

The Effects of Sports Injuries on Mental Health in High School Female Athletes

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Received June 23, 2022; Revised October 17, 2022; Accepted, October 27, 2022

Abstract

Sports injuries have become increasingly common in female high school athletes, ranging from ankle or wrist sprains to ACL tears. Despite this, the mental health effects resulting from these injuries have not been investigated. By utilizing a mixed method approach and incorporating survey quantitative data in conjunction with interview qualitative data, the various mental health effects of sports injuries in high school female athletes were examined. It became evident that young female athletes who have experienced injuries deal with major anxiety, mood drops, lack of motivation, lack of confidence, and diminished physical performance. Moreover, positive correlations were established between injury severity and mental struggles. While analyzing prior research and new information from the interviews conducted, a vicious cycle was confirmed regarding stress and re-injury. Overall, this research is significant because it allows female athletes dealing with mental health issues due to sports injuries to understand that they are not alone and to help find healthy ways to address these struggles.

Keywords: Injury, Sports, Athlete, Mental Health, Female

1. Introduction

Female participation in high school sports has increased dramatically since the late 1900s. Specifically, when Title IX passed in 1972, females were given the ability to receive equal opportunities in sports and thus participate in more high school sports. Since Title IX, injuries in female high school athletes have increased significantly, yet the mental toll of these injuries has not been fully explored. Investigation of these mental effects would allow coaches and parents to better understand and help female high school athletes suffering mentally after an injury. The gap in research regarding this psychological toll leads to the question: To what extent do sports injuries affect mental health in female high school athletes?

In order to understand how the collected data help

to determine the extent to which sports injuries impact the mental health of young female athletes, it is important to first look at the existing research on the subject. There are currently a few studies analyzing how females' mental health can be impacted by injury risk as well as rehabilitation after a sports-related injury (Herrero, 2020). Dr. Herrero, an orthopedic surgeon at NYU, begins by explaining how resilience, sleep, and mindfulness are related to an athlete's performance and injury risk. Furthermore, she asserts that anxiety, depression, and burnout can impair recovery after a sports-related injury. Specifically, Dr. Herrero includes eating disorders as an effect of injury, which is highly prevalent in female athletes. Dr. Herrero also acknowledges that many female athletes' source of identity relates to their body image and athletic build (Herrero, 2020). For this reason, injuries that cause a

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change to the body may have the potential to trigger depression and eating disorders. From this study, the additional aspect of eating disorders can be examined further as an effect of sports injuries. Because eating disorders can impair both physical and emotional well-being, effects of eating disorders can be linked to both performance and confidence upon returning to sports. It is important to acknowledge however that this study is somewhat limited because as a meta-analysis, it only has four reference sources.

While it is important to recognize the effects of sports injury on mental health, it is also important to understand the ways in which mental health issues can impact sports injuries. A research study in the *British Journal of Sports Medicine* by Dr. Margot Putukian, chief medical officer for major league soccer, was conducted to explore the influence of stress on injury rate. In her paper, Dr. Putukian begins by noting that stress increases muscle tension, which in turn can increase the risk of injury. Additionally, she concludes that physical injury can cause depression, which also increases the likelihood of re-injury and can have a negative impact on performance when returning to a sport (Putukian, 2016). This study brings light to a potential trend amongst female athletes: the cycle of stress and sports injuries. Stress itself can lead to injury, and once injured, one can become depressed thereby heightening the chances of re-injury. From this study, it will be possible to further examine this cycle by asking interview questions regarding the possible effects of stress on injury rate. In addition to stress, Dr. Putukian explains why many athletes avoid seeking help with their mental health after an injury, and connects this to factors of stigma, denial, and fear. In her study of elite athletes aged 16-23, Dr. Putukian found that “stigma was the most important perceived barrier to seeking help” (Putukian, 2016). She concluded that this stigma surrounds the fact that many athletes view seeking therapy as a weakness and are accustomed to working through pain. Furthermore, Dr. Putukian suggests that athletes may have not developed a healthy coping mechanism outside of their sport, and therefore struggle to appreciate the benefits of seeking help (Putukian, 2016). It is important to understand that this study is slightly limited in that it did not differentiate between

specific populations within the athletic community, such as specific genders or sports. Dr. Putukian could have more successfully illustrated the distinguishing characteristics between different groups of athletes and injury-related mental health challenges.

