PSYCHOLOGICAL HEALTH OF INJURED COLLEGE ATHLETES

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A Thesis

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by

DaMarko Williams

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DEDICATION

In love and memory of Garrett K. Dolan. You loved me for who I was and accepted me for the person I was striving to become. While you were here and now that you're gone, you have been my strength through many trials and tribulations. Your strength gave me a sense of protection and the courage to endure. Now that you are in Heaven, I know that you are still looking over me as my guardian angel and our hearts are forever connected. Thank you for believing in me, even at times when it was hard for me to believe in myself. Thank you for always pushing me and bringing out sparks of greatness that I didn't know I possessed. Thank you for helping instill into me the concept of if you start something finish it. And thank you for being a loving friend to many and an amazing brother to me. I love and miss you terribly…this world misses you terribly. Until we meet again, your brother from "Ozen." Always remember get sacks…get stacks. Ball in paradise 40!

ABSTRACT

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It is said that an individual's health can be broken down into three parts: physical, social and mental. All of which work together to make up a person's overall state of well-being. With the nature of sport today, injuries are very common amongst athletes. It is apparent that an injured athlete is affected physically because of their injury, but it does not stop there. There is ample amount of research over injured athletes; however, the majority of the research only focuses on the physiological aspect while neglecting the psychological component. This study is intended to shed light on the psychological health and emotional hardships college athletes endure during an injury. All 104 participants in this study were Division I athletes from various sports ranging in age from 18-24. Half of the participants were males and half of the participants were females. The study revealed that there are multiple factors that potentially affect an athlete's mental state during an injury. The two main factors that were the central focus of this study were stress and anxiety. Injured athletes had significantly heightened levels of both. The results of this study can be used to see the need to pay closer attention to an athlete's mental state during an injury instead of focusing solely on the physical aspect of injuries. Ultimately, this could help create healthier athletes and healthier individuals as a whole.

KEY WORDS: Psychological health, Stress, Anxiety, Injury

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Thank you to all of you who have mentored me, been patient with me, loved me unconditionally and encouraged me to become the man that I have become and continue to become.

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I. Introduction

Problem Statement

With the nature of sport, many of the athletes involved often experience an injury during their sporting career. Lemoyne et al. (2017), stated “statistics show over 70 percent of collegiate athletes will go through an injury during their college career” (p.93). Numerous studies have been conducted on athletes and their injuries; however, a vast majority of these studies solely focus on the physiological component of the athlete’s health while dealing with an injury. With the athlete’s physical condition being the main focal point, their psychological health, or mental health, and social health are often overlooked and neglected. Health is commonly looked at on three separate spectrums: physical, mental and social (Froud & Andrewes, 2019). Although these three aspects are independent, they all work together to make up the overall health of a person. An imbalance can cause various problems within a person. Therefore, it is imperative that all three facets are balanced to ensure an individual's overall health. This research was intended to bring more awareness to and to assess the psychological health of athletes that are going through injuries.

Definitions

As it pertains to this research, sport was defined as competitive physical activity in which individuals use their unique skills to compete against one another. An athlete was a male or female who competes in organized team sport for a school of higher education. An injury is a physical ailment that hinders an athlete from participating in practice or in competition of their respective sport for longer than 3 days. Health is defined as a person’s state of well-being. Physiological health refers to the branch of

health that deals with an individual's physical well-being; while psychological health refers to the branch of health that deals with an individual's mental well-being which includes emotions, behaviors and attitudes.

II. Literature Review

Introduction

The purpose of this section is to examine the previous studies on the topic of injuries in sport. The information below will be divided into five sections, focused on some of the central themes that have been noted in the literature on sports injuries. The first section will cover the theme of the types of injuries that are common in sports realm an athlete may attain, with an emphasis on ankle injuries. While some are more prevalent than others in certain sports, there is a great magnitude of the forms of injuries an athlete can obtain. The subsequent section will be in connection with the first and cover the causes of injury. Many factors contribute to the injuries such as overuse, poor technique and genetics to name a few. The third section will cover the recovery process and treatment of an athlete who has endured an injury. The last two sections of this chapter will cover stress and anxiety. Although these are not the only two psychological factors that are affected by injury, these are the two that will be highlighted in this research study.

Types of Injuries/Ankle Injuries

With the nature of sport, injuries are bound to occur. An athlete could pretty much hurt any part of their body. In a study by Dong (2013), she mentioned athletes who engage in sport for more than 4 years are most likely to suffer injury to different degree; major on the ankle, knees, hips, shoulder or elbow. There are several ways a person can hurt a single body part. For example, the ankle can be sprained, twisted, dislocated or even broken. Ankle injuries are the most common injuries sustained by high school athletes (Nelson, Collins, Yard, Field, & Comstock, 2007).

Ankle injuries are more prevalent in some sports as opposed to others. In research conducted by Nelson et al. (2007), it was noted that ankle injuries were more common in the sports that involved both running and jumping, with the highest rates occurring in football, basketball, soccer, and volleyball. The authors also stated activities that involve jumping in close proximity to other players were also associated with ankle injuries like, rebounding and shooting in basketball and spiking and blocking in volleyball. This was not the only combination of movements that lead to a great amount of ankle injuries. Other types of activity that were related to ankle injury involved swift changes of direction while running; for example, the activities required of the running back and wide receiver positions in football and the general play of all positions in soccer and basketball (Nelson et al., 2007).This cutting and jumping put a lot of stress on the body, mainly in the joint. Overtime this takes a major toll on the joints causing them to become weak and more susceptible to injury. The most common type of ankle injury is when the ankle rotates outward more than its normal parameters. Ankle taping and bracing are some of the preventative measures that are taken to reduce the likelihood of an ankle being injured.

