Investigating the Prevalence and Risk-Factors of Depression Symptoms among NCAA Division I Collegiate Athletes

by Charles Cox, Bachelor of Arts

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ABSTRACT

INVESTIGATING THE PREVALENCE AND RISK-FACTORS OF DEPRESSION SYMPTOMS AMONG NCAA DIVISION I COLLEGIATE ATHLETES

By

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College is already considered an at-risk period for the development of mental illness, however a number of studies have suggested that certain stressors may increase student athlete's vulnerability to depression. Despite this, research into the actual prevalence rate of depression among this population is thin. This study, therefore, aimed to determine an overall prevalence rate for depression symptoms among NCAA Division I collegiate athletes. It was also designed to assess various risk-factors that may increase an athlete's vulnerability to depression such as sex, academic class, scholarship level, sport season status and history of injury. Due to the lack of any required mental health education in college athletics, athletes were also asked questions regarding their opinion of current mental health services within their athletic program. Using a sample of 950 Division I student athletes it was found that 33.2% of athletes experienced symptoms of depression, contradicting findings from previous studies that have suggested a prevalence rate lower than the general college population (approximately 30%). Female athletes (p =. 00), underclassmen (p = .01), and in-season athletes (p = .05), were all found to experience higher rates of depression symptoms than other athletes. Similarly, athletes who suffered an injury in the previous 6 months (p = .05) experienced more severe

depression symptoms than healthy athletes. Missing practice or competition due to injury was also shown to increase depression symptoms ($p = .00$) compared to athletes who were able to continue their activity. It was found that 25.7% of athletes did not know how or where to access mental health treatment at their university, and 44.5% had received no mental health education from their athletic department. The results from this study suggest that depression is a more significant issue in college athletics than previously thought, and highlights the need for continued improvements to be made in both the understanding of mental health issues in college athletics, and the services that are provided to athletes.

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Thank you all.

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CHAPTER I

INTRODUCTION

"Student Athlete mental health is an under-recognized health issue, and if managed improperly, leads to poor performance in sport and the classroom, and can potentially lead to life threatening emergencies."

Brian Hainline, NCAA Chief Medical Officer

The mental health of the nation's collegiate athletes is a subject that has garnered significant media attention in recent years (Associated Press, 2013; Flanagan, 2014; Noren, 2014). By speaking out about their experiences with depression, high profile athletes, such as former Michigan defensive lineman Will Heininger, have shown that the toughest athletes at the best programs in the country are not immune to mental illness (Noren, 2014). A recent study (Weigand, Cohen & Merenstein, 2013) investigating depression rates in current and former college athletes, found that 16.77% of current athletes had Wakefield Depression Scale scores consistent with depression, compared to just to just 8.03% of former, retired athletes, suggesting that engagement in college athletics may contribute to increased susceptibility to depressive symptoms. Tragic stories such as that of Madison Holleran, a student-athlete at UPenn, who committed suicide midway through her freshman year, have shed light on some of the unique challenges and pressures felt by student-athletes. Holleran was said to have been struggling with the stress of combining a full academic course load with her athletic commitments prior to her suicide (DeNinno, 2014).

CHAPTER II

LITERATURE REVIEW

College is already considered an at-risk period for the development of depression symptoms (Kessler, Berglund, Demler, Jin, Merikangas, & Walters, 2005; NAMI, 2012). In a 2014 nationwide survey of college students, the American College Health Association found that over 30% of college students reported feeling significantly depressed at some point during the previous 12 months (ACHA, 2014). In addition to the risk factors faced by non-athlete students, the daily demands placed on college athletes, both physical and psychological, may represent additional risk factors that increase vulnerability to depression. Pinkerton, Hinz & Barrow (1989) highlighted some of the problems experienced by student-athletes as a direct result of their participation in college sports, such as fear of failure or poor athletic performance. They concluded that athletes might be considered an at-risk population for a variety of mental health concerns, including depression. The national governing body for college athletics, the NCAA, has acknowledged this fact. The NCAA Mental Health Handbook- a resource specifically focused on managing the mental health concerns of student athletes- cites depression, and the role that athletic participation may play in the development of depression, as something for coaches and support staff to be acutely aware of (NCAA, 2007). In 2013 the NCAA inaugurated the Mental Health Task Force, designed to discuss the mental health issues of college athletes and develop strategies regarding future education and research in this area. This has resulted in a number of grants recently being awarded to research institutions in support of this mission (NCAA, 2014b). Furthermore, in 2014 the

NCAA's Sport Science Institute produced *Mind Body and Sport: Understanding and Supporting Student Athlete Mental Wellness*- a guide to student-athlete mental health- and distributed this resource to approximately 1100 athletic directors (Terlep, 2014). All this suggests an apparent move away from the negative stigma that traditionally accompanies mental illness issue in sports (McLean, 2013), and the desire to identify potential depression risk factors in student athletes. However, research directly examining the prevalence and severity of depression symptoms among this population has yielded somewhat contradictory results.

One possible explanation for this variance in reported data is that student athletes still appear to be reluctant to seek out help for mental-health concerns (Watson, 2005). A sample of 135 athletes and 132 non-athletes, taken from a Southeastern US University, were asked to complete questionnaires concerning their attitudes towards seeking professional psychological help and their expectations regarding the outcomes of potential counseling. The findings showed that athletes harbored significantly less positive attitudes towards help-seeking behavior and counseling outcomes than non-athletes. Although no analysis was performed to assess differences between academic classes, over half of the athletes sampled consisted of freshmen. It may be that, although research has suggested freshmen are a particularly at risk-population (Papanikolaou, Nikolaidis, Patsiaouras & Alexopolous, 2003), they may feel a need to prove they are mentally tough enough for the rigors of college athletics and are therefore reluctant to admit needing help. It could also be inferred from these results that the negative attitudes regarding the seeking and outcomes of psychological assistance could impact the

reporting of negative psychological symptoms, both in research and everyday settings. It is therefore possible that athletes are ignoring or underreporting psychological distress, due to negative stigma attached to admitting needing assistance for such problems.

Proctor and Boan-Lenzo (2010) investigated the prevalence of depression among 66 male student-athletes and 51 male non-athletes. All athletes participated in Division I baseball, at one of two public universities. Using the Center for Epidemiological Studies-Depression scale (CES-D), it was found that the prevalence of depression in non-athlete students was almost twice that of student-athletes (29.4% to 15.6% respectively). This finding strongly suggests that student athletes experience lower rates of depression than their non-athlete peers. Possible factors behind these findings are suggested to be increased levels of physical activity and social interaction with teammates. This suggestion is supported by an earlier study, which found athletes had higher levels of self-esteem, social connectedness and lower depression scores than their non-athlete peers (Armstrong & Oomen-Early, 2009). However, both of these studies present significant limitations regarding the size and makeup of the samples used to reach these conclusions. Furthermore a number of studies challenge the notion that participation in college athletics reduces susceptibility to mental illness. In one study looking at the psychological balance of elite athletes in France (Schaal et al, 2011) it was found that anxiety disorders, depression and sleep problems were particularly prevalent. A variety of sports were represented in this study, and aesthetic sports showed the highest prevalence of depression, with 24.2% of participants reporting at least one period of depression throughout their lifetime. This suggests that a noteworthy percentage of elite athletes

experience some form of psychological distress, at some point throughout their career. However, the fact that this study was conducted using data obtained from yearly psychological assessments of elite athletes in France makes the generalization of results to American college athletes problematic. Furthermore collection of data was taken from the findings of athletes' yearly psychological interviews. It is therefore possible that certain symptoms were over or under-reported, based on their severity as assessed by the individual conducting the interviews. Nevertheless, the high prevalence of comorbid disorders such as anxiety, depression and sleep problems suggest a certain degree of reliability in the collection methods (Franzen & Buysse, 2008; Hirschfeld, 2001). Furthermore, these findings are supported by more recent research surveying 224 elite Australian athletes regarding a number of psychological disorders (Gulliver, Griffiths, Mackinnon, Batterham & Stanimirovic, 2015). Investigators found that depression symptoms showed the highest prevalence of any psychological disorder measured in the study, as determined by CES-D criteria. Results showed that over 27% of all athletes reported scores above the cutoff for experiencing significant symptoms of a depression disorder. Injury was also shown to be a significant predictor in the development of depression symptoms, as those with injuries reported more severe symptoms than those without. The overall results showed that more than 46% of athletes were likely cases for at least one psychological disorder, and 14% of college-aged male athletes were found to experience high or very high psychological distress; over 35% higher than the national average rate for the same demographic.

