

## **Epidemiology of soccer-related injuries among male high school players in Kigali, Rwanda**

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*(Received: 15 May 2012; Revision Accepted: 25 June 2012)*

### **Abstract**

Soccer in Rwandan high schools can expose players to the risk of injury warranting prevention programmes. The aim of this study was to determine the type, causes, severity and management of injuries among high school soccer players in Rwanda, in order to obtain baseline data for injury prevention programmes. A cross-sectional study was used to obtain the relevant information. A total of 360 high school soccer players were targetted. Data for soccer players were gathered, using a validated closed-ended questionnaire. Information was obtained from the players during training sessions at the schools after informed consent was obtained. The soccer players were all males aged 11 to 26 years, with a mean age of 16.8 years (SD= 3.4). The study revealed a 75% injury prevalence, with a significantly high rate of injuries occurring during competition ( $p < 0.05$ ). The lower extremities accounted for 78% of all injuries sustained, and most of the injuries were not severe. Management of injuries was poor. The epidemiology and risk factors of soccer-related injuries among Rwandan high school soccer players demonstrates the need for urgent implementation of prevention programmes. There is a clear need for education as part of the injury prevention and management programmes.

**Keywords:** Epidemiology, risk factors, soccer, injury, high school students, Rwanda.

### **How to cite this article:**

Nshimiyimana, J.B. & Frantz, J.M. (2012). Epidemiology of soccer-related injuries among male high school players in Kigali, Rwanda. *African Journal for Physical, Health Education, Recreation and Dance*, 18(3), 597-603.

### **Introduction**

Globally, soccer is the most popular sport in the world, with 270 million active players (FIFA Big Count, 2006). According to Howard and Gillis (2009), soccer is commonly played by high school children. Participation in soccer has, however, been associated with increased injury rates. According to Frank, Jarit, Bravman and Rosen (2007), high school soccer players are skeletally immature, and when participating in sport, are susceptible to a range of hard and soft tissue injuries. Drawer and Fuller (2002) state that compared with other contact sports, soccer is associated with a high injury rate, and this rate is considered high risk because it can reach up to 1000 times higher than injuries in industrial occupations.

Soccer injuries are expensive to treat. The amount of money spent worldwide on soccer injury annually in medical costs is estimated by Fédération Internationale de Football Association (FIFA) to be \$30 billion annually (Dvorak & Junge, 2000). Although this amount may far exceed the cost incurred by Rwandan high school teams, these players may sustain more or less the same injuries.

Preventive measures among Rwandan high school soccer players are essential, as they may have difficulties managing their injuries with their minimal resources. This could result in players spending long periods without being able to play, which might end their careers prematurely because of the injury. Van Mechelen and Verhagen (2005) report that measures to prevent sports injuries in young people should be based on knowledge of the incidence, likely severity of the particular injury, and mechanisms that contribute to the risk of sustaining sport-related injuries. Once identified, preventive measures should be implemented and their efficacy evaluated.

Many people in Rwanda and the rest of the world now know that soccer is a great way for children to develop skills and fitness, and therefore there is an increased level of participation in high school sport activities. Leininger, Knox and Comstock (2007) state that epidemiologically valid studies which analyse soccer injuries are required to help reduce the rate of soccer-related injury at the lowest possible level. One isolated study assesses the epidemiology of soccer injuries among first-division soccer players in Rwanda and the need for physiotherapy intervention (Twizere & Frantz, 2007). They concluded that ankle injuries accounted for 38.5% of all injuries, with knee-related injuries accounting for 26.7%. The most common causes of injury identified were being tackled, collisions, landing, and overuse. However, this study did not exhaustively illustrate the severity or the management of soccer injuries sustained by high school soccer players. The present study attempts to fill these gaps. In order to combat injury risk and implement prevention strategies, Van Mechelen (1997) acknowledges that the extent of injury must be identified and described then the factors and mechanisms that play a part in the occurrence of injuries must be identified. According to Van Mechelen (1997), these stages are important in order to develop effective injury prevention strategies. Therefore, the aim of this study was to determine the type, causes, severity and management of injuries among high school soccer players in Rwanda.

## **Methods**

### **Research design**

A descriptive design was used to describe and quantify the epidemiology of, and factors contributing to, soccer-related injuries in high school. A cross-sectional

survey was used to collect information on epidemiology and risk factors at one point in time. The data were collected from the 2010 soccer season.

### Population and sampling

The study population comprised of 30 Rwandan high school teams in Kigali city. Of these, 12 male high school soccer teams were included in this study. A total of 360 soccer players were thus targeted for this study.

### Data collection and procedure

The data were collected with using a validated closed-ended questionnaire involving amateur male soccer players in Rwanda ((Twizere & Frantz, 2007). For validity purposes, the questionnaire was tested and retested in a pilot study among players not involved in the actual study. The retest was done after one week and a comparison was made between the two measurements. Pearson's correlation coefficients ranging between 0.89 and 1.00 were reported. The content of this questionnaire included demographic data, frequency of play, player position, injury prevention programme, injury history, and professional management received by soccer players. The questionnaire requested soccer players to report only the injuries sustained in the previous season (2010). All players were given time to think about or remember injuries sustained during the previous season, in order to produce a realistic result. Ethical clearance was obtained for this study from the University of the Western Cape ethics committee (Project number: 10/8/17). Permission was obtained from The Ministry of Education in Rwanda, as well as parents/guardians of under-age players. Informed written consent was obtained from all the players. Confidentiality and anonymity were assured.

### Data analysis

Data were captured on an excel spreadsheet, and analysed using the Statistical Package for the Social Sciences (SPSS) version 19.0. Both descriptive and inferential statistics were used. Descriptive statistics were presented as frequencies, means, standard deviation, maximum and minimum values of the dependent variables in the questionnaire for which data were obtained.

