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Profile of Rugby Injuries in High School Zimbabwean Adolescents

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Abstract

Background: Rugby is a popular sport played in many countries worldwide. There has been recent growing interest for the sport in Zimbabwe especially among adolescents. However, no study has been done to documentthe profile of rugby-related injuries among Zimbabwean adolescents between the ages of 10 and 19 years. The goal of the present study is to describe the injuries sustained by adolescent males during the 2014 high school rugby season.

Methods: A cross-sectional survey was conducted involving 275 male adolescents' rugby players who competed in the Super Eight School Rugby League in Harare, Zimbabwe.

Results: The mean age of the sample was 16 years (SD = 1.4). 58.2% of participants sustained at least one rugby-related injury. There were 561 injuries reported in total, of which 63.3% (n = 355) were new injuries and the remainder were recurrent cases. 7.7% (n = 43) of the injuries were graded as severe with participants missing rugby activities for more than 28 days. Of the 561 injuries that occurred, 59.4% (n = 333) occurred during competitive matches in the second half (59.5%). Injuries due to tackles were the most frequent accounting for 48.3% (n = 271) of all injuries sustained. The lower limbs were the most frequent body region affected (38.6%, n = 217). When comparing position of play, flankers sustained the most injuries (14.1%) and there were no differences in incidence of injury between forward and backline players.

Conclusion: Our findings on the profile of rugby injuries among male Zimbabwean adolescents were similar to those of other studies in certain aspects but differed in others. Most injuries occurred in competition during the second half of the game mainly from tackles. Both junior and senior players were equally affected. The lower limbs were frequently injured especially the knee region.

Keywords

Rugby, Profile, Injuries, Adolescents, Zimbabwe

Introduction

Rugby union (henceforth referred to as rugby) is a collision sport played worldwide. It is played at amateur, semiprofessional, and professional level [1]. Recently, the sport has gained enormous popularity especially amongst adolescents even in developing countries not previously known for rugby [1,2]. In the literature, reports on the incidence of adolescent rugby injuries, risk factors and prevention strategies are extensive and have been conducted largely in countries traditionally known for rugby such as England, France, Scotland and Ireland in the northern hemisphere and South Africa, Australia, Argentina and New Zealand in the southern hemisphere [2-7]. But to date, to our knowledge, there are no published studies on adolescent rugby related injuries in Zimbabweans.

There has been recent growing interest for rugby in Zimbabwe especially in adolescents. This has led to the setting up of a domestic high school rugby league called the Super Eight Schools Rugby League [8]. The league features the top and most competitive eight rugby playing high schools in the country [8]. Inevitably, increased competition heightens injury risk in adolescents considering the physical nature of the sport and the unique vulnerability of adolescents to injuries [1,2]. Although Zimbabwean adolescents playing competitive rugby are no different from the rest of adolescents worldwide, it is timely to understand the profile of injuries sustained in the Super Eight Schools Rugby League by the adolescent population. Establishing epidemiological data on injuries has been described as the 'first step' towards decreasing injury rates [9] and such data are important in developing specific preventative protocols [10,11].

Recent systematic reviews on rugby injuriesfor adolescents under the age of 21 years report incidence rate ranging from 27.5 to 129.8 per 1 000 match hours [1,12]. The nature of the sport is thought to contribute to the high injury risk [2]. Rugby is a physically demanding sport characterised by massive physical contact, collisions, and physical aggression because contesting for possession of the ball is one of the basic characteristic of the game [10,13-15]. Soft tissue injuries account for more than 50% of all rugby-associated injuries including capsular/ligament sprains or tears, muscle/tendon strains or tears, fractures, and dislocations/subluxations [5,10,16]. A recent systematic review on the epidemiology of adolescent rugby injuries showed that the rugby injuries were evenly distributed among the head and neck, upper limb and lower limb with the trunk least often affected [1].However, another recent review showed that the lower

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limbs (30% to 55%) followed by head and upper spinal injuries (14% to 30%) were commonly affected [10]. The potential to sustain head injuries including concussions has been reported more frequently in senior professional players as compared to young players [5,10,17,18].

