



Epidemiology and clinical profile of sports injuries treated in the Douala General and Laquintinie Hospitals, in Cameroon

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ABSTRACT

Objectives To describe the epidemiological patterns and clinical characteristics of sports injuries treated at two hospitals in Douala.

Methods This was a cross-sectional study conducted at the Douala General Hospital and Douala Laquintinie Hospital, involving medical records of patients treated for sports injuries from January 2012 to April 2022. Data extracted from records were entered into a data collection software and analysed using Microsoft Excel 2016. Severe injuries were defined as an injury score greater than or equal to 3 on the Abbreviated Injury Scale.

Results The prevalence of sports injuries was 1.12% among all trauma cases. There was a male predominance with 62 (86.1%) males and 10 (13.9%) females. The mean age was 24.97±13.8 years. Most injured persons were students 35 (48.6%), followed by the employed 26 (36.1%), athletes 6 (8.3%) and the unemployed 5 (6.9%). Recreational sports accounted for 43 (59.7%) injuries while 16 (22.2%) injuries occurred during physical education, 8 (11.1%) during trainings and 5 (6.9%) during competitions. Football injuries were 48 (66.7%), running injuries 10 (13.9%) and 9 (12.5%) occurred during long, high and triple jump. Among all injuries, fractures were 43 (59.7%), 11 (15.3%) joint sprains, 5 (6.9%) muscle injuries, 4 (5.6%) brain injuries while 9 (12.5%) were contusions and lacerations. Lower extremity injuries were 34 (47.2%), 21 (29.2%) injuries were on the upper extremities, 4 (5.6%) abdominopelvic, 3 (4.2%) thoracic injuries, 9 (12.5%) head injuries and 1 (1.4%) on the neck. Overall, 53 (73.7%) were severe injuries.

Conclusion The majority of sports injuries treated in these hospitals are fractures that occur during recreational sports, particularly football and predominantly involve the lower extremity. A significant proportion are severe injuries.

INTRODUCTION

Sports practice is inevitably linked with injury occurrence.¹ A sport injury is defined as body tissue damage that occurs as a result of sport or exercise.² Sport injuries treated in hospitals have different levels of severity, each accompanied by long-lasting musculoskeletal

WHAT IS ALREADY KNOWN ON THIS TOPIC

- ⇒ In developed countries, the prevalence and characteristics of sports injuries attending emergency departments, the type of sports involved and the profile of injured individuals are known.
- ⇒ There are little or no data published in a low-income and middle-income country (LMIC), particularly in Africa.

WHAT THIS STUDY ADDS

- ⇒ Contrary to already existing data from developed countries, sports injuries treated in hospitals in Cameroon are mostly fractures as opposed to soft tissue injuries in developed countries.
- ⇒ A significant proportion of sports injuries treated in hospitals are severe injuries that occur during recreational sports.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

- ⇒ These results demand further research on better management techniques to reduce time between occurrence of injuries and return to sports while also reducing the psychosocial impact of sports injuries in LMICs.
- ⇒ The results also call policy-makers to develop strategies for implementing safe sport regulations in LMICs, especially for recreational sports and physical education.

and psychosocial consequences to the injured individuals or athletes.

In the USA, it was reported that 3.5 million youth under the age of 15 years received medical care each year for sport injuries and two-thirds of these injuries require care in emergency units.³ In England, among 2432 new patients seen in an accident and emergency department 7.1% were sports related.⁴ In other developed countries such as France,⁵ studies have been published regarding the epidemiology of sports injuries treated at hospitals; describing the



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clinical characteristics of these injuries. In Turkey, an upper middle-income country, Akkaya *et al* had analysed sport-related injuries in an emergency department and showed that 80.5% of cases were men, and the mean age was 25.7±5.1 years. In their study, football injuries were a majority with 73.1% cases, followed by basketball injuries with 14.0% cases, then running or walking injuries with 10.2% cases. The most commonly injured body part was the lower extremities 62.7%, followed by the upper extremities 23.3% and the head and neck 6.9%, respectively.⁶