In another study published in *The Journal for Medicine & Science in Sports & Exercise*, the authors dive deeper into the psychological reactions accompanying athletic injury as well as the psychological issues related to athletic injury rehabilitation. Dr. Herring and supporting authors, who are doctors in sports medicine, comment that along with disordered eating and lack of motivation, depression is an extremely problematic response to a sport-related injury and it can even magnify other negative responses to injury. Specifically, when summarizing emotional responses of athletic injury related to rehabilitation, the authors note that rehabilitation can be negatively affected by loss of identity, fear and anxiety, and a loss of confidence. Additionally, the authors illustrate that many of the problematic effects of sport-related injuries can also decrease the success of rehabilitation, so it is important to seek strategies to avoid worsening these effects (Herring et al., 2006). This study relates back to the cycle of injuries and stress discussed earlier. Losing confidence during rehabilitation due to stress can increase the risk of re-injury, which only causes more stress for an athlete.

In order to deepen our understanding of the effects of sports injuries on mental health, it is also important to analyze a realistic progression of mental health before, after, and during an injury. In a study surrounding four female division I athletes, “coping behavior, psychological response, and rehabilitation adherence” were studied over the progression of an injury. In the *Journal of Clinical Sport Psychology*, authors Leilani Madrigal and Diane L. Gill identified many common stressors that resulted from sports injury. They found that “feeling isolated from the team, loss of control, and pressure to prove self and abilities were evident as athletes reflected over the course of their rehabilitation experience” (Madrigal and Gill, 2014). Furthermore, the authors included that “playing through injury was reflected in many statements by athletes who adopted a play-through anything mentality” (Madrigal and Gill, 2014). Being

off the field and away from teammates as a result of a sports injury can be extremely difficult. These stressors contribute to more detrimental choices, like choosing to play through an injury. Although this choice may appear as the most desired option at the time, players are simply putting themselves at an even greater risk for re-injury when making this decision. While this article successfully portrayed mental health effects of female athletes, it was limited in that it only included four participants. For this reason, it is not possible to generalize the findings and make definitive conclusions.

Several studies have successfully demonstrated that sports injuries in high school athletes have become more common over time. According to a study from 2006, “participation in high school sports resulted in an estimated 1.4 million injuries at a rate of 2.4 injuries per 1,000 athlete exposures” (Comstock et al., 2006). Sports injuries in high school span from simple wrist and ankle sprains, to severe concussions, fractures and ligament tears. While physical rehabilitation is the primary response to healing a sports injury, the mental effects of these injuries are often overlooked. In female high school athletes in particular, studies are lacking on the emotional and psychological impact of sports injuries. Mental health effects are not prioritized, in part, due to the athletes’ mindset as well as pressure from coaches. Coaches rely on their athletes to win games and bring their teams success, yet the physical aspects of returning to sports after injury are oftentimes emphasized over the mental aspects. Similarly, athletes themselves often refrain from displaying signs of mental issues for fear of being viewed as weak or quitters by teammates and coaches (Keane, 2021). Because of the significant lack of attention to the psychological aspects surrounding sports injuries, a gap in research has developed regarding the extent to which sports injuries actually impact mental health in athletes. This gap is even wider in female athletes and is the focus of my research.

There are several components of mental health that may be impacted by experiencing a sports injury. The effects on confidence, anxiety, depression, and mood are some of the emotional aspects of sports injuries that will be analyzed. Confidence and

perceived performance will specifically relate to mental health upon returning to sports, while anxiety, depression, and mood will likely correlate to the direct effect of the injury before returning to sports. Additionally, it is important to take into account the type of injury, the duration and severity of the injury, as well as the sport that caused the injury. Severe long-term injuries will likely have a more significant impact on mental health compared to minor short-term injuries. Furthermore, by spending more time in the recovery process after an injury, it is likely that an athlete’s mental health will improve and they will experience less issues with confidence, anxiety, and mood. By collecting both quantitative and qualitative data in survey and interview formats, it will be possible to analyze the ultimate effect of sports injuries on mental health in high school female athletes.

