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Athletes have the common issue on whether they should report a concussion or to continue to play through it. The athletes often suspect symptoms of concussions but then do not connect them to the injury concussion itself. Personal and external factors play a role in their decision making. This study looked at the St. John Fisher athletes and their decision making process on whether they report or not. The study included six football athletes and two non-football athletes, including a basketball and soccer athlete. The researcher found that athletes chose to play through their injuries and that the biggest factor is themselves. As hypothesized by the researcher, the athletes on smaller teams felt more comfortable with telling their teammates. The study also found that athletes do not think their injuries are serious enough, so they are not willing to sit out for an injury they do not deem worthy of missed playing time.

What Factors Help Decide to Report a Concussion or Not

Sports injuries are very common at the collegiate level. From 2009 through 2014 there was an average annual estimate of 210,674 injuries (Kerr, Marshall, Dompier, Corlette, Klossner, & Gilchrist, 2015). These injuries can play a big role in how a team does that season. If a star player gets injured, the team can go from being a top team into being one of the worst teams because most of the time schools can't replace top talent. One way an athlete tries to stop this from happening is by playing through injuries without telling anyone, that way they can help their team as much as they can. One of the most common sports injuries is head trauma or sports concussions.

New studies continue to be done exploring the future of athletes and whether or not they are at risk of Chronic Traumatic Encephalopathy [CTE]. CTE has long-term effects on players' lives such as affecting their attention span, memory, concentration which then leads to confusion and disorientation (Abreu, Cromartie, Spradley, 2016). The NCAA has not started adjusting to the rising numbers of concussions that will have a lasting impact on the college athlete's life. The National Football League (NFL) on the other hand has started to put third party league officials on the sidelines to do tests for athletes who take big hits to the head during games. This is only seen at the NFL level though, so college athletes can still get away with hiding their symptoms of concussions in order to stay in games or practices. This means collegiate athletes are at risk of injuring themselves even worse than they could be because they do not have someone making sure they are not injured on the sidelines. The NCAA is at risk of losing athletes, if they realize the dangerous impacts that these injuries can have on their bodies in the future. If the NCAA does nothing to help improve the athletes fight against concussions, then

there will be a high chance of athletes getting CTE in the future which would be a reason why athletes may choose to not play football.

Literature Review

Understanding Concussions

Concussions can be the result from contact with another athlete, any equipment, or the playing surface itself and has been increasingly recognized as a frequent injury in many sports (Kroshus, Garnett, Hawrilenko, Baugh, Calzo, 2015). The issue of concussions in sport has become a matter of global interest that continues to be under dispute by educational, legal and medical professionals (McNamee, Partridge & Anderson, 2015). In multiple sports there have been rule changes to make the athletes ultimately safer, such as moving up the kickoff line in football or eliminating upper limb to head contact in soccer (Concannon, Kaufman & Herring, 2014). Concussions can be described in many different ways but they all mean the same thing in the end, a brain injury has occurred. One way to describe a concussion is by classifying it as a sub-type of mild traumatic brain injury or TBI for short (Conder & Conder, 2015). Another way is to describe sport injuries themselves, which are defined as any physical complaint sustained by an athlete during competition or training that then requires medical attention (Hurtubise, Beech & Macpherson, 2015). Concussions are very different from a dislocated shoulder or a sprained ankle; they have been described as a hidden epidemic (Vance, 2007). A subset of sport injuries includes the category of sports related concussions (Hurtubise, et al. 2015).

For a condition first identified more than 1,000 years ago, scientists do not know much about it (Vance, 2007). The Centers for Disease Control and Prevention or the CDC, report that between 1.6 and 3.8 million sports-related concussions occur each year in the United States (Bauer, Ziemianski, Yukevich & Borncamp, 2015). While other sports related injury rates

remained constant or dropped since 1988, concussions have increased an average of seven percent per year (Vance, 2007). There are an estimated 300,000 concussions happening annually in football alone (King, et al. 2015). Concussions occur when an external force or blow to the head causes an alteration in neurologic functioning. This alteration then leads to an impairment with someone's concentration and their memory (Conder & Conder, 2015). Other problems that occur due to a concussion include headaches, insomnia, dizziness, and fatigue (Conder & Conder, 2015). A growing body of research shows that there are higher rates of depression and dementia in the concussed population (Sussman, Ho, Pendharker & Ghajar, 2016).

Concussions are one of the most common sport related injuries; there are 3.8 million concussive events that occur per year relating to a sporting event (Kay, Welch & Mcleod, 2015). Experts say it is nearly impossible to tally the total number of head injuries because so many players neglect to report them (Vance, 2007). It is important to know that concussions result in a graded set of clinical symptoms that may or may not involve loss of consciousness (Davies & Bird, 2015). The signs and symptoms can be broken down into four categories which include physical, cognitive, emotional, and sleep (Conder & Conder, 2015). With the wide range of symptoms that concussions have it is not surprising that they go unnoticed sometimes or do not get reported (Davies & Bird, 2015). Some of these symptoms can be attributed to other factors, such as an illness, being overwhelmed, lack of sleep or side effects of a substance (Davies & Bird, 2015). The physical category of symptoms includes balance problems, visual problems, and sensitivity to light and noise (Conder & Conder, 2015). Other physical category symptoms include headache, nausea, confusion and shock (Davies & Bird, 2015). The cognitive category includes difficulty remembering, feeling mentally foggy, feeling slowed down and answering questions slowly (Conder & Conder, 2015). Some other cognitive symptoms include trouble

maintaining focus and repeating questions slowly (Davies & Bird, 2015). The emotional category includes irritability, sadness, being more emotional, and nervousness (Conder & Conder, 2015). The final category is sleep and this includes drowsiness, sleeping more than usual or sleeping less than usual, and difficulty falling asleep or difficulty staying asleep (Conder, & Conder, 2015).