In low-income and middle-income countries (LMICs), there are little or no published data, especially in Africa on sports injuries treated in hospitals. Current available data are usually limited only to the prevalence of sports injuries at emergency departments. In Nigeria, Ibraheem *et al* reported a 0.4% sports injury prevalence among all injuries in a teaching hospital.⁷ Blankson *et al* in Ghana also reported a prevalence of 0.6% sports injuries in a teaching hospital.⁸ We were scientifically curious to provide and compare data in our context with already available data reported in developed and upper-middle-income countries regarding the profile of injured individuals, types of sports involved, prevalence and clinical characteristics of sports injuries treated at hospitals in Africa. As earlier mentioned, these injuries have long-lasting physical and psychological consequences and thus we found it necessary to provide this data to clinicians, the scientific community, policy-makers and the general population such that management and prevention policies may be examined. In Cameroon, there is a high participation rate in sports and physical activity and thus the occurrence of injuries.⁹ The types of injuries treated in hospitals vary and the injured population is diverse yet little or no data have addressed this topic in Cameroon. We aimed to study the epidemiological patterns and the clinical characteristics of sports injuries treated in hospitals. This study will provide the global scientific community with the characteristics of sports injuries treated in hospitals within an LMIC, the different anatomical regions concerned, the severity of these injuries, information on the injured population and the types of sports involved. These data add to the scarce literature on this topic in LMICs and will provide policy-makers information to modify sports practice in Cameroon.

METHODS

Study design

This was a hospital-based descriptive cross-sectional study, carried out from 1 October 2021 to 30 June 2022. We studied medical records of patients who were treated for sports injuries from January 2012 to April 2022.

Study setting and sampling

The study targeted file records of individuals inclusive of all genders, races, ethnicities and socioeconomic levels who presented to the Douala General Hospital (DGH) and the Douala Laquintinie Hospital (DLH) with any

injury which occurred during sports or exercise in the period of our study. Archives and registers of outpatient consultations, emergency units and all hospitalisation services were screened anonymously for eligible cases. All incomplete file records were excluded. These two hospitals are reference hospitals in the city of Douala which receive professionals, amateurs and non-athletic regular persons who participate in recreational, national and international sports activities. It is the largest city and the economic capital of Cameroon.

We used a consecutive sampling method. All file records during the period of study were screened for eligibility.

Statistical analysis and definitions

After obtaining ethical clearance and administrative approvals, data were accessed as recommended in the archives of the DLH and the DGH. The data collected were put into Open Data Kit Collect (ODK Collect) V.2022.1.2 and exported to Microsoft Excel 2016 where data were analysed. Quantitative variables were presented as means, frequencies and percentages.

Data collected from records included:

- ▶ Sociodemographic characteristics (age, sex, occupation, skill level, reason of participation).
- ▶ Type of sport or exercise practised (football, handball, walking, running, volleyball, basketball, tennis, swimming, cycling, aerobics, weight training, wrestling, boxing, judo, long/high/triple jump, karate, dance, other).
- ▶ Injury mechanism: direct contact (athlete, object, other), indirect contact, no contact, unknown mechanism.
- ▶ Pathology type: brain, joint sprain, bone contusion, fractures, muscle contusion, muscle injuries, contusion, abrasion, laceration, internal organs, non-specific.
- ▶ Anatomical region concerned (head, neck, thorax, abdomen, pelvis, extremities).
- ▶ Injury severity (AIS; (1) minor, (2) moderate, (3) serious, (4) severe, (5) critical and (6) maximum).
- ▶ Duration of time loss.

Duration of time loss was defined as the number of days that passed between the date of the injury occurrence and the date when the player is allowed to return to full participation in training or game.

Severe sport injuries were defined as any sport injury with a score greater than or equal to 3 on the Abbreviated Injury Scale¹⁰ of the concerned body segment.

