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**The Effects of COVID-19 on Mental Health and Injury Occurrence
of Division III College Football Players**

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MSAH 7000: Master's Thesis

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Statement of Purpose

COVID-19 was a virus that emerged in the United States starting on January 20, 2020, in Washington state (Centers for Disease Control and Prevention, 2022). Due to COVID-19's extreme virality and lethality, this caused a call to action from the nation's government which involved shutting the nation down. This effort was intended to reduce the spread of the virus. A part of the shutdown included a cessation of sports across the entire nation with players being told to stay home and workout/wellness facilities and professional team facilities were closed until further notice. Due to these closures, many athletes were left at home without access to adequate training equipment and this placed a hindrance on their mental health. In a study done by Economou et al. (2021), many college athletes reported an increase in their anxiety and depression while locked down at home during the Fall of 2020.

In the United States alone there are more than 480,000 student athletes under the NCAA regulation with about 25,000 of the athletes being Division III football players ("Estimated probability of competing" n.d.) which is only one of the many governing bodies that oversee college athletes that were all affected with the closure of the United States. Starting in March 2020, all the NCAA men's basketball tournaments were canceled and many of the lower divisions of the NCAA cut sports entirely for the spring of 2020. For example, the Ohio Athletic Conference released a statement on March 13, 2020, that stated the cancelation of the spring sports season of 2020, which also caused the cancelation of all meetings, practices, and other off-season activities for all other sports in the Ohio Athletic Conference ("Ohio athletic conference cancels spring sports season", 2020). These activities then led into July of 2020 where major conferences in Division 1 shut down their non-conference play in hopes of having a shortened season. NCAA division 1 football specifically had eight of the thirteen total

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conferences halt play all together (Hale, 2020). Running parallel to all of this, in March of 2020 there was the closure of many chain workout facilities and many states around the nation were also closing their local workout and fitness centers (Axelrod, 2020). This ended up leaving all the 480,000 student athletes with no season and very limited ability to further train and prepare for the following season. With this lack of training, detraining can start to occur in many of these athletes.

Detraining is seen as the partial or total loss of training adaptations from insufficient training stimulus (Mujika & Padilla, 2000). Detraining can occur in two periods. Short-term detraining involves four weeks or less without training, or long-term detraining involves four weeks or longer of insufficient training stimuli. (Mujika & Padilla, 2000). Some athletes, especially ones for whom competitions occur during the Fall season, were left without any offseason training for 4+ weeks which then subjected these athletes to potential long-term detraining. Strength of athletes can decrease at a rate of 7-12% when they experience 8-12 weeks of training cessation (Mujika & Padilla, 2000). Muscle fiber characteristics change with long-term detraining in the following manner: a decrease in fast twitch and slow twitch muscle fiber cross-sectional area, the fast twitch to slow twitch area ratio, and muscle mass (Mujika & Padilla, 2000).

If an athlete did try to prevent detraining from occurring and chose to work out and try to do sport specific activities while at home, they could expose themselves to other risks. In a case report done by Šimunjak et al. (2021), the researchers looked at a 13-year-old Olympic female figure skater that had no previous medical history. The skater suffered a second metatarsal stress fracture and a fourth metatarsal stress reaction that occurred during home training that was prescribed by the coach and not on the rink. The same athlete suffered spinal disc bulging and

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protrusions that occurred immediately following return to in-rink training. These injuries were seen in the study from the lack of supervision during the home training. New training techniques performed by the athlete without correction of improper training coupled with possible poor nutrition and sleep habits can also contribute to an increased risk for injury (Šimunjak et al. 2021).

Detraining put all of these college athletes in a very high-risk group to suffer an injury from returning to play for their specific sport after being improperly/inadequately trained for multiple weeks and possibly even months. Coupled with poor nutrition, poor sleep habits, and overall poor mental health, this could be a recipe for failure for all the 480,000+ college athletes. The general mental health aspect going into the following season post-lockdown could put these athletes at risk for injury if they don't put themselves in the same focus as they had in previous years posing themselves to errors or mess up their perfected technique resulting in injury .

An athlete's mental health also had the potential to suffer with the lockdown. For many athletes, their sport is a major part of their life due to the time commitment required to be a college student and a full-time athlete. Many athletes reported in a survey done by the NCAA that the athletes practiced on average up to 40 hours a week (Jacobs, 2015). There have even been scales such as the Athletic Identity Measurement scale created by Brewer et al. (1993) that have been used numerous times in the American population with a high test-retest reliability, and internal consistency with scores being predicative of postinjury psychological distress in athletes. (Brewer et al. 1993). This shows that being an athlete can be viewed as a major component of an individual's whole identity. Suffering an injury that takes the athlete away from their sport, especially if that injury could have been avoided with proper training, could pose major psychological distress with the athletes.

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It is important to identify athletes that were put at risk following lockdown so clinicians and athletic trainers can be better prepared to address and prevent this situation from occurring further. Knowing that an increase in injury occurrence may occur with detraining can allow athletic trainers to provide better training regimens to help prepare an athlete for their sport if they do not have access to typical training facilities.

If an athlete does suffer an injury that makes them unable to perform for multiple weeks, understanding the effects of short-term detraining in the athletes will better be able to understand the effectiveness of proper rehab as to not make that athlete susceptible to even further injury that could have been avoided. Based on this information, the goal of this paper is to evaluate how the mental health of college football players was affected and determine if the athletes felt that they themselves would suffer an injury with returning to their sport following the COVID-19 lockdown.

Literature Review

Introduction

The pandemic is still very new to the world and new research continuously keeps appearing in the literature attempting to analyze injury rates and the effect that COVID-19 had on athlete's bodies and mind. Overall research is very limited and the topic and adding a younger population to the search limits the research even further. A few themes can be drawn from the current research on the topic.

Professional Sports

Soccer

Two studies done in Europe looked at injury occurrence of soccer players following the COVID-19 lockdown as their season had a similar shutdown as there was in the United States.

