# **Original Article**

## Profile of trauma patients in the emergency department of a tertiary centre in Nigeria: a five-year review

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#### Abstract

**Background:** Trauma contributes significantly to morbidity, loss of productive man-hours, disability and mortality in both the developed and developing world.

**Aim**: To describe the profile of injuries presenting at the Accident and Emergency Department of the University of Port Harcourt Teaching Hospital.

**Methods**: A retrospective review of the admission records and in-patient records of trauma patients admitted in the Accident and Emergency unit of the University of Port Harcourt Teaching Hospital. Patients' demographics, presenting complaint at admission, treatment spectrum, emergency treatment received and the specialist for definitive treatment were extracted and analyzed. Results were presented in tables and charts where necessary. Means and standard deviations were used to represent certain variables.

**Results**: Records from 10,787 (out of 10,939 persons) that presented with traumatic injuries were included, giving an inclusion rate of 98.6%. Crude injury prevalence rate was 25.4% while crude mortality rate was 7.1%. Male: female ratio was 3.4:1, the mean age was 33.17+/-16.1years while the most common age group was the 21-30-year age group. Road traffic accidents (RTAs) accounted for 46.3% of all injury mechanisms seen. Skin and subcutaneous injuries (39.5%) were the most commonly injured body region, followed by bone fractures (31.6%). Most patients were stabilized and transferred to the ward/ theatre/Intensive Care Unit (63.7%) while 21.7% of patients were discharged home after initial stabilization.

**Conclusion:** A quarter of disease burden in the emergency room is from traumatic conditions with the young adult male being the most common victim. RTAs contribute to 46.3% of injury mechanisms.

Keywords: Injuries, trauma, road traffic accidents, fractures

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## **INTRODUCTION**

Trauma contribute significantly to morbidity, loss of productive man-hours, disability and mortality in both the developed and developing world. Low and middle-income countries contribute to 90% of global trauma deaths.<sup>1</sup> Trauma in general contribute to 12% of the global disease burden.<sup>2</sup>

Generally, injuries are defined as bodily lesions/impact at organic level resulting from acute exposure to energy in amounts that exceeds the threshold of physiologic tolerance or the absence of such essentials as heat or oxygen.<sup>3</sup> Such impacts may lead to a range of physiologic derangements resulting in recovery, disabilities or deaths.

Common causes include, road traffic accidents (RTAs), fall from height, industrial injuries, occupational injuries, domestic injuries, assault and firearm injuries.<sup>4-7</sup> The contribution of each of these is a reflection on the extent of motor vehicular use, degree of adherence to use of safety gadgets, the prevalence of civil unrest as well as other socio-demographic indices.

RTAs have been reported by many authors as the leading cause of both trauma- related injuries and trauma-related deaths.<sup>4-7</sup> Mortalities from such injuries is predicted to rise by 40% by 2030.<sup>8</sup> These injuries usually affect the youthful population- the most mobile and most enterprising segment of demographics of most countries.<sup>9,10</sup> Falls from heights are particularly a major concern in the children and in the elderly population.

In less developed nations with poor safety regulations especially in the manufacturing sector, occupational injuries may play a significant contribution to the trauma spectrum. These injuries typically leave a disabled workforce with attendant negative impact on both the affected individuals and in the gross domestic product of the nation.

The loss of man hours from treatment of injuries resulting from trauma, the health expenditure from patients/ relatives as well as the disabilities arising from these injuries will no doubt have negative economic bearing on the patients involved and may bear significantly on work place compensation measures. Disabilityadjusted life years (DALYs) which combine the number of years of life lost from premature death with the loss of health from disability among persons with nonfatal injuries is an attempt to measure the non-fatal impact of trauma on a given population.<sup>3</sup>

The scope and quality of pre-hospital care in most developing countries is still at rudimentary stage. This creates a serious intervention gap and contributes to the outcome of care following presentation in a care-facility.

Facility based emergency care is also poorer in less developed nations compared to the more developed ones mainly due to absent care equipment, decaying infrastructure and poor health financing.<sup>11,12</sup>

A study of the profile of such injuries will among other things help detect any change in epidemiologic trend, understand the common presentation patterns and appreciate the demographic distributions with the view of improving the management of trauma within the study area, aiding resource allocation and formulating appropriate policies aimed at reducing the burden of trauma in our subregion. A study of this nature can also provide valuable data for health insurance operators and health system managers in periodic reviews of the epidemiology of trauma. The aim of this study was to describe the profile of injuries presenting at the Accident and Emergency Department of the University of Port Harcourt Teaching Hospital.

## PATIENTS AND METHODS

#### Study design

This was a retrospective review of the profile of trauma patients that presented at the Accident and Emergency Department of the University of Port Harcourt Teaching Hospital over a five-year period, 1<sup>st</sup> January 2018 to 31<sup>st</sup> December 2022.