A non-athletic regular person was defined to be any individual who does not practice sport or practices sport only for recreational purposes.

Equity, diversity and inclusion statement

We included all file records of patients treated for sports injuries inclusive of all genders, races, ethnicities and socioeconomic levels.

Table 1 Sociodemographic data of patients treated for sports injuries at the DGH and DLH

Variable	Frequency (n=72)	%
Sex		
Male	62	86.1
Female	10	13.9
Total	72	100.0
Profession		
Student	35	48.6
Employed	26	36.1
Athlete	6	8.3
Unemployed	5	6.9
Total	72	100.0
Reason of participation		
Recreational	43	59.7
Physical education	16	22.2
Training	8	11.1
Competition	5	6.9
Total	72	100.0
Skill level		
Non athletic regular person	64	88.9
Amateur	7	9.7
Professional	1	1.4
Total	72	100.0

DGH, Douala General Hospital; DLH, Douala Laquintinie Hospital.

Patient and public involvement

Our study did not involve the public or patients, we worked strictly with records in an anonymous manner following guidelines from the archives of these hospitals.

RESULTS

Sociodemographic characteristics

A total of 10 211 file records of patients received for trauma at the outpatient and emergency departments from January 2012 to April 2022 were reviewed. A total of 114 (1.12%) were treated for sports injuries. Of the total 114 files, 72 (63.2%) were retained in our study while 42 (36.8%) incomplete files were excluded. The mean age was 24.97 ± 13.8 years. We found a male predominance (table 1) with a 6.2 sex ratio. The ages ranged from 3 to 69 years. The majority of injuries have occurred during football 48 (66.7%), followed by injuries that occurred during running with 10 (13.9%) while 9 (12.5%) injuries were from long, triple and high jump (table 2).

Clinical characteristics

A total of 43 cases (59.7%) were direct contact injuries; whereby 25/43 (58.1%) cases were contact with athletes,

Table 2 Type of sport or exercise practised by patients treated for sports injuries at the DGH and DLH

table 2

Variable	Frequency (n=72)	%
Football	48	66.7
Running	10	13.9
Long/high/triple jump	9	12.5
Basketball	2	2.8
Dance	1	1.4
Karate	1	1.4
Tennis	1	1.4
Total	72	100.0

DGH, Douala General Hospital; DLH, Douala Laquintinie Hospital.

9/43 (20.9%) with objects (balls, goal posts, bats) and 9/43 (20.9%) with play surface. Indirect contact injuries summed up 21 cases (29.2%) while 8 (11.1%) were no contact injuries. Fractures were 43 (59.7%) Of all injuries (table 3).

Among 34 (47.2%) injuries that occurred to the lower extremity (Table 4); 11/34 (32.4%) occurred on the ankle, 10/34 (29.4%) on the knee, 9/34 (26.5%) on the lower leg, 2 (5.9%) cases on the hip and 2 (5.9%) cases on thigh. In the upper extremity 21 (29.2%), injuries were recorded, with 13/21 (61.9%) occurring on the forearm, 4/21 (19.0%) on the shoulder, 3/21 (14.3%) on the elbow and 1/21 (4.8%) on the wrist.

Injuries that resulted to a duration of time loss of over 21 days were 50 (69.4%) of and overall 53 (73.6 %) of injuries had a score of greater than or equal to three thus were considered to be severe injuries (table 5).

DISCUSSION

We assessed 10211 trauma-related files and found 114 sports injuries; a prevalence of 1.12%. Ibraheem *et al* found 0.4% sports injury prevalence among all injuries in a teaching hospital in Nigeria.⁷ Blankson *et al* found a

Table 3 Pathology type for sports injuries treated at the DGH and DLH

Variable	Frequency (n=72)	%
Fractures	43	59.7
Joint sprain	11	15.3
Contusion	5	6.9
Muscle injuries	5	6.9
Laceration	4	5.6
Brain	4	5.6
Total	72	100.0

DGH, Douala General Hospital; DLH, Douala Laquintinie Hospital.