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The first study was done by Seshadri et al. (2021) where the authors looked at the professional league in Germany. The study included 537 participants in the 2019-2020 season. It was found that 70 total game loss injuries were reported over the last 82 games of the season following the lockdown. Sixty-eight unique players reported injuries in the season. The injury rate prior to lockdown was 0.27 injuries per game and following lockdown the injury rate was 0.84 per game. They demonstrated that athletes were 3.12x more likely to sustain an injury following lockdown when compared to prior seasons. The other soccer-based study looked at soft tissue injuries in Premier League players which is the England based professional soccer league division. The study was completed by Mannino et al. (2021), and the participants included 775 injuries that were split among the three observed seasons of 2018-2019, 2019-2020 and 2020-2021. The 2020-2021 season had the highest number of injuries with 289 soft tissue injuries occurring. The 2020-2021 season also had the least amount of play time leading to an injury with that season having 495 minutes on average before first injury with the other team seasons having an average time of 521 in 2019-2020 and 536 in 2018-2019. Both articles theorized that with the lockdown and loss of a season/preseason subjected European soccer players to more injuries at a quicker rate.

American Football

One article looked at the injury occurrence in football players in the National Football League (NFL) following the cancellation of training camp and preseason in 2021 (Baker et al 2021). Baker et al. (2021) looked at the effect of cancelling the preseason games and training camp had on injuries suffered by professional football players during the first four weeks of the season. Four total NFL seasons were included in the study starting first with 2016-2017 and going through 2020-2021. In the fourth season 3,025 injuries were reported with 582 (19%)

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occurring in the first 4 weeks of the 2020-2021 NFL season. 1,292 (53%) occurred during preseason weeks 1-4, and 1,151 (38%) occurred during regular-season weeks 1-4 of NFL seasons 2016-2017, 2018-2019 and 2019-2020” (Baker et al. 2021).

The authors, Baker et al. (2021) stated that this increase in injury occurrence likely occurred due to the deconditioning of athletes along with starters on these teams not being able to slowly transition to game speed play and demanding maximum workload very quickly from their bodies. This article reported similar results to both European Soccer case studies demonstrating that the COVID-19 lockdown did influence the injury occurrences for the professional athletes as compared to previous unaffected seasons.

Mental Health

One of the other concerns that arose from athletes being on lockdown was a decline in their mental health and the reality of athletes being afraid of returning to their sport following lockdown. In a study done by Economou et al. (2021), the authors wanted to look at how mental health was affected with a mid-season cancellation in student-athletes. One hundred and seventy-eight student athletes completed a survey given by the authors when the athletes returned to campus in the Fall of 2020. The survey was broken down to three sections, the Beck Depression Inventory (BDI), Athlete Identify Measurement Scale, and the Generalized Anxiety Disorder 7-Item (GAD -7). The Beck Depression Inventory looks to examine and find symptoms of depression in individuals. The Athlete Identify Measurement Scale asks athletes to rate the level at which they identify as an athlete with the scores correlating with the importance of sports to the athlete. The Generalized Anxiety Disorder 7-Item is a self-report anxiety questionnaire.

The results of the study documented that from the data of the BDI survey, it was found that 50% of the participants reported mild-moderate depression while returning to campus. The

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GAD-7 reported 28% of participants self-identified as having minimal anxiety, 35% endorsed moderate anxiety and 37% endorsed severe anxiety. At the end of the survey, there was an open-ended section that allowed athletes to express themselves as it related to COVID-19 and their return to campus. Three themes emerged from this as identified by the authors which were worsening mental health, anxiety related to the pandemic, and positive experiences from returning to campus. The authors concluded that this is data that universities need to examine and see that following lockdown athlete's mental health were severely affected and understand that the athletes are in a high-risk mental health situation. Universities need to have counseling available for this population to hope for any sort of improvement.

An additional study was conducted by Woodford & Bussey (2021) on the topic. Woodford & Bussey wanted to analyze the effects COVID-19 had on the mental, physical, social, and emotional components of wellbeing that was affected through the lockdown measures in athletes. For the study, 14 elite level athletes were sampled with the demographic breakdown of the participants being eight white women, one Indian woman, and five white men. The participants were asked by the authors to take pictures that they felt represented their experience with COVID-19 as an athlete, these pictures were to serve as an aid to the discussion section of the study. Over the next two weeks the authors met with the athletes to conduct a 45–60 minute interviews. There were no predetermined questions for the interviews and all interviews began with just the athletes discussing their photos and then follow-up questions were asked based on the responses and descriptions of the photos. From the interviews, three major overarching themes were identified with a couple of subthemes under each major theme. The three major themes were Threats to Wellbeing, Adapting Routines and Maintaining Motivation and the last theme was Reflecting on Participation in Competitive Elite Sports.

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The data demonstrated that the COVID-19 lockdown had a psychological impact with athletes having many fears of returning to their sport and worrying if they would be able to still perform at their former level of competitiveness, but also just the feeling of isolation away from their teammates causing a decline in their mental health with no outlet (Woodford & Bussey, 2021). The authors concluded that with the lockdown it caused athletes to change their mindset as to what they knew was no longer available with not being able to access their sport, so the athletes had to come up with new ways to connect to their sports. The athletes had to make life changes that could be sustained should another lockdown happen.

Jagim et al. (2020) also wanted to evaluate the impact the COVID-19 shutdown measures had on training habits and perceptions of athletes. The participants included 105 athletes with an average age of 19.9 years old and a demographic split of 31 males and 74 females with the majority (87.6%) of the participants competing at a collegiate level. Football, baseball/softball, and soccer had the highest representation in the study. Seventy (66.7%) of the surveyed athletes had their sport canceled due to COVID-19, eighty-eight (83.8%) of the athletes reported they were completing their assigned activities alone, and ninety-nine (94.3%) of the athletes reported still receiving guidance from their coach and training staff. The survey looked to measure athletes currently available resources, changes in weekly training habits, and perceptions of training such as intensity, motivation, and enjoyment.

From the results of the survey, it was found that during COVID there was a significant decrease in an athlete's strength, endurance, and mobility training with on average each training being done one less hour per week than pre-COVID-19 (Jagim et al., 2020). The area that took the largest hit was sport specific activities with the athletes performing on average 6.44 less

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hours of training for their sport. 71 (67.6%) of athletes in the study reported decreased levels of motivation during lockdown, and 69 (65.7%) reported lower training satisfaction also.

Jagim et al. (2020) tied in all the articles that with the mental health of athletes being affected and being under lockdown. athletes were not performing nearly at the level they would be. With these athletes also working out less it puts them at a higher risk for an injury and to suffer from the effect of detraining. With the athlete not performing their recommended level of sports-specific activity, their body will start to suffer detraining and this may put the athlete at a high risk for injury. The results of this article also match the findings from Economou et al. (2021) and Woodford & Bussey (2021) stating how much athletes need to have their mental health examined and monitored since returning to their normal workload. Athletes also put themselves at risk for injury if they are living in fear of suffering an injury from their less than healthy mental health state.