Players' positions had been shown to influence injuries. Although both forward and backline players are equally vulnerable [1], the overall rate of injuries is higher in forward players possibly due to the greater exposition to physical collisions and increased body mass index [1,10,12]. Reports on players frequently injured in rugby are divided with hookers, second row players, flankers, and fly half players all implicated [10,19,20]. The risk of injury is reported to increase with advancing age and level of play [1,2]. The majority of the rugby injuries are reported to occur during competitive matches resulting mainly from tackles [1,18]. This study aimed to describe the injuries sustained in one rugby season in Zimbabwean male high school adolescents.

Materials and Methods

Study design

This study used a descriptive, cross-sectional design.

Participants and research setting

Male adolescent rugby players were approached to volunteer for the study from high schools which participated in the Super Eight Schools Rugby League. To enable data collection, only two of the eight schools which participated in the league in 2014 were included in the study as these were based in Harare and agreed to participate in the study. At the end of the 2013 rugby season, 1 100 male high school adolescents had participated in competitive rugby in Harare. According to EpiInfo Stalcalc (with a precision effect of 5% calculated at 95% confidence interval) a minimum sample size of 255 would make the findings general is able to the target population, considering an expected frequency of sports-related injuries of 40% [21]. To be eligible for selection, participants had to play for the high school rugby team and have participated in at least one competitive or training match in the 2014 Super Eight Schools Rugby League.

Instrument

A self-developed injury questionnaire was used to gather data for each reported injury. Most questions were adapted from previous literature [12]. The English questionnaire was evaluated by two sports physiotherapists with several years of experience in high school rugby. The experts had to rate each question on the questionnaire based on criteria adopted from Yaghmale [22] which evaluated each question on a four point scale of relevance, clarity, simplicity and ambiguity. Once the recommended changes were made, a test re-test reliability study was conducted at a school involved in the Co-educational Schools Rugby League using 20 male adolescent players. The re-test was done two weeks later yielding moderate to perfect kappa coefficients for the questionnaire items (k = 0.51-1). Prior to use in the main study, the questionnaire was translated into Shona, a local language spoken by all the participants, to enhance understanding of the questions.

Data on age, school grade, rugby age group, commonly played rugby positions, years of rugby experience were collected and details regarding their injuries. For this study, a rugby injury was considered as any self-reported pain, discomfort, injury or disability to the body sustained through playing competitive rugby or during training. This was measured from the first official day of practice through to the last training or competitive game of the season. A recurrent injury was considered as an injury of the same type and location as the index injury which occurred after player had returned to full participation in competition or training.

Participants graded injury according to severity; mechanism of injury (primary activity resulting in injury); anatomical location; injury time in the game (whether first half or second half). Injury severity was assessed solely by the amount of time lost in days from the time of injury to the date the player returned to full participation in training and match play and graded as mild (0-7 days), moderate (8-28 days) and severe (> 28 days) [11]. If a health care professional was consulted this was recorded with five possible responses: medical doctor, physiotherapist, paramedic, qualified nurse, and nurse first aider. The diagnosis for each injury was not ascertained from the participants. The use of protective equipment at the time of the injuries was also ascertained. Participants were requested also to indicate the absolute number of games they played in the season and the number of days they trained per week.

Procedure

Institutional approval was obtained from the Ministry of Primary and Secondary Schools (Ref: C/426/3) and Harare Provincial Education Office. Thereafter, ethical approval was obtained from Joint Research Ethical Committee (JREC) for the University of Zimbabwe, College of Health Sciences and Parirenyatwa Group of Hospitals (JREC Ref: 375/14).Two Harare based schools participating in the Super Eight Schools Rugby League volunteered to participate in the study. Participating male high school rugby players and their parents/ legal guardians gave written assent and consent respectively.

Data collection took place after the rugby season has ended from October 2014 to January 2015. All male adolescent rugby players playing in the school teams for the senior and junior teams with parental informed consent were invited to participate through their local coaches. On agreed dates with the school authorities, the study questionnaires were self-administered and were completed in the presence of the research teamand the local rugby coaches at each school. Data collection was conducted after school hours either in an empty classroom or in the rugby sports field.

