

Injury patterns and perceived risk factors among basketball players in Nigeria

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Abstract. Sport injuries are expected consequence of athletic competition, and are not generally caused as a result of a single causative factor but are associated with various risk factors interacting at a given time. Sports injury is a public health concern, as it has detrimental effects on the health and well-being of young athletes. Basketball continues to increase in popularity in Nigeria as a participation sport at all levels of play, from recreational to professional but there is a dearth of information on basketball injuries in Nigeria. This study was therefore designed to determine the prevalence, pattern of injury and perceived risk factors of basketball players in Nigeria. *Material and Method.* The study was a cross-sectional survey involving 110 basketball players (96 males and 14 females) including amateur and professionals. The amateur players were recruited from various stadia in Lagos state and professionals players were those who participated in the Dstv Basketball Premier League. The trainings and matches were watched and recording was done. Basketball-related injuries data were collated during trainings and matches using a standardized basketball injury report questionnaire. Data was analysed using SPSS version 21.0 and was summarized with mean, standard deviation, frequency, percentage, tables. *Results.* The 12 months prevalence of sport injury during training session for the basketball players was 80.8%. Sudden turn or twist (40.0%) was the most common cause of injury and majority of the injuries were to the lower extremities being more represented at the ankle joint (39.1%). Ligament sprain (52.7%) was the most common type of injury and massage (41.8%) was the most frequently used modality for treatment. Eighty-one percent of the players never made use of mouth guard and 83% always play on a concrete surface during training session. *Conclusion.* The findings from this study showed that the prevalence of basketball injury was relatively high compared with other studies. Sudden turn, twist or stop, fall from bad landing technique, collision with obstacle, hit by a projectile and previous injury were the major mechanisms of injury. Majority of the injuries were to the lower extremities, being more predominant in the ankle and knee region. The major perceived risk factors, were none usage of mouth guard and playing on a concrete surface.

Key words: *injury, basketball, perceived risk factors.*

Introduction

It has been established that specific injury pattern occur in different sports and at different levels (1, 2). Although there have been studies on the profile of injuries in relatively more contact sports like football and basketball in Nigeria (2-6). There is a paucity of knowledge on the profile of basketball injuries in Africa and particularly in Nigeria where the game is relatively new and gaining popularity by the day (7, 4).

Numerous studies have been published in an attempt to characterize the rate of occurrence, mechanism and contributory factors in sports injuries (4, 8-11). However, understanding how and why athletic injuries occur should lead to a reduction in these injuries (4). It has been observed that there are relatively few studies on the injury pattern, causes, perceived risk factors and prevention strategies of basketball injuries; however the incidence of injury tends to increase as the game gains more popularity globally. The aim of this study was to determine the prevalence, pattern of injuries and perceived risk factors of basketball players in Nigeria.

Material and Method

A total of one hundred and ten (110) basketball players participated in this study. They were recruited from various basketball clubs in selected stadia in Lagos state (National Stadium Surulere, Row Park Sabo, Yaba and also Unilag Sports Center). Included in this study were players who participated in basketball at least one hour every day and are members of an amateur and professional basketball club in Nigeria.

Excluded from this study were Players who are not members of the registered amateur and professional clubs in Nigeria and who did not participate in basketball for at least one hour every day.

Before the commencement of the study, ethical approval was sought and obtained from the Health Research and Ethics Committee of Lagos University Teaching Hospital (LUTH), Idi-Araba, Lagos, with the assigned approval number of ADM/DCST/HREC/APP/886. Approval was also sought from the Lagos state Basketball Association and the head coaches of the different clubs. Informed written consent of all players was equally sought.

Out of the twelve (12) clubs in National stadium, only two (2) of them responded while the remaining ten (10) were unavailable. At Row Park, the two (2) clubs that play there responded. Also, professional basketball players from various states representing different clubs in Nigeria who came to participate in the DSTv Basketball Premier League including a total of eight (8) clubs but only six (6) of them participated in the study. Therefore, the number of clubs that participated in this study is a total of 10 clubs. The head coaches of the various clubs in the stadia were earlier contacted and details regarding the purpose of the study were adequately communicated to them then the training and competition times were noted.