Detraining

With a decline in mental health and lack of desire to train, athletes will begin to “detrain” their bodies. An athlete’s body composition can completely change for the worse without working out or through working out incorrectly.

A case report done by Šimunjak et al. (2021) wanted to evaluate how improper home training caused injury in an elite level gymnast. The skater suffered a second metatarsal stress fracture and a fourth metatarsal stress reaction that occurred during home training that was prescribed by the coach and not on the rink. The same athlete suffered spinal disc bulging and protrusions that occurred immediately following return to in-rink training. These injuries at home may have resulted from improper monitoring of the athlete performing the exercises prescribed to her and the in-rink injuries may have been the result of detraining. A lack of sports-specific

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training as cited earlier can challenge an athlete's body to keep the muscle memory of their sport activity.

Conclusion

The literature review supports the concept that the COVID-19 lockdown had a large impact on athletes of all levels of competition. Athletes with the deconditioning of their bodies and a decrease in mental health followed by an unwillingness to train and/or training in an improper way causing the body to morph and change. Then with the return and cancellation of preseason and training camp practices and games, researchers observed all these factors put the athlete at a much higher risk to suffer injuries when compared to previous seasons. There still is not much literature in terms of studies and data examining how many injuries were suffered by athletes and very little to none on a collegiate population of athletes which makes up a large portion of athletes in the United States. The question that comes from the literature is that if the lockdown from COVID-19 did affect anxiety Division III football players felt and if they did suffer more injuries due to a shortened or detrained period prior to the 2020 season. The researcher hypothesizes from the data available that athletes will suffer more injuries and that the pandemic and associated lock down will have a negative effect on the athletes' mental health.

Methodology

Research Design

To evaluate the effects of COVID-19 on Division Three football players mental health and their perception of how the lockdown affected their training or predisposed them to suffer an injury when returning to normal play, an in-person survey will be given to the participants. The decision for a survey was decided as it allowed for minimal bias in the form of the answers as there were no open-ended questions, it also allows for quantitative numbers to be assigned to the

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data to allow inferences to be made and to see if the lockdown from COVID-19 had a significant effect on Division III football players through self-reporting. The decision for making the survey in-person was to allow all the data to be collected at once and be returned to the researcher for analyzing. The Otterbein University football team met for practices at the time of the study so with the Head Coach's permission, a time was selected to speak to the players and collect the data as majority of the players would be present for the practice and meeting.

Participants

The participants of the survey will be an estimated 80 Otterbein football players. To be eligible for the survey an individual will have to be a current member of the Otterbein University football team. The exclusion criteria for this study would be anyone that is no longer on the Otterbein University football team, under the age of 18, or any individual that does not consent to the survey.

Instruments

Consent will be obtained through the organization representative to allow access the members of the organization. An eighteen-question survey that consists of a demographic survey created by the researcher, a Covid Anxiety Scale that was created by Silva et al. in 2020, and the final section of the survey was an injury occurrence section that was created by the author. Prior to completion of the survey, each student-athlete completed a consent form.

Organizational Consent form

A consent form was sent to the Head Coach of Otterbein's football team. To achieve the goal of the study, the organization's representative needed to give the author access to the team to be able to use the organizations facility and to administrate the survey to the organizations members which is the football team. This form can be found in **Appendix A**.

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Participant Consent

The player will be presented with a consent statement that states the purpose of the survey and that at any time they can stop taking the survey. This consent is presented in **Appendix B**. If a player were informed by turning to the next page and beginning the survey, they give consent to participate in the survey and agree that they are eligible to take the survey as stated by the inclusion/exclusion criteria.

Script for participants

A script will be read to the participants outlining the study. The purpose of the script is to make sure all points are covered regarding the study and properly inform the participants about the study and that their participation is completely voluntary throughout the entire survey. The script for replication can be viewed in **Appendix C**.

Demographic Survey

The start of the survey will be the demographic questionnaire including Age, Ethnicity, Current Academic Grade, Primary position on the football team, and of the three seasons being examined which did the athlete participate located in Appendix D

COVID-19 Anxiety Scale (CAS)

The goal of this survey scale is to measure dysfunctional anxiety based from COVID-19 (Silva et al. 2020). “The CAS is considered to be a reliable mental health screener with “90% sensitivity and 85% specificity” (Bullard 2021). If a participant has a higher CAS score it also shows a high likelihood of “coronavirus diagnosis, impairment, alcohol/drug coping, negative religious coping, extreme hopelessness, suicidal ideation, as well as attitudes toward President Trump and Chinese products”(Lee 2020). The CAS also has unrestricted research re-use and

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secondary analysis in any form with acknowledgement which allows the questionnaire to be used in the survey presented to the athletes which can be found in appendix D

Injury Occurrence Survey

In the final section, the athlete is being asked to list the seasons and type of injury they suffered and if they felt that the lockdown from COVID-19 influenced their injuries. This was a survey created by the researcher to help identify if there was an increase in injuries suffered the season following the COVID-19 lockdown when compared to the previous and post seasons, this can be found in Appendix D.

Data Collection Process

For the survey it will be conducted in person with hard copies of the survey (Appendix D). Hard copies of the survey will be handed to each participant, a script will be read to the participants that follows along with the first page of the survey stating the participants informed consent and what the survey consists of (Appendix C). Once all the participants finish the informed consent page, the individuals that agreed to the survey will complete the eighteen question survey in its entirety. The researcher will try to avoid answering questions that may skew responses to the questions while the survey is being taken. Once all the surveys have been completed by the participants, the surveys will be placed into an unmarked envelope and the envelope will be returned to the researcher. The envelope is to ensure confidentiality among the participants.

Data Analysis Plan

Once the surveys are collected, data will be compiled by the researcher. The researcher will categorize each question answer and maintain a running count of each answer to each

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question on the surveys. This will allow the researcher to be able to draw connection among the answered data and provide an answer to the proposed question.

There is nominal, ratio and ordinal data that can all be measured from the survey.

Appendix E analyzes what areas of the survey can be measured using various statistic tests.