Statistical analysis

Raw data were analysed with STATISTICA version 12. Questionnaires with at least two important outcome measures missing were discarded. Descriptive statistics described age, number of years of rugby participation at high school level, and frequency of position of play. Frequencies were used for categorical data with the chi-square test used to assess for association between two categorical

Table 1: Descriptive statistics describing age, number of years of rugby participation at high school level, and frequency of position of play in adolescent male rugby players (n = 275)

Variable	n (%)
Age (years)	
14	20 (7.3)
15	65 (23.6)
16	59 (21.5)
17	56 (20.4)
18	58 (21.1)
19	17 (6.1)
High school rugby participation (years)	
1	3 (1.1)
2	29 (10.5)
3	61 (22.2)
4	103 (37.5)
5	73 (26.5)
6	6 (2.2)
Rugby team	
Under-16s (junior players)	87 (31.6)
Under-20s (senior players)	188 (68.4)
Playing positions	
Forward players	**137 (49.8)**
• Hookers	25 (9.1)
• Props	31 (11.3)
• Locks	37 (13.4)
• Flankers	31 (11.3)
• Eighth man	13 (4.7)
Backline players	**138 (50.2)**
• Fly half	14 (5.1)
• Scrum half	18 (6.6)
• Centers	38 (13.8)
• Wingers	43 (15.6)
• Full back	25 (9.1)

variables. The p-value for statistical significance was set at 0.05. The total number of injuries recorded for the season was a cumulative count of all injuries reported by each player. Incidence of injury, chronicity of injury (new or recurrent injury), situational setting (training vs. match injury), injury timein the game, injuries per game, mechanism of injury, and anatomical site of injury were all recorded. Data were divided and analysed according to the following groupings: (a) junior players (13-under 16 years) and senior players (16-under 20 years) and (b) forward and backs.

Results

Out of 345 students approached, 286 were eligible and consented. Of the 286 collected questionnaires, 11 were discarded (96.2% response rate). Descriptive statistics are summarised in table 1. Participants' mean age was 16(SD = 1.4) years. The majority of the participants (68.4%) were senior players. The mean years of experience in high school rugby for the participants was 3.8 (SD = 1.0). 50.2% of players played back positions and 49.8% played forward positions. On average, the participants played 9.8 (SD = 3.8) competitive games in the season. However, there were no significant difference in the mean number of competitive games played in the season between senior and junior players [t (273) = −0.68, p = 0.50]. The mean training hours per week for the participants was 7.8 (SD = 1.7). But, senior players trained significantly more hours per week compared to junior players [t (273) = −17.1, p = 0.01].

Profile of rugby injuries

58.2% of the participantsreported sustaining at least one rugby-related injury in the previous season (Table 2). There was no significant difference in proportion of players with injuries between the junior (58.6%) and senior players (60.9%) [χ^2 (1) = 0.01, p = 0.92]. In addition, there was no significant difference in proportion of the players with injuries between the forward (57.9%) and backline players (58.5%) [χ^2 (1) = 0.01, p = 0.92] (Table 2). In absolute numbers, participants playing as flankers experienced a predominant number of rugby-related injuries (14.1%).

There were 561 total injuries reported in all hours of competition and training matches in the 2014 rugby season. One hundred and twenty eight (128) injuries were reported by junior players and 433 by senior players. Three hundred and sixteen (316) injuries were reported by forward players and 245 by back players. The total injuries reported in the 2014 season amounted to 50.4 injuries per 1 000 playing hours [95% CI: 43.6-57.2].

Of the total injuries, 63.3% (n = 355) were new injuries and the remainder were recurrent cases. There was no significant difference in proportion of junior (58.6%) and senior players (64.7) with new injuries in the 2014 season [χ^2(1) = 1.3, p = 0.25]. Similarly, there was no significant difference in proportion between forward (65.8%) and back players (60.0%) with new injuries in the season [χ^2 (1) = 1.8, p = 0.18].