Further athlete-specific risk factors are highlighted in a study exploring the

experiences of 10 current and former Division 1 female collegiate athletes who self-identified as suffering from depression (Jones, Butryn, Furst & Smerjian, 2010). Using open-ended, unstructured, interviews the researchers sought to gain insight from the athletes themselves regarding their personal experience with depression. One of the major issues described was feeling overwhelmed by the daily demands and stressors of college athletics. Feelings of perfectionism and increased self-criticism when failing to meet personal goals were also described. Many participants talked of how poor athletic performance led them to question the foundation of athletic achievement on which much of their identity was built. This identity was further challenged by restricted participation through injury for over half of the athletes. Feelings such as anger, a lack of control, and overall helplessness regarding their participation status were described to cause significant distress to those involved in the study. Due to the nature of the study, limited conclusions can be drawn regarding the causation of athlete's depression. Many of the experiences described may have been exasperated by a pre-existing depressive disorder and the issues raised may be symptoms of depression, just as much as the root causes of the illness itself. A number of the athletes alluded to the palliative effects of athletic participation. Some described it as an escape from other negative life-events, or a reprieve from depression. However, an acknowledgement is made that, due to the pressure and demands placed upon them, their sport may have been both therapeutic and detrimental to their mental health. Whilst causation cannot be assumed from the findings this study does highlight common issues experienced by athletes suffering from depression.

The above study by Jones et al (2010), points to certain day-to-day aspects of student athlete life that represent significant contributing factors in the development of depression. The results from existing research into the psychological impact of three specific areas- daily stress, fear of failure and athletic injury- demonstrate the significant effect of these unique stressors, and highlights the clear need to increase our understanding of the individual risk factors associated with depression in college athletics.

Daily Stress

It has been shown that students who consider themselves "stressed", exhibit lower self-esteem and are less likely to practice healthy behaviors than "non-stressed" students (Hudd et al, 2000). Humphrey, Yow & Bowden (2000) examined stress in collegiate athletics, surveying hundreds of athletes, coaches and athletic directors, on their perceptions of stress. They found that 95% of male athletes and 86% of female athletes surveyed were stressed by academic factors such as missing class, or making up for missed assignments, due to athletic travel commitments. Preparing for assignments and testing, in the context of physically and emotionally challenging practices and competitions, was also considered a major stressor. Over 50% of the athletes reported the simple physical demands of their sport to be stress inducing, while 40% of men, and over 50% of women were stressed by issues related to time. Many respondents in their surveys felt they did not have sufficient time to combine athletics and academics in a way that would allow them to achieve their best in both areas. In discussing the consequences of these stressors, over half of all athletes polled stated that they felt stress affected their

mental and emotional health. Some of the consequences of this negative effect were listed outbursts of anger, excessive anxiety, frustration, irritation and fear. Furthermore almost one in ten male athletes and one in five female athletes mentioned health issues such as fatigue, headaches and digestive problems. The exact demographic details of the study are not given in the book, and therefore generalizations regarding the conclusions found need to be considered carefully. It should also be noted that almost 10% of the athletes said they found stress to be a motivating factor, or that they felt no ill effects from stress.

A finding by Humphrey et al (2000) specific to athletes was the use of the term *overwhelmed,* when asked to define stress. Unlike athletic directors or coaches, 16% of athletes used some form of this term and, in some cases, it was suggested to describe a precursor to despondency or depression. This repeats assertions made by Jones et al (2010), who found their participants to use similar terminology when describing their depression. A further study identified different stressors experienced by freshman athletes (Papanikolaou et al, 2003). Factors such as loss of star status, conflicts with new coaches and teammates, and frustration at possibly playing a lesser role on the team than they did at their previous teams, are all part of an athletic transition being made by freshman athletes. The authors propose that this often causes freshmen athletes to engage in poor coping techniques such as skipping class, drinking, or withdrawing from their team or sport altogether.

These assertions are supported by a study investigating the sources of stress in freshman athletes versus non-athletes (Wilson & Pritchard, 2005). Taking a sample of 52 athlete and 310 non-athlete freshmen from a private Division 1 university, the researchers

found that athletes experienced significantly higher levels of stress due to extra-curricular activities than non-athletes. It was also found that athletes were more likely to report stress from not getting enough time for sleep than non-athletes. Whilst these findings support the idea that student-athletes experience unique stressors that may increase their vulnerability to depression, this study also suggested that participation in college athletics buffers sources of stress from which traditional students suffer. These include issues such as body dissatisfaction and social isolation. It is implied that the extended periods of physical activity, suggested as one potential cause of stress, and increased awareness of proper nutrition lead to increased satisfaction with body image. Furthermore, the social relationships formed with teammates lead to decreased feelings of isolation and instances of social conflict. Nevertheless, the significance of stress caused by time-demands, particularly not having enough time for adequate sleep, should not be ignored.

Further evidence of the psychological effect of this stress is presented by Evans and Jackson (1992), who studied the psychological factors related to drug use by student athletes. They surveyed over 500 Division 1 athletes and found that alcohol was the most widely used drug; used by 87.8% of athletes of which, 34.5% were defined as high users. Significantly, one of the most frequently described reasons for alcohol use was to alleviate the stress of college life (28.3%). High alcohol users were also found to score significantly higher on the POMS scales for anger and fatigue than non-users. High alcohol users also reported more pressure from coaches to perform well than low/non-users. This leads to the suggestion that athletes feeling these pressures turn to alcohol as a coping mechanism. A similar assertion is made regarding high reported scores of fatigue,

with the authors suggesting high-users are turning to alcohol as a way to cope with physical exhaustion. One should be careful to assume causation from this study. The perception of increased pressure to perform may originate from underperforming as a result of alcohol use; something that would also increase feelings of fatigue. Although this suggestion should not be any less worrying, as it indicates alcohol use interfering with everyday activities, it cannot be automatically assumed that increased athletic-related pressure is the cause. However the finding that a high percentage of athletes cite coping with the daily stress of college life as a reason for alcohol use- a behavior often reported to be higher and more risky among athletes than non-athletes (Brenner & Swanik, 2007; Yusko, Buckman, White & Pandina, 2008; Nelson, T. F., & Wechsler, H. 2001) - suggests the significance of daily stressors as a risk factor for psychological distress.

Although it is impossible to identify these stressors as the sole cause of depression among athletes, many of the consequences of experiencing these stressors, such as a lack of sleep, the practicing of poor coping techniques and reductions in self-esteem (Hudd et al, 2000; Humphrey et al, 2000; Papanikolaou, 2003), may exasperate an underlying or pre-existing mental health issue such as depression. The role of stress as a risk factor for depression has been researched in multiple studies. Numerous studies have also identified the fact that athletes experience unique stressors related to their participation in college athletics, in addition to those experienced by their non-athlete peers. Therefore this study will not specifically address stress. Instead, due to the findings that freshman have been suggested to be particularly vulnerable, academic class will be assessed, as will the

competition status of the sport, under the assumption that time and physical demands are increased during the competitive season.