Looking first at the nominal data from the survey given to the athletes it was identified that race and position played can be seen as nominal data. To measure this a simple Central Tendency test will be run giving an idea as to the demographics of the athletes. For the ratio data age, seasons the athlete participated in, and the injury occurrences were all identified as ratio data. For this data also central tendencies tests can be run along with variability measure, or an ANOVA test can be run to see if any correlations exist in that data in relation to the age of the athlete and when injuries were suffered or if the COVID-19 season the athlete participated in observed an increase in injury in relation to the prior and post seasons. Lastly, the ordinal data is identified as the CAS survey, academic level, and questions 3-6 on the survey (Appendix C) regarding injury when compared with COVID-19. A Kruskal-Wallis's H test can compare more than two groups so it can be run to compare the academic levels of the students as it compares to their scores on the CAS survey and questions 3-6 on the survey (Appendix C).

Limitation

A couple of limitations can be identified prior to the study being initiated. The first limitation is the sample size. Even if full participation occurs, the full 80 surveys from the team does not fully represent all of Division III football players. Second, some confounding variables can be present in the lifestyle habits of the football players that might have also contributed with a greater likelihood of injury and could not be controlled as the study is retrospective in nature. Third, recall bias is present with any survey and a participant may not fully be able to place

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themselves back in time to accurately answer how they felt in the peak of COVID-19 which might cause the results to be skewed.

Ethical Considerations

Organizational consent was first obtained by Head Coach of the Otterbein football team (Appendix A) and this allowed the researcher access to the facilities and members of the organization. An IRB application was completed following a signed organizational consent by the authors and approved prior to collecting research by the Otterbein IRB. An expedited review was completed due to the nature of the study being only a survey and no risks or stress was identified with individuals participating in the survey. To ensure if a participant does feel uncomfortable with answering any question on the survey that completion is completely voluntary and then during any time in the survey they can stop with no consequence.

Results

Demographics

All participants of the study are a part of the 2022-2023 Otterbein Football team. A total of 65 surveys were returned from the participants. Of the 65 surveys, two had to be removed due to being incomplete leaving a total of 63 completed surveys. Of the 63 total participants, 6 (9%) were eighteen years old, 25 (39%) were nineteen years old, 17 (26.5%) were twenty years old, 12 (18%) were twenty-one years old, and 3 (4%) were twenty-two years old. The race of the participants was reported as follows; 46 (73%) of the participants identified as Caucasian, 14 (22%) of the participants identified as African-American, and 3 (4%) identified as Hispanic or Latino. No other races were identified by the participants. For the participants' academic grade, the participants reported as follows; 25 (40%) were freshman, 19 (30%) were sophomores, 16 (25%) were juniors, and 3 (5%) were seniors. The graphs for the data is located in **Appendix F**

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Football Seasons and Position

Looking directly at the 63 participants, the positions of the participants were dispersed in the following manor: 11 (17%) defensive linemen, 2 (3%) kickers, 14 (22%) linebackers, 12 (19%) offensive linemen, 3 (5%) quarterback, 6 (10%) running backs, 8 (13%) defensive secondary, 3 (5%) tight ends, and 4 (6%) wide receivers. Looking at each Individual season it was shown that from 2019-2020 19 (29%) of the participants played, from 2020-2021 31 (48%) of participants played, in 2021-2022 62 (96%) of total participants played. The graphs for the data is located in Appendix F

COVID-19 Anxiety Scale

For the first question on the Covid Anxiety Scale (CAS) they were scaled 1-4 on a Likert scale, 1-Nonapplicable, 2:-Hardly Applicable, 3-Sometime Applicable, and 4-Very Applicable. For the first question of the CAS 53 participants (83%) reported a 1, 5 participants (8%) reported a 2, 5 participants (8%) reported a 3, and 0 participants reported a 4. For the CAS question 2: 60 participants (95%) reported a 1, 3 participants (5%) reported a 2, 0 participants reported a 3 or 4. For the CAS question 3: 51 participants (81%) reported a 1, 10 participants (16%) reported a 2, 3 participants (5%) reported a 3, and 0 participants reported a 4. For the CAS question 4: 47 participants (75%) reported a 1, 11 participants (17%) reported a 2, 5 participants (9%) reported a 3, and 0 reported a 4. For the CAS question 5: 57 participants (90%) reported a 1, 6 participants (10%) reported a 2, 1 participant (2%) reported a 3, and zero participants reported a 4. For the CAS question 6: 56 participants (89%) reported a 1, 6 participants (10%) reported a 2, 1 participant (2%) reported a 3, and zero participants reported a 4. For the CAS question 7: 42 participants (67%) reported a 1, 15 participants (24%) reported a 2, 5 participants (8%) reported a 3, and 1 participant (2%) reported a 4.

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Injury Occurrence

For the injury occurrence of each season, in 2019 5 (26%) of 19 players had 8 total injuries, in 2020 10 (32%) of 31 total players suffered 12 total injuries, and in 2021 39 (62%) of 62 total players suffered 50 total injuries. A Chi-Squared Analysis (Appendix G) and a pairwise Comparison (Appendix H) were run to compare injuries suffered with the number of participants in each season. Looking at the types of injuries suffered it was seen for 2019: 1 concussion, 1 right shoulder, 1 groin, 1 left lower leg, and 2 left and right ankle injuries. 2020 season had: 2 concussions, 1 left shoulder, 1 groin, 1 left upper leg, 1 right upper leg, 1 right lower leg, 1 left lower leg, 2 left ankle, 1 right ankle, and 1 right foot. 2021 season had: 1 concussion, 4 left shoulders, 3 right shoulders, 1 left upper arm, 2 left lower arms, 3 left lower arms, 2 chest, 6 groins, 1 left upper leg, 4 right upper leg, 5 left lower leg, 6 right lower leg, 3 left ankle, 6 right ankle, 2 left foot, and 1 right foot

For the next four questions they were scores on a Likert scale 1-5 with the following correlation: 1-Never, 2-Rarely, 3-Sometimes, 4-Often, and 5-Always. For Question 3, 22 participants (35%) recorded a 1, 11 participants (17%) recorded a 2, 18 participants (29%) recorded a 3, 8 participants (13%) reported a 4, and 4 participants (6%) reported a 5. For Question 4, 36 participants (57%) reported a 1, 17 participants (27%) reported a 2, 7 participants (11%) reported a 3, 3 participants (5%) reported a 4, and 0 participants reported a 5. For question 5, 5 participants (8%) reported a 1, 12 participants (19%) reported a 2, 10 participants (16%) reported a 3, 19 participants (30%) reported a 4, and 17 participants (27%) reported a 5, For the last question number 6, 34 participants (54%) reported a 1, 9 participants (14%) reported a 2, 9 participants (14%) reported a 3, 14 participants (22%) reported a 3, 6 participants (10%) reported a 4, and 0 participants reported a 5.