Injuries are not solely exclusive to just bones and the skeletal system. Common types of injuries are bruises, contusions and pulls to the muscles. In sport it is completely normal for athletes to get nicks and bruises throughout the course of practices and competitions. A pulled muscle occurs when the muscle is stretches or pushed past its normal parameters (Aktug et al., 2018). Although some athletes are able to continue playing after experiencing one of these injuries, there are many instances where an injury of this sort has an athlete sidelined. Whether or not an athlete is able to continue playing

after suffering one of these injuries is decided by the athlete's pain tolerance and the severity of the injury.

Injuries also occur in places and to structures that a person may not normally think about. In a study done by Smith et al. (2018), they discovered that 47.9% of all the female collegiate athletes in their study experienced a breast injury during sports participation during their collegiate career. Other studies have been conducted on other injuries that aren't thought to be common. Miller et al. (2018) noted in recent years an estimated 442,000 athletes were treated in US emergency departments for sports-related eye injuries, with the main sports being basketball, baseball and softball. Another form of unusual injuries are orofacial injuries or dental injuries. As participation in competitive sports continues to grow at both the interscholastic and intercollegiate levels; exposure to, and the incidence of athletic-related injury, including orofacial injury, will also likely increase (Gould et al., 2016). Although orofacial injuries represent a small percentage of all sport-related injuries, the financial burden associated with these injuries can cost thousands over an adult's life. Therefore, effective management of sport-related dental injuries is critical to the long-term financial, physical, and emotional health of people who have experienced dental trauma (Gould et al., 2016).

As stated earlier, there are a plethora of ways for an athlete to get injured. These injuries are not limited to certain body parts. While some body parts are more at risk to injury than others, any part of the body can be injured.

Causes of Injury

The majority of all the literature on the subject of injuries in sport cover the theme of the causes of injuries. There are many factors that play a role in the causation of sports

related injuries. Some of these factors include overuse, poor technique, sex and simply the nature of the specific sport.

With athletes constantly performing the same motions repeatedly, they are continuingly wearing down their muscles which in terms leads to overuse. Roos et al. (2015) noted that overuse injuries are traditionally defined as injuries that present in a gradual manner and do not have a single definable event associated with their cause. Competitive organized sports such as, high school and college, are notable sources of this type of repetitive activity. Athletes practice day after day, sometimes more than once in one day, with very minimal rest time in-between. This is a type of injury that is often out of the control of the athlete, and due to the progressive nature of overuse injuries, an injured person may not be aware of the presence or seriousness of the injury. They may not seek treatment until severe tissue damage has occurred, which makes the identification and diagnosis of overuse injuries challenging (Roos et. al, 2015). All levels of sports leave athletes vulnerable to the possibility of overuse as they put forth an effort to improve their skillsets. This is extremely true for adolescents and youth sport. Many parents today specialize their children in one sport too early. Reider (2017), stated that most elite performers [in youth sport] began serious practice at an earlier age than their peers who began such practice later in life and often will develop overuse injuries and quit in frustrated exhaustion.

Another source of injuries that is noted in the literature is the use of poor technique. Technique is derived from a person's ability to perform a specific movement in the most efficient way possible. Individuals will often have a little personalized way of performing a task that is normally close to what would be deemed the proper technique,

but there are often times when an athlete's personal form is improper and could lead to injury. In the study conducted by Dorje et al., (2014), it was found that 40.2% of the injured children (99/246) attributed their injury to poor ground condition while others 30.5% (75/246) to faulty techniques. The study also noted that fatigue attributed to their poor technique and improper use of equipment.

Another source of injuries in sport is sex. Some injuries have been found to be more prevalent amongst one sex as opposed to the other. Following an increase in women's sports participation, evidence surfaced that women had much higher rates of ACL injuries that their male counterparts (Theberge, 2016). The author also found that women's gymnastics, women's basketball and women's soccer were the sports with the highest rates of ACL injuries, as the rates were significantly higher than other sports. The case for the large skew in ACL injuries in women compared to men has to do in part with the anatomy of the body. A woman's hips are naturally wider than men and often the widest part on their body. The angle that is created between the hips and knee of women put women at a greater risk of suffering an ACL injury or any knee injury for that matter.

Another factor in the cause of injuries in sports is the nature of specific sports. Some sports are extremely violent and put athletes at a higher risk of sustaining an injury as opposed to other, less vicious sports. Some sports require the athlete to preform actions and movements that are unnatural for the body to do, putting it at elevated risk of injury. American football is one of the most violent sports the world has to offer. Adel et al. (2016) conducted a study on sports injuries and the study found that n type of sports involved in injury was football (83.6%)…while the most successful sport causing injury

for males was football (88.18%). The study showed that most of the patients presented with pain and swelling as the main complaint. The most common mechanism of trauma involved in sports injuries was caused by direct trauma by another player (40%) (Adel et al., 2016). The most common injuries sustained in football are ankle, arm, knee, back, shoulder and wrist injuries. These injuries are also widespread in many other sports. However, an injury that is more abundant amongst football players than in other sports is a concussion. A concussion is a head injury in which the brain is injured and bruised by hitting the skull. This is a very serious injury, perhaps the most serious of all injuries. In football majority of the concussions come from helmet to helmet impact between two players. Harrison (2014) stated "this early concussion crisis in football raises critical questions about what kind of solutions and settlements are being negotiated in the current crisis and what risks, burdens, and inequities they will leave permissible." (p.823). Head injuries are a very serious matter. When a person is in a concussed state, they are very vulnerable. Their memory is often affected by the concussion as well as their ability to concentrate causing them to often be confused. During a concussion, a person often experiences severe headaches that get worse with loud sounds, bright lights, school-work and physical activity. Their balance also becomes impaired while they are in a concussed state, which is very dangerous and inhibits them from performing some normal daily tasks. The individual becomes more emotional in this state, they are more irritable and often show signs of depression. Even years before the first medical study of football injury was published, it was obvious that this new American game was dangerous. (Harrison, 2014). Many rules have been set in place in the game of football in an attempt to reduce the rate of concussions in the game. However, with the nature of the sport, there

is no sure-fire way to eliminate concussions from the game of football. Players should be made more knowledgeable about the risks they are taking when choosing to participate in the game of American football.

