2015).

Knowing that college students are experiencing life changes, do athletes feel even more victimized considering they are adding a different level of pressure to their lifestyle? There are plenty of high-profile female athletes and entertainers who have suffered or died from these disorders (Kirk, Singh, & Getz, 2001). Due to societal weight pressures, female athletes are said to be a subpopulation at heightened risk for disordered eating attitudes and behaviors (Carrigan, Petrie, & Anderson, 2015). The type of sport may also impact the degree to which female athletes feel pressure about their weight and its relationship with athletic performance.

“Although many pressures exist within the sport environment that may encourage an unhealthy focus on weight, eating, and appearance, weigh-ins may be particularly salient and damaging for female athletes” (Carrigan, Petrie, & Anderson, 2015).

A study in 2017 found that athletes who participate in different sports where body weight control is recommended, such as running, rowing, gymnastics, and swimming, showed dissatisfaction with their body image and the presence of risk factors for the development of eating disorders even among those who presented a healthy body composition (De Oliveira et al., 2017). Today, there is concern about the media stereotyping body image which results in an
appearance of excessive thinness. Young females are starting to believe that there are “standards in society” therefore, experiencing harmful health measures just to control their body weight. Some studies have recently emphasized that athletes who practice sports characterized by flexibility, art of balance, lightness of movements, and mastery of the body present greater prevalence of dissatisfaction with their body self-image and food restriction (De Oliveira et al., 2017). Because each sport has different recommendations and diets for athletes to follow, examination of the relationship between type of sport and risk of eating disorders should be explored.

**Problem Statement**

The purpose of this study is to examine risk of eating disorders between female college athletes and female college non-athletes in attendance at Indiana University of Pennsylvania (IUP), a Division II state university. Studies in the past have showed conflicted results due to some colleges providing different resources that they are willing to provide to athletes for counseling, academic support, and mentoring (Kirk, Singh, & Getz, 2001). Having these resources can create different social and psychological environments for students. Today, the above-mentioned resources are provided at most college institutions therefore, results should not conflict. Although resources are provided for college students, the prevalence of eating disorders are still going to exist. Body image and social media play a big factor and are becoming more of an issue for female college athletes. Depending on what college they perform at, coaching can be a big factor too, considering the coaches head might be in the “winning” zone and less on student development (Kirk, Singh, & Getz, 2001). This study will further explore relationship of social media usage and the risk of eating disorders. Having even more resources available and more of a support system, reduction of the disorders should slowly form.
Research Questions

RQ1: Are female college athletes at higher risk of developing an eating disorder compared to female non-athletes?

RQ2: Does the risk of eating disorders among female college athletes differ depending on the type of sport?

RQ3: Is there a relationship between age and risk of eating disorders in both female college athletes and female non-athletes?

RQ4: Is there a relationship between social media usage and risk of eating disorders?

Hypotheses

1. Female college athletes are at higher risk of developing an eating disorder compared to female non-athletes.

2. The risk of eating disorders is dependent upon type of sport.

3. There will be a relationship between age among female college athletes and non-athletes.

4. There will be a relationship between volume and frequency of social media use and risk of eating disorders among all college females.

Significance of Study

The findings of this study are significant to female collegiate athletes and non-athletes across the United States. A study by Kirk, Singh, and Getz (2001) reported that between 15% and 62% of college females have pathogenic weight control behaviors. Pathogenic weight control uses a variety of harsh methods to reduce weight, including use of laxatives, diuretics, diet pills, and self-induced vomiting (Kirk, Singh, & Getz, 2001). Eating disorders can have lasting negative outcomes like long-term psychological problems, menstrual dysfunction, electrolyte imbalances, premature osteoporosis, and stress factors to the skeletal system (Kirk,
Singh, & Getz, 2001). In addition to investigating the risks of eating disorders, this study will examine if the risk of eating disorders is greater for certain sports. Moreover, a comparison of risk of eating disorders for female college athletes to non-athletes will provide insight into how to provide more targeted prevention education and intervention.

**Definition of Terms**

Below is the definition of terms to help with the understanding of material that will be presented in this research study.

- **Anorexia Nervosa (AN)**- “Intense fear of gaining weight or of becoming fat, or persistent behavior that interferes with weight gain, even though at a significantly low weight” (American Psychiatric Association, 2013)

- **Bulimia Nervosa (BN)**- “Recurent inappropriate compensatory behaviors in order to prevent weight gain by self-induced vomiting, using laxatives, diuretics, or other medications; fasting; or excessive exercise” (American Psychiatric Association, 2013)

- **Binge Eating Disorder**- “Eating in a discrete period, an amount of food that is larger than what most people eat in a similar period of time under similar circumstances” (American Psychiatric Association, 2013)

- **Eating Attitudes Test (EAT-26)**- “A survey measuring participants’ attitudes about food and discerns diet patterns that are similar to those who are clinically diagnosed with anorexia nervosa and bulimia nervosa” (Garner et. al., 1982)

- **Eating Disorder (ED)**- “Characterized by a persistent disturbance of eating or eating related behavior that results in the altered consumption or the absorption of food which significantly impairs physical health or psychosocial functioning” (American Psychiatric Association, 2013)
• Pathogenic Weight Control- “Includes various harsh methods of weight loss, including self-induced vomiting; use of laxatives, diuretics, and diet pills; and excessive exercise, all of which are symptoms attributed to eating disorders” (Kirk, Singh, & Getz, 2001)

• SCOFF- “A screening instrument consisting of a 5-item questionnaire designed to identify subjects that are likely to have an eating disorder” (Eisenberg, 2011)