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Analysis/Discussion

Analysis of the study demographics demonstrated that the mean participant was an 18- to 19-year-old that self-identified as Caucasian in their freshman or sophomore year of school. For the position breakdown of the participants, the spread was reflective of the traditional American football standard for players recruited according to each position (Lillibrige 2017, October3). For instance, classically a football team will possess two players to serve as kickers, 3 players per offensive line position, etc. This attempt to create a “position depth”, was reflected in the position breakdown seen in the given study. As expected with the data seen for average age and grade level, most participants played in the most recent season, Fall 2021. In contrast the 2019 season held the least number of participants, while the 2020 season had almost half of the participants seen in Fall 2021.

The first section of the survey looked to analyze the potential of the participants suffering from anxiety induced by COVID-19 and given alterations of the pandemic on the personal, communal, interpersonal aspects of life. Results of the CAS questionnaire showed that most participants responded to each question with “1-Not Applicable to Me”. This total response implies a low CAS score, and by association a lower effect on the mental health of the participants during the pandemic .

Looking at Appendix F and Appendix G this gives us the significance of the injuries occurring across the three seasons. Looking first at the results of the Chi-Square test, (Appendix F) the data implies that depending on which season you played did affect your likelihood of suffering an injury. The pairwise analysis conducted (Appendix G) was utilized to decipher any statistically significant differences between the injury rates among the three seasons. The test demonstrated that the 2021-2022 college football season injury rate experienced a higher chance

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of suffering injury when compared to the other two seasons with a P-value of 0.005 when the 2019 season was compared to the 2021-2022 college season with a P-crit value of 0.016 showing a statistically significant result that more injuries were suffered in 2021 when compared to 2019.

Without running the pairwise comparison this could also be seen from the raw data. Sixty one percent of the total participants suffered an injury in the 2021 fall season, that accounts for 39 total players. Of those 39 total players they all together suffered a total of 50 injuries. These totals are much higher when compared to the 2019 season of 16% of participants suffering 12 total injuries and for the 2020 season 8% of the total participants suffering an injury. When just compared in their individual season these results are also staggering. For the 2019 season 26% of the participants that played suffered a total of 8 injuries and for the 2020 season 32% of the participants suffered a total of 12 injuries. These values differ by a large margin to the 62% of total participants with a total of 50 injuries suffered for the fall 2021 season. These results go against what was originally seen in the literature review. From the data instead of a longer duration away from the sport, having less time in between seasons put you more likely to suffer an injury if you participated.

When examining the types of injuries the athlete suffered and amounts in correlation to each body party, there are some implied trends. As stated in the previous paragraph, the 2021 season had the most injuries suffered by the athletes. When looking at what types of injuries suffered by the participants was a fair even split of upper to lower body injuries for the season. The ankles, lower legs, and groins accounted for 25 of the 32 (78%) lower body injuries in the athletes. Through the 2020 season the ankles are not as big of contributors with ankles only accounting for 3 out of the 8 (37%) and lower extremity injuries in 2020, but the ankles did account for exactly half of the injuries of 2019 4 out of 8. When looking to help athletes avoid

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injury in a quick turnaround season the strength and conditioning coach could put emphasis on strengthening the lower extremities to potentially help lower the high occurrence of those injuries.

Results of the third question in the injury-based section, showed some inconclusive findings, with almost half of the participants reporting that either rarely or sometimes did not report an injury to a coach or trainer due to stigmas. This was not a common reoccurrence, but some of this data shows the possibility for further expansion and studies of stigmas on injuries and injury reporting standards. The participants further solidified their normal training habits did not fare well during COVID, with majority believing that they felt their injuries were not due to lack of training. Training for the season during COVID-19 varied across the board with almost all the answers being close in percentage, but a majority training often or always as they did in previous seasons. For the final question in the injury section, it was also determined from the results the players did not fear injuries due to the pandemic with majority responding “1-Never” for the final injury-based question.

With all the data it goes against what the previous research had found in professional athletes when it was compared to college athletes. The athletes did not suffer a greater number of injuries from being in the lockdown of COVID-19. The increase in injuries arose due to the format of the season in response to COVID by the Ohio Athletic Conference (OAC). The OAC played the 2020 season in the spring of 2021 stretching from March 12th - April 16th then the players had to play a normal fall season in 2021 stretching from September 2nd – November 13th. This only allowed the players five months off from the season and were not able to utilize the typical off-season training programs that would occur. For instance, being deprived of a “spring ball” season that would allow a slower progression into a season style of play. The athletes’

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bodies would suffer the same continuous forces that their position demands, putting their bodies at a higher risk of suffering an injury which is what the data has shown.

Limitations

When looking at the study there are a few limitations that can be addressed. The first limitation can be a recall bias of the participants. With having the participants trying to first recall all injuries suffered over three different years of play the severity and or number of injuries may have been forgotten. In addition, recall bias may have affected the CAS results. With the CAS being given to the participants almost two full years from the peak of COVID-19, many emotions they felt about it might be skewed and they responded with how they currently feel as the pandemic has been a part of their lives for multiple years now. Another limitation of this survey is the sample size of only one college football team, as well as not being able to obtain the full team for the survey. As a result, this test might yield different results if ran with a larger sample size across multiple teams, sports, and divisions.

Another limitation to the survey was also the time frame the survey was given. All the surveys were given to the participants prior to one of their spring ball practices at 6 a.m. Due to the early time, this could also cause answers to be skewed as it was unable to be controlled the athletes get enough sleep to properly take the survey and give the best possible answers. The coaches were also present at the time the survey was given. Despite the expression that all information will remain confidential, the athletes might have felt they could not answer all questions truthfully. With these limitations they can provide more guidance if the study is to be repeated and fix potential issues that arose following the completion of this study.