2. Methodology

To investigate the proposed research question, this study uses a Likert Style survey to gather respondent data regarding various effects of sports injuries on mental health. Survey analysis attempts to categorize similar responses and relate them to the severity and type of sports injury in a quantitative manner. Quantitative analysis works cohesively with this research inquiry because it allows for a broad range of mental health effects caused by sports injuries to be classified and compared in an organized fashion.

In addition, an interview method was used to gather more detailed information surrounding these mental health effects. While quantitative data can gather fact-based numbers regarding various aspects of mental health, it lacks the ability to capture true emotions which are essential components of mental health. In a semi-structured interview setting, it was possible to create questions related to the responses of the interviewees in order to expand upon the information collection. In the *Practical Research Methods Guide*, Dr. Dawson notes that semi-structured interviews allow the “interview to remain flexible so that other important information can still arise” (Dawson, 2002). Upon comparing the interview data, it is possible to develop repeated themes and topics of discussion to support the overall

analysis.

The mixed-method approach of combining both quantitative and qualitative research is supported by the idea of triangulation. Specifically, according to Denzin, methodological triangulation “involves using more than one option to gather data, such as interviews, observations, questionnaires, and documents” (Denzin, 1973). In using method triangulation, it will be possible to “deepen and widen one’s understanding” regarding sports injuries and mental health by minimizing overall bias and further enriching the study (Denzin, 1973).

The quantitative aspect of the Likert survey was produced using Google Forms software. According to Jan Losby, PhD from the CDC, “Likert scales may meet your needs when you have attitude, belief, or behavior items” (Losby 2012). Effects including overall mental health, confidence, and anxiety were inserted into the form along with severity and type of injury. On the Likert scale, 1 represented minor injuries as well no negative mental health effects, whereas 5 represented severe injuries and the experience of negative mental health effects “quite often”. By comparing similar numbers on the survey, it is possible to connect severity with overall mental health effects.

Regarding the data analysis process for quantitative results, both Chi-Square Tests of Independence and Pearson correlation techniques were utilized to build relationships between the data collected. Moreover, to analyze the data for the qualitative research, interviews were recorded, transcribed, and then put through a complex coding method in which the important themes collectively discussed in the interviews were identified. After completion of the coding process, a thematic analysis chart was created to clearly view the common mental health effects of sports injury in a chart format.

3. Results: Quantitative

A variety of mental health effects due to sports injury were analyzed in the survey. First, actual versus expected data were collected regarding various mental health effects to display the overall significance of the data found. In a set of data regarding mental health effects, it is expected that the

same amount of participants experience minor effects versus severe effects, yet this was not the case in the research found. As seen in Figure 1 which represents actual versus expected anxiety rates related to injury, the majority of participants experienced extreme anxiety. With a total of 40 female athletes answering this question, it is expected that 20 respondents would have minor anxiety and 20 respondents would have severe anxiety. Respondents answered on a scale of 1 to 5, with 1 representing minor anxiety and 5 representing extreme anxiety. Those who answered with 1s and 2s were shown in the figure as having “minor anxiety”, whereas those who answered with 4s and 5s were shown in the figure as having “severe anxiety”. A Chi-Square Test of Independence was used to evaluate actual versus expected amounts of participants with certain mental health effects. All 3s were disregarded from data analysis because as a “middle” or “average” rating, the 3s would effectively weaken the correlations being studied. As portrayed in the figure, 33 respondents had severe anxiety due to injury while 7 respondents had minor anxiety. The findings for those who experienced anxiety from sports injury fell outside of the expected range of responses, (N=40), $p=.000039$. Any p value less than .05 represents a statistically significant finding.