The tricky thing about concussions compared to any other type of sport injury is that these injuries cannot be treated with medicine, the only way to treat a concussion is to let the brain rest (Vance, 2007). Vance also talks about since there's no way to treat a concussion, athletes cannot participate in practices, exercises, or any strenuous thinking, all of which creates a challenge for high school and college athletes (2007). Recovery time following a single, uncomplicated sports related concussion involves complete resolution of any symptom in the first 1-2 weeks following the injury (Conder, & Conder, 2015). Some symptoms though may stick around for several weeks after the concussion (Conder, & Conder, 2015). A further complication, based on a large sample of concussed collegiate athletes, was that reported symptoms increased throughout the first week after the injury happened (Williams, Puetz, Giza & Broglio, 2015). Williams et al. also report that age matters in recovery time too; with high school kids the recovery time is 8 days while collegiate athletes is only 6 days (2015). Once you have one concussion then you are more likely to have a second that is more severe in the future (Vance, 2007).

Concussions have become a bigger issue lately because of the 2015 film that has come out called *Concussion*. This movie talks about the possible effects later in life from multiple concussions. This has become more apparent with the cases of Chronic Traumatic Encephalopathy (CTE) that have come out and continue to come out. CTE is a rare progressive

neurologic disorder that can manifest as multiple symptoms such as cognitive, mood and behavioral, and neurological (Concannon, et al. 2014). The main fear with chronic traumatic encephalopathy is that it cannot be diagnosed in a living person, and it causes chronic psychiatric problems, drug misuse, aggression and suicidal behavior (Gardner, Iverson & McCrory, 2013). The short term or long term consequences can be categorized by whether their effects compromise neurocognitive, emotional, physical, or academic functioning (Conder, & Conder, 2015). Athletes start to realize the danger of CTE and concussions after the movies *Concussion* and *League of Denial* came out. This then leads to changes in the decision for a player to report the symptoms or not and are based on different personal or external factors.

Personal Factors

When thinking of athletes reporting concussions it is important to think of the personal factors that must go into the decision making for them. Some personal factors include athlete's age, maturity, history with concussions, how confident a player might be, the athlete's personality and their behavior motivation (Wiese-Bjornstal, Russell & Smith, 2015). An athlete's mindset would also be a personal factor in that if they think they can play through something they are going to try to play, so if a player does not think they need medical attention they will not report it (Kroshus, et al. 2015).

Age plays a role in the reporting of concussions since the recovery length of time varies based on age (Conder, & Conder, 2015). From young ages, athletes are told things like "suck it up" and also the idea of "you'll be fine if you get knocked around a bit" is established in their minds (Chrisman, Quitiquit & Rivara, 2012). Adolescents that get concussions show personality changes, headaches, irritability, school learning difficulties and attention problems (Hunt & Ferrara, 2009). Youth or high school athletes fully recover after a concussion but still are at risk

during a vulnerable period where a second impact can cause intracerebral hemorrhage, cerebral edema or death (Chrisman, et al. 2012). Due to this, in 2009 a law was passed in the state of Washington stating that athletes had to be removed from play if they had a suspected concussion (Chrisman, et al. 2012). Differences among grade levels in school would support an effect of cognitive maturity on neuropsychological test scores in high school athletes (Hunt & Ferrara, 2009). The issue of non-reporting of concussions exists at all levels, but there seems to be a larger amount of diagnosed concussions at the collegiate level rather than the younger ages and younger level of competition (McCrae, Hammeke, Olsen, Leo & Guskiewicz, 2004). Players believe that not reporting a concussion is a good idea, because then this way they do not have to worry about sitting out. This could mean the athletes are not mature since they are not worrying about themselves or taking care of themselves. The age also factors into the college scene too with the idea that freshmen athletes have a lot of new challenges when they arrive on their school campuses. They need to adapt to the new academic and social environments as well as the athletic environment (Baugh, Kroshus, Stamm, Daneshvar and Pepin, 2014). High school athletes, on the other hand, are already set in their environment so they do not have to find a way to fit in, meaning they already know their spot in the school and on the team (Williams, et al. 2015).

A player's value to a team can have an impact on their choosing to report or not. College athletes do not want to arrive on campus and in the first practice see symptoms of a concussion and not practice for a week because that will give someone else the opportunity to move up the ladder before them. In an analysis done by Christine Baugh where the year in college was measured against reporting a concussion to coach or teammates, she says there was a significant difference between the underclassmen and the upperclassmen (2014). The freshmen agreed more

than their older teammates that their coaches supported concussion reporting (Baugh, et al. 2014). This could be a sign that the lowerclassmen are being told to report because they are young and they do not play, while the upperclassmen are the starters on their teams and would be a big loss for the team if they got hurt. This means that these underclassmen athletes may perceive the loss of playing time as not of a big deal and may be more honest in their reporting when approached by an adult (Williams, et al. 2015). The freshmen in this study thought that if they report the suspected concussion, that is what their coach would want them to do (Baugh, et al. 2014). Collegiate athletes may feel they have more to lose by reporting concussion symptoms and risk being withheld from play (Williams, et al. 2015). Another reason why the younger aged athletes might decide to report a concussion would be the rapidly changing nature of concussion awareness and policies of schools. Freshmen have been exposed to different rules and could be more educated on concussions compared to their older college teammates (Baugh, et al. 2014). This difference could have influenced their knowledge of concussion safety and how coaches feel about concussion safety when entering their first year of college (Baugh, et al. 2014).