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Use of Results

The study did not support the results that were shown in the literature review but does help to provide an insight in the world of early sports specialization in the youth athletics, and the high injury risk that might be placed on athletes by playing multiple seasons without allowing proper rest and off-season training times. In a study done by Ahlquist, Cash, & Hame in 2020 when looking at Division I College Athletes, participants that specialized early in their youth were more likely to report a history of an injury, multiple injuries, multiple college injuries, a greater number of total injuries, and require more time out of an injury. These early sports specializations are prominent in the world of travel sports such as baseball, softball, and soccer where many athletes will go right from their school season with minimal time off into a travel ball season.

Strength and Conditioning coaches can use the results of this survey to put an emphasis of a proper off-season training regime to their athletic director to ensure the safety of their athletes also. If another shutdown had to occur where a season had to be pushed back, this given data suggests that playing the following season will put those athletes at a high risk to suffer an injury. This data can also be used to encourage young athletes to expand their sport resume and branch out to sports of their interest to help make them better overall athletes and limit their risk of injury.

Further Research

Opportunities for further research include running a similar survey across multiple sports and divisions to see if there was any difference in the various sports or level of competition. Having the opportunity to survey at different levels of competition might warrant different results, due to the OAC only having a limited season the athletes might have suffered more

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injuries if the season lasted longer in the spring of 2021. Looking at different levels of competition also brings in a multitude of external factors such as facility access for recovery or the access to training during the lockdown of COVID-19.

An expanded research study can look to explore more into the results of the third injury-based question of the survey regarding the reporting of an injury sustained by an athlete to a trainer or coach. The data showed a mixed expression across the board with no clear define answers emerging. This might bring more insight into the mental health and stressors of student athletes on wanting to preform and not be seen as weak by their peers. This could lead to more serious injuries forming in an athlete because they continue to play at a high level while injured, causing a much larger injury that could have been prevented with lowering the stigma of mental weakness and mental toughness and speaking up as to what is going on in their bodies.

Conclusion

The results of the data may have not pointed in the direction of the hypothesis but still provided valuable data for the world of young athletes. The data showed that the athletes did in fact suffer injuries at a greater rate in the 2021 fall season when compared to the other two season of the study. This numbers obtained can help to guide future decisions by athletic directors for how seasons might be played if they need to be canceled due to a pandemic, but the data has more long-term significance as sports specialization is growing at a rapid rate and likely to become a staple of youth athletics.

Coaches need to be more aware of the risk and strain they are placing on these young athletes pushing their bodies through multiple seasons and quick turnaround season with little to no rest. Those effects will carry with that athlete long after they quit that sport and could have life-altering effects on that athlete that could have been so easily avoided with more emphasis

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placed on recovery and proper training. Future research would still need to be completed to determine if there was a national trend on the data found in the study, but the data provides at least an insight on just how much COVID-19 did impact these athlete's career.

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Appendix A

Organizational consent form of Otterbein University



Organizational Consent Form

Name of Organization: Otterbein Men's Football Team
 Organizational Representative: Tim Doup, Head Football Coach
 Address: 1 S. Grove Street
 City, State, Zip: Westerville, Ohio, 43081
 Telephone: 614-823-3527

This form serves as a Consent form to have access to the Otterbein Football Team for a survey study, below describes the Procedure, Risk and Benefits, Compensation and Privacy of this study.

By signing this consent form, I understand that Evan Kennaley (the researcher) is a candidate for a Masters of Allied Health Degree at Otterbein University. I understand that the researcher is conducting a study entitled "*The Effects COVID-19 had on the Mental Health and Injury Occurrence of Division Three Football Players.*"

The purpose of the research is to evaluate if the lockdown of COVID-19 in the year of 2020 had an effect of the mental health of Division Three football players and if that effect altered injury occurrences when compared to the season prior and post the COVID-19 lockdown season.

Procedure

- The participants will be provided with an oral overview of the study then provided a consent stating the purpose of the study along with the survey
- The survey will then be completed by the athletes
- At the end the researcher will hand out envelopes to each participant and have the athletes place their surveys folded into the envelopes this is to ensure confidentiality.

Risks and Benefits

Risks:

- There are no known risks to the research.

Benefits:

- Gain a better understand of how COVID-19 impacted college football players.
- Evaluate if there is a higher occurrence of injury following the lockdown of COVID-19.

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- Help to bring awareness of the importance of mental health in the student athlete population

Compensation:

- There is no compensation for this study

Privacy:

I understand the findings of this research study are solely the responsibility of the researcher. It is understood that any and all information/data the researcher collects from contacts within and/or about our organization outside the research protocol will not be part of the research findings. I understand the researcher may publish findings following completion of the study. Any information published will be limited to the findings of the research. No research participant will participate in the study without organization and Otterbein University Institutional Review Board knowledge and approval.

Please check the boxes that state your approval based from the research design:

- I grant the researcher permission to contact the players of the Otterbein Football Team for the purpose of participation in the study as required by the research design.
- I grant the researcher permission to use organizational premises as necessary to conduct the research.

Organizational Representative Signature

Date

Print Name and Title: _____

Organization name: _____

Contacts:

Researcher: Evan Kennaley

Contact Information: Email: evan.kennaley@otterbein.edu Phone: (937) 751-9484

Research Advisor: Dr. Paul Longenecker

Contact Information: Email: plongenecker@otterbein.edu Office: CHSS 012

Appendix B

Consent letter distributed to the Otterbein University Men's Football Team



COVID-19 Mental Health and Injury Occurrence Consent

Dear Otterbein Football Player,

The Department of Health and Sport Sciences at Otterbein University supports the practice of protection for human subjects participating in research. The following information is provided for you to decide whether you wish to participate in the study titled "*The Effects of COVID-19 on Mental Health and injury Occurrence of Division III College Football Players*" You should be aware that even if you agree to participate, you are free to withdraw at any time without penalty.

Procedure

If you agree to be a part of the survey the following things would be asked of you:

- Consent to participate in the study.
- Complete the paper-based survey given to you.
- At the end the researcher will hand out envelopes to each of you and have you place the surveys folded into the envelopes this is to ensure confidentiality.

Risks and Benefits

Risks:

- There are no known risks to the research.

Benefits:

- Gain a better understand of how COVID-19 impacted college football players.
- Evaluate if there is a higher occurrence of injury following the lockdown of COVID-19.
- Help to bring awareness of the importance of mental health in the student athlete population

Compensation:

- There is no compensation for this study

Privacy:

I understand the findings of this research study are solely the responsibility of the researcher. It is understood that any and all information/data the researcher collects from contacts within and/or about our organization outside the research protocol will not be part of the research findings. I understand the researcher may publish findings following completion of the study. Any information published will be limited to the findings of the research. No research participant will participate in the study without organization and Otterbein University Institutional Review Board knowledge and approval.

