



Research Article

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COVID-19 Return to Sport: Fall Sports Collegiate Athletics Injury Prevalence Analysis

Troy B Puga, Joshua Schafer, Grace Thiel, Tiffany Ruan, Tejas Patel, Andres Toledo, Laura Ramaker, Elisa Chaparro, Kevin Treffer

^{1,3,4,5,6,7,8} College of Osteopathic Medicine, Kansas City University, Kansas City, Missouri, USA

² School of Medicine, University of Kansas, Kansas City, Kansas, USA

⁹ Department of Osteopathic Manipulative Medicine, College of Osteopathic Medicine, Kansas City University, Kansas City, Missouri, USA

Abstract

Introduction: The COVID-19 pandemic rapidly affected the world and way of life due to the initiation of public health regulations and precautionary measures. Many athletes, at various levels of play, experienced disruptions in their competitive seasons and training opportunities to reduce the spread of COVID-19. At the professional level, an increase in the prevalence of sports-related injuries following the COVID-19 pandemic was depicted in a previous study. Research has yet to examine the effects of COVID-19 on injury epidemiology at the collegiate level. Sports-related injuries can be detrimental to the careers of student-athletes who have a short window of opportunity. The objective of this research is to examine the effects of COVID-19 on injury epidemiology in collegiate fall sports. **Methods:** A Midwest small-college collegiate athletic conference involving the states of Kansas, Missouri, Nebraska, and Oklahoma, was selected for the study. De-identified injury data for the 2018-2019, 2019-2020, and 2020-2021 fall sports seasons was obtained from the collegiate sports medicine staff. All schools and sports were originally included; however, exclusions were taken due to data disruptions or no response. The injury data was tallied for each season, sport, and anatomical region. An unpaired t-test was used to compare the conference mean number of injuries per season for each sport. An unpaired t-test was also used to compare the conference mean number of injuries per anatomical region. **Results:** There was no statistically significant difference ($P>.05$) in injuries per season in this college fall sport (Football, Women's Volleyball, Men's Soccer, Women's Soccer) population. There was also no statistically significant difference ($P>.05$) in injuries to anatomical region for any fall sport. **Conclusions:** There may be several factors attributing to the results of this study. We conclude that these might include increased time between competition, decreased travel, practice regulations, and decreased injury reporting due to fear of going to medical facilities and acquiring COVID-19 infection. Injury epidemiology and data is limited for small college fall sports and women's sports. This study provides the first insight into small college fall sports and women's sports injury epidemiology after COVID-19.

Keywords: COVID-19, Injury, Prevalence, Adaptation, Sports Medicine, College, Athletes, Training.

INTRODUCTION

The COVID-19 pandemic spread rapidly across the world and led to shutdowns across the globe to help mitigate the spread of COVID-19. Athletics, like most of the world, were greatly impacted by the pandemic (1,2). Cessation of play occurred at all levels of sports (1-3), athletics at the collegiate level were highly impacted. College sports saw rapid suspension of competition, which made for an unpredictable return to play. College campuses and collegiate athletic facilities were shut down for extended periods of time, which affected many fall sports going into 2020. During this time, many small school collegiate conferences canceled or postponed their Fall sports competitions. Some Division 1 Conferences followed in postponement, as well (4). Research regarding the impact of COVID-19 at the collegiate level remains scarce and further exploration is necessary to understand its effects at this level.

Previous research has shown that the COVID-19 pandemic shutdowns led to increased injuries at the professional level (5-7). The study hypothesized that professional athletes had decreased physiological adaptations stemming from facility shutdowns and restrictions to mitigate the spread of COVID-19 (5). Previous research has shown that training and proper conditioning provides protection from injury and increases sport performance (8-11). While it is not possible to prevent all injuries, proper training can help athletes to physiologically adapt to the stresses placed on their bodies (8-10). During training, the body will induce physiologic changes to the neurological (12), musculoskeletal (13), and cardiovascular systems (14). While training is beneficial in moderation, there is a fine line that must be walked, as excessive

*Corresponding author:

Troy B Puga

College of Osteopathic
Medicine, Kansas City
University, Kansas City,
Missouri, USA

Email:

troy.puga@kansascity.edu

training can also lead to injuries (15). Therefore, it is essential to find balance between training and recovery, especially in high level sports.

Shutdowns aiming to decrease the spread of COVID-19 impacted the ability to use many facilities thereby impacting athlete training regimens. Many athletes faced difficulty in training at the same levels as prior to the shutdowns and as a result most likely experienced detraining (16-19). Detraining is a loss of performance and the physiological adaptations previously obtained through training (20,21) and has been shown to be a risk factor for injuries (16-19). Many athletes across the amateur, collegiate, and professional levels most likely exhibited detraining due to measures helping to mitigate the spread of COVID-19. Considering how detraining has been shown to have occurred at the professional level due to COVID-19 (5), it is imperative that investigation also takes place at the collegiate level.