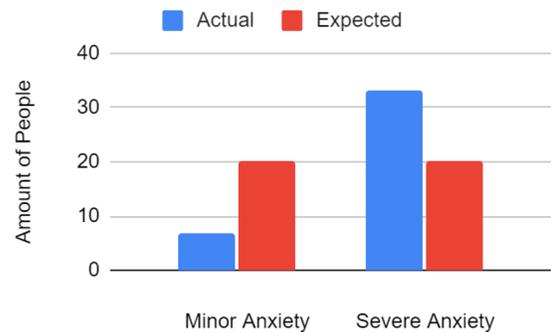


Figure 1: Actual Versus Expected Anxiety Rates due to Sports Injury

Similar to anxiety, drops in mood were also significant effects of sports injury. Figure 2 illustrates actual versus expected mood drop rates. Mood drops were analyzed on the same 1 to 5 scale as anxiety (omitting any 3s), and it was ultimately found that 32 respondents had severe mood drops due to injury

while only 7 had only minor mood drops. The findings for those who experienced mood drops from sports injury fell outside of the expected range of responses, (N=39), $p=.000062$.

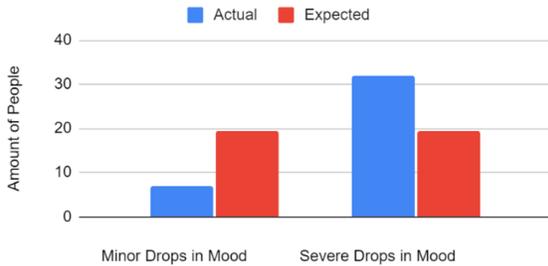


Figure 2: Actual Versus Expected Mood Drop Rates due to Sports Injury

Actual versus expected rates of lack of motivation due to injury were also found using the same process as the previous figures. Figure 3 indicates that 28 respondents experienced severe lack of motivation, whereas 11 respondents had minor lack of motivation. The findings for those who experienced a lack of motivation from sports injury fell outside of the expected range of responses, (N=39), $p=.0065$.

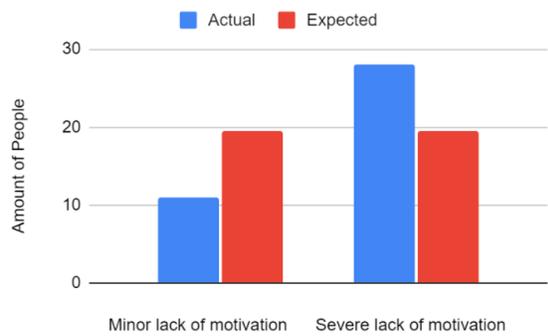


Figure 3: Actual Versus Expected Lack of Motivation due to Sports Injury

Figure 4 had a slightly different scale than the previous figures. The survey choices were on a scale of 1 to 5, where 1 represented high confidence and 5 represented low confidence. Respondents who selected a 1 or 2 are presented in the figure as having excellent confidence, while those who selected a 4 or 5 are presented in the figure as having very poor confidence. The 3s were not included in the data analysis. As seen below, 27 participants had very

poor confidence and 7 participants had excellent confidence after a sports injury. The findings for those who experienced a lack of confidence from sports injury fell outside of the expected range of responses, (N=34), $p=.000054$.

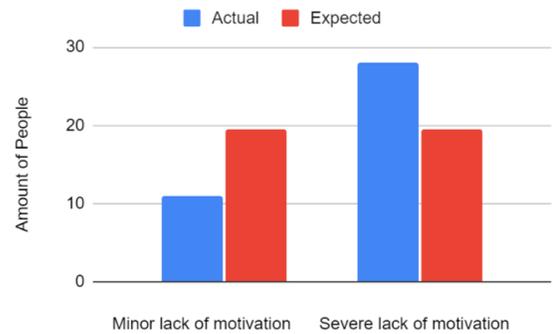


Figure 4: Actual Versus Expected Confidence Levels after Sports Injury

Figure 5 shows actual versus expected physical performance after injury and it has the same scale as figure 4. A total of 36 respondents had very poor physical performances after injury and 11 respondents had excellent performances after sports injury. The findings for those who experienced a lack of performance from sports injury fell outside of the expected range of responses, (N=47), $p=.00027$.