• Social Media- “Internet-based channels that allow users to opportunistically interact and selectively self-present, either in real time or asynchronously, with both broad and narrow audiences who derive value from user-generated content and the perception of interaction with others” (Carr & Hayes, 2015)

Assumptions

1. All participants answered every survey question truthfully and accurately.

Limitations

1. Participants may not be truthful or answer all survey questions due to past experiences.
2. The participants may have lack of knowledge or misinterpret parts of the survey.
3. Determining the exact prevalence of an eating disorder in this study sample may not be possible due to possible underreporting.
CHAPTER II

REVIEW OF LITERATURE

According to Kirk, Singh, and Getz (2001), 90% of patients that are diagnosed with an eating disorder such as AN or BN are females. Previously, research on female college students and risk of eating disorders has been studied. Female college students, both athletes and non-athletes, want to feel accepted and have satisfaction with their body image which then puts them at a higher risk of developing an eating disorder. In fact, the risk being so high in college is believed to be from lack of predictability in a new environment with different codes of conduct, high demands for academic performance, and little or no parental guidance (Kirk, Singh, and Getz, 2001). Females tend to have stronger negative responses to an increase in their body size and studies have shown that there is a relationship between body dissatisfaction and body size (Preston, & Ehrsson, 2018). Ultimately, being an athlete in college has its own stressors on top of the ones already mentioned such as, striving for a low body weight or fat in order to please a coach, making the team, or maintaining a competitive edge in a particular sport (Kirk, Singh, and Getz, 2001).

Only recently, AN and BN were diagnosed into the mental disorder category, and alarmingly have had some of the highest mortality rates compared to any psychological illnesses (Orsini, 2017). Most recently, in 2013, binge eating disorder first appeared in the Diagnostic and Statistical Manual of Mental Disorders (DSM) as a clearly defined mental disorder (Orsini, 2017). Binge eating disorder is eating in a discrete period, an amount of food that is larger than what most people eat in a similar period of time under similar circumstances (American, 2013). Although both AN and BN have some commonalities and are both considered types of
disordered eating, it is important to distinguish them from each other. Many people do not have a clear understanding of the differences between AN and BN.

AN is an intense fear of gaining weight or of becoming fat, or persistent behavior that interferes with weight gain, even though at a significantly low weight (American, 2013). AN consists of three essential features including, the persistent energy intake restriction, being afraid of gaining weight or becoming fat, and a disturbance in self-perceived weight or shape (American, 2013). Diagnosis of AN is when someone does not accept a normal body weight, has intense fear of weight gain, and also disturbance of their own body image (Schwitzer 2008).

BN is recurrent inappropriate compensatory behaviors in order to prevent weight gain by self-induced vomiting, using laxatives, diuretics, or other medications; fasting; or excessive exercise (American, 2013). Individuals with BN tend to eat adequate food while later participating in amendatory behaviors by vomiting, purging, use of laxatives, or excessive exercise, often in secret (Litmanen et al., 2017). A diagnosis of BN requires that the person binge eats and then compensates through vomiting, takes laxatives, exercises excessively or when their body image influences self-evaluation (Schwitzer 2008). These disorders have different symptoms, so it is important to understand which disorder is being faced, therefore, the proper steps can be done to help the patients.

**History of Eating Disorders**

According to Orsini (2017), the eating disorder category first appeared in the Diagnostic and Statistical Manual of Mental Disorders in 1980 and classifies a number of illnesses characterized by gross disturbances in eating behavior because of strong fear of gaining weight or becoming fat. Before the nineteenth century however, behaviors back then, now considered symptoms, were socially accepted in society. These were perceived as a manifestation of “holy
behavior” or as a “wonder of nature” (Orsini, 2017). A large number of nuns in medieval Europe practiced strict starvation therefore believed they were able to reach unity with Christ. Ascetical starvation was said to be a “concrete sign from God” (Orsini, 2017). During the Victorian era, “fasting woman” were commended by society and considered to be an object of curiosity to the scientists and doctors (Orsini, 2017). The prevalence of woman among the people suffering from eating disorders has not changed since before the nineteenth century, which goes to show the severity of an eating disorder (Orsini, 2017).

**Signs and Symptoms**

Negative feelings about one’s body is said to be the start of the development of an eating disorder, which can have long term effects if not diagnosed and treated (Preston, & Ehrsson, 2018). Eating disorders often develop and begin in adolescence with prevalence increasing as age increases (Pearson et al., 2017). Low weight status, trying to lose weight, fear of weight gain, body image distortion, binge eating with loss of control, compensatory behavior, frequency of binge eating, distress about binge eating, etc., are just a few signs and symptoms of an individual who is fighting an eating disorder (Pearson et al., 2017). Psychological predictors to determining an eating disorder could include low self-esteem, depressive symptoms, substance use, suicidal ideation, suicide attempt, and weight teasing by peers or family (Pearson et al., 2017).

**Prevalence of Eating Disorders in College Females**

College is an important time of life, because many students experience independency for the first time. Along with development of maturity, college may also bring risky health behaviors into female students’ lives (Groff & Wilke, 2016). The overall prevalence of AN in young females is about 0.4% according to the DSM (American Psychiatric Association, 2013). The overall prevalence of BN in young females is 1%-1.5% (American Psychiatric Association,
Among female college students though, prevalence of current eating disorders is much higher and ranges from 8% to 17% (Eisenberg et al., 2011). Eisenberg et al. (2011) found that “In the American College Health Association’s National College Health Assessment, 3% of females reported ever receiving diagnosis of anorexia, 2% of females reported a previous diagnosis of bulimia, and 4% of females reported vomiting or taking laxatives to lose weight.” In Eisenberg’s et al. (2011) study, which used the 5-item SCOFF screening instrument to help identify risk of an eating disorder. The prevalence of eating disorders in female undergraduate students was 13.5% (Eisenberg et al., 2011). In another study by Schwitzer (2008), about 25%-40% female undergraduate students of 112 females that participated, acknowledge that they have problems, whether it is weight control difficulties, or fear of an unacceptable body image, or even that their eating is uncontrollable.