Table 4 Anatomical distribution of sports injuries in patients treated for sport injuries at DGH and DLH

Variable	Frequency (n=72)	%
Lower extremity	34	47.2
Ankle	11	15.3
Knee	10	13.9
Lower leg	9	12.5
Hip	2	2.8
Thigh	2	2.8
Upper extremity:	21	29.2
Forearm	13	18.1
Shoulder	4	5.6
Elbow	3	4.2
Wrist	1	1.4
Head	9	12.5
Abdomen and pelvis	4	5.6
Thorax	3	4.2
Neck	1	1.4
Total	72	100.0

DGH, Douala General Hospital; DLH, Douala Laquintinie Hospital.

prevalence of 0.6% sports injuries in a teaching hospital in Ghana.⁸ However, Jones and Taggart found a prevalence of 7.1% in their study in England.⁴ This lower prevalence may be due to lower hospital access rates in the African context.

We found a male predominance, with 62 (86.1%) of sports injuries treated in hospitals to have occurred in men. This is similar to the findings of Akkaya *et al* who had 80.5% males⁶ and Jones and Taggart who had 82% males.⁴ This male predominance in our results is due to

Table 5 Severity of sports injuries treated in the DGH and DLH

Variable	Frequency (n=72)	%
AIS score		
3 serious	49	68.1
2 moderate	19	26.4
4 severe	4	5.6
Total	72	100.0
Duration of time loss		
Severe (over 21 days–permanent)	50	69.4
Moderate (8–21 days)	17	23.6
Minor (1–7 days)	5	6.9
Total	72	100.0

AIS, Abbreviated Injury Scale; DGH, Douala General Hospital; DLH, Douala Laquintinie Hospital.

the high participation of males to females in sports and physical activity in Cameroon.⁹

The mean age was 24.97±13.8 years. This result is consistent with the findings of Akkaya *et al* who found their mean age to be 25.7±5.1 years,⁶ and Jones and Taggart, who had a mean age of 22 years.⁴ This similarity could be explained by the very high participation of this age group in recreational sports, which is played with fewer rules and requirements concerning equipment, warm-ups, play surfaces, etc. The ages ranged from 3 to 69 years and is similar to the results of Jones and Taggart who had an age range from 8 to 60 years,⁴ which is consistent with Akkaya *et al* who found 5–68 years.⁶ This similarity can be explained by the fact that sports injuries affect all age groups.

Students were found with a greater proportion of injuries 35 (48.6%), the employed had 26 (36.1%), 6 (8.3%) were athletes and 5 (6.9%) were unemployed. Jones and Taggart also reported in their study that 40.7% were school children or students, 37.2% were employed and 22.1% were unemployed.⁴ The high participation of students in recreational sporting activities explains this.

In a total, 43 (59.7%) of injuries occurred during recreational sports, 16 (22.2%) occurred during physical education while 8 (11.1%) occurred during training and 5 (6.9%) during competitions. As mentioned, earlier recreational sports are played on inappropriate surfaces and lack strict rules.

Injured individuals were 64 (88.9%) non-athletic regular persons, 7 (9.7%) amateurs and 1 (1.4%) professionals. Jones and Taggart found 62.2% individuals reporting at an accident and emergency department for sports injuries to be non-athletic regular persons, 36.6% amateurs and only 2% were professionals.⁴ This is because amateur and professional sporting activities usually have an attending physician who refers very few cases.