There were more injuries during competitive rugby matches (59.4%) than training matches (40.6%). Junior players sustained significantly more injuries (70.3%) than senior players (56.1%) during competitive matches [χ^2(1) = 7.7, p = 0.01]. Backline players sustained significantly moreinjuries (65.3%) than forward players (56.1%) during competitive matches [χ^2(1) = 4.3, p = 0.04]. Of all the injuries that occurred during competitive matches, the majority (59.5%)

Table 2: Descriptive profile of injuries sustained by adolescent male rugby players in one season

Characteristic	Response	Level of play N (%)		Players position N (%)		Total
		U-16s	U-20s	Forward	Backline	Total
Injured players in 2014 season (n)	Yes	51(58.6)	109 (60.9)	81 (57.9)	79 (58.5)	160
	No	36(41.4)	70 (39.1)	59 (42.10	56 (41.5)	115
	Total	**87**	**179**	**140**	**135**	**275**
	[a]Statistic	*$X^2(1)$= 0.01, p=0.92*		*$X^2(1)$= 0.01, p= 0.91*		
Chronicity	New injuries	75(58.6)	280(64.7)	208(65.8)	147(60)	355
	Recurrent	53(41.4)	153(35.3)	108(34.2)	98(40)	206
	Total	**128**	**433**	**316**	**245**	**561**
	[a]Statistic	*$X^2(1)$= 1.32, p= 0.25*		*$X^2(1)$= 1.77, p=0.18*		
Situational setting	Training injuries	38(29.7)	190(43.9)	143(45.3)	85(34.7)	228
	Match injuries	90(70.3)	243(56.1)	173(54.7)	160(65.3)	333
	Total	**128**	**433**	**316**	**245**	**561**
	Statistic	*$X^2(1)$= 7.67, p= 0.01*		*$X^2(1)$= 4.29, p=0.04*		
Injuries time in the game	1st half injury	78(60.9)	57(27.8)	87(48.1)	48(31.6)	135
	2nd half injury	50(39.1)	148(72.2)	94(51.9)	104(68.4)	198
	Total injuries	**128**	**205**	**181**	**152**	**333**
	Statistic	*$X^2(1)$= 34.5, p< 0.01*		*$X^2(1)$= 8.56, p< 0.01*		
Mechanism of injury	Being Tackled	35(27.3)	140(32.3)	98(29.4)	77(31.4)	175
	Tackling	21(16.4)	75(17.3)	58(18.4)	38(15.5)	96
	Collision	7(5.5)	35(8.1)	28(8.9)	14(5.7)	42
	Scrum	10(7.8)	25(5.8)	35(11.1)	0(0)	35
	Rucking/Maul	16(12.5)	29(6.7)	14(4.4)	31(12.6)	45
	*All Others	39(30.5)	129(29.8)	83(26.2)	85(34.7)	168
	Total	**128**	**433**	**316**	**245**	**561**
Anatomical site	Upper Limbs	30(23.4)	115(26.6)	94(29.7)	51(20.8)	145
	Lower Limbs	53(41.4)	164(37.9)	104(32.9)	113(46.1)	217
	Head & Neck	34(26.6)	48(11.1)	55(17.4)	27(11.0)	82
	Trunk	11(8.6)	106(24.5)	63(19.9)	54(22.0)	117
	Total	**128**	**433**	**316**	**245**	**561**
Anatomical site (lower limbs)	Hip	11(10.5)	9(8.0)	7(7.2)	13(10.8)	20
	Thigh	26(24.8)	20(17.9)	16(16.5)	30(25)	46
	Knee	33(31.4)	46(41.1)	28(28.9)	51(42.5)	79
	Shank	17(16.2)	13(11.6)	20(20.6)	10(8.3)	30
	Ankle	12(11.4)	17(15.2)	18(18.6)	11(9.2)	29
	Foot and toes	6(5.7)	7(6.3)	8(8.2)	5(4.2)	13
	Total	**105**	**112**	**97**	**120**	**217**

[a]Indicates Yates corrected Chi-square value; *denotes non-contact causes such as running, twisting, jumping in lineout, collision with a fixed object like goal post but not with other players as it was recorded under collision, turning, falling during a try, kicking, and catching the ball.