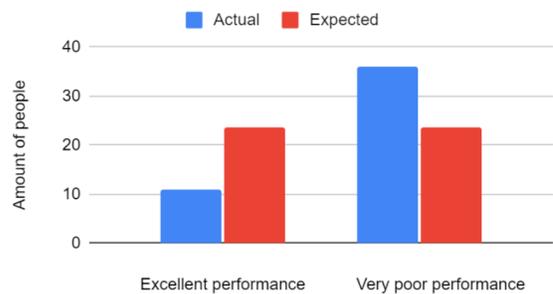


Figure 5: Actual Versus Expected Physical Performances after Sports Injury

Figures 6 and 7 are very similar in that they both analyze overall mental health. Figure 6 illustrates actual versus expected overall mental health immediately after injury, while figure 7 represents overall mental health after having returned to sports once recovered. Figure 6 displays that immediately after injury, 24 female athletes had very poor mental

health whereas 8 female athletes had excellent mental health. The findings for those who experienced an overall drop in mental health immediately after injury fell outside of the expected range of responses, (N=32), $p=.046$. Figure 7 presents that once returning to sports, 3 people had very poor mental health and 33 people had excellent mental health. The findings for those who experienced an overall rise in mental health after returning to sports fell outside of the expected range of responses, (N=40), $p=.000039$.

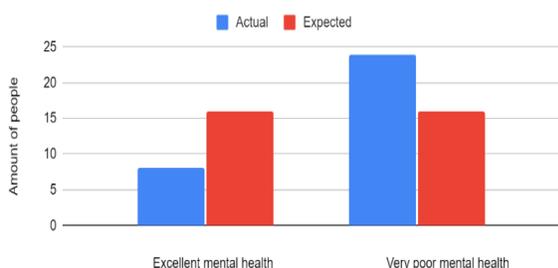


Figure 6: Actual Versus Expected Overall Mental Health Immediately After Injury

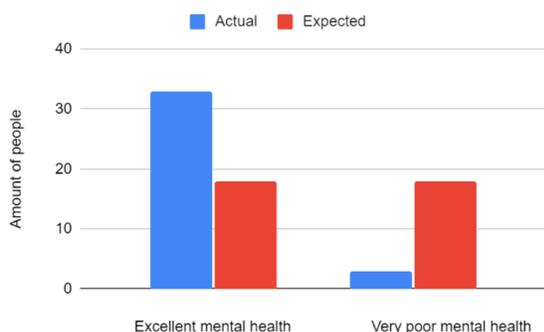


Figure 7: Actual Versus Expected Overall Mental Health after Returning to Sports

The following results do not represent actual versus expected effects, but rather correlations between two different variables using the Pearson correlation method. To develop these results, a tabulated method was utilized in which specific correlations could then be extracted as well as an r value. A high r value and steep slope indicates a very strong positive correlation. Specifically, in the figure below, the correlation between mental health effects and injury severity is displayed. For example, figure 8 presents the correlation between severity of injury and depression. Ultimately, there was a weak positive

correlation between injury severity and depression rates, in which $r = 0.21$. A weak positive relationship indicates that as severity of injury increases, the response of depression slightly increases. The strength of correlations is determined by the r value, on a range from weak to strong.

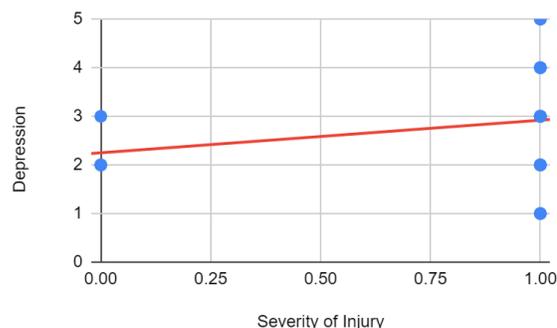


Figure 8: Correlation of Injury Severity to Depression Rates

Figure 9 presents the correlation between injury severity and drops in mood. There was a moderate positive correlation between injury severity and mood drop rates, in which $r = 0.31$. A moderate positive relationship indicates that as severity of injury increases, the response of mood drop increases to a medium extent.