Injury and Athletic Identity

Injuries are one of the risks athletes face every day as a part of their athletic commitments. Research has shown 40-50% of athletes face at least one injury resulting in significant loss in participation during their college years (Meeuwisse, Selmer & Hagel, 2003). A research study on injured athletes and the risk of suicide (Smith & Milliner, 1994) presented common factors that existed among a small group of athletes who had attempted suicide post-injury. They found that each member of this group had required surgery on their injury; perceived a decrease in their athletic skills following their rehabilitation programs, which lasted from 6 weeks to 1 year; felt as though they had been replaced by a teammate; and felt they lacked their pre-injury ability following their return. Whilst this was a small sample, consisting of just five athletes, it underlines some of the psychological processes that can affect an injured athletes. Specifically, it highlights areas that cause reductions in self-esteem post-injury that are generally considered to be sources of self-esteem in healthy athletes (Armstrong & Oomen-Early, 2009; Wilson & Pritchard 2005). Athletes with major injuries (defined as forcing a loss in participation of more than 21 days) have been shown to present with higher levels of perceived stress and lower overall life-satisfaction than athletes with minor/no injuries (Malinauskas, 2010). Although no specific mood-states were measured in this study, prolonged negative cognition, such as lower life satisfaction and greater perceived stress, has been linked to the development of negative affect (Brewer 2007, as cited in

Malinauskas 2010).

Research has shown that athletes are particularly susceptible to feelings of depression immediately following an injury (Fallon & Quinn, 2009; Tracy, 2003). Recently, researchers conducted athlete interviews, using the semi-structured interview guide for the Hamilton Rating Scales (SIGH-D), and administered the CES-D self-report checklist to assess feelings of depression in 164 healthy and recently injured student athletes (Appeneal, Levine, Perna & Roe, 2009). Measures were taken at one week, one month and three month intervals to determine the progression of symptoms over time. Results showed that 9.9% of injured athletes met criteria for diagnosis of major depression disorder (MDD) at 1-month following injury, and 4.4% after 3-months. Although these numbers may not seem especially high, it was noted that those athletes with greater restrictions regarding their physical activity at 3 months reported higher SIGH-D scores. These percentages were also based on the clinical guidelines for diagnosis of MDD. Falling below this cut-off point does not define an absence of depressive symptoms. It was observed that, generally, injured athletes reported higher levels of depressive symptoms than their uninjured counterparts. This shows that injury is a risk factor in the development of depressive symptoms, possibly at clinically significant levels, particularly during the early stages of recovery. These finding are echoed by Manuel et al (2002) who found that 27% of adolescent athletes experienced moderate depression symptoms, based on the Beck Depression Inventory (BDI) diagnostic criteria, immediately following injury onset. This fell to 21% at 3 weeks, and 13% at 12 weeks. Although depression ratings decreased over time, the continued presence of significant

depression symptoms at 12 weeks post-injury emphasizes the psychological impact injury can have on athletes.

Injury has also been suggested to challenge an athlete's identity, as they are unable to participate in the activity which once defined their social role (Jones et al, 2010). Over the course of four studies, Brewer (1993) investigated the relationship between athletic identity and feelings of depression following a role-disrupting event, such as injury. The first two of these studies involved participants in a Kinesiology class to complete an Athlete Identity Measurement Scale (AIMS) to determine how strongly they identified with the social role of "athlete", and then consider their feelings of depression, using the BDI-II and the Depression Scale of Profile of Mood States (POMS-D), following a hypothetical injury. The third study took severity of injury and current injury status, into account, surveying elite athletes at various stages of injury recovery. These stages ranged from acutely injured to completely recovered. The final study consisted of surveying a football team to assess their feelings of depression. This included both injured and uninjured athletes, allowing the investigators to compare the depression levels of athletes with differing injury status competing in the same environment. Across all four studies, strength of athlete identity was linked to higher depression following a role-disrupting event. Whilst the first two studies only asked students to consider a hypothetical injury and imagine their feelings following such an injury, a positive relationship between athlete identity and depressed mood was observed. More significant were the findings in the final two studies that showed strength of athlete identity was a significant predictor of depressed mood among injured athletes. Results

also showed that high AIMS scores were negatively related to severity of depressed mood in healthy athletes. This presents further evidence that injury can cause significant psychological distress to athletes, particularly if they identify strongly with the athlete social role.

It should be added that certain studies have shown, in the absence of an event such as injury, that the strength of identification with the role of athlete was inversely related to feelings of depression and suicidal ideation (Miller and Hoffman, 2009). Participation in team sports was also related to lower reported feelings of depression. These findings support previous research (Armstrong, Oomen-Early, 2009; Wilson & Prtichard, 2005) in suggesting participation in team sports increases feelings of social-connectedness and self-esteem; factors related to decreased depressive symptoms. However, it must be noted that whilst the sample, taken from a large Northeastern university, consisted of 791 students, it did not require the participants to indicate if they were involved in collegiate athletics. Rather they were required to self-report the extent to which they identified themselves as an athlete. According to the results, 40% of males and 20% of females reporting as athletes had participated in community or school sports in the past year. Although this presents a positive message regarding team-sports participation in reducing feelings of depression, it also raises the question as to the reliability of applying these results specifically to the varsity student-athlete population. Without exposure to the pressures and stressors of collegiate athletics, as previously discussed in this paper, it is difficult to assume conclusions regarding the protective effect of strong athletic identity on depressive symptoms from this study alone.

This caveat is further enforced by Watson and Kissinger (2007) in a study of self-reported wellness, a state of mental and physical health and mental well-being, among student-athletes and non-athletes. This study used a sample consisting of 62 athletes and 95 non-athletes, and a measure consisting of 23 factors assessing the wellness ratings of the individual's physical, social, creative, essential and coping self. It was found that the mean wellness scores for non-athletes were higher than athletes' for 22 of 23 factors measured. Unsurprisingly, Exercise- a sub-factor of physical self- was the only wellness factor with a higher mean score for athletes than non-athletes. Significant differences were observed in social self, essential self; concerning aspects of identity, and love. The limited exposure to many everyday college experiences for collegiate athletes, due to athletic commitments such as practice and travel, is suggested to contribute to a lack of essential self. Few opportunities to socialize or explore an identity outside of athletics potentially lead to an over-identification with the athlete identity. This, in turn, may cause increased feelings of social isolation and mood-disturbance following a role-disrupting life event, as seen in previous studies (Brewer 1993). Although only a small number of factors reached statistical significance, the consistently lower mean wellness scores for athletes compared to non-athletes further suggests the presence of significant stressors affecting the mental and physical well-being of student athletes. Injury represents one of the clearest risk-factors for the development of depression in college athletes. Therefore, in order to advance the understanding of the specific role of injury on depression symptoms, participants will be asked questions regarding their history of injury, including if, and how long, they were unable to compete because of any injury suffered.

Fear of Failure

Whilst non-athlete students may experience fear of academic failure, fear of athletic failure presents another stressor that, in a college setting, is unique to student athletes. The discrepancies that may exist between an athlete's desired goal and actual performance outcome can be a cause of significant psychological distress (Schaal et al, 2011). Whilst perfectionism is an incredibly complex topic, with many different dimensions affecting athletes in both positive and negative ways (Koivula, Hassmen & Fallby, 2002), certain perfectionist tendencies such as excessive worrying about mistakes have been shown to be related to lower self-esteem and performance satisfaction in athletes (Gotwals, Dunn & Wayment, 2003). Perfectionism combined with poor coping techniques, something with research suggests athletes are prone to engage in (Evans & Jackson, 1992; Papanikolaou, Nikolaidis, Patsiaouras & Alexopolous, 2003), has also shown to increase vulnerability to depression following athletic failure (Hewitt & Flett, 2002).

