

Epidemiology of rugby injuries sustained by Free State University hostel-league players during the 2003 rugby season

Mahaffey J

Owen J

Owen L

Van Schalkwyk O

Medical students

School of Medicine, University of the Free State

Theron N, MBChB, MFamMed

Clini-Sport Sports Medicine, Rehabilitation & Wellness Centre, Bloemfontein

Joubert G, BA, MSc

Department of Biostatistics, University of the Free State

Correspondence to: Prof. Gina Joubert, e-mail: gnbsgj.md@mail.uovs.ac.za

Abstract

Background

Rugby results in more hospitalisations and visits to the emergency rooms of hospitals than any other sport. It is also the sport with the highest injury rate. The aim of this study was to determine the incidence and profile of the rugby injuries that were sustained by hostel-league rugby players at the University of the Free State.

Methods

This analytical prospective cohort study included all the rugby players playing in the Free State University Rugby Hostel League in the 2003 rugby season. Throughout the rugby season, the rugby coaches documented the dates of each practice session, the duration of each practice and the players present at each practice and each match. The captains reported the injuries in their teams. Each player also personally completed a separate injury form for each injury. All the players who had been injured gave informed, written consent for their data to be used. The protocol was approved by the Ethics Committee, Faculty of Health Sciences, University of the Free State. The main outcome measures were the incidence of injury, injury risk per 100 hours played and the profile of the injuries.

Results

The results of only four of the six hostels are reported due to a lack of cooperation from the other two hostels. Fifty-eight (26.4%) of the 220 players were injured during the season, with 61 injuries being recorded, three of the players being injured twice. The incidence of the injuries ranged from 21.4% to 32% per hostel. Forty per cent of the injured players had also been injured during the previous season. Only three hostels had sufficient information for their risk per time exposure to be calculated. The risk was 0.4, 6.2 and 6.3 per 1 000 hours of exposure. The overall risk of injury per 1 000 hours of rugby played was 5.3. The majority of injuries occurred in the first league and in the lower limbs, with the most common type of injury involving ligaments. Most injuries were caused by tackling. The occurrence of injuries took place evenly throughout both halves of the matches. One date and one time interval during the rugby season stood out due to the high incidence of injuries sustained: on 9 May 2003, 10 injuries were sustained, eight in a game between the first teams of two hostels (seven from Hostel A and one from Hostel B). From 18 July 2003 to 1 August 2003 (the first three weeks after the June/July holidays), 25 injuries occurred.

Conclusion

Our findings were similar to those of other studies in certain respects but differed in others. Further research should investigate the effect of coaching techniques, fitness levels, protective gear and first aid provided on the injuries sustained.

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Introduction

Rugby results in more hospitalisations and visits to the emergency rooms of hospitals than any other sport and is the sport with the highest injury rate.^{1,2,3} Although soccer accounts for more than 25% of all exercise-related morbidity in England and Wales, the risk of a substantive injury resulting in treatment or in the participant being unable to take part in normal activities is three times higher in rugby than in soccer.³ Injuries are extremely common as a result of the high number of collisions and the dynamic nature of the game.² Severe injuries are the cause of significant morbidity among rugby players.^{4,5}

There has been a large increase in the number of players who have been injured as a direct result of rugby over the past 15 years.⁵ Due to this increase, there is a growing need to understand the frequency and consequences of rugby injuries.⁶ This information, among others, is needed to help train first-aid workers and to develop techniques regarding first aid. This process would be beneficial to teams, as it would help players to recover faster and thus minimise days absent from matches and practices. In South Africa, recent studies done on rugby injuries are either at professional⁷ or at schoolboy level^{8,9} and often focus on a specific type of injury.⁸ There is a lack of data on the social level of rugby, such as university-hostel league level and club level. A Scottish study found that schoolboy rugby is much safer than senior club rugby.¹⁰

This study aimed to determine and report the epidemiological aspects of rugby injuries sustained by Free State University Rugby Hostel League players during the 2003 rugby season. The objectives were:

- To determine the incidence of the injuries sustained by the Free State University 2003 league rugby players.
- To determine the risk of injury per playing-time exposure of the players.
- To analyse the data according to the nature of the injury, the position of the player, the competitive level of the player, the phase of play during which the injury was sustained and the stage of the 2003 rugby season.

Methodology

This was an analytical prospective cohort study. The study sample included all rugby players playing in the Free State University Rugby Hostel League in the 2003 rugby season.