**Prevalence of Eating Disorders in Female College Athletes**

There is difficulty when trying to determine the exact prevalence of eating disorders among female athletes because many affected athletes may not seek treatment or report the symptoms/feelings they have (McLester, Hardin, & Hoppe, 2014). According to Greenleaf et al. (2009), the sport setting may highlight concerns with weight and body image which may promote pathogenic eating behaviors. Research supports that prevalence rates of eating disorders are more common in female athletes than non-athletes (Greenleaf et al., 2009). A recent study by the U.S. Sports Academy (2017), concluded that eating disorders are prevalent in female athletes, although they did not find any relationship between the athlete’s feelings about being an athlete and eating disorders. For example, being competitive or team support were not found to be risk factors. However, there is a prevalence of eating disorders in female college athletes because their thoughts lean more towards their body, performance, and eating, causing the
negative inner thoughts toward themselves (U.S. Sports Academy, 2017). Although the relationship between female athletes and eating disorders weren’t observed, there were several females who still reported engagement in weight control and unhealthy eating (Greenleaf et al., 2009). Luckily, female athletes were mostly starting to experience symptoms of eating disorders and were not diagnosed, therefore, getting help early can prevent being diagnosed with an eating disorder (Greenleaf et al., 2009).

A study by Arther-Camaselle and Quatromoni (2011) that focused strictly on athletes, found that factors describing the onset of an eating disorder can be narrowed down to two main domains: internal and external factors. Internal factors contributing to eating disorders were identified as negative mood states, low self-esteem, perfectionism/drive for achievement, and desire for control, while the external factors included negative influences on self-esteem, hurtful relationships, hurtful role models, and sport performance (Arther-Camaselle & Quatromoni, 2011). Out of the 17 females studied, more than 50% of them related to one or more of these factors mentioned, providing evidence that the prevalence of eating disorders in female college athletes may be high at some schools (Arther-Camaselle & Quatromoni, 2011).

**Relationship Between Age and Eating Disorders**

Maturity usually occurs when age increases, therefore determining if there is a relationship between age and eating disorders could help identify signs early on to implement early treatment. Kirk, Singh, and Getz (2001) examined the relationship between age and eating disorders in female college students and found a correlation of -0.06 for athletes (not statistically significant) compared to the correlation for female non-athletes of -0.16 which indicated a significant but a very small negative relationship. The results suggest that the younger female college students may be more likely to be at a risk for experiencing an eating disorder than the
older female college students. Because this study was completed over a decade ago, these comparisons should be reexamined.

**The Impact of Social Media**

The definition of what is considered social media can vary widely. Carr and Hayes (2015) define social media in a verbose and accessible way which is that “Social Media are Internet-based channels that allow users to opportunistically interact and selectively self-present, either in real-time or asynchronously, with both broad and narrow audiences who derive value from user-generated content and the perception of interaction with others.” This definition explains that there is much more to social media than just the widely popular platforms of Facebook or Twitter. According to Carr and Hayes (2015), social media includes: social networking sites, professional networking sites, chat boards and discussion forums, and Wiki “talk” pages. A recent study concluded that the most preferred social media sites within college students were Instagram, Snapchat, Facebook, Twitter, and YouTube (Knight-McCord et al., 2016).

Fitness is widely posted about on social media including images, advice, and a discussion about healthy diets (Raggatt, et al., 2018). Social media tends to expose unrealistic images of what is considered female beauty, while the “thin-ideal” media images may cause females to experience negative thoughts and feel dissatisfaction toward their bodies (Perloff, 2014). Aspirations to look like celebrities and follow their trends is real, with the media practically promoting eating disorders by going as far as linking the illness with females of beauty and status (Verma & Avgoulas, 2015). Verma and Avgoulas (2015) further explain that after eating disorders are displayed and brought to female’s attention, about 38% of female tend to change their eating habits.
A study by Raggatt et al., (2018) aimed to investigate the disordered eating and exercise behaviors leading to distress of individuals who use “fitspiration.” There were 180 people out of 813 that completed the survey. The results indicated that the females who post about fitness inspiration are the same females who reported about eating behaviors and excessive exercise, while the females posting about travel did not. The individuals who do not post about fitness and health but view the content are just as exposed to the negative imagery causing negative effects as those who do, which explains the impact social media has on young females today (Raggatt et al., 2018).

**Social Media Use and Eating Disorders**

Social media use may be a factor related to the increased risk of eating disorders. Eating disorder etiology are multifactorial including biological, psychological, intrapersonal, and environment influences (Sidani et al., 2016). Young people use social media more than two hours per day providing more opportunity to influence the development of eating disorder risk factors (McLean et al., 2017). According to Sidani et al. (2016), Facebook as a maladaptive use, like comparing one’s self to other people, is associated with risk of disordered eating in college female. Sidani et al. (2016) also suggested that those who use Facebook more frequently tend to compare body images with others which can also potentially lead to image concerns. In the same study, results concluded that the younger groups in the study reported higher social media volume, but there was no significant interaction effect for social media use and age concerning eating (Sidani et al., 2016).
CHAPTER III
METHODOLOGY

Participants

Participants in this study included a random sample of Division II female college athletes that attend Indiana University of Pennsylvania (IUP) and female non-athletes that are also enrolled at IUP. The age range for both groups is 18 to 24 years of age. Female athletes across all 10 sports at IUP including basketball, cross country, field hockey, lacrosse, soccer, softball, swimming, tennis, track & field, and volleyball were asked to participate. To be eligible for the study, female students had to be enrolled full-time (at least 12 credit hours) as undergraduate students. To be considered an athlete, the student had to be on the team’s current roster for the 2018-2019 academic year. Exclusion criteria included graduate student status, male students, part-time students and students over the age of 24. After applying the exclusion criteria, there were a total of 180 participants; 130 were considered to be female non-athletes while 50 were female college athletes.