## Method

The admission records and in-patient records were retrospectively reviewed to extract relevant information on patients' demographics, presenting complain at admission, treatment spectrum, emergency

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treatment received and the specialist for definitive treatment. For the purpose of analysis, patient co-morbidity was defined as the presence of pre-existing medical conditions that could alter the outcome of of the treatment traumatic condition. Definitive treatment outcome could only be evaluated after definitive care by the managing team which was usually after the patient has left the accident and emergency unit. Definitive outcome was however not part of this study although the immediate outcome based on treatment in the emergency room was included in the study.

#### **Study location**

The University of Port Harcourt Teaching Hospital (UPTH) is in Rivers State along East-West Road with coordinates of 4.45305800N and 6.5504300E. UPTH serves as a tertiary referral centre and receives referrals from neighboring states such as Bayelsa, Abia, Imo, Akwa-Ibom, Delta, Cross River, and other states in Nigeria. The Accident and Emergency Department is the first point of call for all adult and pediatric trauma emergencies.

The department has medical officers of several categories and varying level of training who provide emergency care for trauma patients before transfer to the more appropriate specialty for definitive treatment. Payments for elective interventions are based on out–of-pocket for most patients since the insurance coverage is quite low.<sup>6</sup> The emergency care policy of the hospital provides some cover for emergency procedures but drugs and advanced surgical interventions are not included in this policy.

#### **Study population**

Patients who presented at the Accident and emergency department of the study center within the study period. Patients with incomplete medical records that will not aid in the analysis were excluded.

#### **Ethical approval**

The authors obtained ethical approval before commencement of the study.

Table	1:	Dem	ograj	phics
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Variable	Frequency (Percentage)			
Age (years)	n (%)			
<1	23 (0.2)			
1–10	302 (2.7)			
11–20	924 (8.6)			
21–30	3941 (36.6)			
31–40	2523 (23.4)			
41–50	2086 (19.3)			
51–60	719 (6.7)			
61–70	117 (1.1)			
71–80	82 (0.7)			
80-90	53 (0.5)			
>90	17 (0.2)			
Sex				
Male	8342 (77.3)			
Female	2445 (22.7)			
Occupation				
preschool Children/students	1323 (12.2)			
Driver	508 (4.7)			
Civil servant/ self -employed	2409 (22.3)			
Unemployed	5638 (52.3)			
Businessman	3981 (36.9)			
Professionals	349 (3.2)			
Others	60 (0.6)			
Marital status				
Single	4434 (41.1)			
Married	5969 (55.3)			
Widow	306 (2.8)			
Divorced	78 (0.7)			
Level of education				
Un-educated	228 (2.1)			
Primary	714 (6.6)			
Secondary	5717 (53.0)			
Tertiary	4128 (38.3)			

Road traffic accidents (RTAs) accounted for 46.3% of all injury mechanisms seen. Firearm

injuries (23.5%), burns (8.7%) and assault (6.0%) also made good contributions as shown in Table 2.

#### Data analysis

Data obtained was analyzed descriptively using the Statistical Package for Social Sciences (SPSS) version 21 (IBM Corp., Armonk, NY, USA). Results were presented in tables and charts where necessary. Means and standard deviations were used to represent socio-demographic variables of respondents.

Table 2: Distribution of aethologies					
Aetiology	n (%)				
Road Traffic Accidents (RTA)	4993 (46.3)				
Firearm injuries	2531 (23.5)				
Burns	934 (8.7)				
Falls	643(6.0)				
Sports injuries	244 (2.3)				
Industrial injuries	786 (7.3)				
Assaults	637 (6.0)				
Birth trauma	19 (0.1)				
Total	10,787 (100)				

Table 2. Distribution of acticlesion

Table 3: Distribution of injury mechanisms across age groups

Age	Aetiology								
group (years)	RTA	Falls	Firearms	Burns	Sports injuries	Industrial injuries	Assaults	Birth trauma	Total
<1	3	1	-	-	-	-	-	19	23
1–10	29	108	27	34	60	-	44	-	302
11–20	641	89	5	54	48	-	87	-	924
21–30	1501	21	1418	329	83	283	306	-	3941
31–40	1412	38	425	117	53	352	126	-	2523
41–50	1047	81	434	358	-	130	36	-	2086
51-60	327	99	217	31	-	21	24	-	719
61–70	18	79	3	9	-	-	8	-	117
71-80	12	63	1	2	-	-	4	-	82
81-90	1	50	-	-	-	-	2	-	53
>90	2	14	1	-	-	-	-	-	17
Total (%)	4993 (46.8)	643 (6.0)	2531 (23.5)	934 (8.7)	244 (2.3)	786 (7.3)	637 (6.0)	19 (0.1)	10,787 (100)

Patients from age 1 to 20 years and those from 41 to 90 years had more falls. Road traffic accidents and firearm injuries were more common in those between 21 and 50 years (Table 3).