One reason why athletes choose to not report their concussion symptoms could be the factor of having a lack of knowledge on concussions. The lack of knowledge would play a role since high school athletes do not tend to know as much as college or professional athletes. The professional athlete and most college athletes' lives revolve around a sport while a high school athlete has to focus more on school work. This then plays a role when athletes believe they have had their bell rung but think it falls short of concussive injuries which makes athletes think they have never had a concussion (Miyashita, Timpson, Frye, & Gloeckner, 2013). The lack of knowledge relating to risks and potential consequences of a concussion play a greater role in whether high school athletes decided to report a probable concussion (McCrae, et al. 2004).

When the athletes were provided with a definition of concussion and description of the symptoms, the players admitted to sustaining a concussion over the course of their athletic season (McCrae, et al. 2004). Concussion awareness efforts have increased in recent years, but research indicates that players continue to under-report concussions and symptoms alike to continue playing or return to play sooner (Williams, et al. 2015). It is clear then that concussion knowledge does not always translate into reporting (Chrisman, et al. 2012).

If a player has a history of concussions, then there is a greater risk for future concussions and greater damage to the brain. A history of previous traumatic brain injuries can be predictive of cognitive deficits and long term disability (Wiese-Bjornstal, et al. 2015). If athletes know of these cumulative effects, then would be more likely to tell someone that way they can try and help prevent future problems. College athletes, whether they be male or female, who reported three concussions or more said they experienced a lower quality of life and more frequent headaches than those who only had two or less concussions (Wiese-Bjornstal, et al. 2015). One of the strongest predictors of prolonged recovery is a history of previous concussions, this happens most when three or more have occurred (Conder, & Conder, 2015). Along with the history of concussive injuries of an athlete there are also the roles of their attitudes towards reporting symptoms or not.

A common reason why an athlete might not report a concussion is that they do not believe the injury to be serious enough to let anyone know about it (Kay, et al. 2015). In a test done by Andrea Cripps and Mikaela Boham, they found that males reported a significantly higher number of symptoms on a computer compared to verbal reporting (2015). Another study was done by giving athletes hypothetical situations where symptoms of concussions were mentioned (Davies & Bird, 2015). The reason for this test was to see in what situations athletes

would report their symptoms, if any. All of the participants said they would continue playing or take a brief break but then return to the game (Davies & Bird, 2015). The reasons provided by the athletes for their answers included not wanting to be removed from the game, not being in enough pain, and not knowing the specific symptoms of getting a concussion (Davies & Bird, 2015). Athletes did not want to be pulled from the games because they had to endure the hard training that went into getting them where they are at in their sport (Chrisman, et al. 2012). If they reported the symptoms then the athletes would have been taken out of the game and they would not be allowed to play (Chrisman, et al. 2012). In the study by Chrisman et al., athletes were saying they just wanted to keep playing because it is just something little and it will eventually go away so play through it (2012). Football players said “that is what you practiced all summer for and there are only like 10 to 12 games and 40 minutes a night, and you do all that work, you do not want to come out” (Chrisman, et al. 2012). An athlete’s attitude also plays a role in the reporting of a concussion in that if the athlete has a favorable attitude of reporting a concussive injury, they might have a better understanding of the importance of the damage that can be done because of concussions (Baugh, et al. 2014). The personality factor goes along with the attitude factor in that it plays a role because the type of player you are is based on how your personality is, so if you are someone that can withstand pain then you are going to want to play through something as small as a headache. After personal factors, come the external factors that can also play a role in whether the athlete decides to report their symptoms or not.

External Factors

One external factor that plays a role in the reporting of concussions is a player’s identity and how they view themselves. If an athlete is worried about what other people think of them, it will play a part in deciding if they will report a concussion or not worry. Athletes think leaving a

game due to a headache means that they are showing weakness which is something that is not acceptable in sports (Chrisman, et al. 2012). Athletes say it is hard for them to tell someone they do not want to play anymore because people will judge you (Chrisman, et al. 2012). Players do not want to be taken out of a game, they often think the injury is not serious enough to warrant medical attention (McCrae, et al. 2004). A player's confidence is another factor that could play a role in their decision making. It takes confidence to tell someone that you have a concussion, especially when it comes to telling your coach. In Chrisman's article, athletes said they did not want to tell their coach that they suspected a concussion or any other injury (2012). The athletes in that study who were fearful stated reasons such as "I hate telling any coach that I'm tired or want to come out. It is embarrassing saying, coach I need a break" or "The coaches call you bad words if you come out, they say 'when you're hurt, come out' but they do not mean it" (2012). In a study done by McCrea, Hammeke and Olsen it was found that concussions were often reported to athletic trainers and less frequently reported to coaches, teammates or parents (2004). The reason for this was that the athlete hates telling their coach things like being tired or that they want to come out because they feel like it is embarrassing saying they need a break (Chrisman, et al. 2012). Reasons provided by football players who did not report concussions suspicions include having to look like a soldier, and it seems 'like a little kid thing' to have to leave the game for (Chrisman, et al. 2012).