The impact of the COVID-19 pandemic on injury epidemiology has yet to be explored at the collegiate athletic level. Small college and fall sports studies regarding the return to sport after the COVID-19 pandemic are scarce. Return to sport from the COVID-19 pandemic data is also limited in women's sports across all levels. Exploration of injury epidemiology at the collegiate level is necessary to further understand the impact of COVID-19 on injury epidemiology and return to sport protocols. This research aims to better understand the impact of COVID-19 and its effects on small school college men's and women's fall sports, both of which have very little current research.

Based upon previous research and theories regarding injury spikes at the professional level, we hypothesize that there will be increased injuries in small college fall sports due to decreased physiological adaptations during the 2020-2021 season which was impacted by shutdowns from the COVID-19 pandemic.

METHODS

Study Design

A small school collegiate athletic conference with teams in Kansas, Missouri, Oklahoma, and Nebraska was chosen as a study population. De-identified injury data for the 2018-2019, 2019-2020, and 2020-2021 seasons was obtained from the athletic training staff and sports medicine staff. All schools and all fall sports were originally included; however, exclusions were undertaken due to disruptions in data, incomplete data, or program non-response. Exclusions were made to ensure the most accurate and complete results. Football, Women's Volleyball, Men's Soccer, and Women's Soccer were included in the study. 6 of 11 Football teams were included, 7 of 13 Volleyball teams were included, 6 of 13 Men's Soccer teams were included, and 6 of 13 Women's Soccer teams were included. Men's Cross Country and Women's Cross Country were excluded due to lack of data. Inclusion criteria limited injuries to physical complaints only, excluding COVID-19 infections and additional illnesses. This is a method consistent with injury epidemiology research (22). After exclusions and inclusions, the de-identified injury data was tallied for each of the seasons and sports. An additional sub-category was tallied to monitor the injuries by anatomic region (Upper Extremity, Lower Extremity, Trunk, and Head and Neck) for each sport and season.

Data Analysis

Data analysis was conducted. An unpaired t-test was used to compare the conference mean number of injuries per year to each season for each individual sport (Football, Volleyball, Men's Soccer, and Women's Soccer). This is consistent with studies at the professional level (5). An unpaired t-test was used to compare the conference mean number of injuries per anatomical region (Upper Extremity, Lower Extremity, Trunk, and Head/Neck) per season for each sport (Football, Volleyball, Men's Soccer, and Women's Soccer).

RESULTS

Of the programs included in the analysis, football had a total number of injuries of 438 for the 2018-2019 season, 224 for the 2019-2020 season, and 288 for the 2020-2021 season. An unpaired t-test showed no statistically significant difference when comparing the 2018-2019 season and the 2019-2020 season ($P = .19$), the 2018-2019 and 2020-2021 seasons ($P = .32$), and the 2019-2020 and 2020-2021 seasons ($P = .47$). There was no statistically significant difference ($P > .05$) when each season was compared to each other by the mean number of injuries per anatomical region (Upper Extremity, Lower Extremity, Trunk, and Head/Neck).

Volleyball had a total number of injuries of 108 for the 2018-2019 season, 68 for the 2019-2020 season, and 73 for the 2020-2021 season. An unpaired t-test showed no statistically significant difference when comparing the 2018-2019 season and the 2019-2020 season ($P = .55$), the 2018-2019 and 2020-2021 seasons ($P = .44$), and the 2019-2020 and 2020-2021 seasons ($P = .89$). There was no statistically significant difference ($P > .05$) when each season was compared to each other by the mean number of injuries per anatomical region (Upper Extremity, Lower Extremity, Trunk, and Head/Neck).

Men's Soccer had a total number of injuries of 145 for the 2018-2019 season, 73 for the 2019-2020 season, and 92 for the 2020-2021 season. An unpaired t-test showed no statistically significant difference when comparing the 2018-2019 season and the 2019-2020 season ($P = .23$), the 2018-2019 and 2020-2021 seasons ($P = .40$), and the 2019-2020 and 2020-2021 seasons ($P = .67$). There was no statistically significant difference ($P > .05$) when each season was compared to each other by the mean number of injuries per anatomical region (Upper Extremity, Lower Extremity, Trunk, and Head/Neck).

Women's Soccer had a total number of injuries of 135 for the 2018-2019 season, 77 for the 2019-2020 season, and 131 for the 2020-2021 season. An unpaired t-test showed no statistically significant difference when comparing the 2018-2019 season and the 2019-2020 season ($P = .29$), the 2018-2019 and 2020-2021 seasons ($P = .95$), and the 2019-2020 and 2020-2021 seasons ($P = .30$). There was no statistically significant difference ($P > .05$) when each season was compared to each other by the mean number of injuries per anatomical region (Upper Extremity, Lower Extremity, Trunk, and Head/Neck).