Each of the four study investigators was randomly allocated a certain number of hostel rugby teams. The study investigators contacted all house-committee sports representatives and informed them about the study. The coaches' details, the captains' details and the different teams' practicing times were received from these representatives.

Information sessions were held at the beginning of the 2003 rugby season, in April, during one of the practices in order to ensure that the players attended the sessions. Informed consent was obtained from the coaches, captains and rugby players before data collection started.

Throughout the rugby season of 2003, the rugby coaches documented the date of each practice session, the duration of each practice and the players present at each practice and each match. This helped to determine the risk of a rugby-related injury per playing exposure.

The captains were contacted by the study investigators. They were given information about the study, either through the contact sessions or individually by appointment with the investigators. They were required to report on the injured players within their teams.

"Injury" was defined as the interruption of normal training or match participation or by the need for medical attention. Players with valid injuries and the injuries themselves included the following: (1) Players who had been injured during a match and had been temporarily or permanently replaced for the rest of the match (2) Players who were absent from matches or practices as a direct result of a rugby injury (3) Players who had received medical attention for a rugby injury sustained during a rugby practice or match (4) All concussions as a direct result of rugby. "Concussions" was defined as follows: "Concussions are characterized by immediate and transient impairment of neural function, such as alteration of consciousness, disturbance of vision

and equilibrium"¹¹ (5) All open and bleeding wounds that complied with the third law⁴ or required management within the blood-bin replacement rule.⁶

These definitions were explained to all the players, especially the captains, ensuring that they understood what qualified as an injury and what did not.

Injury reporting was done on a form that included the following: the name of the injured player, when the injury occurred (either during a match or during a practice) and the date on which the player was injured. It was the captain's responsibility to ensure that the injured player received the injury form and that the injury form was collected from the player. A separate injury form was personally completed by each player for each injury. The form included the following: the position of the player, the team that the player was playing for, information on whether the player had sustained any injuries during the previous rugby season (2002), the protective gear that the player was wearing, the nature of the injury, the time that the injury was sustained, the phase of play during which the injury was sustained and the result of the injury. The captains' forms and the player injury forms were collected from each captain each week by the study investigators. The investigators were available if the captains had problems or needed help due to time constraints because of class, study and practice times. The investigators tried to keep captains as motivated as possible throughout the study by regularly keeping in touch with them. The captains' forms were compared with the forms filled in by the injured players. The study investigators followed up any contradictory or missing information either by means of a telephonic interview or a personal interview.

All the players who had been injured gave informed consent for their data to be used. An informed-consent form was attached to the rugby-injury form. All identifiable information of the study subjects remained confidential. The protocol was approved by the Ethics Committee, Faculty of Health Sciences, University of the Free State.

The investigators evaluated selected matches regarding the occurrence and circumstances of injuries. Matches were chosen using stratified simple random

sampling according to the subgroups within the study population and included the different levels of the teams (first, second and third) and the strength and dominance of the different teams that participated within the different leagues. The investigators were required to fill in a captain's form. This information completed by the investigators was compared with the forms filled in by the captain on that specific match. Any discrepancies were analysed and reported to the captain and/or player concerned.

A pilot study was done within the first week of the 2003 rugby season. The study included all hostel teams engaged in rugby activities. Any relevant changes to the forms were made after the pilot study.

Results

The study originally included the follow up of all six university hostels. Two of the hostels, however, were excluded from the results due to a lack of cooperation. In a last attempt to retrieve information from these two hostels, a retrospective study was done at the end of the rugby season of 2003. However, it was decided that they would be excluded, due to under-reporting and recall bias.

Fifty-eight out of 220 players were injured during the 2003 season, with 61 injuries being recorded, three of the players being injured twice. Thus, 26.4% of the players were injured during the season. Three of the four hostels had three teams with a total of 50 players and the fourth hostel had four teams with a total of 70 players. The incidence of injuries ranged from 21.4% to 32% per hostel. Forty per cent of the injured players had also been injured during the previous season.

Only three hostels had sufficient information for their risk per time exposure to be calculated. The risk was 0.4, 6.2 and 6.3 per 1 000 hours of exposure. The overall risk of injury per 1 000 hours of rugby played was 5.3.

In total, 92% of the injuries occurred during match time (see Table 1). There was a relatively even distribution of injuries in both the first and the second halves of the matches. The injuries generated during training, extra time and practice matches were negligible.