Although it cannot be assumed all athletes are perfectionists, athletic failure is an, almost daily, risk for all athletes. Negative game-outcome may represent the most frequently experienced example of this. Hassmen and Blomstrand (1995) investigated the direct effect that competition outcome had on the mood states of professional female soccer players in Sweden. Participants completed the POMS prior to, immediately after, and two hours post, all 22 games throughout a soccer season. Whilst pregame POMS scores remained fairly consistent throughout the season, bar, increased tension prior to the opening game, a significant relationship was found between game outcome and

feelings of depression and anger. Loss resulted in significantly higher scores for each of these values consistently throughout the season. In particular, scores for depression increased dramatically in post-game measurement following a loss, and remained elevated at 2-hours post competition. This finding demonstrates the psychological distress that can occur in elite athletes following negative competition outcome. Conducted with a small sample of professional athletes in Sweden, this study has obvious environmental and cultural limitations when viewed in the context of American collegiate athletes. Playing at a higher level may increase the importance of competition, and therefore increase the psychological distress following a loss. Furthermore, final readings for POMS values were taken 2-hours post competition, questioning the enduring nature of negative feeling in the athletes.

In answer to some of these limitations Jones & Sheffield (2007) surveyed 64 college athletes following both wins and losses to observe fluctuations in mood depending on contest outcome. Mood was determined using the General Health Questionnaire (GHQ) and the Profile of Mood States- Short Form (POMS-SF). It was shown that, for four to six days following a loss, athletes experienced significantly lower levels of vigor and significantly higher levels of depression and anger than in the days following a win. Whilst these findings do not provide an insight to the severity of these feelings, they do show that athletes mood is significantly, negatively, affected by athletic failure and those feelings of depression and anger endure for a period of time following competition. College athletes can compete in upwards of 50 regular season games per season, creating numerous opportunities for such mood disturbances to take effect**.**

Focusing on depressed mood following athletic failure, researchers investigated the prevalence of failure-based depression among 50 varsity swimmers (Hammond, Gialloretto, Kubas and Henry (2013). Using the BDI and semi-structured interviews, measures of severity of depression symptoms were taken prior to international competition, and then again within 2 months of trial completion. It was determined that, prior to competition 64% of athletes met DSM - IVTR criteria for diagnosis of MDD in the previous 36 months. After the trials, 34% of athletes met the criteria for a current major depressive episode, and 26% self-reported mild to moderate symptoms. When the sample was limited to highly elite swimmers- defined as the top 25% of athletes- the number of participants meeting DSM-IV criteria jumped to 66%, with 41% self-reporting mild to moderate symptoms. This was attributed to the increased expectations of the top 25% of competitors, who placed more importance on personal success and therefore experienced higher rates of depression when those expectations were not met. The large number of athletes meeting criteria for depression could be attributed to the use of diagnostic interview as a measure; as opposed to sole reliance on self-report scales, which reported lower depression prevalence throughout the sample. However, both measures yielded a high number of athletes experiencing post-competition depression and, overall, post-competition feelings of depression were strongly linked to performance success. Although the sample was limited to athletes from one sport, these results support previous findings that suggest that athletic failure significantly increases the development of depression symptoms among elite athletes. The consistent nature of these findings clearly establishes the effect of fear of failure and pressure to perform on depression

symptoms. Therefore this will not be assessed directly in this study. However factors that may be affected by this stressor will be assessed, including the effect of scholarship received and, competition status of sport, assuming the potential for athletic failure increases during the season, will be examined.

Mental Health Care Accessibility and Education

In an article highlighting the mental health needs of student-athletes (Etzel, Watson, Visek & Maniar, 2006**),** student affairs professionals are encouraged to pay particular attention to injured and freshmen athletes. They are encouraged to watch for the warning signs of alcohol abuse and signs of depression or other psychological distress. Recommendations are made on how to recognize warning signs, and ways in which to monitor at-risk athletes, even recommending that depression screenings be conducted at regular points throughout the athletic season. The authors also discuss the increased demands placed on student athletes- both physically and mentally, compared to the daily demands of non-athletic students, which may contribute to the development of mental health concerns. Despite these suggestions, there are currently no specific requirements for athletic programs to educate their athletes about mental health. Athletic programs are not required to inform athletes of the issues may face during their time in college, or inform them of how and where to go to receive mental health treatment should they require it. This suggests that athletes may be unaware of the symptoms of depression, and unaware that treatment is available.

The importance of awareness of these issues can be seen in the results of a 2007 study examining the help-seeking behavior of college students at a large public university

(Eisenberg, Golberstein & Gollust, 2007). It was found that, for students with a positive depression screening based on the Patient Health Questionnaire, a lack of perceived need and being unaware of available services were the two strongest predictors for not accessing mental health services. One of the most common reasons given for this lack of perceived need was the assumption that their symptoms were an aspect of normal stress related to college life. These findings present the possibility that athletes assume symptoms of depression are normal reactions to the significant daily demands of college athletics and are therefore unworthy of treatment- further reducing the likelihood of them seeking help.

It has been show that increasing the awareness of mental health issues, through education and the promotion of available resources, can increase the awareness and recognition of mental illness. Studies in Australia investigating the impact of Beyondblue, a national program designed to increase depression literacy among the public, found that increased awareness was related to better recognition of depression symptoms and more positive beliefs in treatment outcomes (Jorm, Christensen & Griffiths, 2005; Jorm & Morgan, 2007). Similarly the stigma of mental illness, notably still present in athletics (McLean, 2013), has also been shown to be a significant barrier to accessing treatment (Corrigan, Druss & Perlick, 2014). Educational and contact interventions; presenting information about mental illness and exposing individuals to others who have experienced mental illness, have been successful in reducing this stigma and have shown to improve overall attitudes about mental health treatment (Penn & Couture, 2002).

Evidence, therefore, suggests that adequate education and exposure to mental health resources will increase student athlete's awareness and recognition of potential mental health issues, increase their awareness to the availability of treatment, and increase help-seeking behaviors. In order to determine how effectively athletic programs are communicating these services to their athletes, this study will assess athletes' opinion regarding the availability and accessibility of mental health services for athletes at their university. Athletes will also be asked whether they have received any education regarding mental health from their athletic department, and whether they feel their program would support them through a mental health issue.

Research Template

Existing research has identified significant factors, unique to student athletes, that may lead to the development of depression in college athletes, such as increased daily stressors (Hudd et al, 2000; Papanikolaou et al, 2003; Wilson & Pritchard 2005), injury (Appaneal et al, 2009; Brewer, 1993; Gulliver at al, 2015; Malinauskas, 2010; Manuel et al, 2002; Smith & Milliner, 1994; Yang, Peek-Asa, Corlette, Cheng, Foster & Albright, J. 2007), over-reliance on athletic identity (Brewer, 1993; Watson and Kissinger, 2007) and fear of failure (Hammond et al, 2013; Hassmen & Blomstrand, 1995; Jones et al, 2010 Jones & Sheffield, 2007). However, research into the actual prevalence rate and individual risk-factors for college athletes is minimal (Proctor & Boan-Lenzo, 2010; Weigand, Cohen & Merenstein, 2013; Yang et al, 2007), highlighting the need for further investigation in this area. In order to extend the literature on the prevalence and risk factors of depression symptoms in college athletes, this study will replicate aspects of a

previous research study in the field (Yang, et al, 2007), whilst simultaneously building on this research to add to the understanding of the relationship between depression and NCAA sport participation.