The basketball players were met before the beginning of their training or competition sessions. Prior to the distribution of the questionnaire, the aim and objectives of the study were clearly stated to all the players. Informed written consent of all the participants was sought, after which the baseline assessment was carried out. Prior to the administration of the questionnaire, assessment of demographic variables (age, height, weight, BMI) was done. The completed questionnaire was then collected by hand immediately after completion.

Questionnaire Design. The questionnaire was adopted from two previous studies, the first being a study on Injury Prevalence and Prevention Strategies among Professional Female Basketball Players in Nigeria by Owoeye *et al* (12) and the second "Pattern of Injuries Among Adolescent Basketball Players in Nigeria by Owoeye *et al* (2). The questionnaire was titled "Injury Patterns and Perceived Risk Factors of Basketball Related Injuries among Basketball Players". It consists of five (5) sections and thirty (30) questions: Section A: This section includes demographic data of the players which included their age, sex, height, weight, ethnicity, number of years as a player.

Section B: This section includes playing position which maybe point guard, shooting guard, etc., cause of injury including fall, previous injury, collision with obstacle, etc., type of playing surface which maybe wooden or concrete, the zone of the court where the injury occurred which includes the offensive half, defensive half or the key area, body part injured which includes abdomen, back, knee, ankle, etc., side of the body injured, whether there was blood exposure or not, first aid rendered after sustaining an injury which includes cryotherapy, massage, etc., further care-disposition, type of injury sustained which maybe bruise, sprain, strain etc., and number of injuries sustained during the training and competition matches, who managed their injury and how long it took the players to recover from injuries sustained.

Section C: This section includes perceived risk factors such as use of mouth guard, type of playing surface, adequate lightening, type of foot wear, duration (for how long do they play).

Data analysis. The data was analysed using the Statistical Package for Social Sciences version 21.0 (SPSS 21.0). It was summarized with descriptive statistics of frequency, percentage, mean and standard deviation.

Results

A total of one hundred and ten basketball players (96 males and 14 females) participated in this study. One hundred and twenty (120) copies of the questionnaires were administered to the various basketball players and 112 copies returned with 110 copies valid for analysis giving a response rate of 91.67%.

The total study population for this study was 110 players comprising 96 males (87.3%) and 14 females (12.7%). The mean age, height, weight and BMI were 20.15 ± 5.3 years, 1.85 ± 0.14 m, 75 ± 14.03 kg and 22.2 ± 3.09 kg/m² respectively (Table 1). The ethnicity of most of the participants was Yoruba (50.9%).

Table 1. Demographic Characteristics of the Players

Variables	All players (X ± SD; N= 110)
Age (years)	20.15 ± 5.26
Height (m)	1.85 ± 0.14
Weight (kg)	75.35 ± 14.03
BMI (kg/m ²)	22.15 ± 3.09
Years of experience (yr)	3.90 ± 3.19

Causes of Injury. Regarding the causes of injury, sudden turn or twist was found to be the most common cause of injury by the players 44 (40.0%), while previous injury was the least cause of injury 5 (4.5%) (Table 2).

Table 2. Frequency Distribution of the Causes of Injury

Causes of injury	Frequency (n)	Percentage (%)
Collision with obstacle	16	14.50
Fall	22	20.00
Hit by a projectile (ball, etc.)	13	11.80
Sudden turn, twist, or stop	44	40.00
Previous injury	5	4.50
Others	15	13.60

Keys: n = frequency; % = percentage

Patterns of Injury Sustained. Regarding the injury sustained during trainings pattern, sprain was found to be the most common type accounting for 58 (52.7%) of the cases, while concussion was the least type of injury accounting for 1 (0.9%) of the cases. Regarding the pattern of injury sustained during matches, sprain was found to be the most common type accounting for 33 (30%) of the cases, while laceration, fracture and concussion were the least types of injuries sustained, accounting for 1 (0.9%) of the cases respectively (Table 3).