Recovery Process/Treatment

Once an athlete becomes injured, they are now in the recovery process. The steps that are taken for treatment are determined by the type of injury and the severity of that injury.

Many injuries sustained in sports require the athlete to undergo surgery. An excellent surgical outcome provides both the patient and the rehabilitation professional the opportunity to incorporate the postoperative rehabilitation guidelines without restrictions and in an appropriate timeline (Totlis, Panariello & Oliver-Welsh, 2017). When an athlete has undergone surgery, they are now on the road to recovery. This recovery process often involves a lot of physical therapy to get the injured body part back to the standard that it was previously at and maybe even stronger. According to Totlis, Panariello & Oliver-Welsh (2017), “rehabilitation seeks to alleviate the patient's pain as well as restore joint mobility and proprioception, reactivate muscles, restore basic abilities of activities of daily living, reestablish exercise technical proficiency to enhance the physical qualities of strength and speed, as well as restore neuromuscular control and the patient’s work capacity” (para 5). Once an athlete has progressed in their rehabilitation and is back to a functioning level of strength and mobility in the injured part of the body, they will progressively be worked back into participation of their sport. Once an athlete has had a body part surgically repaired, that body part will always be more susceptible to reinjury. This is also the case with concussions. In a study conducted

by Makdissi et al. (2009) ten players who were previously injured, were reinjured in their first game back after returning to competition. There is also rehabilitation for those injuries that do not require surgery to repair the injury. Their rehabilitation looks very similar to those that undergo surgery, as they have the same goals. These goals are to alleviate the athlete's pain, restore joint mobility and proprioception, reactivate muscles, reestablish exercise technical proficiency to enhance the physical qualities of strength and speed, as well as restore neuromuscular control and the patient's work capacity (Totlis, Panariello & Oliver-Welsh, 2017).

Rehabilitation of sports injuries involve more than simply repairing the psychical injury and regaining previous level of athletic performance. Optimizing injury rehabilitation also includes understanding the psychological impact of the injury on the athlete and how psychological factors can affect the rehabilitation process (Frontera, 2003). Major advances have been made in recent years in understanding the psychological factors that are associated with sports injury rehabilitation. Emotional responses to injury have been widely examined and it has been found that athletes with positive attitudes respond better during the rehabilitation process. There are techniques and advisories that have been developed to help athletes remain positive during this process. These include setting clear and realistic goals, the athlete visualizing a healthy version of themselves, honoring their feelings and accepting help and support (Frontera, 2003). Unfortunately, these techniques have been under utilized in the recovery process of injured athletes.

Stress

The first psychological factor that will be looked at is stress. Stress is a feeling everyone experiences when they feel challenged or overwhelmed. However, stress is more than just an emotion. It is a hard-wired physical response that travels throughout the entire body. There are two types of stress, eustress and distress. Eustress is a positive response one has with a stressor and has a beneficial effect on health (Quinones, Rodríguez-Carvajal, & Griffiths, 2017). On the contrary, they go on to describe distress as a negative form of stress. As it pertains to this research study, stress will refer to distress unless otherwise specified.

In the short-term, stress can be advantageous but when activated too often or too long, your primitive fight or flight stress response not only changes your brain but also damages other cells and organs throughout the body. Belem et al. (2014) explained that the adrenal gland releases the stress hormones cortisol, epinephrine or adrenaline and norepinephrine. They further explained, as these hormones travel through the blood stream, they easily reach the blood vessels and heart. Adrenaline causes the heart to beat faster. It also causes a rise in blood pressure, overtime, causing hypertension. This can also cause the inner lining of blood vessels to not function properly. Scientists now know that this is an early step in triggering the process of cholesterol plaque build-up in the arteries. Together, these changes can increase the risk of stroke and heart attack. Cortisol can also increase an individual's appetite. It tells the body to replenish energy stores with energy dense foods and carbs ultimately causing one to crave comfort foods. High levels of cortisol can cause an individual to put on the extra calories in a visceral layer of fat. This type of fat is an organ that actively releases hormones and immune system

chemicals. These chemicals can increase a person's risk of developing chronic diseases, such as heart disease and insulin resistance. Stress hormones affect immune cells in a variety of ways. Initially, they help prepare to fight invaders and heal after injury. However, chronic stress dampens the function of some immune cells. This not only makes an individual more susceptible to infections but also slows the rate of healing. Chronic stress can also sabotage a person's health by causing acne, hair loss, headaches, muscle tension, difficulty concentrating, fatigue and irritability (Basiaga-Pasternak, 2018).

The way of perceiving oneself and the surrounding world plays an important role in coping with stress, including the stress related to sports competition. There are numerous ways that athletes choose to cope with their stress. There are two core forms of coping, problem focused and emotion focused. Problem-focused coping aims to resolve the stressing situation that is the source of the stress. On the other side of the coin, emotion-focused coping is the kind of coping that is aimed at managing the emotions that are associated with the situation, rather than simply changing the situation (Crossman, 2001). While an injured athlete would benefit from both forms of coping, problem focused coping is the kind that is more frequently used when working with an injured athlete.

The people in the best position to help athletes suffering from stress are their trainers/coaches, due to the proximity and time spent with the athletes. Dawson et al., (2014) concluded that injured athletes who have spent time away from training can be prone to stress upon return to activity, often cause by the frustration of not being able to complete training the same way prior to injury. The authors also found that one of the

most effective ways to aid the return to full time activity would be to use relaxation techniques; this can positively encourage cognitive appraisals to performances. Trainers and health care professionals, however, should be competent to identify; when and how to use such techniques. Other healthy ways for athletes to deal with stress are to engage in pleasurable activities, take care of their body, maintain a positive perspective, laugh, talk to others, and get help from a professional. Many athletes do not know how to handle their stress and usually need help when it comes to dealing with the stress. Due to this fact, many times the athletic trainer or the coach is the first person the athlete turns to when they are stressed out. The coach and athletic trainer both need to know the available resources and know the proper steps to go to in order to get the athlete the proper help they need.