The study by Yang et al represents the most comprehensive research on the risk factors and prevalence rate of depression in NCAA college athletes to date. The researchers aimed to determine which risk-factors and demographics are most strongly associated with symptoms of depression. A sample of over 250 student-athletes, representing a variety of sports, completed the CES-D to determine symptoms of depression. Risk factors considered included race, sex, academic class, history of injury, history of diagnosed depression, pain and residence status. Overall 21% of athletes surveyed reported a CES-D score of 16 or higher, indicating a significant presence of depression symptoms in the student athlete population. In particular freshmen and female athletes were shown to experience more depression symptoms than any their male and upper-class counterparts. This supports the notion that freshmen may represent a particularly vulnerable population (Papanikolaou et al, 2003). Pain was also shown to be a significant predictor for depression symptoms. Although the relationship did not reach statistical significance, it was observed that athletes with a history of injury tended to report higher levels of depression symptoms. Significant findings from previous research into the relationship between depression and athletic injury provide further support for this observation (Appaneal et al, 2009; Brewer, 1993; Gulliver at al, 2015; Malinauskas, 2010; Manuel et al, 2002; Smith & Milliner, 1994).

Although important findings regarding the prevalence of depression symptoms in

college athletes were made in this research, almost 10 years has passed since data collection occurred. In that time the conversation regarding mental health in college athletics has changed, with governing bodies taking steps to improve mental health care for their athletes (Burnsed, 2013; NCAA, 2014b; Terlep, 2014). This suggests that previous findings in the area may not be truly representative of the current population.

Purpose and Hypotheses

The purpose of this study is to assess the current prevalence of depression symptoms among college athletes, across gender, academic class, scholarship level and sport season status. The impact of injury, missing practice or competition due to injury and the length of time missed due to injury, on depression symptoms will also be assessed. Finally, this study will determine athletes' opinions regarding the availability and accessibility of mental health treatment and education within their athletic department.

It is hypothesized that the current prevalence of depression symptoms among athletes is higher than the rate of 14-21% observed in previous studies. The second hypothesis is that female athletes experience more severe depression symptoms than male athletes. It is also hypothesized that the severity of depression symptoms differs significantly between academic classes. The fourth hypothesis is that scholarship status has a significant effect on depression score. Due to the increased pressure of regular competition and significant physical and time demands it is hypothesized that in-season athletes experience more severe depression symptoms than off-season athletes. It is also

hypothesized that athletes with a history of injury at any point in their career experience more severe depression symptoms than healthy athletes. Similarly, it is hypothesized that athletes will a history of injury in the previous 6 months experience more severe depression symptoms than healthy athletes. It is further hypothesized that missing practice due to injury increases depression score, and that depression scores also increase in relation to length of time out with injury.

CHAPTER III

METHODS

Participants

A total of 1169 NCAA student athletes responded to the online survey. According to data compiled from various sources, there are approximately 140,000 NCAA Division I college athletes (O'Rourke, 2014), giving a response rate of approximately 0.8%. However, 219 respondents either dropped out or only partially completed the questionnaires, leaving a sample of 950 participants. Participants were 327 males (34.4%), 622 females (65.5%) and 1 (0.1%) unreported (0.1%). The majority, 83.9%, of participants identified as Caucasian/White (n= 796), 5.8% identified as Black/African American (n= 55), 3.7% Latino/Hispanic (n= 35), 3.1% Asian America (n= 29), 0.4% Native American (n= 4) and 3.2% Other (n= 30).

All participants were NCAA Division I athletes. This included 30.5% freshmen (n= 290), 25.8% sophomores (n= 245), 24.1% juniors (n= 229), 17.1% seniors (n= 162), 2% graduate students (n= 18), and 0.5% other (n= 5). A variety of scholarship levels were observed, with 24.9% of athletes receiving full scholarship (n= 237), 47.6% receiving partial scholarship (n= 452), 27.4% with no scholarship (n= 260) and 1 unreported case. 45.5% reported their sport as being off-season (n= 432) and 55.5% currently in-season (n= 518).

Measures

Background Information Questionnaire: Participants reported demographic information (e.g., race, sex, academic class) as well as information related to their sport

standing, including questions related to academic class, scholarship level, history of injury, and previously diagnosed depression. Included in this questionnaire were questions related to their depression history as well as any information they have received on depression or about the accessibility of mental health services within their athletic program. These questions will be measured on a 1-5scale from strongly disagree to strongly agree. See Appendix A.

Center for Epidemiological Studies Depression Scale (CES-D) (Radlof, 1977): The CES-D scale is a 20-item, self-report, questionnaire asking participants to what extent they have experienced a variety of symptoms, such as feeling lonely, feelings of worthlessness or crying spells, during the previous week. Responses are rated on a 4-point scale, from 0 (*less than once a week*) to 3 (*5-7 days a week*). A total score, out of 60, is calculated from the summation of all 20 items (certain questions are reverse scored), with higher scores indicating more severe symptoms of depression. A total score of 16 or higher indicates the diagnostically significant presence of depression. This measure has been validated for use with the college student population (Radloff, 1991).

Procedure

Following Institutional Review Board (IRB) approval, a list of all current NCAA Division I colleges were obtained from the NCAA website. Contact information for every coach was then found via the schools athletics staff directory pages. Coaches from every program were then listed, and random sampling methodologies were used to choose 3000 coaches to contact (approximately 75% of NCAA Division I coaches). Those coaches were contacted via email to request their athletes' participation (for email script see

Appendix B). Although the sampling was random, three weeks into data collection, it was clear significantly more females were participating than males. Therefore during the last week of emailing 400 male teams were again randomly chosen, from all male teams, to be contacted to request their participation, in order to equalize sample sizes among the two sex groups. The email asked coaches to forward a link on to their athletes that they could click to complete the survey on Qualtrics. The survey included an informed consent form, background questionnaire and the CES-D. Athletes were not required to provide their name, or any other potential identifying information, including sport played or name of school. Participants were only required to complete the measure at one-time point. Data collection took place between January 2015 and March 2015. Following completion of the surveys, participants were encouraged, via a final page of the questionnaire, to seek professional mental health care if they identified with the symptoms addressed in the CES-D.

CHAPTER IV

RESULTS

CES-D Scores and Non Sport-Related Demographics

A total of 315 (33.2%) participants reported a depression score of greater than 16, indicating the presence of depression symptoms, with 8.7% (91) scoring ≥30. For a full breakdown of depression symptom scores greater than 16 by demographic variables, see Table 1. To analyze the effect of sex on CES-D scores an independent T-test was performed. A significant difference was found for sex, t (947) = -3.30, p = 0.00. Female athletes (m = 14.46, sd = 10.64) reported significantly higher rates of depression symptoms than male athletes
(m = 12.10, sd = 10.10). Although originally expected to be a variable of interest for the study race was not included as an Independent Variable due to unequal sample sizes.

Table 1.

