

Prevalence and commonly sustained injuries among male football players at the Olympic Youth Development Centre in Lusaka, Zambia

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Abstract

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Background: Football is an extremely popular, high speed, contact sport enjoyed by millions of people worldwide. Unfortunately, there is a high risk of injury during training and competition on the field of play caused by players colliding or falling awkwardly, while tackling or being tackled by an opponent. This study aimed to determine the prevalence and commonly sustained injuries among football players at the Olympic Youth Development Centre in Lusaka, Zambia

Methods: Data was collected retrospectively from player records, from February to November 2016 using a record review checklist. Analysis of data was done using the statistical package for social sciences (SPSS) version 20.0 for windows. Descriptive and inferential statistics were used while association of variables was tested using the chi-square test and the t-test for categorical and continuous variables respectively. The significance level was set at 5%.

Results: The overall injury prevalence during the 2016 playing season at OYDC was 31.7%. Majority 42.5% of these injuries were seen in participants aged 20 years and above. Factors that influenced injuries included collision with another player ($P < 0.001$), previous injury ($P = 0.023$) and level of competition ($P = 0.018$).

Conclusion: From the outcomes of this study, it is evident that football is associated with a high risk of injuries, especially on the thigh, and affecting those aged 20 years and above. It is paramount that further research focuses on modalities of injury prevention.

Keywords: *Player, Football, Prevalence, Injury, Collision, Strain, Sprain*

INTRODUCTION

Football is an extremely popular, high speed, contact sport enjoyed by millions of people worldwide [1]. However, there is a high risk of injury during training and competition on the field of play because of players colliding or falling awkwardly while tackling or being tackled by an opponent [2, 3]. In the past decade, it has been estimated that the injury rates range from 48-91% among male elite players [4]. In Rwanda, Nshimiyimana and Frantz [5] reported a prevalence of 75% while Twizere and Frantz [6] reported 68%. Naidoo [7] in South Africa, indicated a prevalence of 58% and in Zambia it was 32.7% in a study done in 2012 [8]. Despite inadequate documentation in Africa, Zambia inclusive it cannot be disputed with these figures that football injuries worldwide are common and come along with other burdens such as the cost of managing these injuries. The Fédération Internationale de Football Association (FIFA) [9] estimates that an average treatment cost of 150 U.S. dollars is spent per injury, which accumulates to approximately 30 billion dollars a year on treatment of injuries in soccer worldwide. Meeting this huge cost is a big challenge especially in developing countries like Zambia. Further, most injuries are not adequately managed due to the minimal resources available in developing countries which often results in mobility or biomechanical complications among players [8]. Consequently, this reduces playing time and the chance of players returning to the field of play. In addition, young players miss academies thereby influencing illiteracy and loss of motivation as their friends advance [9].

Leininger and colleagues [10] stated that epidemiologically, valid studies that analyse soccer injuries are required to help reduce the rate of soccer-related injuries to the lowest possible level. When this is achieved, the cost associated with injury management is ultimately reduced and so is the loss of playing time for the players. Hawkins and Metheny [11] also highlighted that in dealing with injury, there are factors to be considered such as knowing the injury extent, mechanisms, and preventative strategies. Unfortunately, lack of research on sports injuries

has contributed to the high injury rates among football players as appropriate injury management protocols have not been developed because of inadequate research [8]. Therefore, in this study we aimed to highlight the prevalence and the commonly sustained injuries among male football players at the Olympic Youth Development Centre (OYDC) in Lusaka, Zambia. We believed that obtaining information on injuries among the football players would highlight details, which could be used to draw appropriate preventive and management measures in the field of sports medicine and rehabilitation.

METHODS AND MATERIALS

We conducted a retrospective cross-sectional survey on records of players who participated in the 2016 season using a records review checklist derived from previous studies [6]. The checklist comprised four sections; Section A collected the players' demographic data. In Section B the location and type of injury, Section C the mechanism and severity of the injury, and pertinent information relevant to the study objectives were collected under Section D. We carried out descriptive data analysis using the Statistical Package for Social Sciences (SPSS) version 20.0. Cross tabulations of variables to test, association was done using the chi-squared (χ^2) test for categorical variables and the t-test for continuous variables and the significance level was set at 5%.