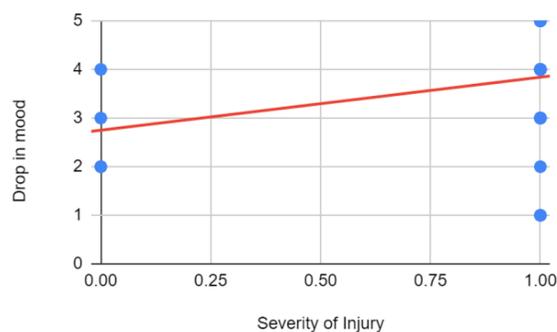


Figure 9: Correlation of Injury Severity to Mood Drop Rates

Figure 10 presents the correlation between injury severity and lack of motivation. There was a strong positive correlation between injury severity and lack of motivation, in which $r = 0.47$. A strong positive relationship indicates that as severity of injury increases, lack of motivation increases to a great extent.

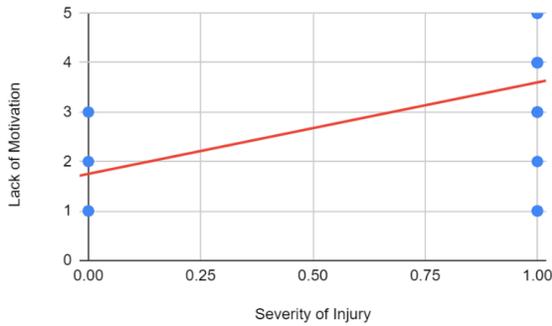


Figure 10: Correlation of Injury Severity to Lack of Motivation

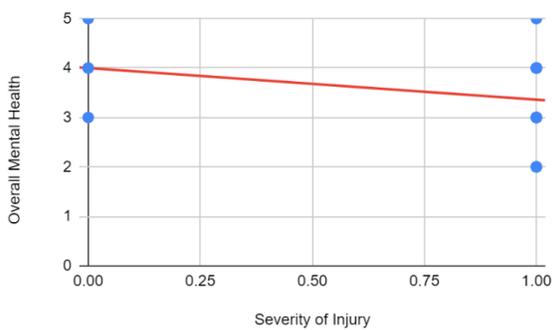


Figure 11: Correlation of Injury Severity to Overall Mental Health Immediately After Injury

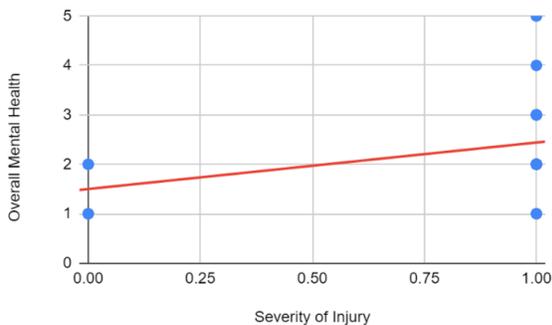


Figure 12: Correlation of Injury Severity to Overall Mental Health After Returning to Sports

Figures 11 and 12 present severity of injury correlated to overall mental health immediately after injury and after returning to sports. There was a weak negative correlation between injury severity and overall mental health immediately after injury, in which $r = -0.27$. A weak negative relationship represents that as injury severity increases, overall mental health slightly decreases. Figure 12 illustrates

that after returning to sports, there was a moderate positive correlation between injury severity and overall mental health, in which $r = 0.33$. Thus, after returning to sports, many athletes' mental health increased to a great extent.