A sub-category of external factors is social factors, this includes teammates, coaches, and family members (Wiese-Bjornstal, et al. 2015). When a concussion is sustained, the athlete's interactions within their environment such as the teammates, coaches and parents play a critical role in behavioral reinforcement for future reporting (Kroshus, et al. 2015). Behavioral reinforcement can help determine their future reporting decisions since there was a connection

between coach response to concussion reporting and reporting behavior by the athlete (Kroshus, et al. 2015). Two things lead to greater concussion reporting, one is a strong level of comfort with his or her superior and the second is education (Kay, et al. 2015). An important social factor when helping decide to report symptoms is the parent's opinions and attitudes (Kay, et al. 2015). The reason behind this thought would be due to college division I athletes tend to leave home in order to play their sport. Athletes often think that their parents came all the way to watch them play so they do not want to disappoint them by sitting out due to injury. In a study done by Kroshus et al. it was found that one in four athletes experience pressure from teammates or coaches to continue to play after head impact (2015). Athletes do not want to let their teammates down since they identify strongly with them and want them to do well, so the worst possible scenario is coming out of the game because of a concussion (Chrisman, et al. 2012). Losing games can result in players feeling escalating pressure to return to play sooner and to forget about the concussive symptoms (Kroshus, et al. 2015). Athletes fear that if they come out of the game and the team loses, they worry about their teammates blaming them for the loss (Chrisman, et al. 2012). In Scott Delaney's study involving 469 athletes, ninety-two of the athletes said they've experienced one or more concussions during a twelve-month period (2015). The results found that of the ninety-two athletes, seventy-two athletes did not seek medical attention during a practice or a game for the presumed concussion (Delaney, Lamfookon, Bloom, & Correa, 2015). Reasons provided for the players not reporting the concussion during the game or practice includes not wanting to be removed from the game, and the fear of letting the team down (Delaney, et al. 2015). Athletes who experience pressure from teammates, parents and fans have lower intentions to report symptoms of concussions compared to those who aren't pressured (Kroshus, et al. 2015).

Since coaches and teammates are most often directly involved with reporting concussions during participation, they have the strongest influence (Kay, et al. 2015). Coaches often give negative messages regarding injury reporting, often saying things like you are overreacting or why can you not play through it (Chrisman, et al. 2012). The evidence supports the possibility of increased exposure to their coach and the college environment would lead to a decrease in coach support for report concussions during an athletes playing career (Baugh, et al. 2014). Athletes have said that coaches have told their athletes that if he had to take them off the field that there better be a bone sticking out (Chrisman, et al. 2012). The extent to which an individual is motivated to make their behavior align with the norms varies by their extent of identification with the referent group (Kroshus, et al. 2015). It was found that concussed high school athletes would not report concussion-related symptoms to a medical professional, coach, or parent, instead they would tell teammates (Williams, et al. 2015). According to Chrisman et al., football players would want a teammate to walk off the field knowing they did everything they could for the betterment of the group (2015). When athletes experience a gap between their own behavior and the team's behavior, they experience internal pressure to modify their beliefs for social approval (Kroshus, et al. 2015). The reporting behavior may be based on whether the athlete has a desire to conform to group norms and avoid social sanction for deviating from these norms (Kroshus, et al. 2015). One article found that hockey players were willing to hide their symptoms and even try to act in ways that they perceived to be normal in their masculine sport culture (Kroshus, et al. 2015). One test of high school athletes showed an estimate of 12.5 percent of concussions sustained by the athletes went undiagnosed (Baugh, et al. 2014). Another test showed that high school athletes were significantly underreporting the concussions as well as continuing to play their sport while having concussion symptoms (Williams, et al. 2015).

Some external factors also include the sport played and environmental factors (Wiese-Bjornstal, et al. 2015). Concussions have become such a common issue of everyday sports that each sporting league has modified their own concussion protocols in an attempt to bring them into line with a consensus statement from 2012 (McNamee, et al. 2015). These protocols have operated as an authoritative guide in concussion research (McNamee, et al. 2015). Athletes may be more likely to report symptoms if there are personnel on the sideline that they perceive to be qualified to diagnose a concussion or who appear to be sympathetic about the situation (Kroshus et al., 2015). An environmental factor includes the testing provided on the sideline for players; once a player passes that test they might not report any other symptoms (Kroshus et al., 2015). Sport factors include the physicality and violent nature of the sports themselves and whether the idea of being tough plays a role depending on the sport played (Wiese-Bjornstal, et al. 2015). Soccer players and football players both will react the same way when it comes to concussion symptoms and if they decide to report them or not (Chrisman, et al. 2012). A study done by Cournoyer and Tripp found that fewer than half of the football players they questioned would report their concussion and almost twenty-five percent would continue to play through the symptoms (2014).

Purpose

As the previous literature stated, high school and college athletes base their decision to decide to report a concussion or not based off of many factors. At high schools the common theme of the literature is that player's had a lack of knowledge. While at the Division I colleges the theme involves players not wanting to let the team down, or being pressured by the coach to play through the pain. Taken collectively, research has included external factors such as the

environment, coaches, and teammates, and the personal factors of age, personality and knowledge about concussions.

1. How big of a role do external factors (coach, depth chart, teammates, family, sport played, and position) play in reporting concussion symptoms.
2. How big of a role do personal factors (self, class, and years in the sport) play in reporting concussion symptoms.
3. Do athletes know the risks or consequences of not reporting their concussion symptoms and how it could possibly affect their lives.