Life will always be filled with stressful situations but what matters to the brain and an individual's body is how they respond to this stress. If these situations are viewed as challenges that can be controlled and mastered as opposed to threats that are insurmountable, the person will perform better in the short run and stay healthy in the long run.

Anxiety

Sports activity is full of difficult and stressful situations. Even athletes with long-term experience often face problems with emotional regulation, coping with stress and with very strong pre-competition emotions such as anxiety. Anxiety is "the emotional or cognitive dimension of physiological arousal" (Ray and Weise-Bjornstal, 1999, p.258). Hann (2000) contended, of all the psychological factors thought to influence sport performance, anxiety is often considered the most important. In this study the two types

of anxiety that were studied were state and trait anxiety. State anxiety has been said to be the "anxiety intensity at a given time," whereas trait anxiety is said to be "an individual's general tendency to experience elevations in state anxiety when exposed to stressors" (Hann, 2000, para 4). He proposed that each athlete possesses an optimal zone or range of anxiety most beneficial for performance. This optimal zone is different for each athlete and is known as their Zones of Optimal Functions (ZOF). Research has shown that "some individuals can tolerate a wide range of anxiety intensity before experiencing a decline in performance, whereas others perform best only when anxiety lies within a very narrow range" (Hann, 2000, para 6). Too much anxiety can negatively affect an athlete's sport performance, but if the amount of anxiety is within the athletes ZOF then the results will be positive.

Athletes who suffer from stress and anxiety and do not learn to control their symptoms will soon have issues that will cross over into their performance. Hann (2000) noted that sports psychologists have long believed that high levels of anxiety during competition are harmful, worsening performance and even leading to dropout. Dropout is a bad result for athletes to have due to poorly managed stress and anxiety, but Hann also found "another widely accepted assumption is that all positive emotions facilitate sport performance" (para 7), which has actually been proven to not be true. Performance is especially affected when an athlete has suffered an injury and is stressed and anxious about their return to their sport. Mann, et al (2007) found the psychological issues patient-athletes worry about are fears of reinjury, fears about surgery, unwillingness to be patient with recovery and rehabilitation, avoidance of rehabilitation or sports-related activities and concerns that the consequences of the injury will disappoint others.

Overload and burnout are common among athletes especially at the higher levels of sports, such as collegiate athletes. Elite athletes have dropped out of sports at the peak of their careers maintaining that they are 'burned out' and that participation has become too aversive for them to continue (Hackfort & Spielberger, 2003). Burnout, overload, dropout and maladaptive fatigue syndrome are conditions that an athletic trainer does not want their athletes to experience. The athletic trainer should supply resources for the athlete before their condition gets to this level, even if it is to just send them to the counseling center on campus. Storch, et al, (2006) found a particularly problematic issue is that athletes greatly underutilize school counseling and mental health services. They found many athletes report a need for counseling regarding time management, stress, burnout, and fear of failure, anxiety, depression and performance related issues. There are many ways that stress and anxiety negatively affect sports performance, which the athlete needs to consider in order to get help.

Conclusion

There is ample amount of literature on the topic of sport related injuries. The literature is centered around themes. One of those being the types of injuries that are associated with sport. There are many injuries that are common when it comes to sport but the most common injury in all sports. Another theme that is consistent throughout the literature is the cause of injury in sport. There are many things that play a factor in the causation of injury. These happen to be overuse in athletes, poor technique, their sex and nature of specific sports. Another theme that is in the literature is the prevention of injury. There are many steps taken in order to reduce an athlete's risk of injury such as warm-up programs and the tapping and bracing of athletes. The next theme that I focused on in my

literature review was the recovery process an athlete goes through once they have been injured. Athletes must regain the strength and mobility of the injured body part before they are allowed to progressively move back into participation of their sport. The last two sections of this section cover stress and anxiety. These are the two psychological factors that will be examined for this research study. All of the themes of current research tend to focus solely on the physical aspect of sports related injuries, neglecting the psychosocial aspect of it. The psychosocial aspect focusses on the athlete's feeling and behaviors while going through the injury as well as focusing on their social interactions with others. These two components along with the physical aspect all need to be examined to ensure the complete health of an athlete who has been injured.

III. Methodology

Much research has been done on athletes and injuries. Despite this, the majority of this research only focused on the physiological aspect of the athlete's health, often neglecting the psychological and social components of health. There are three facets of health (physical, mental and social) that work together that make up an individual's well-being.

Grooms et al. (2013) stated "injuries are common among university-level athletes. Competitive athletes sustained on average more than two injuries each year, with ankle, knee and shoulder injuries being most frequently reported" (para. 27). The nature of sport brings along injury with it. In order for a sport to take place, there must be healthy athletes involved in the competition. Contrary to popular belief, health doesn't stop at just physical. Health branches into 3 subcategories. Physical is only one of those. The other two are psychological or the mental component of health and social or the way an individual interacts with others. These three work together in the overall health of a person. This means it is very important to look at all three of these components of health, not just one. Most of the research on athletes dealing with an injury on focus on the physical and neglect the mental and social aspects of the athlete in this process of recovery. The psychological aspect of an athlete in an injured state needs to be further explored. This is to bring about more awareness of the athlete's overall health, rather than just on a physical level and ultimately creating healthier athletes.

Hypotheses

Hypothesis 1

$H_{1:}$ There is a positive correlation between Stress and Anxiety amongst injured athletes.

$H_{-1:}$ There is a negative correlation between Stress and Anxiety amongst injured athletes.

$H_{0:}$ There is no correlation between Stress and Anxiety amongst injured athletes.

Hypothesis 2

H_2: Males experience more stress and anxiety than females while injured.