Frequency of CES-D scores ≥16

Independent Variable	n	n (CES-D score ≥16)	% of n (CES-D score ≥16)
Sex			
Male	327	87	26.6
Female	622	228	36.6
Academic Class			
Freshman	290	100	34.4
Sophomore	245	85	34.7
Junior	229	73	31.9
Senior	162	49	30.2
Graduate	18	6	33.3
Other	5	2	40.0
Season Status			
In-Season	432	133	30.8
Off-Season	518	182	35.1
Scholarship Level			
Full	237	84	35.4
Partial	452	151	33.4
None	260	80	30.8

CES-D Scores and Sport-Specific Demographics

Due to the high number of freshman and sophomore participants in the final sample, compared to the junior, senior and graduate categories of the Academic Class, this variable was unequal in sample size. To deal with this issue, the means of the juniors, seniors, and graduate students were analyzed and a one-way ANOVA was run to see if there were any significant differences among these groups. No significant differences were found ($p > 0.05$), therefore the data was collapsed into one group labeled upperclassmen. It was also found that the freshman and sophomore categories presented with the same mean scores; therefore these two categories were combined to a single group labeled lowerclassmen. Participants who listed their academic class as other were disregarded for the analysis, due to the small size of the sample (n= 5). Following this, in order to analyze the effect of sport related characteristics a Univariate ANOVA [2 (academic class) X 3 (scholarship level) X 2 (time of season)] was run. A significant difference was found for academic class, F (1, 932) = 6.67, p = 0.01, η^2 = 0.01, β = *0*.73. Lowerclassmen (m = 14.36, sd =11.08) reported significantly higher rates of depression symptoms than upperclassmen (m = 12.74, sd =9.65). A significant difference was also found for sport season status, F (1, 932) = 3.98, p =.05, η^2= 0.004, β =.51. Athletes in the off-season (m = 13.14, sd = 10.39) reported significantly lower rates of depression symptoms compared to in-season athletes (m = 14.10, sd = 10.60). No significant difference was found for scholarship level (p> 0.05).

CES-D Scores and Injury

A series of T-tests were run to analyze the effect history of injury had on CES-D scores. Multiple T-tests were chosen over Univariate ANOVA as different people qualified for different analysis. For example only those who answered yes when asked if they had suffered an injury, either ever or in the previous six months, were prompted to respond to questions regarding the severity and duration of that injury. If an ANOVA had been used, only those people who qualified for all questions would have been included in the analysis.

First, a t-test was run to investigate whether there was a significant difference based on whether athletes had ever suffered an injury *(p* > 0.05). However, a significant difference was found between athletes history of injury in the previous six months, *t* (784) = 2.01, *p* = 0.05. Athletes who had suffered an injury in the previous 6 months (*m* = 14.49, *sd* = 10.99), reported significantly higher levels of depression symptoms than those who had remained healthy during this time (*m* = 13.07, *sd* = 10.12). A further T-test was performed to determine whether, for those who had suffered an injury in the last 6 months, missing practice or competition due to this injury effected depression scale scores. A significant difference was found *t* (155) = 4.16, *p* =0.00, suggesting that those who were forced to miss activity (*m* = 15.30, *sd* = 11.52) scored significantly higher on the CES-D than those who did not (*m* = 10.85, *sd* = 7.04).

A univariate ANOVA was conducted to determine the effect of the duration of an athlete's injury on CES-D score, based on <1-month, 1-3 months, 3-6 months and 6+

months intervals. No significant difference was found between these intervals. However, analysis of the means suggests that athletes who are injured for under 1-month (m = 15.84, sd = 11.96) or over 6-months (m = 16.25, sd = 10.65) generally report higher depressive symptoms scores than those who are injured for 1-3 months (m = 13.69 sd = 10.99) and 3-6 months (m = 14.92 sd = 11.46).

Mental Health Care Accessibility and Education

The descriptive for each of the questions regarding mental health availability, accessibility and education were analyzed. The results showed that, of the four questions asked, athletes agreed most strongly that athletic department would support them through a mental health issue (m = 3.90, sd = 0.96). Overall, 72.9% of athletes either agreed, or strongly agreed with this statement. Participants generally agreed that mental health care was easily available to themselves or other athletes at their university (m = 3.69, sd = 0.93), and that they knew how or where to access treatment (m = 3.57, sd = 1.14). However, a total of 25.7% either disagreed or strongly disagreed with this statement. A total of 44.5% also disagreed or strongly disagreed that they had received any education about mental health as a college athlete (m = 2.92, sd = 1.16).

CHAPTER V

DISCUSSION

Overall Depression Prevalence

One of the main intentions of this study was to determine a prevalence rate of depression symptoms among college athletes. The observed rate of 33.2% supported the hypothesis that the rate of depression symptoms in college athletes is significantly higher than has been reported in previous studies of this population. These have shown the prevalence rate to range from 14-21% depending on the methods and measures used (Proctor & Boan-Lenzo, 2010; Weigand, Cohen & Merenstein, 2013; Yang et al, 2007). The discrepancy between the results obtained in this study and previous findings suggests that depression may be an issue that affects far more college athletes than previously thought. Although this finding may be surprising, it aligns much closer to the suggested 30% prevalence rate experienced by the general college population (ACHA, 2014). This contradicts previous suggestion that participation in college athletics may serve as a protective factor against mental illness (Armstrong & Oomen-Early, 2009; Proctor & Boan-Lenzo, 2010). Although a CES-D score of 16 or higher does not represent a clinical diagnosis of depression, scores have been shown to correlate highly with results of similar self-report depression screenings such as the Beck Depression Inventory (Zich, Attkisson & Greenfield, 1990), and it remains a widely used measure of depression symptoms. Therefore, the finding that one third of athletes reported a score indicating the presence of at least mild depression symptoms is worrying.

A potential reason for the increased prevalence rate of depression symptoms observed in this study is that the high level of anonymity given to participants. No identifying information was requested during the survey, and this may have allowed participants to report more honestly than in previous studies conducted at a single institution (Yang et al, 2007) or those only comprising athletes from a single sex or sport (Proctor & Boan-Lenzo, 2010). It is also possible that, due to the recent exposure mental health issues have received in the press (Associated Press, 2013; Flanagan, 2014; Noren, 2014), athletes are more aware of these issues and therefore are more likely to acknowledge negative emotions when asked to report them. However, the fact that only 8.3% of participants indicated they had ever been diagnosed with depression, and just 3.7% had been diagnosed in the previous 6 months, suggests that the percentage of athletes actually reporting these symptoms to health professionals is very low. In comparison, the diagnosis rate of depression among college students in the previous 12-months, as reported by the ACHA (2014), is 12%. This, therefore, proposes that although athletes appear to experience depression symptoms at a similar rate as non-athletes, approximately 30%, they are less likely to seek help and receive a clinical diagnosis.

This assertion is supported by previous findings into the general attitude of athletes surrounding mental health treatment (Watson, 2005) possibly due to the stigma that may still exist around mental health in athletics (McLean, 2013). A potential example of this was seen in the 219 participants who only partially completed this study. Despite following the email link and completing the demographic questionnaire, many participants chose not to complete the CES-D. This reluctance to complete a 20-item

depression scale, despite answering all questions until that point in the survey, possibly indicates a significant level of discomfort with the subject matter. Athletes may be concerned that, by acknowledging depression symptoms, they will appear weak or unable to handle the pressure of elite athletics (Papanikolaou et al, 2003) reducing their desire to report such problems. Nevertheless, the discrepancy between the reported prevalence of depression symptoms and the rate of depression diagnosis in athletes is an issue that should be of grave concern to administrations and health professionals, due to the potential life-threatening consequences of undiagnosed depression (Rihmer, 2001; Isacsson, Bergam & Risk, 1996).

Individual Risk Factors for Depression Symptoms

Sex

Analysis of the potential demographic risk factors on depression symptom prevalence provided some interesting findings. The hypothesis stating the female athletes would experience significantly higher levels of depression symptoms was supported. This is in accordance with trends observed in the general population and from previous studies involving college and elite athletes (Schaal et al, 2011; Yang et al, 2007). This finding was, nevertheless, noteworthy and may have several explanations. Female athletes are more likely to participate in aesthetic sports, such as swimming, diving or gymnastics- all sports that were contacted for participation in this survey. Participation in these sports, as noted by Schaal et al (2011), has been shown to be consistent with higher depression and anxiety scores. Women are also diagnosed with depression at a higher rate than men in the general population, and are more likely to seek treatment for depression than men.