Injuries occurred during football in 48 (66.7%) cases, 10 (13.9%) during running, 9 (12.5%) during long/high/triple jump while basketball injuries accounted for 2.8%. Akkaya *et al* also found football to be the most common cause of injuries in all age groups and Jones and Taggart found football in 65.11% of cases.⁴ This could be explained by the combination of high speed and contact in football.¹¹

The lower extremity was found to be the most injured region, with 34 (47.2%) injuries, followed by the upper extremity 21 (29.2%), the head 9 (12.5%), abdomen and pelvis 4 (5.6%), 3 (4.2%) of injuries were thoracic. Jones and Taggart showed that the majority of injuries were to the extremities (32.6% arm and 55.2% leg), 1.7% chest, 9.3% to head or face and 1.2% spine.⁴ Akkaya *et al* found similar results in their study with the majority of injuries to have occurred in the lower extremity 62.7%, the upper extremity 23.3%, torso 4.7% and the 6.9% on the head and neck.⁶ Systema *et al* explained that extremity injuries are more common in team sports.¹² This correlates with our results which showed football to be the most practised sports and therefore, presenting with more injuries.

A total of 43 (59.7%) were direct contact injuries, indirect contact injuries summed to 21 (29.2%) while 8 (11.1%) were no contact injuries. Football was the most practised sport in the injured population. The high speed and contact involved in football thus explains the greater proportion of contact injuries in our study.

Fracture injuries were a majority with 43 (59.7%) while 11 (15.3%) were joint sprains, 5 (6.9%) muscle injuries, 5 (6.9%) contusions, 4 (5.6%) lacerations and 4 (5.6%) brain injuries. This study is not in accord with the findings of Akkaya *et al* who rather found soft tissue injuries to be a majority of the cases with contusions, lacerations, abrasions and hematoma accounting for 40.6%, strains and sprains 37.5%, fractures 15.2% and head injuries 6.5%. Jones and Taggart reported in their study that 70.9% of injuries were soft tissue injuries and fractures were 17.44% while head injuries 3.5%.⁴ This difference in result can be explained by the pyramidal health system in Cameroon and the economic burden associated to healthcare which motivates only seriously injured individuals to arrive hospitals.

We found 50 (69.4%) of injuries with a duration of time loss of over 21 days and overall 53 (73.6 %) of injuries had a score greater than or equal to 3, considered severe injuries. The explanation of these results could be multifactorial including factors like the fact that these hospitals are central hospitals and thus receive only serious cases, that injuries that occur during recreational are severe, some management techniques in LMICs are not up to international standards, among others.

CLINICAL AND POLICY IMPLICATIONS

- ▶ Most injuries occurred during recreational sports and physical education. This is a call for local policy-makers to create, contextualise and implement international safe sport practices and rules for recreational sports and physical education.
- ▶ Sports injuries treated at hospitals in LMICs are severe. Clinicians in LMICs will, therefore, have to contextualise protocols and techniques to reduce duration of time loss and the psychosocial effects of sports injuries.
- ▶ We found a high male to female predominance due to lower participation of females in LMICs in sports. Policy-makers should reinforce equity diversity and inclusion of the female population in sports. For example, offering awards to female athletes is amateur and school sports.

LIMITATIONS

This was a hospital-based, two-centre limited study. Our study was exposed to several limitations; records were made by various clinicians with variable expertise; we have a pyramidal health system thus injuries that reach these tertiary institutions are likely to

be serious. Poor storage of file records, incomplete records greatly reduced our study population.

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Contributors LTT: conceptualisation, data curation, investigation, methodology, writing original draft, writing review, validation (guarantor); WND: methodology, validation, project administration, supervision and validation. TCN: conceptualisation, methodology and validation. GMA: conceptualisation, methodology, writing review and editing. B-EM: writing original draft, methodology, validation; KLK: data curation, formal analysis, methodology; AB: methodology, project administration, supervision and validation of this work.

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Patient consent for publication Not applicable.

Ethics approval Ethical and administrative clearance was obtained from the University of Douala (No.2987 IEC-UD/04/2022/T), the Review Board of DGH (No_ AR/MINSANTE/HGD/DM/03/22) and the DLH (No 01077/AR/MINSANTE/DHL). Data were then accessed anonymously following the recommended guidelines.

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Data availability statement All data relevant to the study are included in the article.

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