DISCUSSION

The results of our study show there was no statistically significant difference between the 2018-2019, 2019-2020, and 2020-2021 seasons when compared to each other in any sport (Football, Volleyball, Men's Soccer, and Women's Soccer). There was also no statistically significant difference in the number of injuries by anatomical region during each of the seasons, across all sports considered. This indicates that there was no statistically significant difference between the overall number of injuries or number of injuries by anatomical region in any of the seasons before the COVID-19 pandemic (2018-2019 and 2019-2020) and after the COVID-19 pandemic (2020-2021). This information differs from previous research showing a statistically significant increase in the number of injuries after the COVID-19 pandemic (5-7,23). The information at the collegiate level is scarce, as many small school collegiate conferences canceled their fall athletic competition seasons during Fall 2020, which makes this conference's competition season unique. Even some Division 1 colleges canceled their fall sports seasons [4]. There is also a scarce amount of information regarding female sports after the COVID-19 pandemic, and much remains unknown on its effects in female sports (24). This study is unique in that it provides information for small school collegiate conferences and female sports, areas that currently have very limited available data.

There could be a multitude of confounding factors as to why there was no difference in the number of injuries and why this study's findings differ from previous COVID-19 studies. One potential factor could be due to an increased time between competitions. Many games in this conference were postponed due to COVID-19, and games continued into the spring season rather than ending in the fall like they would in a typical year. There have been some sports which have shown that increased time between competitions can lead to a decrease in injury (25,26). The increased time between competition could be a reason there was no statistically significant increase in injuries, as was seen in professional sports, as professional level maintained a normal competition schedule.

Secondly, there may not have been an increase in injuries due to a decreased travel schedule. With COVID-19 restrictions, many competitions remained in regional areas to mitigate the spread. Increased travel has been associated with an increased risk of injury due to disruptions in sleep and recovery (27,28). Decreased travel may lead to decreased stress on the body and may allow for athletes to have better recovery.

Another reason we did not see a spike in injuries may be due to athletes avoiding medical facilities, as many people did during the COVID-19 pandemic, due to fear of catching and spreading COVID-19 (29,30). Many athletes may have avoided reporting minor injuries to decrease medical facility related illness exposures due to this concern.

The final possibility as to why there may not have been a spike in injuries is that athletes, coaches, athletic trainers, and strength coaches worked diligently to follow practice hour rules and restrictions. Excessive training and practice hours have long been a concern in college sports, and why many collegiate institutions, including this conference, have enacted contact hours rules. Excessive training hours can lead to increased injuries (31). Excessive training can lead to overtraining syndrome, where athletes develop negative effects on multiple body systems, including, but not limited to, the musculoskeletal and cardiovascular systems (32). This could potentially lead to illness and injury. It is believed that these factors may have contributed to the lack of injury increase seen in the sports included in this study. Further investigation should be undertaken to see if other conferences that held fall athletics seasons in 2020 had similar results. Further investigation should also be done at the amateur level to see if the effects also differ from professional sports.

CONCLUSION

The results of this study showed no statistically significant difference in injuries before and after the COVID-19 pandemic lockdowns in small-college fall sports. These results may be due to reasons such as increased time between competition, decreased travel, practice rules and regulations, and fear of medical facilities due to COVID-19. Injury epidemiology is currently limited for small-college collegiate fall sports. Women's sports are also limited in epidemiologic studies. This study provides the first insight into small-college fall sports and women's sports injury epidemiology after COVID-19.

Limitations of The Study

This study was limited due to several factors. Exact practice and training hours were not recorded for the study years. While this would be helpful for examining training hours across the years, we recognize that a survey of practice and training hours would have most likely exhibited significant recall bias. Nonetheless, it is well established and understood that the COVID-19 pandemic brought substantial limitations to practice and training when compared to other years. A second limitation of this study is that there is the potential for unreported injuries and injuries that were not recorded or recorded as a defined injury. The third limitation of this study is that several schools

and two sports had to be excluded due to disruptions in data. Ideally these exclusions would not have had to be made, however due to the desire to provide the most accurate results for the study these exclusions had to be made. Regardless of the exclusion of those schools, the study has sufficient sample size which is similar in size to many small-college collegiate athletic conferences that currently exist. Therefore, we believe that this study is representative of small-college athletic conferences.

Conflicts of Interest

The authors of this research declare no conflicts of interest.

Author Contributions

TBP, JS, and KT conceived the idea and design of the research. GT, TR, LR, TP, AT, EC, TBP, JS, KT contributed to the data collection, data analysis, writing, and editing of this study.

Ethical Approval

This research was approved by the Kansas City University Institutional Review Board.

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ORCID ID

Troy B Puga: <https://orcid.org/0000-0003-3291-9700>

Joshua Schafer: <https://orcid.org/0000-0002-4537-444X>

Grace Thiel: <https://orcid.org/0000-0003-1748-3777>

Tiffany Ruan: <https://orcid.org/0000-0002-8094-0697>

Tejas Patel: <https://orcid.org/0009-0007-7440-0452>

Andres Toledo: <https://orcid.org/0000-0003-4694-5942>

Laura Ramaker: <https://orcid.org/0009-0004-2842-4144>

Elisa Chaparro: <https://orcid.org/0009-0008-2365-7239>

Kevin Treffer: <https://orcid.org/0000-0002-4804-0605>

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