H_{-2}: Females experience more stress and anxiety than males while injured.

$H_{0:}$ There is no difference in stress and anxiety between males and females while injured.

Hypothesis 3

H_3: Athletes who've had surgery have higher stress and anxiety than those who did not.

H_{-3}: Athletes who did not have surgery have higher stress and anxiety than those who did.

$H_{0:}$ There is no difference in stress and anxiety between athletes who've had surgery and those who have not.

Hypothesis 4

H_4: Underclassmen experience more stress and anxiety than upperclassmen while injured.

H_{-4}: Upperclassmen experience more stress and anxiety than underclassmen while injured.

$H_{0:}$ There is no difference between stress and anxiety between underclassmen and upperclassmen.

Hypothesis 5

H_5: Athletes who were out of their sport for more than 3months have more stress and anxiety.

H_{-5}: Athletes who were out of their sport for less than 3months have more stress and anxiety.

$H_{0:}$ There is no difference between athletes who have been out of their sport for more than 3months and those who have been out of their sport for less than 3months.

Independent Variable

The independent variables for this study will be sex, and classification. Other variables will be whether or not the athlete's injury required surgery, and the amount of time they were unable to participate in their sport.

Dependent Variable

The dependent variable in this study will be the mental health score of the college athletes. This score will be produced from a questionnaire that the athletes will be asked to fill out. The questionnaire will be composed of questions that reflect the athlete's stress and anxiety levels. The lower the score the athlete receives it would be perceived that their mental health is better. On the contrary, a high score will reflect a poor mental health.

Participants

For this study, a total of 120 participants were asked to fill out a survey. Of these 120, only 104 of the participants completed and returned the survey. These participants were all Division I athletes that attended universities in Houston, Texas. All the participants were either injured at the time they partook in the survey or were previously injured in their college sporting career. The participants were all placed in several categories from sections 2 and 3 of the survey. Half (52) of the participants were male and the other half (52) were female. Of the 104 participants, there were a total of 24 freshmen, 22 sophomores, 20 juniors, 20 seniors and 18 redshirt seniors. Half (52) of the participants required surgery for their injury while half (52) did not. The last category that the participants were divided into was the amount of time the athletes were unable to participate in their sport. 20 were out 1-2 weeks, 26 were out 2-4 weeks, 10 were out for 1-2 months, 12 were out for 3-6 months and 36 were out for 7 or more months. These various categories are important for the researcher to see trends amongst the separate groups.

Procedures

On the date of November 8, 2019, an email was sent to various sports coaches, by the researcher, asking for permission to collect data from their athletes. The email reads as follows:

"Hello, my name is DaMarko Williams and I am a graduate student at Houston Baptist University conducting research on college athletes. I am emailing you seeking permission to give your athletes a brief survey. The total process will take roughly 15-20 minutes. Thank you for your time."

Being granted permission, between the dates of November 11, 2019 and November 14, 2019 the researcher went to different sports practices in order to get a pool of participants. The participants were eager to partake in the study. The participants were informed to be eligible to participate in the study they had to be currently or previously injured. The participants were also informed that the information they provided would be secured and only for research purposes. A total of 120 surveys were attempted but only 104 were completed and used in the study's data.

Design/Analysis

This study is to compare the psychological health of injured athletes. The instrument used in the study was distributed to currently injured or previously injured athletes. It was designed to access as well as compare the mental health of injured athletes. The first part of the instrument is the adult consent form which the participants had to agree to in order to be a part of the study. The next section of the instrument was designed to get background of the participant. This section included information about their sex, race, sport and classification. The third section of the instrument was designed to get information on the participants injury history. The information in this section was about the amount of injuries the participant sustained over their sporting career, the type of injury sustained, whether the injury required surgical repair and how long the injury caused them to be unable to participate in their respected sport. The last section of the instrument was composed of stress inventory and an anxiety inventory (Both located in appendix B). The minimum stress score a participant can receive is a 0; while the maximum score is a 120. The minimum anxiety scores a participant can receive is a 21;

while the maximum score is 105. The higher the scores, the worse their mental state is perceived to be.

Limitations

The research may be limited to sample size. The study may also be limited to external factors of the participants' personal lives, such as age, socioeconomic status, and sex. The research may also be limited by the honesty of the participants when answering the questionnaire as the study was discussing a sensitive topic. A delimitation of the study is the single geographic location of the college athletes who have been injured being examined (Houston, Texas).

Summaries and Conclusions

Limited research has been conducted on the psychological and social health of athletes going through an injury. This research is intended to bring awareness of this. It is also intended to articulate new means of handling the recovery process for injuries. The researcher believes that injuries have a negative effect on an athlete's psychological health and that this causes a negative effect on their social life involving their teammates and coaches. Once these two aspects of health become as closely examined as the physiological component there will be ways to address all three parts of health ultimately creating healthier athletes.

IV. Results

The results of the study are located below. The information gathered in part 2 and 3 of the survey was divided into different sections. The information from parts 4 and 5 was then scored averaged out amongst the different groupings from part 2 and part 3.

Table 1

Statistical Analysis for Hypothesis 1

Correlation between stress and anxiety (N=104)

	Anxiety	Stress
Stress	.808**	
Anxiety		.808**

**. Correlation is significant at the 0.01 level (1-tailed).

Table 1 is the results of the correlations between stress and anxiety. The relationship between the two is positive.

Table 2

Group Statistics for Hypothesis 2

Factor	Sex	N	Mean	Std. Deviation
Stress	Male	52	71.5769	17.03214
	Female	52	80.9231	15.59980
Anxiety	Male	52	65.8462	16.73246
	Female	52	72.4615	13.68278

Table 2 is composed of the means and standard deviations of stress and anxiety between male and female participants. Females participants had noticeably higher scores in regard to both stress and anxiety.