## Results

Three hundred and sixty questionnaires were administered to the soccer players, but 336 responded, yielding a response rate of 93%. The soccer players were 11 to 26 years old, with a mean age of 16.8 years (SD= 3.4). The overall injury prevalence revealed in this sample was 75% (n=251). Of those who sustained injuries, 77% were recurrent injuries, and 78% were injured during matches

( $p=0.00$ ). The lower extremities accounted for 78% of all injuries sustained, with the ankle being the most commonly affected joint (26.6%), followed by the knee, accounting for 19% of injured parts. Defenders were the most commonly affected players (22.6%). Most of the injuries were as a result of collision with another player (24.2%). Table 1 below illustrates the distribution of the mechanism of injuries.

Table 1: Mechanism of injury (n=251)

Mechanism	Injured n (%)
Collision	61 (24.2)
Tackled	51 (20.2)
Tackling	40 (15.8)
Falling	30 (11.8)
Landing	23 (9.2)
Turning	14 (5.6)
Heading	13 (5.3)
Shooting	11 (4.3)

Many of the injuries were characterised by pain (175: 28.4%), followed by swelling (127: 20.6%) and inability to bear weight on the affected side (16%). The severity of the injuries were classified according to the time taken to return to the sport activity: slight (1-3 days absence), minor (4-7 days absence), moderate (8-28 days absence) and major (>28 days absence). Of all the injuries reported, slight injuries accounted for 53.9% (n=97) followed by moderate injuries 26.1% (n=47); minor injuries accounting for 16.7% (n=30) and major injuries accounting for 3.3% (n=6).

Participants were requested to report on the use of protective equipment in this study. Most participants 62%) reported that they did not use protective equipment. The Chi-square test showed a significant association between injury occurrence and lack of use of protective equipment ( $p=0.00$ ) and exposure time according to number of matches per week ( $p=0.04$ ). Most of the participants did not perform warming-up and cooling-down exercise during training (71%) or during matches (56%). In addition, among the 251 injured participants, only 34% (n=88) received professional treatment. Most of the participants who did not receive professional management reported recurrent injuries 66% (n=173). The Chi-square test showed a significant relationship between recurrent injuries and those not receiving professional injury management ( $p= 0.02$ ).

**Discussion**

The results of this study reveal a higher prevalence (74.7%) of soccer injuries among the Rwanda soccer players than those reported in other African studies, such as Naidoo (2007), who indicated an injury prevalence rate of 58% among South African soccer players, and Twizere and Frantz (2007) who reported an

injury prevalence of 68% in Rwanda. The definition of injury and injury prevalence adopted in this study was different from those used in some of the other studies, and could account for the difference in injury prevalence between studies. In the present study, injury is defined by the FIFA Injury Consensus Group, as “any physical complaint sustained by a player that results from a football match, irrespective of the need for medical attention or time-loss from football activities” (Fuller *et al.*, 2006). The injury prevalence was calculated from the total number of players who sustained one or more soccer injury at any time (during training or competition). This definition limits the comparability of this study with many similar studies because the other studies included in the injury definition the issue of seeking medical attention (Dvorak & Junge, 2000; Woods, Hawkins, Hulse & Hodson 2002) as well as that of 1000 playing hours, in calculating injury prevalence (Morgan & Oberlander, 2001; Rahnama, Reilly & Lees, 2002).

Findings of the present study demonstrated that more injuries occur during competition than during training, which is similar to the results reported in previous studies (Chomiak, Junge, Peterson & Dvorak, 2000; Mtshali, Mbambo-Kekana, Stewart & Musenge, 2008; Merron, Self, Swire & Rolf, 2006). In the present study the soccer injuries reported are mostly classified as slight and moderate, which is similar to the findings of other studies. The same findings were reported by Powel and Barber-Foss (2000), as well as Le Gall *et al.* (2006) in their studies involving high school soccer. Due to lack of complete rehabilitation and early return to sport activity, a minor injury can result in a major injury (Woods *et al.*, 2002). A total absence of team specialist medical practitioners coupled with the possible poor and inadequate rehabilitation with the possible early return to sporting activities may increase the injury recurrent rate and worsen the severity of the sustained injury from slight to major of the same type and location (Woods *et al.*, 2002).

Therefore, injury prevention programs should emphasise the need to improve the quality of rehabilitation for injured players and collaboration between the coaching and rehabilitating teams regarding the manner and condition of returning previously injured players. In addition, it is evident that most of the participants did not get professional injury management (66.3%). If injuries are not properly rehabilitated then there is a greater risk of the injury recurring (Alison, Schiff & Rivala, 2009). This has an impact on the performance of a team and specifically players (Finch, 1997). Thus, emphasis should be placed on providing professional management to injured soccer players.

#### Limitations of the study

Conducting a retrospective study in high school populations has made it difficult to accurately determine the type of soccer injuries because players had to recall

the information. The participants had not consulted medical professionals to diagnose the injuries, and could not precisely determine the type of injury sustained. Comparisons with similar studies are difficult, owing to the nature and varied definitions of injury and injury prevalence. Implemented sports injury prevention strategies and safety practices were assessed, but detailed information about their quality was not gathered

## Conclusion

The similarity of injuries and risk factors to soccer players with other studies, as well as their negative impact, highlight the need for medical team intervention, even at high school level. Clear injury-prevention strategies are needed in high school sport to ensure that talented soccer players are able to progress to elite level. It is also evident that a large component of the prevention strategies should include education for all stakeholders. In addition, the role of medical coverage at all levels of competition should be emphasised if the impact of injuries on players' career paths is to be decreased.

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