Table 1: Details of injuries sustained (n = 61)
Continuation of play and treatment received

Continued playing	37%
Discontinued playing – no treatment	5%
Discontinued playing – first aid at field	23%
Discontinued playing – treated by doctor/physio	18%
Discontinued playing – hospitalised	15%
Received treatment – continued playing	2%
Absence from rugby activities after injury	95%
Time at which injury occurred	
Training	3%
First half of match	46%
Second half of match	46%
Extra time	3%
Practice match	2%
Type of injury sustained	
Ligament	59%
Muscle	21%
Concussion	11%
Fracture	8%
Nerves	3%
Dislocation	3%
Open wound	3%
Cartilage	2%
Intervertebral disc	2%
Stroke/brain damage	2%
Phase of play during injury	
Being tackled	21%
Tackling	21%
Scrum	8%
Open play	23%
Foul play	5%
Maul	11%
Ruck	7%
Line-out	2%
Other	2%

One date and one time interval during the rugby season stood out due to the high incidence of injuries sustained. On 9 May 2003, 10 injuries were sustained, eight in a game between the first teams of two hostels (seven from Hostel A and one from Hostel B). From 18 July 2003 to 1 August 2003, 25 injuries occurred. This time interval falls within the first three weeks after the June/July holidays, which separate the season into the first and second halves.

The number of injuries sustained by first-team rugby players was 36 and by second-team players 16. The remainder of injuries was sustained among the third (eight) and fourth (one) team players.

Nearly 40% of players continued playing in their matches after their

injuries (see Table 1). The absenteeism of players ranged from one day to permanent, with a median of three weeks. Nine players (16% of the injured players) had to discontinue playing for the rest of the season, while three (5%) of the injured players had to discontinue playing permanently.

The injury that occurred most frequently was ligament injuries (36, 59% of the injuries), obtained by players in the position of lock (n = 6), flank (n = 7) and centre (n = 6). These injuries occurred mainly during tackling (n = 7), being tackled (n = 9) and open play (n = 10). The second-most frequent injury was muscle injuries (13, 21% of the injuries), which were evenly distributed throughout all phases of play. Of these injuries, the players in the positions

of centre (n = 4) and wing (n = 3) sustained the most injuries. The injury with the third-highest frequency was concussion (7, 11% of the injuries). Centres and wings had the highest incidence of concussion (n = 2 each). Most concussions (n = 4) occurred during tackling.

Overall, flanks (12, 20% of the injured players), centres (12, 20% of the injured players) and wings (8, 13% of the injured players) had the highest incidence of injuries compared with the other playing positions.

The study found that the lower limbs were injured in 52% of the injuries, followed by the head and neck with 28%, upper limbs with 20% and trunk with 5%. Among the head and neck injuries, two serious injuries occurred (an intervertebral disc tear, and concussion and stroke), which resulted in the players never being able to play rugby again. Among the lower-limb injuries, a serious injury was also sustained (a hip dislocation), resulting in the player never being able to play rugby again.

At the time of injury, 22 (36%) of the injured players were not wearing any protective gear. Of those wearing protection, 30% were wearing scrum caps, 23% were wearing mouth guards, 57% were wearing shoulder-pads, 5% were wearing knee guards and 3% were wearing strappings.

Discussion

The use of university students as a target group is ill-advised. In this study, they proved unreliable and uncooperative even after agreeing to participate. This resulted in the eventual exclusion of two of the six hostels initially included in the study. Had incentives been offered, the response might have been better. In New Zealand, a similar study was conducted but players were monitored through telephonic interviews held each week.² This was not done in this study, as students were not readily available due to busy study timetables and rugby-practice times and many not possessing their own telephones.

It is recommended that, for future studies, the definitions of the injuries should be clearer in respect of the target population. It was found that either the rugby players did not understand the definitions or did not take notice of them, resulting in the under-reporting

of injuries. It is also recommended that there be more specificity with regard to the anatomical location of the injury, for example both ankle and knee injuries (which are quite different anatomical locations) were classified under lower-limb injuries.

A third of the injured players received medical treatment (they were treated by a doctor or a physiotherapist or were hospitalised) and were thus most likely to be correctly diagnosed. It is suspected that the remainder of the injured players (67%) made self-diagnoses, as it is unknown where they got their information to grade or classify their injuries. This would also have influenced the days that the players took off after injury, returning to play when they felt recuperated but running the risk of sustaining a similar second injury.