Table 3

Group Statistics for Hypothesis 3

Factor	Surgery	N	Mean	Std. Deviation
Stress	Yes	52	84.3846	20.10587
	No	52	71.6154	17.07648
Anxiety	Yes	52	73.8462	14.58408
	No	52	64.0385	16.58513

Table 3 is composed of the means and standard deviations of stress and anxiety between participants who had surgery to repair their injury and those who did not. Those who had surgery have higher means in both stress and anxiety.

Table 4

Group Statistics for Hypothesis 4

Factor	Classification	N	Mean	Std. Deviation
Stress	Underclassmen	46	82.3913	40.04173
	Upperclassmen	58	77.6897	25.99739
Anxiety	Underclassmen	46	73.6522	16.95075
	Upperclassmen	58	71.4138	18.75884

Table 4 is composed of the means and standard deviations of stress and anxiety between underclassmen and upperclassmen. The means are slightly higher in both stress and anxiety for underclassmen.

Table 5

Group Statistics for Hypothesis 5

Factor	Time Out	N	Mean	Std. Deviation
Stress	Less than 3months	56	75.2143	19.78282
	3+months	48	81.9583	14.11592
Anxiety	Less than 3months	56	71.1786	13.88592
	3+ months	48	78.7917	12.12966

Table 5 is composed of the means and standard deviations of stress and anxiety between participants who were out of their sport for less than 3 months and those who were out longer than 3 months.

V. Discussion

As it has been previously discussed, the psychological state of an athlete is just as important as the physiological state of the athlete. Both should be treated equally in order to create healthier overall athletes and ultimately healthier individuals. The purpose of this study is to bring awareness to the psychological health of injured athletes. The study is also intended to compare the psychological state of injured athletes based on different characteristics.

As seen in Table 1 a Pearson product-moment correlation was conducted to evaluate the null hypothesis (Hypothesis 1 H_0) that there is no relationship between stress and anxiety in injured athletes (N=104). Preliminary analysis showed that there were no violations in the assumptions of normality, linearity, or homoscedasticity. There was significant evidence to reject the null hypothesis and conclude that there is a strong relationship between stress and anxiety in injured athletes. The Pearson correlation is (.808). This value represents a significantly positive correlation between stress and anxiety. This means as stress goes up, anxiety does as well. Stress and anxiety are two closely related psychological factors. This could explain why the two or so closely correlated. Elevated amounts of stress over a period of time could ultimately bring on anxiety and other health problems.

As seen in Table 2.1, the means for both male and female stress and anxiety scores are shown. The mean of stress in males is (71.5769) and the mean of stress in females is (80.9231). The mean of anxiety in males is (65.8462) and the mean of anxiety for females is (72.4615). As seen in Table A located in appendix c, an independent t test was conducted to determine if a difference existed between the stress and anxiety

experienced by males and females while going through an injury. There was a statistical significance in both the stress (t(50)=-2.063, p=.044) and anxiety (t(50)=-2.032, p=.047) between the two. Therefore, the researcher can reject the null hypothesis (Hypothesis 2) that there is no difference between stress and anxiety between males and females while going through an injury. However, the researcher cannot accept the directed hypothesis (H_2) Males experience more stress and anxiety than females while injured. The findings support the alternative hypothesis (H_{-2}) Females experience more stress and anxiety than females while injured. This was shocking to the researcher because he assumed that the males' psychological state would be worse than that of the females. However, these finding could be reflective of several things. Female and male brain structures differ slightly, and it is believed that females comprehend and experience stress and anxiety differently from males. Another possible explanation for these findings could be because males tend to be less open about emotions as opposed to females, and therefore, some of the males may have not been totally truthful.

As seen in Table 3.1, the means for both stress and anxiety for athletes who have had surgery and those who have not are shown. The mean of stress in those who did have surgery is (84.3846) and the mean of those who didn't is (71.6154). The mean of anxiety in those who did have surgery is (73.8462) and the mean of those who didn't is (64.0385). As seen in Table B located in appendix c*,* an independent t test was conducted to determine if a difference existed between the stress and anxiety experienced by those individuals who had surgery and those who didn't. There was a statically significant difference in both stress (t(50)=2.468, p=.017) and anxiety (t(50)=2.264, p=.028). Therefore, the researcher can reject the null hypothesis (Hypothesis 3) there is no

difference in stress and anxiety between athletes who've had surgery and those who have not. The researcher can accept the directed hypothesis (H_3) athletes who've had surgery have higher stress and anxiety than those who did not. These findings were not surprising to the researcher because surgery can be a very scary thing, especially for the first time. The idea of surgery can cause a great deal of stress for an individual. This is especially true once the doctor explains to the athlete of all the tasks, they're going to have to do in the recovery process. This can include things like multiple doctor visits, extensive rehabilitation and long periods of time away from their sport. All of this is certain to affect an athlete's psychological state.

As seen in Table 4, the means for both stress and anxiety for underclassmen and upperclassmen are shown. The mean for stress of underclassmen is (82.3913) and the mean for stress for upperclassmen is (77.6897). The mean for anxiety of underclassmen is (73.6522) and the mean for anxiety for upperclassmen is (71.4138). As seen in Table C located in appendix c, an independent t test was conducted to determine if a difference existed between the stress and anxiety experienced by underclassmen and upperclassmen. There was no statistically significant difference in stress ($t(50)=1.055$, $p=.296$) or anxiety ($t(50)=.446$, $p=.658$). Although the means for both stress and anxiety for underclassmen was higher than those of upperclassmen the researcher failed to reject the null hypothesis (Hypothesis 4 H_0). There is no difference between stress and anxiety between underclassmen and upperclassmen. The reasoning for this slight discrepancy in means could be the fact that underclassmen are younger and already experience heightened stress by being one of the younger people on a team. They come into college with the pressures to perform at a high level. This can cause a lot of stress and adding an injury on

that just makes matters worse. They could feel like they are letting their team down or even may fear losing their spot.