Method

General Research Descriptors

This research sets out to try and find how athletes at St. John Fisher College decide whether or not to self-report a suspected concussion through structured interviews. The data for this research will be primary and classified as qualitative (Jones, 2015). This will help get an understanding of what the athletes at St. John Fisher do when going through the decision making process for concussion symptoms. The classification of the research is descriptive and explanatory. Descriptive research sets out to describe a particular phenomenon, focusing on the issue of what is happening, also how much has happened rather than trying to explain why it is happening (Jones, 2015). Explanatory research on the other hand is involved with explaining why something happens, often looking at casual relationships between the variables (Jones, 2015). The research will follow a post-positivism tradition, this is the belief that it is not possible to gain a true understanding through measurement and observations due to limitations such as influence from the researcher and their own values (Jones, 2015). The interviews will help give a

better understanding but it won't fully answer why players report concussions or not since it's only focusing on some athletes and not the full school.

Participant Selection

The participants of this research included St. John Fisher College athletes who have suspected a concussion or if they knew they have had a concussion. The study looked at male athletes of different class years at the college. The participants included athletes from the football, male soccer and male basketball teams because concussions are common in these sports or these sports were in season right now. The research looked at a total of 8 athletes trying to mix in athletes from the different sports that have had concussions. The athletes were chosen at random through the use of a random number generator. The researcher plugged in the total number of athletes on each sports team and then the number that comes up is then the athlete that is chosen. The athlete's jersey number will be the deciding factor to choose athletes at random. There were no parameters other than the sport played by the athlete. The researcher chose this way of picking athletes due to these sports being in-season and also since they are the common sports that deal with concussions. The previous research has focused on large numbers or large universities with only a few switching their focus on a small portion of athletes, so study looks to explore the small college numbers (Davies & Bird, 2015). Breaking it down there would be majority from football looking at the different positions but focusing on the more concussion prone positions. In all of the literature review the studies involved D-I schools or high schools and looking at just one sport entirely or looking at all sports entirely. Looking at the official sports of the school instead of the club sports was due to the fact that the athletes on the official sports teams have trainers that watch over their practices. The club sport athletes do not have the trainer watching over their practice, so they do not have someone to report their symptoms to

right away. While the official sports team have the trainer at the practice giving them a greater chance to report a symptom. Instead, the club sports athletes have to tell their coaches their problems if they choose to do so at all. This idea is also due to the coaches not being as hard on the athletes to try and get them to play through an injury. The guidelines for a club sport could also be more lenient when it comes to the reporting of injuries. While athletes on the official sports teams have specific guidelines on what they can and cannot do set by the NCAA.

Variable Operationalization

The researcher collected data on whether athletes at St. John Fisher college who have suspected themselves of having a concussion or when they have a concussion and if they decided to not report them to a medical professional or a coach or their teammates. The independent variables include internal factors and external factors, while the dependent variables are the decision to report or they do not report. The internal factors included age, sex, year in school, sport played, and past history with concussions. Age was how old the athlete and the scale will be the range from college freshman to college seniors. Sex was the gender of the athlete and it only included male athletes. The year in school helped determine the athlete's age and maturity by a scale of college freshman to college seniors. The sport played is defined by the sport they are currently playing at St. John Fisher college and will be either football, basketball, or soccer. The past history of concussions was defined by the number of concussions the athlete has had while in high school and while in college, it. The external factors included family, friends, teammates, and coaches. The athlete was given a list and asked to rank the amount of influence that the family, friends, teammates, and coaches have on a scale from one to five. One will hold the highest amount of influence, while the five will be holding the least amount of influence.

These independent variables helped show which factors affect a player's decision to report a concussion or not.

Data Collection Instrument

The interview had scripted questions that way the answers would be more focused toward the same area but there was no time limit for responses (See Appendix A). The first couple of questions had a focus on their high school experience and background then the rest of the questions focused on the athlete's experiences in college and what made them do what they did. The focus was around the most recent experiences for the athletes and their concussion symptoms. The fourth question included a checklist of symptoms which allowed the researcher to see what athletes really think a concussion is. This question asked them to circle the symptoms that they did not associate with concussions (Appendix B). There has been a history of athletes not knowing symptoms of concussions, so they could have experienced a concussion and not even know it. The factors going into the decision making process come up in questions 12-17. The sequence of questions was simply yes or no and numeric responses to begin with but then turned into open ended questions focusing more on the factors that helped make the decision to report or not. After the researcher found out how many concussions the athlete has suspected or have been diagnosed with, the researcher found out if and who the athlete reported to. After that the questions focused around the factors went into their decision making process; specifically reasons they had for not reporting if they didn't report and what reasons led to their reporting. The researcher thought choosing to do interviews would be better since not everyone answers open ended questions on surveys. It would be hard to not include in the cover email asking only for athletes with experience that way the researcher won't be doing interviews with athletes that have no history of head trauma (See Appendix A).

Data Collection Procedure

The researcher sent out an email asking for players with head trauma history and ask to have an interview about their experiences (See Appendix C). Then the researcher emailed back all of the athletes that responded asking them when was the best time for them to complete the interview. After the researcher collected the information for who'd be willing to meet up to be interviewed then the research turned into the interviews. Once the interview was setup, next thing taken care of was the liability release form, which is where the interviewees choose their pseudonym for the study (See Appendix D). The researcher pilot tested the interview on an athlete not on one of the sports teams that got interviewed, but they were still an athlete at St. John Fisher. The researcher wrote down answers while also using a recording instrument to break down the athlete's answers. After the researcher typed the answers into a Microsoft excel spreadsheet and separated them into the different factors of the decision making. The categories helped draw connections and also helped draw conclusions about the data.