Table 3: Severity of injuries, medical attention sought, protective equipment and medical personnel consulted for the injuries by male adolescent rugby players (n = 561)

Characteristic	Responses	N (%)
Injury severity (time lost in days)	Mild (0-7 days)	376 (67.0)
	Moderate (8-28 days)	142 (25.3)
	Severe (> 28 days)	43 (7.7)
	Total injuries	**561**
Medical attention sought	Yes	249 (44.4)
	No	312 (55.6)
	Total injuries	**561**
Medical personnel consulted	Physiotherapist	15 (6.02)
	Medical doctor	9 (3.6)
	Medic	34 (13.6)
	Qualified Nurse	17 (6.8)
	Nurse First Aider	174 (69.9)
	Total	**249**
Rugby players wearing protective clothing at the time of injury	Yes	44 (27.5)
	No	116 (72.5)
	Total	**160**

occurred during the second half of the game. But, senior players sustained significantly more injuries (72.2%) compared to junior players (39.1%) in the second half [$\chi^2(1) = 34.5$, $p < 0.01$]. Significantly, the backline players sustained more injuries (68.4%) as compared to the forward players (51.9%) in the second half.

Contacts contributed to 70.1% of all the injuries reported. The majority of the injuries were due to tackles (48.3%), with 31.2% of the tackled player sustaining a higher incidence of injury than tackler (17.1%). Although not significant, forward players sustained more injuries (73.7%) compared to back players (65.3%) during contacts [$\chi^2(1) = 4.3$, $p = 0.03$].

The majority of the injuries were of the lower limbs which contributed 38.7% of all injuries, followed by the upper limbs (30%) and trunk (20.8%). Backline players had significantly more injuries of the lower limbs when compared to forward players [$\chi^2(1) = 9.6$, $p = 0.01$]. However, the lower limbs were equally affected between the junior and senior players [$\chi^2(1) = 0.38$, $p = 0.54$]. Of the lower limb injuries, the knee was the common site (36.4%). Head and neck injuries constituted 14.6% of all the injuries reported. 26.6% of all the injuries sustained by junior players compared to 11.1% for senior players were head and neck injuries. Of all the injuries sustained by forward players, 17.4% were head and neck compared to 11.0% for back players.

7.7% of all the injuries sustained were graded severe with participants missing rugby activities for more than 28 days (Table 3). Of the 160 participants who reported at least one injury during the 2014 rugby season, 85.0% sought medical treatment for at least injury sustained. Out of the 561 total injuries reported in the 2014 season, 249 (44.4%) were medically treated (Table 3). The majority of the injuries (69.9%) were attended to by nurse first aiders, followed by paramedics (13.6%) and nurses (6.8%). 27.5% of the injured players reported wearing some sort of protective equipment such as soft-shelled helmets, shin guards, knee guards, mouth guards, shoulder pads, and strappings at the time of the injury.

Discussion

This study was aimed at describing the injuries sustained by Zimbabwean male adolescents in the 2014 high school rugby season. This is the first study to provide descriptive information on rugby injuries in the Zimbabwean context. The response rate of the study was satisfactory eliminating any bias from non-participation. The high response rate could have been due to the immediate collection of the study questionnaires upon completion by researchers. In addition, data was collected in schools traditionally known as the powerhouses of high school rugby in Zimbabwe. This could have stimulated interest in the sample participants to want to participate in the study.

The sample population was relatively young with a mean age of 16 years and was mainly composed of senior players as opposed to juniors. This could have been due to the time data collection was conducted. Data was collected after school hours to avoid disrupting classes. It possible that junior players had to leave early for home before schools close. There was an equal representation of rugby positions between forwards and backline players in the study sample.

58.2% of the participants sustained at least one rugby-related injury in the 2014 season. In total, the 275 participants reported 561 injuries amounting to 50.4 injuries per 1000 playing hours of training and competition. This figure falls within the range reported in systematic literature reviews indicating that rugby injuries in male adolescents in Zimbabwe are as common as in the rest of the world [1,10]. However, the results of this study reveal a lower prevalence of rugby injuries than those reported in South Africa. A recent cross-sectional study conducted among 194 schoolboys under the age of 18 years from 10 elite schools across South Africafound a higher injury prevalence of 78.2 injuries per 1 000 playing hours [23]. Although our study had a relatively big sample size compared to the previous study, population and injury definition differences may possibly account for the variability in injury rates between studies [11].