Recruitment Strategies

After approved by the IUP Institutional Review Board, the female athlete emails were retrieved as well as the random sample of female non-athlete’s emails. An email was sent out explaining the purpose of the study, asking consent, and resources available for potential risk along with contact information for the primary investigator and co-investigator (Appendix A). Completion of the survey indicated implied consent. Any participant who did not complete the survey, declined consent, or did not fall into the guidelines for the study was excluded.

Instrumentation

The survey consisted of three parts. The first part was a demographics survey where the participants recorded their age, class standing, gender, athlete status, and type of sport (Appendix
The second part consisted of questions about social media including volume and frequency for specific platforms. The third part was the Eating Attitudes Test (EAT-26), which consisted of 26 statements that are answered using a 5-point Likert scale (always-3, usually-2, often-1, sometimes-0, never-0. It should be noted that question 26 is worded such that it should be reverse scored. Questions on the EAT-26 measure participants attitudes about food and patterns that are suggestive of eating disorders. Scoring a 20 or about could consider the participant to more likely be at risk.

**Validation of Instruments**

Although the questions used about social media usage are not from a validated or reliable questionnaire, they are based on questions used by Sidani and colleagues. Permission to utilize the survey was gathered via email from the lead author (Appendix C). The EAT-26 was previously reported valid and reliable, measuring eating attitudes and symptoms of AN and BN by Garner et al. (1982). This instrument does not diagnose an eating disorder; however, obtaining a score of equal to or greater than 20 indicates a potential risk of an eating disorder. The EAT-26 has been reproduced with permission (Appendix D).

**Procedures**

This study was approved by the Indiana University of Pennsylvania Institutional Review Board. After approval was provided by the board, the investigator proceeded to obtain a randomized list of 2,000 email addresses that included every female athlete on the 2018-2019 roster. A link to the survey was distributed via email to the 2,000 randomized list (Appendix B). The email included information about the purpose of the study, consent information, potential benefits and risks, and a reminder that the participants can choose not to complete the survey at any point within the questionnaire. Due to the sensitive nature of the questions, information for
resources was provided to the participants (e.g., contact information for the university counseling center).

**Design**

This research study is a cross-sectional, quantitative study, meaning that causation cannot be applied to results. Participants were given the above-mentioned questionnaire; however, no other intervention was included as a part of this research study.

**Statistical Analysis**

Descriptive statistics were used to present the demographic variables including athlete status, class standing, specific sport played, and age of the respondents. In order to further examine the research questions, demographics will distinguish the differences within our participants. A two-sample T-test was utilized in this study to examine the risk of an eating disorder comparing athletes, non-athletes and the risk of eating disorders as a continuous variable.

There was not a large enough sample to run any test when determining a relationship between risk of an eating disorder and type of sport. For the third research question, a logistic regression was used with age as a continuous variable looking at several models. The first model included an interaction with age and athlete status. In the second model, the interaction was dropped but focusing on age, indicating that the inclusion of variables is a significant improvement over the default intercept only model, and the third model focusing only on athlete status also providing significance.

A linear regression was used for determining social media usage giving a discrete output. Risk of eating disorder score was used as a dependent variable and athlete status and social media platform as the independent variables.
CHAPTER IV

RESULTS

The purpose of this study was to compare risk of eating disorders among female college athletes and female non-athletes. A secondary aim was to investigate if there was a relationship between eating disorder risk and social media usage.

Response Rate

The three-part survey was distributed to 2,000 students at Indiana University of Pennsylvania (IUP) including every female athlete on the 2018-2019 roster. Overall, there was 306 responses, however after the exclusion criteria: being a graduate student, over the age of 24, or considered a part time student, there were 191 subjects. After having 11 missing cases however, there were 180 respondents included in the final sample. Overall, there were 128 female non-athletes and 52 female athletes. Again, athletes included students from the basketball, cross country, field hockey, lacrosse, soccer, softball, swimming, tennis, track and field, and volleyball teams.

Demographics

Aside from being a female athlete or a female non-athlete, class standing, specific sport, and age were taken into consideration. Out of the 180 responses, 43 (23.9%) were freshmen while 17 were athletes and 26 non-athletes. There were 35 (20.6%) sophomores while 11 were athletes and 24 were non-athletes. 56 (31.1%) were juniors while 13 were athletes and 43 non-athletes, and 46 (25.6%) were seniors while 8 were athletes and 38 were non-athletes (Table 1). Because each sport only included a few athlete respondents, sports were collapsed into either, team sport (basketball, field hockey, lacrosse, soccer, softball and volleyball) or individual sport (cross country, swimming, tennis, and track and field). Out of the 50 athletes, there were 34
(68%) participants a part of team sports while 16 (32%) were individual sports. Because of a low response rate with ages 23 and 24, we combined ages 22-24 into one group. Of the 27 (15%) participants that were 18 years old, 10 were athletes and 17 were non-athletes. Of the 32 (17.8%) participants that were 19 years old, 15 were athletes and 17 were non-athletes. Of the 52 (28.9%) participants that were 20 years old, 12 were athletes and 40 were non-athletes. Of the 48 (26.7%) that were 21 years old, 10 were athletes and 38 were non-athletes, and of the 21 (11%) participants that were 22-24 years old, 3 were athletes and 18 were non-athletes (Table 2).