Contact Information

Evan Kennaley

Email: Evan.kennaley@otterbein.edu

Mobile Phone: 937-751-9484

By turning to the next page and completing the survey and turning it in, you are providing your consent to the participate in the study. In addition, you are confirming that you are 18 years of age

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Appendix C

Thesis Script

“Hi, my name is Evan Kennaley, I played football here from 2017-2019 I am in my second to last semester here at Otterbein in the Masters of Allied Health program. As part of the program, I am taking part in completing a Thesis and need the help of you guys. I am interested in studying the physical and emotional effects the lockdown from COVID-19 had on Division III college football players. I am seeking your participation in an eighteen question survey. It is estimated that this will take no more than 10-15 minutes of your time. Although it is not likely, there is a chance that you might feel slightly uncomfortable with some of the questions. Although participation will not directly benefit you, I believe that the information will be useful in evaluating the COVID-19 lockdown had on Division III college football players. Your participation is solicited although strictly voluntary. I assure you that your name will not be associated in any way with the research findings. The information will be identified only by a code number. If you would like additional information concerning this study before or after it is complete, please feel free to contact me by phone or email which will be located on the survey you are about to receive. If you feel you do not want to take part in this survey at this time you may now exit. Prior to complete the survey, I need for you to review the study consent form. Once the survey starts, I will no longer be able to help answer the questions, with that being said does anyone have any questions before we proceed?”

Athletes will then be provided with the consent and survey. Once everyone appears to be finished, I will begin speaking again “Now that all of you have finished, I will walk around and hand each of you a blank envelope I want you to place your survey folded in this blank envelope this will ensure your answers remain confidential. Once you do that I will come back around and collect all of your envelopes and once your envelope has been collected you may exit. Thank you once again for your participation”.

Appendix D

Survey distributed to the participants of the survey

COVID-19 Mental Health and Injury Occurrence Survey

Please respond to each question by marking the appropriate bubble or filling in the blank that best answers the question in relation to you.

1. What is your age?

2. What is your Race?

- American Indian or Alaska Native
- African American
- Asian
- Caucasian
- Hispanic or Latino
- Native Hawaiian or Other Pacific Islander

3. What is your current Academic Grade?

- Freshman
- Sophomore
- Junior
- Senior
- Graduate student

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4. What is your Primary Position on the team:

- Defensive line
- Kicker
- Linebacker
- Offensive line
- Quarterback
- Running Back
- Secondary
- Tight end
- Wide Receiver

5. Which seasons did you participate in?

(Select all that Apply)

- 2019-2020
- 2020-2021
- 2021-2022

Please Continue to the next page

The next seven Questions are from the COVID-19 Anxiety Scale (CAS) to measure dysfunctional anxiety based from COVID-19. (Silva et al. 2020)

1. I have trouble relaxing when I think about COVID-19

- Not applicable to me
- Hardly ever applicable to me
- Sometimes applicable to me
- Very applicable to me

2. I feel heart racing when I read about COVID-19

- Not applicable to me
- Hardly ever applicable to me
- Sometimes applicable to me
- Very applicable to me

3. I feel anxious about COVID-19

- Not applicable to me
- Hardly ever applicable to me
- Sometimes applicable to me
- Very applicable to me

4. I feel uneasy when reading news about COVID-19

- Not applicable to me
- Hardly ever applicable to me
- Sometimes applicable to me
- Very applicable to me

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5. I have trouble relaxing when I think about COVID-19

- Not applicable to me
- Hardly ever applicable to me
- Sometimes applicable to me
- Very applicable to me

6. I feel like I may panic when I update myself about COVID-19

- Not applicable to me
- Hardly ever applicable to me
- Sometimes applicable to me
- Very applicable to me

7. I am afraid of being infected with COVID-19

- Not applicable to me
- Hardly ever applicable to me
- Sometimes applicable to me
- Very applicable to me

Please continue to the next page

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The next six questions will be related to injuries that occurred for the past three seasons. An injury is being defined as “damage to the body produced by energy exchanges that have relatively sudden discernible effects”. (Langely & Brenner 2004)

1. Select all seasons where you suffered an injury

- 2019-2020
- 2020-2021
- 2021-2022

2. Mark all injuries that were suffered in each season selected. Be sure to circle which side the injury occurred as well. If an injury was suffered fill in the line with a number 1-3. 1= missed **NO** practice or game time, 2= missed practice but still played in the same weeks game, or 3= missed practice and game time (Max 10 injuries)

- 2019-2020
 - Concussion _____
 - Neck. _____
 - Shoulder
 - Left or Right _____
 - Upper arm
 - Left or Right _____
 - Lower arm
 - Left or Right _____
 - Chest _____
 - Abdominal _____
 - Groin _____
 - Upper leg
 - Left or Right _____
 - Lower leg
 - Left or Right _____
 - Ankle
 - Left or Right _____

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- Foot
 - Left or Right _____

- 2020-2021-
 - Concussion. _____
 - Neck _____
 - Shoulder
 - Left or Right _____
 - Upper arm
 - Left or Right _____
 - Lower arm
 - Left or Right _____
 - Chest _____
 - Abdominal _____
 - Groin _____
 - Upper leg
 - Left or Right _____
 - Lower leg
 - Left or Right _____
 - Ankle
 - Left or Right _____
 - Foot
 - Left or Right _____

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- 2021-2022
 - Concussion_____
 - Neck _____
 - Shoulder
 - Left or Right _____
 - Upper arm
 - Left or Right _____
 - Lower arm
 - Left or Right _____
 - Chest _____
 - Abdominal _____
 - Groin _____
 - Upper leg
 - Left or Right _____
 - Lower leg
 - Left or Right _____
 - Ankle
 - Left or Right _____
 - Foot
 - Left or Right _____

3. Was there any injuries you suffered that you did not report to a Coach or an Athletic Trainer due to fear of missing playing time or looking “weak”?

- Always
- Often
- Sometimes
- Rarely
- Never

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4. Was there any injury suffered that you felt was due to you not being well trained due to the pandemic/lockdown?