Table 3. Patterns of Injury Sustained

Patterns of injury	Training n (%)	Matches n (%)
Sprain	58 (52.7)	33 (30.0)
Strain	12 (10.9)	15 (13.6)
Laceration	4 (3.6)	1 (0.9)
Dislocation	32 (29.1)	17 (15.5)
Fracture	11 (10.0)	1 (0.9)
Bruises	36 (32.7)	23 (20.9)
Concussion	1 (0.9)	1 (0.9)
Cramp	20 (18.2)	14 (12.7)
Others	11 (10.0)	6 (5.5)

Key: % = percentage

Body Parts Injured. Regarding the injuries according to the specific anatomical region, the ankle was the common part affected accounting for 43 (39.1%), followed by the knee 35 (31.8%), shoulder accounted for 20 (18.2%), the hip accounted for 12 (10.90%), while the leg, forearm and elbow were the least body parts affected, accounting for 0 (0.0%) respectively (Table 4).

Table 4. Frequency Distribution of Body Parts Injured

Body parts injured	Frequency (n)	Percentage (%)
Head	3	2.70
Eyes	4	3.60
Face	13	11.80
Neck	3	2.70
Shoulder	20	18.20
Arm	1	0.90
Forearm	0	0.00
Elbow	0	0.00
Wrist	12	10.90
Thumb	6	5.40
Finger	13	11.70
Hand	4	3.60
Abdomen	1	0.90
Trunk	8	7.30
Back	11	10.00
Hip	12	10.90
Knee	35	31.80
Ankle	43	39.10
Leg	0	0.00
Toes	4	3.60
None	60	54.50

Keys: n = frequency; % = percentage

Playing Positions, Surfaces, Zone of the Court and Injury Care. Regarding the playing positions, point guards sustained more injuries than players in other positions 47 (42.7%) and forward center sustained the least injuries 7 (6.4%). Regarding type of playing surface, majority of the players agreed to play on concrete surface 88 (80.0%) while 22(20.0%) played on wooden surface.

Table 5 shows the zone of the court where most of the injuries occurred, majority of the injuries occurred in the offensive half 50 (45.5%), followed by the defensive half 46 (41.8%) while the key area accounted for the least area of the court where injuries occurred 14 (12.7%).

Regarding the first aid rendered, massage was the most frequently administered first aid, 46 (41.8%), while CPR/rescue breathing, 1 (0.9%) accounted for the least administered. Regarding blood exposure, majority, 97 (88.2%) of the players didn't have blood exposure after sustaining the injury while 13 (11.8%) had blood exposure on their injury sites. Regarding further care disposition, 71 (64.5%) of the total injured players continued playing while 39 (35.5%) were prevented from playing after being treated (Table 5).

Table 5. Playing Positions, Surfaces, Zone of the Court and Injury Care

Variables	Frequency (n)	Percentage (%)
Playing position		
Point guard	47	42.70
Shooting guard	30	27.30
Small forward	24	21.80
Power forward	7	6.40
Forward center	11	10.00
Playing surface		
Concrete	88	80.00
Wooden	22	20.00
Total	100	100.00
Zone of the court		
Defensive half	46	41.80
Offensive half	50	45.50
Key area	14	12.70
Total	110	100.00
First aid		
CPR	1	0.90
Cryotherapy	7	6.40
Massage	46	41.80
Exercise therapy	12	10.90
Rehydration	3	2.70
Strapping/bandaging	11	10.00
Wound dressing	6	5.50
None rendered	41	37.30
Blood exposure		
Yes	13	11.80
No	97	88.20
Total	110	100.00
Disposition		
Continued playing	71	64.50
Prevented from playing	39	35.50
Total	110	100.00

Key: CPR = Cardiopulmonary resuscitation

12-Month Prevalence of sport Injury among the Players. Thirty-six (32.7%) of the players sustained an injury over the past 12 months during training session that resulted in them being unavailable for selection while 47 (42.7%) of the players did not sustain any injury over the past 12 months during competition matches that resulted in them being available for selection (Table 6).