Although we expected injury rates for senior players to be higher than for junior players, the present study showed that both senior and junior players were equally affected.This indicates that all rugby players irrespective of playing level are equally vulnerable to injuries. This result underscores that seniority and experience in rugby does not necessarily cushion players from injuries [24]. However, these findings are in contrast with results of other studies. Rugby injuries have been reported to increase with increasing age [2,4]. Our results could be explained by the fact that junior players who are younger and less experienced are equally playing the same number of competitive matches in the league predisposing them to a higher number of injuries.In the present study, there was no significant difference in the mean number of competitive games played by senior and junior players. This calls for continued surveillance to monitor injury rates in junior players.

The present study showed that most of the injuries were new injuries, a finding in concordance with study results by Collins et al. [9]. There is a huge need for continued monitoring of these injuries to minimise reoccurrence. However, it is notable that 37% of the reported injuries were recurrent cases. The reasons for the recurrences are unclear. One possible explanation could be premature return to competition or training before enough recovery time has elapsed [25]. The fact that most rugby injuries sustained in the league were mild in nature could have led to early return into training or competition before full recovery. According to Mahaffey et al. [25] young players have a tendency to return to play when they 'feel' they have recovered. Further research is needed to evaluate the knowledge of the young rugby players on the injury prevention guidelines. In addition, most of the injuries sustained in the league were attended to by first nurse aiders. It is possible to speculate that the rugby players irrespective of severity of the injury were probably not receiving full rehabilitation of the injuries. Pressure from parents and coaches has also been cited as a reason for young players to return to rugby early before achievement of full recovery [26]. Nevertheless, there is need for future research to establish the factors associated with recurrent injuries in youth rugby.

The majority of the injuries occurred during competitive matches. A number of rugbystudies have shown similar findings [9,25,27,28]. A South African study conducted on the epidemiology of schoolboy rugby injuries by Roux et al. [28] found a 71% injury prevalence in competitive matches. Injuries during competition could be explained by the competitiveness of the rugby players during game matches [25]. The present study involved top male adolescent high school rugby players in the country and for that reason they may take the game serious and thus play harder and aggressively [25]. Junior players had significantly more injuries in competition than senior players. The reasons for this are unclear. Although this contrary to some studies that found that senior players suffer more injuries, one plausible

explanation requiring further investigation could be the difference in the training hours between the senior and junior players [17,28]. The present study showed that junior players train significantly less hours than senior players probably resulting insufficient conditioning yet they play an equal amount of competitive games in the league.

Most of the injuries (48.3%) reported in this study involved tackles. This is consistent with the results reported for English youth male rugby players aged between 16 and 18 years by Palmer-Green et al. [29]. The authors' found that tackle event contributed to 57% of match injuries. In the present study, being tackled caused more injuries than tackling. This was shared by Brooks et al. [30] who showed that the incidence of an injury to the player being tackled was twice that of a tackler (23 vs. 13%). There is need for preventative strategies to decrease injuries associated with the tackle. Collins et al. [9] recommended providing coaches with materials designed to help them run proper tackling drills, showing players videos demonstrating proper tackling techniques, educating referees on the injury risks associated with unsafe tackling techniques and encouraging referees to penalise unsafe tackling when warranted.

Most injuries reported in this study occurred during the second half of the game. This confirms the results of other studies [15,27]. The majority of the studies included in a literature review of injuries in rugby union by Kaux et al. [10] showed that rugby injuries are prone during the second half (between 55% and 70%). Interestingly, the present study showed that senior players sustained significantly more injuries (72.2%) compared to junior players (39.1%) in the second half. Similarly, back players had more injuries in the second half than forward players. The reasons for these findings are speculative. It is possible that senior players play a much more physical game towards the end of the game resulting in more injuries in that half. Second half injuries have been attributed to players increased work rate as they will be playing the last half of the game, slower reaction time, and decreased endurance or fatigue among players [24,27]. Coaches should ensure that all players are adequately prepared for the physical nature of the matches by simulating match conditions at practice [9].