This research study establishes risk of eating disorder according to frequency and volume of social media usage. Participants were asked about the frequency and volume of usage of the following social media platforms: Instagram, Twitter, Facebook, YouTube, and Snapchat. Twelve (6.7%) participants reported that they used Instagram less than once a week, 2 (1.1%) 1-2 days a week, 9 (5%) 3-6 days a week, 25 (13.9%) about once a day, 63 (35%) 2-4 times a day, and 69 (38.3%) 5 or more times a day. For Twitter, 48 (26.7%) reported usage less than once a week, 13 (7.2%) 1-2 days a week, 14 (7.8%) 3-6 days a week, 20 (11.1%) about once a day, 40 (22.2%) 2-4 times a day, and 45 (25%) 5 or more times a day. For Facebook, 42 (23.3%) reported usage less than once a week, 27 (15%) 1-2 days a week, 17 (9.5%) 3-6 days a week, 38 (21.1%) about once a day, 42 (23.3%) 2-4 times a day, and 14 (7.8%) 5 or more times a day. For YouTube, 42 (23.3%) reported usage less than once a week, 30 (6.7%) 1-2 days a week, 27 (15%) 3-6 days a week, 34 (18.9%) about once a day, 29 (16.1%) 2-4 times a day, and 18 (10%) 5 or more times a day. Lastly, for Snapchat, 7 (3.9%) reported usage less than once a week, 5 (2.8%) 1-2 days a week, 0 3-6 days a week, 10 (5.6%) about once a day, 24 (13.3%) 2-4 times a day, and 134 (74.4%) 5 or more times a day (Table 3).
Table 1

*Number of Participants by Class Standing and Athlete Status*

<table>
<thead>
<tr>
<th></th>
<th>Freshmen</th>
<th>Sophomore</th>
<th>Junior</th>
<th>Senior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athletes</td>
<td>17</td>
<td>11</td>
<td>13</td>
<td>8</td>
</tr>
<tr>
<td>Non-Athletes</td>
<td>26</td>
<td>24</td>
<td>43</td>
<td>38</td>
</tr>
<tr>
<td>Overall</td>
<td>43 (23.9%)</td>
<td>35 (20.6%)</td>
<td>56 (31.1%)</td>
<td>46 (25.6%)</td>
</tr>
</tbody>
</table>

Table 2

*Number of Participants by Age and Athlete Status*

<table>
<thead>
<tr>
<th></th>
<th>18 years</th>
<th>19 years</th>
<th>20 years</th>
<th>21 years</th>
<th>22-24 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athletes</td>
<td>10</td>
<td>15</td>
<td>12</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Non-Athletes</td>
<td>17</td>
<td>17</td>
<td>40</td>
<td>38</td>
<td>18</td>
</tr>
<tr>
<td>Overall</td>
<td>27 (15%)</td>
<td>32 (17.8%)</td>
<td>52 (28.9%)</td>
<td>48 (26.7%)</td>
<td>21 (11%)</td>
</tr>
</tbody>
</table>
Table 3

Frequency of Social Media Usage by Platform

<table>
<thead>
<tr>
<th>Social Media Platform</th>
<th>Less than once a week</th>
<th>1-2 days a week</th>
<th>3-6 days a week</th>
<th>About once a day</th>
<th>2-4 times a day</th>
<th>5 or more times a day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instagram</td>
<td>6.7% (12)</td>
<td>1.1% (2)</td>
<td>5% (9)</td>
<td>13.9% (25)</td>
<td>35% (63)</td>
<td>38.3% (69)</td>
</tr>
<tr>
<td>Twitter</td>
<td>26.7% (48)</td>
<td>7.2% (13)</td>
<td>7.8% (14)</td>
<td>11.1% (20)</td>
<td>22.2% (40)</td>
<td>25% (45)</td>
</tr>
<tr>
<td>Facebook</td>
<td>23.3% (42)</td>
<td>15% (27)</td>
<td>9.5% (17)</td>
<td>21.1% (38)</td>
<td>23.3% (42)</td>
<td>7.8% (14)</td>
</tr>
<tr>
<td>YouTube</td>
<td>23.3% (42)</td>
<td>16.7% (30)</td>
<td>15% (27)</td>
<td>18.9% (34)</td>
<td>16.1% (29)</td>
<td>10% (18)</td>
</tr>
<tr>
<td>Snapchat</td>
<td>3.9% (7)</td>
<td>2.8% (5)</td>
<td>0</td>
<td>5.6% (10)</td>
<td>13.3% (24)</td>
<td>74.4% (134)</td>
</tr>
</tbody>
</table>

Female College Athletes Versus Female Non-Athletes

For research question 1, we found a significant difference for risk of eating disorders when comparing female athletes to non-athletes. Figure 1 shows the difference in number of respondents for both comparative groups. Scoring a 20 or above on the EAT-26, as mentioned previously, indicates risk of an eating disorder. There was a total of 34 (18.9%) participants at risk for an eating disorder, with 4 (11.7%) of the participants being female athletes. Using the calculated risk of eating disorder score comparing female athletes and non-athletes as two groups, a two-sample t-test was utilized finding that female non-athletes have a significantly higher eating disorder risk score (mean = 12.88, p = .003) (Table 4) compared to female athletes. However, this only suggests that female non-athletes are more likely to be at risk, not necessarily that they have an eating disorder.
Figure 1. The number of female college athlete respondents versus female non-athletes respondents.