RESULTS

Demographic characteristics of the players

Following a records review, 40 records were included in this study, these being the records of the players that had sustained injuries out of the 126 players registered at the center during the February to November 2016 season. As can be seen in table 1, playing experience ranged between 1-4 years and most (41.5%) of the players were in the 20 and above age group. Further, majority (60%) of the players used the right limb during play.

Table 1: Table 1: Player Demographic Characteristics

Factor	n	%
Age		
Under 15	10	25
Under 20	13	32.50
20 and above	12	42.50
Years of Playing Experience		
< 1 Year	11	27.50
1-4 Years	18	45
>4 Years	11	27.50
Limb Dominance		
Left	9	22
Right	24	60
Both	7	18
Playing Position		
Goal Keeper	3	7.5
Defence	10	25.50
Midfield	12	30
Forwards	15	37.50

The prevalence and profile of injury

The overall injury prevalence during the 2016 playing season at OYDC in this study was 31.7%. Table 2 shows that majority (37.5%) of these injuries occurred because of players being

tackled by another player and the most commonly affected site was the thigh (20%). Sprains, cuts and bruises were frequent (30%) and minor injuries healed in less than 8 days (50%).

Table 2: Injury profile of the players

	N (%)	
Location	Head	4 (10)
	Shoulder	3 (7.5)
	Elbow	3 (7.5)
	Hand	1 (2.5)
	Trunk	2 (5)
	Thigh	8 (20)
	Knee	4 (10)
	Lower leg	6 (15)
	Ankle	5 (12.5)
	Foot	4 (10)
	Type	Concussion
Contusion		6 (15)
Strain		7 (17.5)
Sprain		12 (30)
Other		12 (30)
Type and location		Head concussion
	Shoulder contusion	2 (5)
	Shoulder sprain	1 (2.5)
	Elbow bruise	3 (7.5)
	Hand bruise	1 (2.5)
	Trunk contusion	1 (2.5)
	Trunk bruise	1 (2.5)
	Thigh contusion	3 (7.5)
	Thigh strain	3 (7.5)
	Thigh bruise	3 (7.5)
	Knee sprain	3 (7.5)
	Knee bruise	1 (2.5)
	Lower leg bruise	3 (7.5)
	Lower leg strain	3 (7.5)
	Ankle sprain	5 (12.5)
	Foot strain	1 (2.5)
	Foot sprain	3 (7.5)
Mechanism	Collision with another player	6 (15)
	Tackled by another player	15 (37.5)
	Tackling another player	7 (17.5)
	Heading the ball	1 (2.5)
	Running	2 (5)
	Kicking the ball	4 (10)
	Turning	3 (7.5)
	Jumping	2 (5)
	Severity	Less than 8 days
8-28 days		17 (42.5)
More than 28 days		3 (7.5)

Cross tabulations for factors contributing to football injuries

Factors considered in this study included

age, playing position and injury mechanism. Table 3 in this study shows that, mechanism of injury significantly ($p < 0.001$) contributed to the occurrence of football injuries.

Table 3: Cross tabulations for factors contributing to football injuries

	Type of Injury					(χ^2) p-value
	Concussion	Contusion	Strain	Sprain	Other	
Age						
Under 15	2	3	2	1	2	12.841 (0.118)
Under 20	1	2	2	2	6	
20 and above	0	1	3	9	4	
Player's position						
Goalkeeper	0	1	0	0	2	11.960 (0.449)
Defense	2	2	1	2	3	
Midfield	0	3	2	4	3	
Forward	1	0	4	6	4	
Mechanism of injury						
Collision with another	2	2	0	0	2	82.103 (>0.001)*
Tackle by another player	0	4	0	8	3	
Tackling another player	0	0	0	0	7	
Heading the ball	1	0	0	0	0	
Running	0	0	2	0	0	
Kicking the ball	0	0	3	1	0	
Turning	0	0	0	3	0	
Jumping	0	0	2	0	0	

Other contributing factors to football injuries

We also assessed previous injuries and playing surfaces as intrinsic and extrinsic factors respectively, that could contribute to occurrence of injuries among football players. In addition, level of competition and use of protective

equipment were also considered. Outcomes showed that most players (57.5%) had previous injuries at p-value 0.023 during the playing season and most 62.5% of these injuries were sustained on artificial turf (Table 4).