As seen in in Table 5, the means for both stress and anxiety for athletes who have been out of their sport for less than 3 months and those who have been out longer than 3 months. The mean for stress of athletes who have been out of their sport less than 3 months is (75.2143) and the mean for stress for those who have been out of their sport for 3 months or longer is (81.9583). The mean of anxiety of athletes who have been out of their sport less than 3 months is (71.1786) and the mean of anxiety for those who have been out of their sport for 3 months or longer is (78.7917).

As seen in Table D located in appendix c, an independent t test was conducted to determine if a difference existed between the stress and anxiety experienced by athletes who have been out of their sport for less than 3 months and those who have been out for 3 months or longer. There is no statistically significant difference in stress experienced by athletes who have been out of their sport less than 3 months and those who have been out 3 months or longer ($t(50)=.-1.393$, $p=.159$). However, there is a statistically significant difference in anxiety between anxiety experienced by athletes who have been out of their sport less than 3 months and those who have been out 3 months or longer ($t(50)=-2.088$, $p=.042$). Although the difference for anxiety is statistically significant, the researcher failed to reject the null hypothesis (Hypothesis 5 H_0) there is no difference between athletes who have been out of their sport for more than 3months and those who have been out of their sport for less than 3months, because the difference in stress was not statistically significant. Although the difference between stress was not statistically significant it was higher in those who were out 3 months or longer. The difference in

anxiety was statistically significant. These findings are logical because the longer an athlete is unable to participate in their sport the more stress and anxiety, they are likely to endure. Three months is typically the duration of an entire sports season. Also, with a long time away from their sport an athlete may begin to feel unneeded by their team or even not a part of it. This can take a major toll on an athlete's mind and lead to poor psychological health.

Conclusion

This study was to bring awareness to the psychological problems and hardships injured college athletes endure during and after their injuries. A survey was constructed to examine the levels of stress and anxiety injured athletes experience while going through the injury process. Athletes who were injured showed heightened levels of stress when compared to athletes who were not hurt. The study found that stress and anxiety are linked. The two psychological factors are positively correlated, meaning as the levels of stress go up so does anxiety. The research study also found that females have higher levels of stress and anxiety while injured compared to males. Another finding of the study is athletes who had surgery experience more stress and anxiety than those who did not while dealing with an injury. Heightened levels of anxiety were also found when the athlete was out of their sport for 3 months or more. The findings of this study can be used to kickstart further research into the realm of psychological health when it comes to injured athletes. Addressing this problem, overtime, will not only create healthier athletes but healthier individuals overall. By producing healthier athletes, the university has a better chance to win and produce more revenue for their school.

Limitations

The research may be limited to sample size. The study may also be limited to external factors of the participants' personal lives, such as age, socioeconomic status, and sex. The research may also be limited by the honesty of the participants when answering the questionnaire as the study was discussing a sensitive topic. A delimitation of the study is the single geographic location of the college athletes who have been injured being examined (Houston, Texas).

Implications of Further Research

As this study comes to an end, some pretty important things were discovered. It is apparent that there is a connection between psychological health and injuries as it pertains to athletes. While this study only focused on stress and anxiety, there are numerous of psychological factors that could be impacted by athletic injuries. "Sustained or chronic stress, in particular, leads to elevated hormones such as cortisol, and reduced serotonin and other neurotransmitters in the brain, including dopamine, which has been linked to depression" (Praag, Kloet & Os, 2004, para 3). This calls for further research to examine other psychological factors that could possibly be affected by an injury. Also, factors other than sex, surgical repair, classification and time out should be studied as possible influences on the psychological health of injured athletes. Those student athletes who are also first-generation college students may also feel extreme stress and pressure as they go through the recovery process. These individuals already experience a greater amount of stress than regular college students as they often feel pressure from family to succeed (Adams, 2016). By focusing on this branch of health, the athlete stands a better chance at not only being healthier physically but healthier overall. In an effort to help

create healthier athletes, some universities have invested in sports psychologists. By having this resource available to the athletes, they are able to receive specialized help in the psychological aspect from a professional. If the athletes are healthier, they have better odds at preforming well in their respective sport. Teams of healthy athletes preforming well together stand a better chance of winning competitions. Majority of the revenue that is generated by Division I colleges comes from the university's sports (Lacey, 2016). By simply improving their athlete's mental health, a university could potentially increase the amount of proceeds they bring in annually.

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Appendix A

Houston Baptist University
Adult Subject Consent Form

TITLE OF STUDY
Psychological Health of Injured College Athletes

PRINCIPAL INVESTIGATOR
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College of Education and Behavioral Sciences: Psychology
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PURPOSE OF STUDY

You are being asked to take part in a research study. Before you decide to participate in this study, it is important that you understand why the research is being done and what it will involve. Please read the following information carefully. Please ask the researcher if there is anything that is not clear or if you need more information.

The purpose of this study is to examine the relationship between sport's injuries and the psychological health of athletes as it relates to stress and anxiety. This study is also to shed light on the psychological aspect of health for athletes as it doesn't receive as much attention as the physical health component does.

STUDY PROCEDURES

You will be asked to complete a brief questionnaire about your mood and behaviors. This should be completed to the best of your abilities.

RISKS

a) When filling out questionnaires, you may (come across a question or answer choice) that you find unpleasant, upsetting, or otherwise objectionable. For instance, (a few of the questions may cause you to think about negative emotional states.)

b) You may feel that you have performed poorly on a test. For many of the activities, tests and questionnaires we are evaluating, there is no right or wrong answers. However, for some activities, it is to be expected that some people will do better than others on some of the tests. We encourage you to discuss this with the test administrator during the debriefing period, when all procedures have finished.

c) You will be asked to provide confidential information about yourself
You may decline to answer any or all questions and you may terminate your involvement at any time if you choose.

BENEFITS

a) When your participation is complete, you will be given an opportunity to learn about this research, which may be useful to you in your course or in understanding yourself and others. b.) You will have an opportunity to contribute to psychological science by participating in this research.