4. Results: Qualitative

At the beginning of the study, data from four interviews were thematically analyzed. In a thematic analysis, researchers can determine broad themes in a given data set. From these themes, it is then possible to determine more inclusive themes that generalize certain ideas. This method of analysis was used to evaluate the extent to which certain athletes encountered similar mental effects as a result of sports injuries. The interviews were voice-recorded anonymously and then translated onto a document.

The thematic analysis was carried out in multiple steps. First, each of the four interviews were conducted, recorded, and transcribed. Interview recordings were listened to multiple times to identify arising themes from the interviewee responses. Next, a coding method was used to connect similar experiences between the athletes in an attempt to recognize common mental effects athletes endured as a result of sports injury. Once similar experiences were identified, the various themes were sorted into a list of multiple broad categories that fit all themes well. From here, the number of times each broad theme occurred in all the interviews was counted to display a more direct view of shared mental health experiences.

After applying the thematic analysis to the interviews and primary sources, six different themes emerged regarding mental effects as well as approaches to addressing the mental effects of sports injuries. However, four themes were repeated more frequently. These four themes were: (1) Loss of an Outlet, (2) Feeling Rushed to Return to Sport, (3) Performance Anxiety, and (4) Strong Relationships Boost Recovery. Below, each theme is defined and the number of times it was referred to during the interview process is listed. Furthermore, below is also a list of the questions asked during the interviews that allowed the different themes to emerge.

Table 1: Thematic Analysis Themes and Definitions

Theme	Definition	Number of times this theme occurred in interviews
Loss of an Outlet	Sports injuries lead to a loss of a psychological outlet outside of everyday life.	8
Feeling Rushed to Return to Sport	After sports injuries, athletes feel rushed to return to their sport before fully recovering.	7
Performance Anxiety	As a result of sports injuries, athletes are nervous regarding performing at their original potential. They are also nervous about the risk of re-injury.	6
Strong Relationships Boost Recovery	Athletes have found that speaking with friends and loved ones helped them mentally recover after injury	5

Questions asked during semi-structured interviews:

1. What was your injury? What was the severity of your injury? How long was your recovery?
2. Do you believe that your mental health was impacted by your injury? Explain.
3. How did you/did you not deal with or cope with any mental health effects from your injury?
4. How do you think your performance and confidence changed once returning to sports after your injury?
5. Do you believe that you were mentally prepared upon returning to your sport after your injury?
6. If you could give others who are suffering sport-related injuries one piece of advice, what would it be?
7. Did you feel that your coach/club/parents did enough to support you mentally?
8. Did you get outside help? Why/why not? Were you afraid to seek support?
9. Did you feel rushed to return to your sport?
10. Many athletes have mentioned that a loss of a physical outlet becomes very difficult when an athlete is injured. Do you relate to this?

5. Discussion and Limitations

As predicted in this research study, sports injuries have a significant impact on mental health in female athletes in high school. Not surprisingly, those who have more severe injuries tend to have more extreme

mental health effects. In reference to Dr. Putukian and her theory that stress increases re-injury rates, it is evident that athletes who were participants in the interview can relate to this idea. As discussed in the qualitative section of the paper, many athletes experienced anxiety and stress when preparing to return to their sport after recovering. As a result of this stress, which as noted by Dr. Putukian can increase muscle tension, many athletes claimed that they suffered re-injuries due to rushing to return to their sport. Relating back to the cycle of stress leading to re-injury discussed earlier, many athletes experience this unfortunate cycle because of sports injury.

Looking at the quantitative Chi-Test of Independence results, certain mental health effects stood out as more prominent than others. For example, most athletes that responded to the survey ended up having severe anxiety, severe drops in mood, and severe lack of motivation compared to expected values. Furthermore, most athletes who experienced injuries had very poor confidence and physical performance after injury. Herring suggested that rehabilitation can be negatively affected by loss of identity, fear and anxiety, and a loss of confidence. It can be concluded that the unfortunate mental health effects many athletes experience can slow down their rehabilitation process, underscoring why it is extremely important to recognize and understand the psychological impact of sports injuries.