Table 4: Distribution of other contributing factors to football injuries

Variables	Distribution of Factors	t-test statistic (p-value)
Intrinsic Factors (Previous injury)		
Yes	23 (57.5%)	1.396 (0.023)*
No	17 (42.5%)	
Extrinsic Factors (Playing surface)		
Artificial turf	25 (62.5%)	0.947(1.791)
Natural turf	15 (37.5%)	
Level of competition		
Competitive matches	24 (60%)	2.386 (0.018)*
Training sessions	16 (40%)	
Protective equipment		
Always	10 (25%)	0.042 (1.430)
Sometimes	30 (75%)	

DISCUSSION

Fuller and colleagues [12] explains that a football injury is any physical complaint sustained by a player that results from a football match or football training, irrespective of the need for medical attention or time loss from football

activities. The prevalence rate found in this study is slightly lower to the reported prevalence rates in similar studies around Africa [5, 6, and 7]. However, our finding is almost the same as the reported 32.7% prevalence rate among male football players in the super division and division

one leagues in Zambia [8]. Comparing these rates with other studies done in developed countries is difficult because these studies have focused on the incidence of injuries; which is the number of injuries per 1,000 hours of player activity time while prevalence has been highlighted as a percentage of the number of injured players divided by the total number of players in a given population [13]. However, some researchers have stated that the incidence and prevalence of football injuries in both developing and developed countries could be the same with the difference being inadequate research in developing countries [8, 11]. Of importance in this study there were more injuries during competitive matches compared to training sessions and a significant relationship was recorded. It can therefore, be speculated that there is more intensity in competitive games compared to training sessions hence, increased intensity of play, leads to increased risk of injury.

Previous research [13-17], highlights that injury of the lower limbs forms 60-85% of all soccer injuries in both genders; the thigh, knee and ankle joints have been reported as the most commonly affected sites. Similarly, in this study, majority of the injuries were located in the lower extremity and the thigh was the most commonly injured site, followed by the ankle and knee. This may be attributed to the fact that the lower limbs are exposed to enhanced levels of risk during jumping, kicking, and tackling during a game. Ekstrand and colleagues, [16] indicated in their study that the most occurring types of injuries in football were sprains, cuts and bruises. In another study, Fuller and others [12] reported that most injuries diagnosed were contusions, sprains, ruptures and strains. However, in our study, cuts and bruises have been highlighted as the most occurring injuries sustained by football players at the OYDC. This might be due to the differences in the definitions of 'an injury' among different researchers. The definition of an injury in this study was any physical complaint sustained by a player that results from a football match or football training, irrespective of the need for medical attention or time loss from football activities, hence the consideration of cuts and bruises. Whereas, in other research injury was defined as any injury or incident that occurs during training or competition that requires medical attention and causes the player to be either absent from sport participation in a training or match session. As such, minor injuries such as cuts and bruises may have not been considered in

these studies.

Previous research has also indicated that ankle injuries in particular ligamentous structures followed by thigh contusions account for 67-80% injuries of the lower limb's injuries [18]. In addition, it has been highlighted that 80% of the reported ankle injuries are located in the lateral complex of the joint. In this study, the injuries sustained at the ankle joint were sprains however; we could not determine which was the most affected side, as this was not recorded in the player's files. Researchers have also found that 81% of all thigh injuries were muscular strains and the posterior aspect being more susceptible [11, 18]. We recorded similar findings in this study and research suggests that this could be attributed to strength imbalances between the agonist and antagonist muscle groups which is often not paid attention to during training and match games [11, 12, 18]. Other injuries found in this study were knee sprains, which affected often the medial collateral ligament, concussions, and elbow bruises and cuts. Similar findings concerning the knee joint, ligamentous sprains and in particular the medial collateral ligament accounting for 75% of injuries in the joint were reported in a similar study [18].