Data Analysis Plan

To see the outcome of the study, the results must be collected and sorted to find the similarities within the responses. The results cannot be determined without making categories for the interview results. The data will be qualitative data and will be broken down into Microsoft Word. Then there will be different categories based on the data that will be made to help understand the different variables that are present. The data can be broken down into the athlete reporting or not based on coach, teammate, or personal factors. Looking for similarities between not reporting and the personal and external factors (see table 1).

Results and Discussion

Participant Background and Knowledge

The researcher was able to find how the student athletes decision making process when deciding to report a concussion or not. The participants had a variety of knowledge about concussions and different backgrounds but there were multiple similarities between the athletes too. The athletes that were interviewed included six football players, one male soccer player and one male basketball player. The class breakdown between the athletes included five seniors, two juniors and one sophomore. Almost all of the athletes shared a common time period when they started playing their sports. Five of the athletes began playing their sports in elementary school while two athletes started playing in middle school and one athlete did not start playing his sport until his second year of college.

The athlete's knowledge of concussions varied when asked what symptoms they associate with concussions. Looking at appendix B we can see the list of symptoms provided for the athletes to choose from. As Davies and Bird explained, with "the wide range of symptoms that concussions have, it is not surprising that they go unnoticed sometimes or do not get reported" (2015). Three out of the eight athletes said that they believed that all of the symptoms were in fact involved with concussions and these three included one football player and the soccer and basketball players. Four out the five remaining athletes picked the same symptoms that they never associated with concussions: headaches, fatigue, difficulty staying asleep and also difficulty falling asleep. The final athlete differed only by including balance problems instead of headaches and fatigue. Some of the responses when talking about why they picked fatigue as one of the symptoms not associated with concussions included "I do not think of fatigue as an injury but instead something where I haven't ran in a few days and I'm running again so I'm fatigued because of it" (Chris Gloweman). Another response was "fatigue is just assumed from participating in the sport, being tired from playing is something that only happens

when you are doing something” (Jenkins). Not identifying a headache as a concussion symptom was argued because it is “something anyone can get at any time; such as being overtired” (Jordan Willis). Questions about difficulty falling asleep and difficulty staying asleep revealed the inconsistency with concussion symptoms. Michael Todd stated “the last couple of times I’ve had a concussion, I’ve been very tired after them so I’d fall asleep and I’d sleep till my alarm went off” was contrasted by Jose Jones experience, “I don’t see how concussions affect someone’s sleeping pattern since my experiences, I’ve had no problems with sleep”. One athlete took a different approach, and provided an example about miseducation, when looking at these two symptoms with the response of:

“I don’t associate these with concussions at all because you always hear that if someone has a concussion then you shouldn’t let them fall asleep, so I would assume that you wouldn’t have a problem falling asleep because if that was the case then you would be popping right back up so there would be no need for people to worry about sleeping with the injury” (Jenkins).

Finally, with balance problems the athletes said that this symptom is only due to concussions to a certain extent but they do not think they are primarily because of concussions. As Miyashita explained, “if the athletes do not understand or know all of the symptoms then this plays a role when athletes believe they have had their bell rung but then think it falls short of concussive injuries” (2013). Looking at Table 1 you can see the athlete’s background and the differences between the football athletes and the non-football athletes. Football athletes are constantly taking hits to the head and that’s why there’s the major difference between the amount of times they’ve had their bell rung or stinger or seen stars. As King, et al. explained, there’s an estimated 300,000 concussions happening annually in football alone due to the amount of hits to the head they take every day in practice and games (2015). Concussions occur when an external force or blow to the head causes an alteration in neurologic functioning. This alteration then leads to an impairment with someone’s concentration and their memory (Conder, & Conder,

2015). By looking at the data from table 1 we can see that the football athletes are less likely to get their concussions diagnosed since out of the suspected eighteen concussions only three were diagnosed. While for the two non-football athletes they had four suspected concussions and two were diagnosed.

External & Internal Factors

When asked about returning to practice after experiencing symptoms of concussions, five of the eight athletes said that they've always returned to practice and the idea that they've never left the field because of the symptoms. One football athlete even went as far as saying "Never take a play off, even if you have a headache or feeling dizzy; just shake it off and keep playing" (Jordan Willis). As Williams, et al. explained, collegiate athletes may feel they have more to lose by reporting concussion symptoms and risk being withheld from play (2015). Bryce Bowser said that he returned to practice three to four times out of the five possible times that he has experienced concussion-like symptoms. The thought process behind his decisions to return involved his not thinking the symptoms were serious enough to make himself sit out, which supports research by Kay, et al. (2015). John Doe responded by saying that he returned to practice the one time he ever felt that he had concussion like symptoms during practice. The last player who responded with an actual number instead of saying they've never been taken out was Jose Jones, he said he's returned to practice twice, also due to the idea that they didn't think the symptoms were serious enough to sit out a whole practice.