However, the simple fact that female athletes are consistently reported to be at an increased risk of experiencing depression symptoms highlights the need for improved screening practices and treatment within female athletic programs.

Academic class

The third hypothesis, stating that depression symptoms will differ between academic classes was supported. It was found that underclassmen reported significantly higher CES-D scores than upperclassmen. It has been previously suggested that freshmen athletes are particularly susceptible to feelings of depression, due to the many challenges that accompany adjusting to college life (Wilson & Pritchard, 2005). These can include acclimatizing to a new location, homesickness, integrating into a new team, forming relationships with new teammates and coaches, and the loss of star-athlete status experienced in high school (Papanikolaou et al, 2003). However, as freshmen and sophomores reported equal means and therefore could be combined into one category, it appears that these feelings and issues have an enduring effect that extends beyond freshman year. Many of these factors may dissipate over time, such as homesickness and needing to develop relationships with new coaches, explaining the lower scores reported by upperclassmen. This indicates that underclassmen, as a group, are more at risk for depression symptoms rather than just freshmen as previously thought. Therefore particular attention needs to be paid to the mental health of both freshmen and sophomores as they try to fully adjust to the rigors of college athletics.

Scholarship

The fourth hypothesis regarding the effect of scholarship level on depression symptoms was not supported, as no difference was observed. However the lack of statistically significant difference between scholarship levels was, in of itself, significant. It has been proposed that scholarship athletes experience less freedom that non-scholarship athletes (Medic, Mack, Wilson & Starks, 2007), and may perceive more pressure or expectation on their performance. It, therefore, was expected that they would experience increased depression symptoms. However no difference was found; suggesting that, whilst scholarship may affect one's motivation and enjoyment of sport, it does not cause clinically significant psychological distress. It is also possible that the negative effects of scholarship receipt are offset by a lack of financial concern; a stressor that may be experienced by non-scholarship athletes.

Season status

Season status was shown to significantly affect depression scores, as athletes who were in-season reported significantly higher depression scores than those in the off-season, supporting the stated hypothesis. Many of the daily stresses of college athletics are heightened during, what can be, short and intense collegiate seasons (Humphrey et al, 2000). Significant time spent travelling to and from competitions reduces available time for activity outside of sport. Frequent in-season competitions may increase pressure to perform, fear of failure, and provide multiple opportunities to experience negative game outcome and any subsequent psychological distress related to that outcome (Hammond et al, 2013; Hassmen & Blomstrand, 1995; Jones et al, 2010 Jones & Sheffield, 2007).

These are issues that are less likely to be experienced in the off-season. As data collection occurred during spring semester, it is possible fall sport athletes were able to relax after the completion of their seasons and were less stressed by their reduced daily athletic commitments than their in-season counterparts. Although athletes engage in off-season training programs, the decreased activity schedule permitted under NCAA compliance regulations and lack of competitive contests may reduce the daily demands on an athlete's time and effort. In turn, this may allow for increased focus in non-athletic related areas such as academics and social activities, resulting in a reduction of daily stress compared to the levels experienced during season. This shows that athletic programs should be aware that athletes are vulnerable to increased psychological distress during their competitive season, and measures should be developed to identify and monitor those experiencing symptoms of depression during this period.

Injury

The results from this study supported the hypothesis predicting that athletes who had suffered an injury in the previous 6 months experienced increased depression symptoms. This closely aligns with the findings of previous research (Appaneal et al, 2009; Brewer, 1993; Gulliver at al, 2015; Malinauskas, 2010; Manuel et al, 2002; Smith & Milliner, 1994). However, new to this study, was the support for the hypothesis that athletes who were unable to practice or compete because of an injury suffered in the previous 6 months experienced more severe depression symptoms than those who were able to continue practicing. This highlights the psychological distress caused by the act of missing out on practice or competition. It implies that removing the athlete from activity

may have more of a negative psychological effect than the physical limitations or pain associated with an injury. Being unable to physically compete represents a significant disruption to the athletes' social role, suggested by Brewer to increase feelings of depression in those who most strongly identify with this role (1993).

However, the hypothesis predicting that depression symptoms would increase in relation to the amount of time missed due to an injury was not supported, as no difference was found between these groups. Comparison of the means showed that athletes who were injured for less than one month and more than six months reported higher depression scores in general. This suggests that the severity of depression symptoms is not directly correlated to the duration of an injury. Rather, it appears to be short-term injuries and injuries requiring an exceptionally lengthy rehabilitation are more difficult psychologically.

Interestingly, the hypothesis regarding the effect of experiencing an injury at any point in ones' athletic career was also not supported, as this factor was found to have no significant effect on depression score. This implies that one recovers from the psychological impact of injury over time, but that recent history of injury is of particular significance with respect to the development of depression symptoms. Although symptoms may dissipate over time, experiencing depression symptoms can result in a number of immediate negative consequences to the individual; ranging from impairment of academic performance, (Heiligenstein, Guenther, Hsu & Herman, 1996) to an increased risk of suicide (Rihmer, 2001; Isacsson, Bergam & Risk, 1996). Therefore it is

vital that any athlete experiencing symptoms of depression following an injury receives treatment, rather than being allowed to assume they will simply recover over time.

The results from this study further demonstrate that athletes are at an in increased risk for depression symptoms following a recent injury. However, the findings also show that this risk is significantly higher if the athlete is forced to miss practice or competition due to their injury, regardless of the amount of time they miss. This suggests that it is important to administer depression screenings for all athletes who suffer an injury, and especially important to administer these screenings at various times throughout the rehabilitation process for athletes who are forced to miss activity. It also emphasizes the importance of integrating and involving injured athletes in all team activities including practice and competition, as a way to minimize the negative effects of their injury-forced absence.

Mental Health Care Accessibility and Education

An aspect of this study that was unique compared to previous research was the investigation of opinions regarding current mental health care availability, accessibility, education and support. Due to the recent promotion of these issues by governing bodies it was important to gain an understanding of how mental health care is currently experienced by student athletes. The results from these questions present some cause for concern. It was found that 25.7% of athletes did not know how, or where, to access mental health treatment at their university, and over 44% of athletes had not received any mental health education through their athletic department. These findings are particularly poignant as understanding these issues and knowing where to receive treatment are vital

aspects of effective mental health care. This points to a significant deficiency in the mental health services provided by collegiate athletics programs.

Positively, despite the above findings, athletes generally felt that their athletic department would support them through any mental health issue, with only 9.8% of participants indicating they disagreed or strongly disagreed with this sentiment. It was also found that most athletes felt treatment was available to themselves or other athletes should they need it, with just 11.6% disagreeing or strongly disagreeing with this statement. This presents an interesting contradiction, wherein the majority of athletes do feel care is available and would feel supported by their athletic department if they suffered a mental health issue, but many don't actually know where to get this care, and have received little to no education of why they might need it. It, therefore, appears clear that increasing mental health education for college athletes and increasing their knowledge regarding the accessibility of services should be a significant area of focus for athletic departments and administrations.