Table 6. 12-Month Prevalence of Injury among the Players

Variables	Frequency (n)	Percentage (%)
Training session injuries		
0	21	19.10
1	36	32.70
2	24	21.80
3	14	12.70
4	5	4.50
5	2	1.80
>5	8	7.30
Total	110	100.00
Competition session injuries		
0	47	42.70
1	30	27.30
2	18	16.40
3	7	6.40
4	1	0.90
5	4	3.60
>5	3	2.70
Total	110	100.00

Perceived Risk Factors. Table 7 shows the predisposing perceived risk factors of the players to injuries. Ninety (81.8%) of the players never used mouth guard during trainings and 83 (75.5%) of them during matches. Almost all the players, 91 (82.7%) played on concrete floor during trainings and 57 (51.8%) during matches. More than half 72 (65.5%) of the players agreed to adequate lightening during trainings and 93 (84.5%) during matches. Seventy-three (66.4%) wore Nike foot wear during trainings and 76 (69.1%) during match. Also, most of the players played between 1-3 hours during trainings 61 (55.5%) while most of the players 92 (83.6%) played more than an hour during matches.

Table 7. Perceived Risk Factors

Perceived Risk Factors	Training n (%)	Matches n (%)
Use of Mouth Guard		
Yes	17 (15.50)	22 (20.00)
No	90 (81.80)	83 (75.50)
Sometimes	3 (2.70)	5 (4.50)
Type of Playing surface		
Concrete	91 (82.70)	57 (51.80)
Wooden	16 (14.50)	52 (47.30)
Synthetic	3 (2.70)	1 (0.90)
Adequate Lightening		
Yes	72 (65.50)	93 (84.50)
No	29 (26.40)	13 (11.80)
Sometimes	9 (8.20)	4 (3.60)
Type of foot wear		
Nike	73 (66.40)	76 (69.10)
Jordan	17(15.50)	20 (18.20)
Reebok	2(1.80)	1 (0.90)
Adidas	18 (16.40)	13 (11.80)
Duration (for how do you play)		
<1hr		
1-3hrs	29 (26.40)	92 (83.60)
>3hrs	61 (55.50)	17 (15.50)
	20 (18.20)	1 (0.90)

Keys: n= frequency; % = percentage

Discussion

The aim of this study was to investigate the prevalence, patterns of injuries and perceived risk factors of basketball players in Nigeria. These findings are the results of the information collected from the basketball players in Nigeria. This study shows that safety report data can be coded and summarized in a way that could be useful for prioritization and prevention of injuries in basketball players in Nigeria.

Most of all the basketball players who participated in this study reported at least one or more basketball injuries. The results of the study revealed a high prevalence (80.8%) of injury during training sessions compared with 57% of competition matches which agrees with the study of Moussa (7) which revealed a 77% prevalence of injury during training sessions compared with 23% competition matches. This finding disagrees with the studies of Kujala *et al* (13) and Messina (14) who reported a 58.3% prevalence of injury during competition matches (58.3%) compared with 41.7% of training sessions.

The population of male basketball players in this study was more than the female players and this might be as a result of more male players participating in the basketball competition than female players (7). This could be due to cultural issues that limit females from participating in certain vigorous activities. Vigorous activities may be defined as all activities which demand a lot of force and which may change the normal morphology of a woman (7). The society considers those vigorous activities to be appropriate for males, but not females. This reduced the level of physical activity among females predisposing them to risk of developing chronic diseases of lifestyle such as hypertension and diabetes (7). Although, female participation in sport is on the rise globally, males are still more involved in sports than females (15). Education regarding the health-related benefits of sports is of paramount importance in Nigeria.

The finding from this study showed that sudden turn, twists/ stop was the most common mechanism of injury. This finding agrees with the study of Borowski *et al* (16) which reported sudden turn, twists or stops as the most common causes of injuries in adolescent/youth basketball players. However, it contrasts with some other studies on professional male and female basketball players in which collision with an obstacle (fellow player or opponent) was documented as the major cause of injuries (17, 18). This contrast maybe due to the difference in the levels of play and skills. This is also in contrast with the report of the study by McKay *et al* (19), who identified eight mechanisms of basketball injuries: landing, half on another person's foot and half on floor), sharp twist, cut, or turn, collisions, falls, sudden stopping and tripping. Another study, which reported results of a large interview survey that, used a classification scheme based on the International Classification of External Causes of Injury system, found that the most common mechanism for all sports and recreation injuries were being struck by/against, falls, and over exertion (20).