The most frequently injured body part was the lower limbs, a finding shared by a number of other authors [5,10,25]. Of the total injuries reported for the lower limbs, the knee was the commonly injured, a finding shared by Bathgate et al. [27]. In a study monitoring rugby injuries for 18 weeks among schoolboys derived from 26 high schools in South Africa, the lower limbs were frequently injured with 37% of all injuries [28]. Future prospective studies detailing the nature and the risk factors of knee injuries sustained in rugby by male adolescents are needed in Zimbabwe. This is crucial in developing targeted prevention strategies. In contrast to our study which found that head and neck injuries were the least common, Constantinou and Bentley [26] found that the majority of the adolescents who participated in a rugby festival for five days in South Africa frequently reported head and neck injuries. The reasons for these findings in Zimbabwe are unclear. There is need for future studies with robust study designs to determine the factors that may influence the site of injury in adolescent rugby. Rugby injuries occur as a result of multiple factors. However, factors related to the laws of the game protecting players during contacts, refereeing, coaching, and physical fitness and wearing of protective equipment have been identified to play an important role in preventing head injuries [26]. The present study showed that 72% of the injured players were not wearing any protective equipment at the time of the injury. A finding which underlines the importance of awareness campaigns in the schools on the risk of injury in rugby and the need to advocate for protective clothing. Future studies investigating the players understanding of the importance of protective gear are warranted. Mahaffey et al.[25] found 36% not wearing protective equipment at the time of injury.

Injuries vary with playing position in rugby [5]. Although this study revealed no significant difference in the incidence of injury between forward and back players, flankers received the predominant number of injuries than any other playing position. These findings have been reported elsewhere [5,10,24,25]. As forward players, flankers have been linked to greater exposition to physical contestspredisposing them to injuries [10]. The present study showed that forward players had more contact-related injuries than back players. The New Zealand Rugby Injury and Performance study by Quarrieet al. [31] linked rugby injuries to increased body mass index, suggesting that forwards should be more prone to injuries since they are usually heavier than backline players [1]. In an epidemiological review of injuries in rugby, Kaux et al. [10] reported that flanks are the positions often substituted for injury reasons in rugby. Mahaffey et al. [25] found that flanks, centers and wings had the highest incidence of injuries in a study involving university rugby players in one season. Flanks are susceptible to injuries because of their role in clearing loose balls and beginning new phases of play making them prone to tackles [5,25]. On the other hand, the present study also showed that back players sustained significantly more injuries during competitive matches than forward players; a finding reported elsewhere [25].

Although the majority of the injuries reported for the last competitive season were mild, a sizeable number of injured players (85%) received medical treatment for at least one of the reported injuries. These results are consistent with the findings of Mahaffey et al. [25]. Medical treatments for the injured players were mainly administered by first nurse aides. This is commendable at youth level to have injuries being medically attended as early as possible. However, there is need to increase the presence of other qualified health personnel such as physiotherapists and medical doctors at these rugby matches. Although this may be challenging to achieve, having injuries attended to qualified medical personnel may help in proper diagnosis and treatment of injuries in this population.

Limitations of the study

When interpreting the results of this study a number of limitations need to be considered. Although the study recruited an adequate number of participants to ensure adequate statistical power and the response rate was satisfactory, the rugby players represented a limited number of high schools. This sampling may have restricted the study setting and results may not be a true reflection of the injuries in the league. This convenience sampling restricts generalisations of the study results. The cross-sectional nature of the data collected and the reliance on self-report exposes the data to recall bias, hence underestimating injury rate. Recollection bias was minimised by collecting data immediately after the rugby season and by reporting only injuries that occurred within the last season. However, reporting injuries in the last season alone may overestimates injury rate due to the concept of forward telescoping as adolescents may report injuries preceding the 2014 season [32]. Additionally, the definition of injury used in the study was broad and could have captured both minor and severe injuries resulting in over estimation of the incident rate.

Conclusion

The profile of rugby injuries among male Zimbabwean adolescents playing high school rugby is similar to numerous regional and international studies findings on schoolboy rugby players. Both senior and junior players were equally. Injury rates were similar between forward and back players. Most injuries occurred during the 2014 season, were mild in severity, occurred during the second half of the game and sustained mainly during tackles in competitive games. The lower limbs are frequently injured. Protective gear is seldom worn during training or competitive matches. Most injuries sustained in the league were treated medically by nurse first aiders.

Further prospective studies with larger samples would be of value to generate more data on incidence of rugby injuries and to profile injuries in players in varying school settings, between adolescents and adult rugby players. Based on the findings of this study the authors recommend continued monitoring of rugby injuries in high schools playing competitive rugby.

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