- Always
- Often
- Sometimes
- Rarely
- Never

5. During the pandemic in 2020 did you train and prepare for the season at the same rate you did prior to the pandemic?

- Always
- Often
- Sometimes
- Rarely
- Never

6. Did you ever have any fear that when you returned to campus and normal athletic play you were more likely to suffer an injury due to the pandemic/lockdown?

- Always
- Often
- Sometimes
- Rarely
- Never

You have completed the Survey please return to the first page and wait for further instruction.

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Appendix E

Table stating measurable data with the level of measure and Statistics Test that can be used

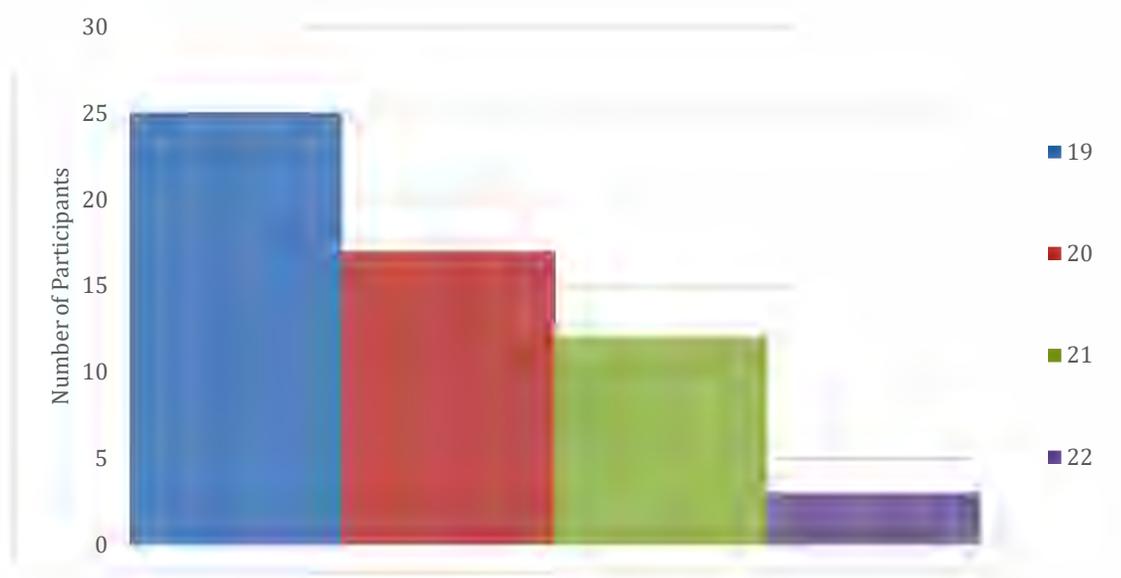
Measured Data	Level of Measurement	Statistic Tests that can be ran
Race, Position played	Nominal	○ Variability tests
CAS survey, Injuries in relation to COVID-19 lockdown, Academic level	Ordinal	○ Pairwise ○ Chi-Square ○ Descriptive Statistics
Age, Season Participation, injuries suffered	Ratio	○ Central Tendency measures ○ Variability measures

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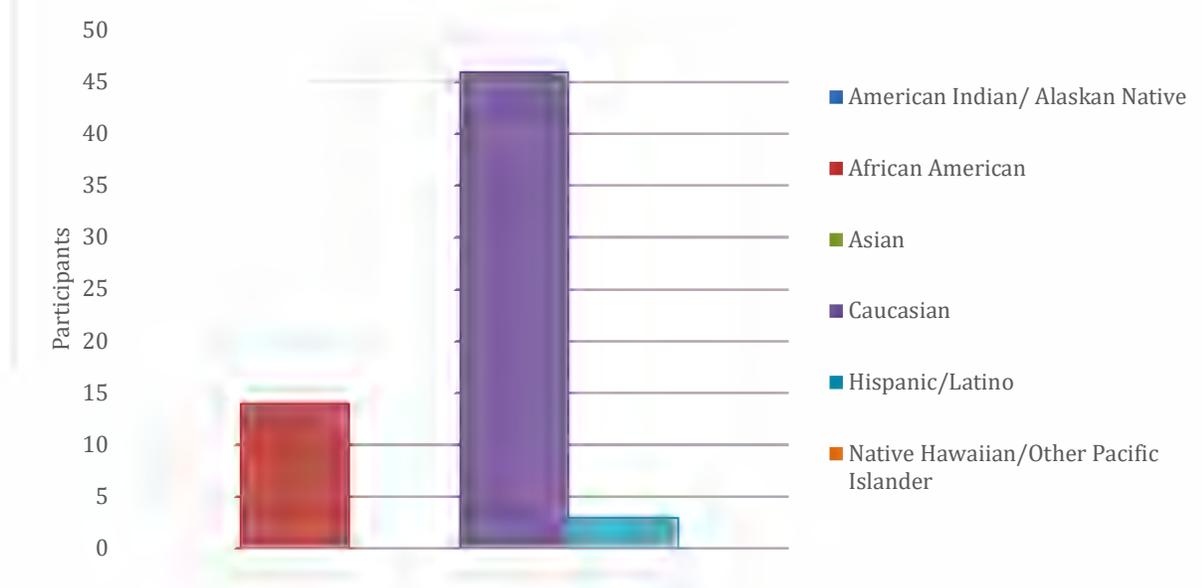
Appendix F

Demographic Charts

Age of Participants



Ethnicity



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Academic Grade of Participants



Primary Position of Participants



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Seasons Played by the Participants



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Appendix G

Chi-Squared Table

	injured	uninjured	All
2019-2020	5	14	19
	9.16	9.84	
2020-2021	10	21	31
	14.95	16.05	
2021-2022	39	23	62
	29.89	32.11	
All	54	58	112
<i>Cell Contents</i>			
<i>Count</i>			
<i>Expected count</i>			

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	12.168	2	0.002
Likelihood Ratio	12.462	2	0.002

COVID-19 & INJURY OCCURANCE

Appendix H

Pairwise Two-Tail Comparison

	Pearson Chi-square	P-value	j	$P_{crit} = \alpha_T / (k-j+1)$	$P < P_{crit}?$
2019 vs 2021	7.846	0.005	1	0.016667	Yes
2020 vs 2021	7.786	0.005	2	0.0253	Yes
2019 vs 2020	0.198	0.656	3	0.05	No