Basketball requires all basic movement of high risk sports, such as jumps, landings, acceleration, deceleration, shifts and pivoting, which alone, lend a potentially hurtful nature to it combined with the inexperience of the players and coaches on proper landing, dribbling and movement techniques. Also, a significant proportion of the injuries were due to previous injuries which may have resulted from the fact that none of the teams who participated in the competition had neither a personal team physiotherapist nor a medical doctor who could have reduced the reoccurrence of injury with proper treatment and education. Therefore, proper preventive strategies, such as adequately trained coaches, good technique, protective equipment and appropriate playing surface should be implemented in basketball games and medical staff should be made available to the various teams.

In this study, sprain was predominantly the most common type of injury documented for both genders which was more represented at the ankle and knee joints. This is in line with the report of the study of Borowski *et al* (16) on adolescent basketball players which showed that ligament sprain and muscle/tendon strain were the most frequent injury diagnosed and studies of Akinbo *et al* (16) and Owoeye *et al* (2) reported the same. Also, the study of Zuckerman *et al* (21) reported that the most common injury in male and female basketball was ankle sprain.

The offensive zone recorded the highest injuries of the three zones and this is in line with the study of Akinbo *et al* (22). This is because the area is a very active area where offensive players try making shots against their opponent followed by the defensive area then the key area where they struggle to get rebound in order to make a shot or save the ball from getting into their opponent possession.

Concerning grouped body region, a large proportion of literature addressing basketball injury reported lower limbs as the region with the highest incidence of injuries (23-25, 18, 2). This study agrees with the findings in other studies which revealed that the majority of basketball injuries occur in the lower limbs. The result of this study revealed that ankle is the most commonly injured anatomical region followed by the knee which is

in line with previous studies on basketball injuries (17, 6, 21). However, the findings of this study are in contrast with some epidemiological studies of (18, 12) which reported injury to the knee joint as the most prevalent. The likely reason for this may be due to the fact that jumping and landing are skills often performed by basketball players. Therefore, most ankle injuries were sustained during this maneuver. Another cause of ankle injuries is sharp twist or turn, and changing of direction, which is also an integral part of basketball as half of the landing injuries and all of the twisting/turning injuries were incurred during weight bearing, as reported in the study of (26).

Regarding the injury prevalence and player's position on the court, point guard sustained more injuries (42.7%), followed by shooting guard (27.3%), small forward (21.8%), power forward (10.0%) and forward center (6.4%) with the least number of injuries. This could be due to the fact that players' playing point guards are more active on the field of play, scoring points for their teams which could predispose them to their opponent teammate preventing them from scoring thereby sustaining more injuries.

The most frequently used modalities for treatment in this study were massage, exercise therapy, bandaging which was also documented in other studies (27, 28, 23, 15). This is because most of the injuries were minor to moderate sprain which did not require any form of special treatment modalities. As a result, only 35.5% were prevented from playing after treatment and the remaining 65.5% continued playing.

The duration of period lost to injuries by players were mostly between 4-7 days (29.1%) while between 1-3 days and 8-28 days were the least duration of period lost to injuries by players (19.1%) respectively.

Most of the players did not make use of mouth guard during trainings and matches. This may be because there was no provision for this due to lack of fund for the team and this has caused players to sustain injuries. Majority of the players played on concrete floor during trainings and matches. This situation was quite surprising and it may be as a result of lack of good welfare package which should have taken care of the environment that the players practice. More than half of the players agreed to adequate lightening while playing during trainings and matches. Most of the players used Nike foot wear to play during trainings and matches. Over half of the players played between 1-3 hours during trainings while most of the players played less than 1 hour during matches.

Conclusion

The findings from this study showed that the prevalence of injury was relatively high compared with other studies. Sudden turn, twist or stop, fall from bad landing technique, collision with obstacle, hit by a projectile and previous injury were the major mechanisms of injury. Majority of the injuries were to the lower extremities, being more predominant in the ankle and knee region. The major perceived risk factors, were none usage of mouth guard and playing on concrete surface.

Conflict of Interest: None declared.

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