CONFIDENTIALITY

You will be assigned a code number which will protect your identity. All data will be kept in secured files, in accord with the standards of the University, Federal regulations, and the American Psychological Association. All identifying information will be removed from questionnaires as soon as your participation is complete. No one will be able to know which are your questionnaire responses. Finally, remember that it is no individual person's responses that interest us; we are studying the usefulness of the tests in question for people in general.

Participant data will be kept confidential except in cases where the researcher is legally obligated to report specific incidents. These incidents include, but may not be limited to, incidents of abuse and suicide risk.

VOLUNTARY PARTICIPATION

Your participation in this study is voluntary. It is up to you to decide whether or not to take part in this study. If you decide to take part in this study, you will be asked to sign a consent form. After you sign the consent form, you are still free to withdraw at any time and without giving a reason. Withdrawing from this study will not affect the relationship you have, if any, with the researcher. If you withdraw from the study before data collection is completed, your data will be returned to you or destroyed.

CONSENT

I have read and I understand the provided information and have had the opportunity to ask questions. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I understand that I will be given a copy of this consent form. I voluntarily agree to take part in this study.

Participant's signature _____ Date _____

Appendix B

College Student-Athletes' Life Stress Scale

(CSALSS)

Directions: Below are 24 statements that describe something that annoys/bothers you or makes you uncomfortable in your daily life as a college student-athlete. Please read each one carefully and circle the number that indicates how often you experience it. Your answers are confidential.

Never-0
Rarely-1
Sometimes-2
Quite often-3
Very often-4
Always-5

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1. I am annoyed by my injury because it has still not yet fully recovered. 0 1 2 3 4 5
2. I worry about my unstable competitive performance. 0 1 2 3 4 5
3. I am annoyed by my disappointing relationship with my coach. 0 1 2 3 4 5
4. I am annoyed with the training program now. 0 1 2 3 4 5
5. I am bothered by poor social skills in handling interpersonal relationships. 0 1 2 3 4 5
6. I am annoyed with not finding time to encounter romantic partners. 0 1 2 3 4 5
7. I am annoyed by my parents' high expectations. 0 1 2 3 4 5
8. I am bothered by a lack of motivation for academic learning. 0 1 2 3 4 5
9. I worry about being frequently injured. 0 1 2 3 4 5
10. I worry about dragging my team down. 0 1 2 3 4 5
11. I am annoyed by my coach's preference for some teammates. 0 1 2 3 4 5
12. I worry that my training is not beneficial to my performance. 0 1 2 3 4 5
13. I am annoyed with being friendless. 0 1 2 3 4 5
14. I am annoyed with being shy to express myself when I encounter someone I love. 0 1 245
15. I am bothered by difficult situations in my family. 0 1 2 3 4 5
16. I am annoyed when preparing for exams. 0 1 2 3 4 5
17. I am bothered by the slow recovery of my injury. 0 1 2 3 4 5
18. I am afraid of being eliminated from competition because of poor performance.0 1 2 3 4 5
19. I am annoyed by my coach's bias against me. 0 1 2 3 4 5
20. I am annoyed by my training load because it is too much for me. 0 1 2 3 4 5
21. I am annoyed by my social skills because it seems like nobody likes me. 0 1 2 3 4 5
22. I am annoyed with not getting along with my romantic partner. 0 1 2 3 4 5
23. I am annoyed with communicating with my family. 0 1 2 3 4 5
24. I worry about my academic skills because I do not know how to learn efficiently. 0 1 2 3 4 5

Sport Injury Anxiety Scale
SIAS

Strongly Disagree-1
Disagree-2
Neutral-3
Agree -4
Strongly Agree-5

1. When I am injured, some people turn away from me.	1 2 3 4 5
2. When I am injured, I am losing athletic potential.	1 2 3 4 5
3. When I am injured, some people stop calling me.	1 2 3 4 5
4. When I am injured, I feel anxious about how my body looks.	1 2 3 4 5
5. When I am injured, some people think I am just being a baby.	1 2 3 4 5
6. When I am injured, I am letting my teammates down.	1 2 3 4 5
7. When I am injured, I lose some social support.	1 2 3 4 5
8. When I am injured, some people think I am just being lazy.	1 2 3 4 5
9. When I am injured, I worry that the same injury will happen again.	1 2 3 4 5
10. When I am injured, I am losing athletic ability.	1 2 3 4 5
11. When I am injured, I am in a lot of pain.	1 2 3 4 5
12. When I am injured, I think I am more likely to get injured again when I return.	1 2 3 4 5
13. When I am injured, some people think I am faking it.	1 2 3 4 5
14. When I am injured, I lose some of my athletic skill.	1 2 3 4 5
15. When I am injured, I believe that I will get injured more easily in the future.	1 2 3 4 5
16. When I am injured, I hurt a lot.	1 2 3 4 5
17. When I am injured, I worry about getting fat.	1 2 3 4 5
18. When I am injured, I am letting my coaches down.	1 2 3 4 5
19. When I am injured, I am letting my friends down.	1 2 3 4 5
20. When I am injured, I experience throbbing pain.	1 2 3 4 5
21. When I am injured, I lose self-esteem	1 2 3 4 5

Appendix C

Table A

Statistical Analysis for Hypothesis 2

Factor	.t	df	Sig. (2-tailed)
Stress	-2.063	50	.044
Anxiety	-2.032	50	.048

Table B

Statistical Analysis for Hypothesis 3

Factor	.t	df	Sig. (2-tailed)
Stress	2.468	50	.017
Anxiety	2.264	50	.028

Table C

Statistical Analysis for Hypothesis 4

Factor	.t	df	Sig. (2-tailed)
Stress	1.055	50	.296
Anxiety	.446	50	.658

Table D

Statistical Analysis for Hypothesis 5

Factor	.t	df	Sig. (2-tailed)
Stress	-1.393	50	.170
Anxiety	-2.088	50	.042