The under-reporting of minor injuries (open wounds requiring stitches and the bruising of soft tissue, for example) could have led to bias, as reported injuries were mainly of a serious nature. The incidences of injury are thus possibly an underestimate. In an attempt to ensure that there was a minimum of under-reporting and that the information received was valid and reliable, the study investigators evaluated the matches. It is also suspected that the number of days taken off by the injured players is fewer than it should be. Players have a tendency to return to play before enough recovery time has elapsed, as they "feel" recovered. This could have led to the aggravation of the injuries.

The vast majority of the injuries (92%) occurred during the matches. This could be due to the competitive nature of rugby players during matches. Previous studies have also found that most injuries occur during matches: 85% for adult club-rugby players¹² and 71% for schoolboy players¹³.

The number of injuries sustained in the first three weeks after the June/July holidays could be due to the players not maintaining their fitness levels during their time off. Earlier studies on adult club rugby and schoolboy rugby found that injuries were most prevalent during the first few weeks of the season and after the mid-season break.^{12,13} It has also been reported that players who were injured at the end of a season were more likely to be injured again the

following season.¹⁴ The peak of eight injuries in the first-team match between Hostels A and B on 9 May could be due to the rivalry between these two hostels. It was also found that a few of the Hostel A players played for the University team and were absent from the match, which caused the Hostel A team to be considerably weaker than the Hostel B team.

The pre-study expectation was to find that the lower-league teams would sustain the majority of the injuries for the following reasons:

- The lower leagues are considered to be more social leagues, which results in players being inadequately prepared.
- The qualifications, experience and techniques of the coaches decrease in order from the first team to the last team.
- In the lower leagues, players tend to vary with each game and it is the norm to find different players playing in different games.

Contrary to this expectation, it was found that the majority of the injuries was sustained in the first league among the first teams. In schoolboy rugby, A-teams were found to suffer more injuries.¹³ It is suspected that the reason for our finding could be that the stronger (first league) teams play a much more physically demanding, high-impact game. These teams may take the game much more seriously and thus play much harder, as there is a lot (including hostel pride) at stake, which results in more pressure to win compared with the weaker (lower league) teams. In addition, the higher the league, the longer the duration of the game. First-league teams play for 80 minutes, while second-league teams play for 70 minutes and third and fourth-league teams play for 60 minutes. This variation in the duration of the games could contribute to the higher incidence of injuries in the upper leagues.

The location of the injuries sustained during this study is consistent with that found in a study done on schoolboy rugby¹³, in which 37% of injuries were lower limb, followed by head and neck with 29%, upper limb with 20% and trunk with 13%. At the 1995 Rugby World Cup, lower limbs accounted for 42% of injuries.⁷ It was expected that props would have the highest incidence

of concussion due to their role in the game. The study, however, found that it was the centres and wings who had the highest incidence of concussion. The fact that most concussions occurred during tackling could be due to incorrect or poor tackling techniques. The fact that flanks, centres and wings had the highest incidence of injuries compared with the other playing positions could be due to these players doing the most tackling. In most studies, tackling has been found to be the phase of play representing the highest percentage of injuries, ranging from 26% to 56%^{7,12,13,15}, although an Argentinian study reported that open play represented the highest percentage (33%)⁴.

Conclusions

The study has provided information on the profile of injuries sustained by social rugby players. Some of the findings are in agreement with those found in other levels of the game.

Future studies should be done on social rugby in order to extend and improve on the findings of this study and to provide information applicable to this level of rugby. Future studies should investigate the following:

- The effectiveness of protective gear in preventing specific injuries.
- Players' understanding of the reason why each specific item of protective gear is worn and their individual reasons for either wearing or not wearing their own protective gear. In addition, it should be determined whether the players regard the gear as effective protection against injuries and whether player experience contributes to the incidence of rugby injuries.
- The fitness levels of rugby players

immediately after holidays and the relation of this to the incidence of injuries sustained.

- Whether coaching techniques have an impact on injuries with respect to the position of the injuries (e.g. head [concussion] and the technique of tackling) and the phase of play (e.g. techniques that involve decreasing the incidence of injuries sustained during open play or tackling).
- The impact of the current provision of first-aid treatment on the injuries sustained.

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