After asking the number of suspected concussions the athlete had the athletes were then asked who, if anyone, they told. Four athletes (3 football and 1 soccer) said that they never told anyone about their suspicions. Two other football players responded by saying that they only told their suspicions to their teammates since they didn't believe it was serious enough to tell a

trainer or coach. The basketball player said that his first suspected concussion, he told the trainers right away but, for his second suspected concussion, he remained quiet for a day and a half, but ended up not wanting to prolong the recovery so he told the trainers. The final football player said that he talked to his coach about the suspicion and after that the coach kept him out of the game for the rest of the game. As Williams, et al. explained, players continue to under-report concussions and symptoms alike to continue playing or return to play sooner (2015). All of the athletes said that they've never left a game due to an injury. One athlete's response was

“I've never left the field, I remember one time in high school we were down and I was the running the ball and back juking but then getting laid out. After the hit I laid on the ground for a couple seconds until my right tackle came and picked me up saying we don't show weakness, never expecting that I was injured” (Chris Gloweman).

Athletes think leaving a game due to an injury means that they are showing weakness which is something that is not acceptable in sports (Chrisman, et al. 2012). Next the athletes were asked what factors play the largest role in the decision making process when deciding to report concussion symptoms or not. As Chrisman, et al. explained, athletes don't want to let their teammates down since they identify strongly with them and want them to do well, so the worst possible scenario is coming out of the game because of a concussion (2012). Ranked factors in Table 2 show the non-football athletes considered the team to be the most important while football athletes considered the self-motivation and the team as the first and second factors when deciding on whether or not to return to practice. In Table 3 the athlete's responses again show that the team factor is the most important for non-football athletes and for football athletes its again self and team as the #1 and #2 when deciding on reporting or not. Athletes who prioritized the self, made statements like “I hate sitting out and I hate getting taken out so if I feel like I can keep going I'm definitely going to; I feel like I'm letting myself down if I report something that wasn't serious that can cause me not to play” (Jose Jones). John Doe stated “I know I have a

concussion first so I would try to keep it to myself until I'm sure it's a serious issue". Other football players talked about maintaining a specific image of themselves as indicators of prioritizing the self. John Smith stated "self is own self-motivation because I don't like to sit out, I don't like to sit out a practice or a game and because of that I've never sat out a practice or a game in my entire playing career". Jordan Willis echoed this by saying, "internally I don't see concussions as something that would stop me from playing, I've always thought I was tough enough to play through it".

Dealing with Suspected Concussions

In the study done by McCrea, Hammeke and Olsen it was found that concussions were often reported to athletic trainers and less frequently reported to coaches (2004). Most of the athletes in this study indicated that they would rather not report to anyone, but two athletes indicated that they've reported to teammates and trainers. Kroshus et al. found that one in four athletes experience pressure from teammates or coaches to continue to play after head impact (2015). Two out of the eight athletes said they felt pressure to return to practice, but they've never felt serious pressure where they would be looked at differently if they didn't go back in. Chris Gloweman explained "I've felt pressure but I never been in a situation where I've been told by coaches or teammates to return" and "there's more self-pressure, since if it's not visible like something broken then there shouldn't be a need to sit out since its weird to sit on the sideline with your helmet off, so you want to go back in". One athlete talked about the coaches and the pressure they put on athletes by saying

"it's not looked on kindly if you don't have a serious reason for why you aren't practicing, coaches will make comments whether they are joking or not about you sitting out and some athletes take that personally and think their coaches don't like them sitting out" (Jose Jones).

Kroshus explains how athletes who experience pressure from teammates, parents and fans have lower intentions to report symptoms of concussions compared to those who aren't pressured (2015).

When the athletes were asked about the pressure to return to a game, the football players talked about how it disrupts the game if you leave the game. There was also a focus around the pressure from the fans, and team since there's more on the line and it influences winning or not.

One athlete explained this by saying

“that's why you play the game, you practice so hard all week for the one game a week, you practice 5 days a week, so why would you let an injury keep you from playing in that one game. It's the sacrifice that you make during the week and the sacrifice you make during the offseason to be able to play each Saturday, so you want to keep putting your body on the line because you know your teammates are doing the same thing or at least you hope they are” (Chris Gloweman).

Chrisman, et al. explains this when talking about how football players say “that is what you practiced all summer for and there are only like 10 to 12 games and 40 minutes a night, and you do all that work, you don't want to come out” (Chrisman, et al. 2012).

Abreu, Cromartie, and Spradley talk about how CTE has long-term effects on players' lives such as affecting their attention span, memory, concentration which then leads to confusion and disorientation (2016). These are the types of things that all of the athletes were concerned with for their future after sports. All of the athletes talked about how they fear the future outcomes on their lives. Football players responded with answers like “I do not hit as hard when I think about the type of brain damage that I'm doing with each hit” and also “I think about personal health factors like having permanent brain damage or becoming paralyzed”. Jordan Willis spoke directly of CTE and said “I know I'm building up CTE with each and every hit to the head, and with that I know my life is going to be shit and every time it happens I know my life is going downhill”. John Doe also responded to CTE directly by saying “I think about the

future and how in the future I want my brain all there and not suffer from these concussion symptoms such as CTE, where people can't remember things and go into depression, so keeping my mind and living a healthy life is always something I think about".

Limitations and Future Direction

The athletes that were examined involved six football athletes, one basketball athlete and one soccer athlete. The researcher had a difficult time getting more athletes from different sports to participate in the interviews. Since the athletes were chosen at random this could have played a role in the researcher finding athletes for the study. There could have been the limitation of athletes not wanting to talk about their concussion history with anyone and that's why they didn't want to participate. Another limitation could be that athletes do not know if they have had symptoms which would mean they wouldn't participate in the interviews. Some of the athletes that were interviewed knew the researcher so, they could have adjusted their answers to what they thought the researcher was looking for.