Table 4

Two sample T-Test Comparing Risk of Eating Disorder Between Female College Athletes and Female Non-Athletes

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athlete</td>
<td>50</td>
<td>8.12</td>
<td></td>
</tr>
<tr>
<td>Non-Athlete</td>
<td>130</td>
<td>12.88</td>
<td>P=.003</td>
</tr>
</tbody>
</table>

Risk of Eating Disorder and Type of Sport

Unfortunately, because there was such a small group of female athletes found to be at risk of an eating disorder as measured by the EAT-26, no other statistical tests could be run. Therefore, the answer to this research question cannot be determined.
Risk of Eating Disorder and Age

A multivariate logistic regression was used to examine risk of eating disorder. The risk of eating disorder score from the EAT-26 was used as the dependent variable and age and athlete status were used as predictors. Model 1 (Table 5) shows the interaction between age and athlete status, which was found to be non-significant (p=.054). When dropping the interaction however, the Omnibus Test of Model Coefficients shows statistical significance (p = .034). This shows that the inclusion of variables has significant improvement over the default intercept only (age) in Model 2 (Table 5), indicating that the model is useful in identifying at risk females. Next, the model summary the Cox & Snell pseudo-$R^2$ 0.033 and Nagelkerke pseudo-$R^2$ 0.054 explain that between 3.3% and 5.4% is the variance of at-risk female students and is estimated to be explained by the variation in age and athlete status. The data providing a useful model shows that its explanatory variable power is very low, therefore, there is more contributing to an eating disorder than age or being an athlete. Though, the athlete status was found to be a significant predictor (p=.021) shown in Model 3 (Table 5). Overall, on average, female non-athletes are 3.71 times more likely than female athletes to be at risk for an eating disorder when controlling for age.

Model 1: log odds of being at risk for an ED = Intercept + Age + Athlete Status + Age * Athlete Status

Model 2: log odds of being at risk for an ED = Intercept + Age + Athlete Status

Model 3: log odds of being at risk for an ED= Intercept + Athlete Status
Table 5

*Models Indicating Interaction and Removal of Variables to Show Significance in Relationship with Age*

<table>
<thead>
<tr>
<th>Model</th>
<th>Overall P-Value</th>
<th>Term Being Removed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td>.054</td>
<td>Age*Athlete Status</td>
</tr>
<tr>
<td>Model 2</td>
<td>.034</td>
<td>Age</td>
</tr>
<tr>
<td>Model 3</td>
<td>.021</td>
<td>None</td>
</tr>
</tbody>
</table>

**Risk of Eating Disorder and Social Media Usage**

A linear regression model, $ED_{\text{Risk}}$ score = intercept + athlete status + social media platform, was run using the risk of eating disorder score as the dependent variable and athlete status and each type of social media platform as independent variables. The ANOVA table in the output of the regression looking at the regressors and residuals has a p-value of 0.008 (Table 6) indicating it is a statistically significant model, where athlete status as a predictor was also significant ($p = .002$). The $R^2$ value of 0.094 indicates that 9.4% of the variation in risk of eating disorder score is explained by variation in athlete status and social media platform use.

Unfortunately, the model did not address everything that is contributing to female eating disorder risk scores. But because athlete status was found to be significant, this means that on average, non-female athletes have a risk of eating disorder score that is 5.193 points higher than a female athlete based on social media platform on a 95% confidence interval. Overall, there is a relationship between risk of eating disorder and social media usage.
Table 6

*ANOVA Table in the Output of Regression looking at Regressors and Residuals*

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>1550.523</td>
<td>6</td>
<td>258.421</td>
<td>3.008</td>
<td>.008&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Residual</td>
<td>14863.921</td>
<td>173</td>
<td>85.919</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>16414.444</td>
<td>179</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER V
DISCUSSION

Summary of Study

Research has been done in the past comparing risk of eating disorders among female college athletes and female non-athletes, however these results have been mixed. The question remains whether college athletes are at a higher risk of developing an eating disorder than college students in general. It is reported that risk of eating disorders among females are increasing (Kirk, Singh, & Getz, 2001). Not only is comparing risk of eating disorder between the two groups appropriate but also comparing type of sport and age could provide some evidence of who is most at risk.

A secondary aim examined whether or not social media usage played a factor with risk of eating disorders. A previous study concluded that the individuals who use more social media are exposed to more images and messages possibly proving a risk for the development of an eating disorder (Sidani et. al., 2016).

The most important aspect of this research study was to provide updated information on risk of eating disorders when comparing female college athlete versus female non-athletes. In addition, this study compared type of sport, age, and social media usage among the two groups as well.

Hypothesis Results

Before conducting the study, four hypotheses were formed based on the four research questions provided for this study. The hypotheses involved the risk of eating disorders comparing female college athletes to female non-athletes, risk of eating disorders dependent upon type of sport, the relationship between risk of eating disorder and age, and the relationship
between risk of eating disorder and the influence of social media usage. Research Question 1 and 2 showed that the hypothesis was rejected while research questions 3 and 4 showed that the hypothesis were accepted.

**Female Athlete Versus Female Non-Athlete and Risk of Eating Disorders**

The first hypotheses of the study predicted that female college athletes are at a higher risk of developing an eating disorder compared to female non-athletes. Participants were asked to complete the EAT-26, where scoring a 20 or more indicated risk of an eating disorder. Of the 180 participants, 34 respondents were considered to be at risk, with 4 of these being female athletes. The results indicated statistical significance (p= .003), where female non-athletes were considered to be more likely at risk for an eating disorder compared to female non-athletes. In this case, the hypothesis was rejected.