In addition to analyzing expected versus actual mental health results, correlation graphs between severity of injury and certain mental health effects were constructed. As an example, there was a positive correlation between injury severity in relation to depression, mood drop, and lack of motivation. There was a weak negative correlation between injury severity and overall mental health immediately after injury, indicating that as severity of injury increased, overall mental health slightly decreased after injury for many athletes. On the other hand, there was a moderate positive correlation between injury severity and overall mental health after returning to sports, indicating that once athletes with severe injuries returned to sports, their overall mental health increased more significantly. These results suggest that those with more severe injuries

tend to have even better mental health than prior to their injury once returning to sports. In this case, athletes finally can return to their outlet, and are likely more appreciative and grateful for their ability to take part in sports. In the end, both the quantitative and qualitative data collected helped to narrow the current gap in research regarding female athletes and mental health effects due to injury.

As discussed in the literature review, it was anticipated that eating disorders would be an effect of sports injury. However, eating disorders actually were not a significant mental health effect compared to others based on the survey results, and therefore were omitted from the results section. Surprisingly, depression rates were also low in comparison to other mental health effects. Part of the reason many athletes reported they did not have major depression or eating disorders because of injury relates to the stigma specifically attached these two issues. Dr. Putukian concluded that there are also stigmas around weakness for athletes and behind seeking therapy for issues like depression. It is possible that because of these stigmas, many athletes did not select that they had depression or eating disorders to avoid appearing weak.

The two bar charts illustrating Actual versus Expected Overall Mental Health Immediately After Injury and Actual versus Expected Overall Mental Health After Returning to Sports demonstrate the importance of utilizing sports as an outlet. Immediately after injury most athletes had very poor mental health. However, after returning to sports, the majority of athletes had excellent mental health, and few had very poor mental health. This relationship implies that the true reason athletes suffer mentally following injury is because of a loss of their physical and emotional outlet. As soon as athletes returned to their sport, their overall mental health rapidly improved. As expressed in the qualitative interviews, athletes still suffer through stressors even after returning to sports, specifically regarding the anxieties of re-injury. However, because they have returned to their sport, mental health improves significantly, illustrating the gravity of the outlet that sports provide for athletes.

Significant limitations arose from collecting the quantitative and qualitative data in this research. In

the quantitative study, athletes had to rate the severity of their own injury. This approach was inherently subjective, as some athletes ranked more severe and less severe injuries at the same severity rate in my survey. For example, a sprained ankle is typically not as severe as an ACL injury, however some athletes may have ranked these injuries as the same severity depending on their own experiences. Injury severity correlations were a key aspect of the quantitative data, therefore this limitation likely skewed some of the results. In addition, had the quantitative data been collected on a 1 to 4 scale instead of on a 1 to 5 scale and then omitting the 3s from the analysis, all responses would have been included. It is possible that this would have made the results more significant. Furthermore, data was only collected from 50 athletes for the quantitative results, and more athletes could have further broadened the scope of the data. Additionally, most participants were soccer players, slightly limiting the type of injuries and injury severities included in the data. Moreover, although the qualitative results were crucial for the research, only four students were interviewed. By interviewing more students, additional significant themes may have become evident, thereby enhancing the qualitative section of the research.

6. Conclusion and Implications

There are critical implications that have arisen from the results of this research. There has been a lack of attention to mental health issues associated with sports injuries in female athletes in high school. This research can help doctors, coaches, and athletes to further appreciate the severity of mental health issues in female athletes resulting from sports injury. Simply understanding the mental health effects themselves is a critical first step in eventually creating a solution. However, more research is needed to investigate different tools and strategies to screen for and address the psychological suffering of female athletes. By providing better support for their athletes, coaches can have a more impactful role in helping their athletes recover mentally. Finally, the most important implication of this research is that female athletes struggling with mental health issues after sports injuries can now realize that they are not

alone. Female high school athletes suffer similar psychological issues following sports injuries, and hopefully this study will encourage athletes to acknowledge and prioritize mental health after injury.

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