For future research, there may be a benefit in getting female athletes to participate to see if their numbers match up with the numbers of the male athletes. The researcher may look into sports other than football since only two non-football athletes were interviewed in this study. The researcher may look at how the athletes respond to the ranking of factors, if one of the factors includes implications for the future. This would help show the athletes consciousness of CTE and other dangers of concussions. The researcher may look into full sports teams instead of certain players in order to get more numbers for the study.

Conclusion

Concussions are serious injuries with many symptoms that people overlook and continue to play through. As stated earlier, there are multiple factors that go into the decision making of

whether an athlete decides to report or not. The most important factors that the football athletes said, was the self-motivation while the non-football athletes said the team. This proved the hypothesis that the small team athletes felt more comfortable with each other. The researcher also hypothesized that athletes wouldn't want to report their symptoms due to the factors such as being too tough or not wanting to miss playing time. Instead, the study showed that athletes never thought their symptoms were never serious enough. The study showed that athletes knew the symptoms of concussions but, when they had those symptoms they didn't connect them to concussions. The findings of the study are important because it helps determine if athletes are understanding the risks of concussions and the factors that go into their decision making processes.

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Appendix A

Pseudonym

Class

Sport

Time frame started playing

HS-

of times had bell rung or had a stinger

of times have suspected yourself of having one

of times diagnosed during high school

College-

of times had bell rung or had a stinger

of times have suspected yourself of having one

of times diagnosed during high school

The time you suspected an injury who knew?

Who did you tell your suspicions too?

times returned to a practice after experiencing the symptoms

times returned to a game after experiencing the symptoms

Practice Factors

Game Factors

Reason for numbering the way you did

After the practice did you report the symptoms

- If so to who?

After the game did you report the symptoms

- If so to who?

Did you feel pressured to come back into practice?

Did you feel pressured to come back into the game?

What consequences did you consider when making your decision?

Appendix B

- Headache
- Balance Problems
- Dizziness
- Difficulty Concentrating
- Visual Problems
- Fatigue
- Sensitive to Light and Noise
- Difficulty Falling Asleep
- Difficulty Staying Asleep
- Feeling Slowed Down
- Feeling Mentally Foggy
- Difficulty Remembering

Appendix C

Dear student athletes,

My name is Tony Finger and I am a Sport Management Major here at St. John Fisher College. For my senior thesis project, I am studying how people report concussion symptoms. Since you are a student athlete here at SJFC, your participation could help my study. I am inviting you to do a private interview.

The purpose of this research is to determine how student athletes here at St. John Fisher College are reporting their symptoms of concussions. I am looking for current student athletes that have experienced concussion like symptoms or have been diagnosed with a concussion during their playing career. My study is looking to better understand the process an athlete takes in acknowledging their own suspicions of personal head trauma. If you fit these criteria I am requesting, you to contact me to help with my research. The Interviews will take around 10-12 minutes.

There are no known risks and since answers are reported generally, they will not be linked to you. You will pick your pseudonym to use in order to replace your name during this process.

If you would like to help me with my research, please contact me through email (akf06456@sjfc.edu). Also, if you do not fit these criteria, please send a quick response indicating that so I can select another athlete. If you have any questions, contact me or Edane-staples@sjfc.edu.

Sincerely,

Anthony Finger

315-882-8975

akf06456@sjfc.edu

Dr. Emily Dane Staples

Edane-staples@sjfc.edu

Appendix D

Liability Release Form

I _____ hereby choose to participate in the research done by Anthony Finger.

In this interview, you will be asked questions pertaining to the idea that you've had a concussion history and the decision making process when you see the symptoms show up. The focus of this research is to try and find out if athletes here at St. John Fisher College report their symptoms of concussions and what are the factors that play into their decision. As a student athlete, you will be interviewed based on your past and current experiences within your sport. The interviews will be structured and will be around 17 questions.

I consent to the use of an audio recorder and know that the recording will not be made public.

Participation in the interviews is completely voluntary, you have the right to decline questions at any time during the interview.

By signing below, you give permission to have the audio recordings from the interviews to be used by the researcher for educational purposes like papers or presentations.

Name (Print) _____

Signature _____

Date _____

Pseudonym I would like to use _____

Table 1

Pseudonym	Class	Sport	Position
Chris Gloweman	Senior	Football	Safety
John Smith	Junior	Football	Safety
Bryce Bowser	Senior	Soccer	Goal Keeper
Michael Todd	Senior	Football	Offensive Linemen
Jordan Willis	Senior	Football	Safety
Jenkins	Sophomore	Football	Offensive Linemen
John Doe	Junior	Basketball	Forward
Jose Jones	Senior	Football	Cornerback

Table 2

		Football Athletes (n=6)	Non-Football Athletes (n=2)
High School			
	Number of stingers/getting bell rung	92	0
	Number of suspected concussions	11	1
	Number of diagnosed concussions	1	2
	Totals	104	3
College			
	Number of stingers/getting bell rung	97	5
	Number of suspected concussions	18	4
	Number of diagnosed concussions	3	2
	Totals	118	11

Table 3

Factors That Go into Reporting or Not			
		Football Athletes (n=6)	Other Athletes (n=2)
Practice Factors			
	Family	4.8	3.5
	Coach	3.0	4.0
	Team	2.3	2.0
	Self	1.6	2.5
	Depth Chart	3.1	3.0
Game Factors			
	Family	4.3	4.5
	Coach	3.3	4.0
	Team	1.8	2.0
	Self	1.6	2.5
	Depth Chart	3.8	2.0