**Risk of Eating Disorder and Type of Sport**

The second hypothesis of this study predicted that the risk of eating disorder is dependent upon type of sport played by the female athlete. However, because there were only 4 athletes considered at risk, there was not information to determine the relationship. The hypothesis is rejected.

**Risk of Eating Disorder and Age**

The third hypothesis of this study predicted that there would be a relationship between risk of eating disorder and age. Using 3 models, we found that the interaction between age and athlete status was not significant. After dropping the interaction, a significance was found showing that the model was useful. In this case, there is a relationship between age and risk of eating disorders, therefore, the hypothesis is accepted.
Risk of Eating Disorder and Social Media Usage

The last hypothesis for this study predicted that there would be a relationship between risk of eating disorder and social media usage. Results from a logistic regression model showed a significance ($p=.008$). In other words, a relationship between risk of eating disorder and social media platform usage was found showing that female non-athletes are more likely to be at risk when comparing social media platforms. The hypothesis is accepted because there is a relationship between female college students and social media platform.

Conclusion

Previous research has shown that female college athletes are more at risk for an eating disorder than female non-athletes. Factors such as extra stressors, teammates, making weight, coaches, schedules, have been thought to be important in determining risk. Though this could be the case, factors such as social media usage or age could also impact risk of eating disorders for both athletes and non-athletes. Scoring a 20 or higher on the EAT-26 can help determine who is more likely to be at risk for an eating disorder, though it cannot directly diagnose if someone does indeed have an eating disorder. Examining frequency and volume of social media usage may help determine if social media usage does play a factor in those at risk.

Overall, the results of this study suggest that female non-athletes are more likely to be risk for an eating disorder even when comparing age and social media usage. When determining type of sport and risk of eating disorder, there was not enough information. The findings suggest though, that more resources should be available for those potentially at risk to help decrease the percentage.
Direction for Future Research

The results from this study indicate that the sample size was generally small using participants only from Indiana University of Pennsylvania, a Division II school. Future studies should include a larger, more heterogenous sample in order to generalize findings.

Future researchers should focus on the cause of different factors in regard to risk of eating disorders. Furthermore, female athletes and risk of eating disorder should be investigated further.

Providing more helpful resources for individuals at risk could also decrease the risk percentage to lower the prevalence of eating disorders. Resources should remain consistent for all college students; therefore, the risk of eating disorders among female college athletes and non-athletes hopefully will vanish in the near future.
References


Appendix A

Informed Consent Form

Primary Investigator
Tara Kibe
Graduate Student, Sport Management
Indiana University of Pennsylvania
Phone: 717-437-0979
Email: tpcv@iup.edu

Co-Investigator
Dr. Richard Hsiao
Professor
Indiana University of Pennsylvania
Phone: 724-357-0123
Email: hsiao@iup.edu

Dear student,

My name is Tara Kibe and I am a current graduate student here at Indiana University of Pennsylvania conducting research for my thesis while getting my master’s degree in Sport Management. I am writing to request participation from you in my study concerning the risk of eating attitudes among female athletes versus non-athletes. To participate in this study, you will fill out a short 3-part survey that will take you approximately 10-15 minutes. If you wish to learn more about the study, please see the attached cover letter.

Participation in this study is voluntary, you may refuse to complete this survey or may stop taking it at any time with zero penalties. The data being collected for this master’s thesis will be collected through IUP Qualtrics and will be completely anonymous, not asking for your name. The results of the survey will only be reviewed by the primary investigator and co-investigator of the study. If you have any questions, feel free to contact the primary or co-investigator of the study at any time.

Because of the sensitive nature of some of the questions, please know that there are free resources for on-campus counseling services if needed (The Counseling Center, 724-357-7728, https://www.iup.edu/counselingcenter/). Responses obtained from this survey will remain anonymous and will only be used for research purposes.

Completion of this survey implies your consent and we thank you for participating and supporting this research study. If you are willing to participate in the study, please click the link below.

Thank you for your time,

Tara Kibe
Appendix B

Survey

Section I – Demographics

In this section, you will be asked to answer questions asking about demographics that relate to you as of right now, attending Indiana University of Pennsylvania.

1. What is your age?
   a. 18  b. 19  c. 20  d. 21  e. 22  f. 23  g. 24  h. Other
2. What is your class standing?
   a. Freshman  b. Sophomore  c. Junior  d. Senior  e. Graduate Student
3. Are you a female athlete at IUP on the 2018-2019 roster?
   a. Yes (Proceed to Question 4)
   b. No (Qualtrics will skip to question 5)
4. If so, what sport do you play?
   a. Basketball
   b. Cross Country
   c. Field Hockey
   d. Lacrosse
   e. Soccer
   f. Softball
   g. Swimming
   h. Tennis
   i. Track and Field
   j. Volleyball
   k. I do not play a sport at IUP
5. Are you a full-time (taking 12 credits or more this semester) student at IUP?
   a. Yes
   b. No

Section II – Social Media Use

In this section, you will be asked to answer questions on frequency and volume of usage of specific social media platforms.

1. How often do you use each of these social media platforms?
   a. Facebook
      i. Less than once a week
      ii. 1-2 days a week
      iii. 3-6 days a week
      iv. About once a day
      v. 2-4 times a day
b. Twitter
   i. Less than once a week
   ii. 1-2 days a week
   iii. 3-6 days a week
   iv. About once a day
   v. 2-4 times a day
   vi. 5 or more times a day

c. Instagram
   i. Less than once a week
   ii. 1-2 days a week
   iii. 3-6 days a week
   iv. About once a day
   v. 2-4 times a day
   vi. 5 or more times a day

d. Snapchat
   i. Less than once a week
   ii. 1-2 days a week
   iii. 3-6 days a week
   iv. About once a day
   v. 2-4 times a day
   vi. 5 or more times a day

e. YouTube
   i. Less than once a week
   ii. 1-2 days a week
   iii. 3-6 days a week
   iv. About once a day
   v. 2-4 times a day
   vi. 5 or more times a day

2. On average, how much time per day do you spend on social media for personal use (not including work-related)?
   a. ____ (0-24) ____ hours
   b. ____ (0-60) ____ minutes

Section III – Eating Attitudes
In this section, please answer truthfully and to the best of your ability relating to eating and behavior concerns as this is anonymous.