Tackling among players was a mechanism for majority of injuries in this study followed by collision. According to Fuller and colleagues [12], tackling and collision with another player accounts for more than half of injuries sustained in football and are grouped as 'contact injury mechanisms and the others are 'non-contact injury mechanisms. More than half of the injuries caused by collision between players occur during actions such as running, shooting, turning and hitting the ball with head [3, 5, 14, 17, 19]. In the current study, player-to-player contact injury mechanism accounted for more than half of the injuries, which is similar to findings in other studies [12, 17, 19]. Emery and others [14] also identified running and turning as the major causes of non-contact injuries and indicated that non-contact injuries are the cause of most muscle strains, especially the rectus femoris mainly occurring during kicking and strains to the hamstrings or gastrocnemius during sprinting. We recorded similar reports in this study as most muscle strains occurred during kicking and running and a significant association was obtained between type of injury and the mechanism of injury.

Ferguson and Collins [20], reported in

their study that over 65% of injuries were minor, 25% moderate and 10% severe and is similar to what has been reported in other studies [21, 22]. Minor injuries are injuries where the player is able to resume training and matches within a week. While, severe injuries commonly constitute joint sprains, typically to the knee and muscle strains, often affecting the hamstrings [18, 23, 24]. In this study, most of the injuries sustained were minor and a significant relationship between type of injury and severity was recorded ($p > 0.001$). Fractures and dislocations are other injury types often leading to substantial absence, but they are more uncommon in football players and none of these was reported in the current study.

There have been suggestions that injury risk increases with increasing age. However, findings regarding the relationship between age and injury risk in adult football players have been contradictory. For youth or adolescent players, risk for injury seems to increase with age [3, 19]. Some studies found an association between increasing age and injury in general [18, 23, 25] while others have reported no association between age and injury [21, 22, 24, 26]. In this study, majority of injuries were recorded in players aged 20 years and above and there was no significant relationship between age and type of injury. It is therefore speculated that statistical methods and different cut off points for age groups between studies may have a bearing on the different outcomes in studies and the effect of age on the injury risk among players is still equivocal.

Previous injury and inadequate rehabilitation have been stated as risk factors for football injury as most of the time injured players more often had sustained previous injury, and reported more joint pain at baseline, than uninjured players [3, 19]. Equally, in this study, records highlighted that majority of the players had reported previous injuries during the 2016 season. We defined a previous injury as an injury of the same type and location within two months of the final rehabilitation day. Generally, the rate of recurrent injury reported in literature is high, indicating that inadequate rehabilitation maybe a probable risk factor for injury. In our study, equally, a significant relationship was obtained between previous injury and occurrence of injuries in this study.

Playing surface was a risk factor that was considered in this study as earlier studies reported increased injury rates for 1st and 2nd generation artificial turf even though injury risk appeared to be similar when playing elite football on natural turf [16]. In this study, although there was no

significant association between occurrence of injuries and playing surface records showed that more injuries were sustained on artificial turfs compared to natural turf. This could suggest that the quality of the artificial turf at the study center may not be at the standard of artificial turfs used in developed countries, which may have a better degree of quality that is similar to natural grass.

Some studies have shown conflicting results for the risk of injury and playing position and no association between playing position and injury [21, 24]. It has also been speculated that the risk of injury is higher in areas in which competition for owning the ball is tenser such as the midfield, attack and defense regions [17]. In this study, records showed that forwards were the most injured with goalkeepers being least. In contrast to our finding Nshimiyimana and Frantz [5] found that defenders were the most commonly injured players (22.6%). Other similar studies [3, 19] found that goalkeepers sustained fewer injuries than other players and the injuries were more located on the head/face, neck and upper extremities like in the current study and no significant relationship was obtained between the playing position and the type of injuries. This could be attributed to team formations constantly changing during a game to suit a particular style of play.

The non-use of protective equipment during training and competition is another factor that is assumed to contribute to injury but this has been poorly evaluated and failure to wear shin guards and bad footwear has been cited as a factor that increases the incidence of lower leg and foot injuries [23]. In this study, only a few players recorded using protective equipment such as shin guards, ankle taping and proper football boots. Relatively, this could have contributed to the high prevalence of injuries although a non-significant association was obtained.

CONCLUSION

Overall, from the findings of this study and in relation to similar studies it is evident that football is associated with a high risk of injury. Therefore, there is need for further research, which will provide information to guide injury-prevention and improve sport safety. Awareness programmes on injuries and possible preventative measures are ventures medical personnel associated with sports should consider exploring especially in the sub-Saharan region to reduce on costs associated with injury management.

DECLARATION

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