Precedent has been set for the development of guidelines to address a significant concern to student-athlete health by the progression of concussion awareness and treatment in recent years. Only after significant pressure to update their policies, following numerous personal-injury lawsuits filed by former athletes (Axon, 2014), were regulations implemented by the NCAA for the education and management of concussions. These regulations now include requirements for athletic departments to educate athletes, athletic trainers, coaches and team physicians, about the institute's specific concussion management plan (NCAA, 2014a). Furthermore, all athletes now

must complete a pre-participation baseline concussion assessment, requiring physician approval before being cleared to compete. Despite the noted advancements that have been made by the NCAA with respect to their acknowledgment of mental illness (NCAA, 2014b; Terlep, 2014), the continued lack of specific regulations requiring regular education and screenings for mental illness, such as those required for concussions, may contribute to the a lack of awareness surrounding this issue. In a possible sign of athletic staff support for such measures, throughout data collection a number of coaches responded to the recruitment email, despite no specific request to do so, indicating their support for this study. This suggests that many coaches do recognize depression and mental health to be a serious issue in college athletics, and are keen for advancements to be made in this field.

This study has highlighted specific groups of student-athletes who are at an increased risk for the development of depression symptoms. Female athletes, underclassmen, in-season athletes, athletes who experience injury, and athletes who miss practice or competition due to that injury, are all shown to be susceptible to increased depression symptomatology. Improving mental health awareness, particularly among these at-risk groups, should be of the utmost importance going forward. Similarly, the development of regular depression screening and treatment procedures to adequately address these risks should be strongly considered. By not requiring athletic departments to provide any mental health education to their athletes; either in terms of the factors that may increase susceptibility to mental illness, or of the services that are available to them,

administrations are potentially increasing the possibility that symptoms will go unreported and athletes will fail to receive the care that they need.

Limitations

Like any research study, there are limitations with this research that should be acknowledged. A returned response rate of less than one percent of total college athlete population could be considered to be low, however this represents the largest sample of college athletes for studies of this kind (Proctor & Boan-Lenzo, 2010; Weigand, Cohen & Merenstein, 2013; Yang et al, 2007), including male and female athletes from a variety of sports and universities. As with any self-report study, the measures used were open to self-report bias, leading to potential under or over-reporting of depression symptoms. The depression measure itself, the CES-D, does not constitute a clinical diagnosis, and therefore interpretation of the results on a clinical level should be done with caution. It is entirely possible to experience certain depression symptoms without suffering from diagnostically significant levels of depression, creating the possibility for false positives when using the 16-point cut-off. Furthermore, as data was only collected at one time, no conclusions can be drawn as to the enduring nature of the reported symptoms. To protect potential participants' sense of confidentiality it was decided not to ask any information on the university attended or sport played by the participant. Although, this likely led to more participants, responding more honestly, it did lead to an inability to assess sport as a potential independent variable. It also raises the question as to whether the sample is truly representative of college athletes across all sports or whether it has been unduly affected

by high response rates from certain teams and sports. However, the random sampling methodology used should have adequately controlled for this limitation.

Recommendations for Future Research

The findings from this study present several potential avenues for further research. One such avenue would be to extend the methodology of this study to include NCAA Division II and III athletes. This would not only give researchers a national prevalence rate for all college athletes but would allow for comparison of risk factors between divisions, which may well differ significantly based on the differing pressures and stressors experienced by each group. As mentioned above, sport was not a variable measured in the study. This was, in part, to maintain anonymity for athletes, and encourage honest reporting of their symptoms. However, in order to develop the most thorough analysis of risk factors, sport-specific differences may be a variable that warrants investigation.

The prevalence rate of depression symptoms among athletes observed in this study and a diagnosis rate far lower than the general college population suggests a significant need to examine how these issues are reported. Research should focus on identifying any barriers that may exist specific to college athletics. A concerted effort also needs to be made to develop effective mental health education programs for athletes, focused on increasing awareness and reducing the stigma surrounding mental health. Research also needs to be conducted into how symptoms are recognized and treated within the team environment. Whilst it is possible athletes are able to mask their symptoms during team activities, it is also possible that athletic trainers and coaches are

either ignoring or unable to recognize these symptoms. Education programs should therefore extend to coaches and athletic trainers, to increase their understanding and ability to recognize depression symptoms in their athletes.

Conclusion

To the researcher's knowledge, this study represented the largest investigation into the prevalence of depression symptoms in college athletes to date. The sample of 950 athletes, obtained from various sports and universities across the country, answered many of the limitations from previous studies with regards to sample size and diversity. Therefore, the results present several unique findings that could significantly advance the topic of depression in college athletics. The high prevalence rate observed in this study indicates that depression is a more significant issue in college athletics than previously acknowledged. However the low rates of diagnosed depression in the past 6 months also indicate a reluctance to seek treatment. It appears that athletes are not receiving adequate education from their athletic department on issues regarding their mental health. The identification of several risk factors was an important aspect of this study, as this should increase institution's ability to screen and treat the most vulnerable groups more effectively. Although this topic has received increased attention from governing bodies in recent years, these findings highlight the need for continued improvements to be made in both the understanding of mental health issues in college athletics, and the services that are provided to athletes.

APPENDIX A

PARTICIPANT DEMOGRAPHIC QUESTIONNAIRE

PARTICIPANT DEMOGRAPHIC QUESTIONNAIRE

Gender
- Male
- Female

Race
- White/Caucasian
- Black/African American
- Latino/Hispanic American
- Native American
- Asian/Asian-American
- Other

Academic Class
- Freshman
- Sophomore
- Junior
- Senior
- Graduate

Scholarship Status
- None
- Partial
- Full

Current sport competition status
- In-season
- Off-season

Have you ever suffered an athletic injury?
- Yes
- No

If yes, were you required to miss practice or competition because of this injury?
- Yes
- No

If yes, approximately how long were you unable to practice or compete?

- Less than 1 month
- 1-3 months
- 3-6 months
- 6+ months

Have you suffered an athletic injury in the past 6 months?

- Yes
- No

If yes, were you required to miss practice or competition because of this injury?

- Yes
- No

If yes, approximately how long were you unable to practice or compete?

- Less than 1 month
- 1-3 months
- 3-6 months
- 6+ months

Have you ever been diagnosed with depression?

- Yes
- No

Have you been diagnosed with depression in the past 6 months?

- Yes
- No

I feel that mental health care is easily available to myself and other athletes at my university...

- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

I know how and where to access mental health treatment at my university…

- Strongly Agree
- Agree

Neither Agree nor Disagree
Disagree
Strongly Disagree

I have received education about possible mental health issues I may face as an athlete at my university...

Strongly Agree
Agree
Neither Agree nor Disagree
Disagree
Strongly Disagree

I feel that my athletic program would support me if I suffered from a mental health issue…

Strongly Agree
Agree
Neither Agree nor Disagree
Disagree
Strongly Disagree

APPENDIX B

PARTICIPANT RECRUITMENT EMAIL SCRIPT

PARTICIPANT RECRUITMENT EMAIL SCRIPT

Coach _____ ,

My name is Charlie Cox, I am a graduate student at Southern Illinois University in Edwardsville, and a former college soccer player, having competed for Rutgers University from 2006-2010. I am currently conducting research for my Masters thesis in Sport & Exercise Behavior and was hoping to you would be willing to allow your players to participate in this study.

My research is aiming to determine the prevalence rate and risk factors associated with depression among college athletes. I am aiming to gain the largest sample of athletes possible, and was hoping you may be able to assist me in this by forwarding the following link to your athletes and encouraging them to complete the short online questionnaire.

https://siue.co1.qualtrics.com/SE/?SID=SV_3y43I2giKR93I57

I understand that both yours and your athlete's free time is limited. However, the whole process should take no more than 10 minutes, and their participation would be greatly appreciated.

Please do not hesitate to contact me if you have any further questions.

Thank you for your time,

Sincerely,
Charlie Cox
Master of Science in Kinesiology - Sport and Exercise Behavior Graduate Student

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