1. I am terrified about being overweight.
   Always    Usually    Often    Sometimes    Never

2. I avoid eating when I am hungry.
   Always    Usually    Often    Sometimes    Never
3. I find myself preoccupied with food.
   Always     Usually     Often     Sometimes     Never
4. I have gone on eating binges where I feel that I may not be able to stop
   Always     Usually     Often     Sometimes     Never
5. I cut my food into small pieces.
   Always     Usually     Often     Sometimes     Never
6. I’m aware of the calorie content of foods that I eat.
   Always     Usually     Often     Sometimes     Never
7. I particularly avoid food with a high carbohydrate content (i.e. bread, rice, etc.)
   Always     Usually     Often     Sometimes     Never
8. I feel that others would prefer if I ate more.
   Always     Usually     Often     Sometimes     Never
9. I vomit after I have eaten.
   Always     Usually     Often     Sometimes     Never
10. I feel extremely guilty after eating.
    Always     Usually     Often     Sometimes     Never
11. I am occupied with a desire to be thinner.
    Always     Usually     Often     Sometimes     Never
12. I think about burning up calories when I exercise.
    Always     Usually     Often     Sometimes     Never
13. Other people think that I am too thin.
    Always     Usually     Often     Sometimes     Never
14. I am preoccupied with the thought of having fat on my body.
    Always     Usually     Often     Sometimes     Never
15. I take longer than others to eat my meals.
    Always     Usually     Often     Sometimes     Never
16. I avoid foods with sugar in them.
    Always     Usually     Often     Sometimes     Never
17. I eat diet foods.
    Always     Usually     Often     Sometimes     Never
18. I feel that food controls my life.
    Always     Usually     Often     Sometimes     Never
19. I display self-control around food.
    Always     Usually     Often     Sometimes     Never
20. I feel that others pressure me to eat.
    Always     Usually     Often     Sometimes     Never
21. I give too much time and thought to food.
    Always     Usually     Often     Sometimes     Never
22. I feel uncomfortable after eating sweets.
    Always     Usually     Often     Sometimes     Never
23. I engage in dieting behavior.
    Always     Usually     Often     Sometimes     Never
24. I like my stomach to be empty.
25. I have the impulse to vomit after meals.
   - Always
   - Usually
   - Often
   - Sometimes
   - Never

26. I enjoy trying new rich foods.
   - Always
   - Usually
   - Often
   - Sometimes
   - Never
Appendix C

Permission to use Social Media Questionnaire

Tara Kibe
Thu 11/1, 8:46 PM
ejaimesidanipitt.edu

Dr. Siddani,

Hello, my name is Tara Kibe and I am currently a graduate student at Indiana University of Pennsylvania. I am writing a thesis on the risk of eating disorders among female athletes compared to non-athletes and a part of my study pertains to social media usage. I came across one of your studies, The Association Between Social Media Use and Eating Concerns Among U.S. Young Adults, and it really interested me as I read through. I wanted to reach out and see if you minded if I used the same questionnaire and if you could potentially send it to me as well? Social media usage and eating disorders is a really interesting topic and I would love to further your research! If you could let me know by November 6th, that would be fantastic. Thank you, and I hope to hear from you soon!

Tara Kibe
Indiana University of Pennsylvania
Graduate Assistant/Manager
James G. Mill Fitness Center
B.S. Sport Administration
(717)437-0979

SE
Mon 11/5, 2:13 PM

Hi Tara,

Certainly, you can use the items. I think they are all in the paper that you referred to in your e-mail. But if not, here are the specific items we used...

Please indicate how often you visit or use the following social media platforms:

<table>
<thead>
<tr>
<th>Social Media Platform</th>
<th>I Don’t Use This Platform</th>
<th>Less Than Once a Week</th>
<th>1-2 Days A Week</th>
<th>3-6 Days A Week</th>
<th>About Once A Day</th>
<th>2-4 Times A Day</th>
<th>5 or More Times A Day</th>
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On average, how much time per day do you spend on social media for personal use (not work-related)?

[ ] [0-24] hours [ ] [0-60] minutes

Please select the answer that best describes you.

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<th>Losing control</th>
<th>Definitely No</th>
<th>Probably No</th>
<th>Don’t Know</th>
<th>Probably Yes</th>
<th>Definitely Yes</th>
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Appendix D

Permission to use EAT-26

Hello,

Thank you for your request for permission to reproduce and use the EAT-26. The EAT-26 is protected under copyright; however, all fees and royalties have been waived because it has been our wish for others to have free access to the test.

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You can download a copy of the scoring instructions and the test on the homepage of the EAT-26 website. If you use the written version of the test, it is recommended that you provide respondents with the link to the EAT-26 website (www.eat-26.com) so that they can learn more about the test.

Again, thank you for requesting permission to reproduce and use the EAT-26. If you intend on publishing your work, please send me your results so that they can be included in a research database being developed on the EAT-26 website (www.eat-26.com).

Best wishes,

David M. Garner, Ph.D.
EAT Copyright Holder
President & CEO
River Centre Clinic