Skin and subcutaneous injuries (39.5%) were the most commonly injured body region, followed by bone fractures (31.6%) (Table 4).

#### RESULTS

A total of 10,939 patients presented Accident and Emergency Department with traumatic injuries. Records of 152 patients were either not completely reported or not found in the archives. Available records from 10,787 were included in the study giving 98.6% inclusion rate. Total emergencies (medical and surgical) seen within the study period were 42,443 giving a crude injury prevalence rate of 25.4%.

The age range was from 0-96 years with a mean age of 33.17+/-16.1 years. The most common age group was the 21-30-year age group. There were 8,342 males and 2,445 females giving a male to female ratio of 3.4:1 (Table 1).

Injury pattern	n (%)
Bone fractures	3,405 (31.6)
Skin and subcutaneous Injuries	4,261 (39.5)
Traumatic brain injuries	1894 (17.6)
Spinal cord injuries	910 (8.4)
Maxillofacial injuries	493(4.6)
ENT injuries	676 (6.3)
Ophthalmic injuries	390 (3.6)
Urologic injuries	341 (3.2)
Chest trauma	681 (6.3)
Abdomino-pelvic injuries	108(1.0)
Multiple injuries	1,994 (18.5)

Table 4: Distribution of body regionsaffected

Most patients were stabilized and transferred to the ward/ theatre/ICU (63.7%) while 21.7% of patients were discharged home after initial stabilization as shown in Table 5.

 Table 5: Outcome of ER treatment

ER treatment outcome	n (%)		
Stabilized and discharged home	2342 (21.7)		
Stabilized and transferred to the ward/theatre/ICU	6867 (63.7)		
Signed against medical advice	249 (2.3)		
Absconded	115(1.1)		
Referred out by specialist team	445 (4.1)		
Died in the ER	766 (7.1)		
Total	10,787 (100)		

#### DISCUSSION

This study showed that of the 42,443 patients

that presented to the Accident and Emergency Department (emergency room) within the fiveyear period under review, 10,787 had injuries accounting for a crude injury prevalence rate of 25.4%. This was similar to findings reported by both Onyemaechi *et al.*<sup>13</sup> in Enugu (24.3%) and Prekker *et al.*<sup>10</sup>(24.4%) in Minnesota, USA.

Health system managers and policy makers in the developing world can no longer afford to neglect this huge load of patients as it consistently takes a good chunk of health expenditure. The center for disease prevention and control has reported that trauma accounts for 30% of life years lost.<sup>8</sup>

The 'young adult male' was the most common patient in this study. This corroborates the findings from many other studies.<sup>4,5,8</sup> In the developing world 'the young adult male' is the most productive, the most enterprising and the most daring.<sup>15-17</sup> The direct impact of having this sector of the demographics of a developing nation crippled by injuries, on the socio-economic dynamics of the families affected and the GDP of the nations affected is difficult to evaluate.

Most patients (52.3%) in this study are unemployed. This probably reflects the high unemployment rate in the Nigeria. The study by Onyemaechi *et al.*<sup>13</sup> in Enugu however, had more traders, artisans and students. The latter study was carried out in the south eastern part of the country which is predominantly known for traders and artisans.

Road traffic accidents account for 43.6% of all injuries seen in this study. Abhilash *et al.* <sup>18</sup> in South India also reported that road traffic accidents were the most common mechanism of injury (65%). Same pattern was reported by other authors.<sup>19,20</sup> This study particularly showed a high incidence of firearm injuries (23.5%) in the region much higher than injuries from falls as reported by other studies.<sup>18,19</sup> This clearly reflects the high rate of gun violence in the oil-rich regions of the Niger delta and perhaps the unguided use of weapons by security personnel in a bid to maintain law and order.

Burns (8.7%) and industrial injuries (7.3%) also made good contributions to the reported mechanisms of injury. The study period probably witnessed a steady rise in the activities of illegal refineries within the creeks of the Niger delta region. This may explain the high contribution of burns injuries. Other authors<sup>13,21</sup> reported low incidence of burns injury.

Skin and subcutaneous tissue injuries were the most predominant injuries (39%) seen in this study. The wide distribution of these body organs made them prone to injuries and in most cases associated with injuries to other organs, during trauma. Elachi *et al.*<sup>4</sup> in Makurdi, North Central Nigeria also reported that 63.4% of their patients had wounds that required debridement.

Bone fractures (21,6%) and traumatic brain injuries (17.6%) were the second and third leading injuries seen in this study. This is consistent with findings from most studies in the region.<sup>4,13,22,23</sup> Whilst bone fractures are notorious contributors to prolonged hospital stay, increased health expenditure and increased need for post-care rehabilitation, traumatic brain injuries are good contributors to early trauma deaths. The high incidences of these two injuries portend the need for promotion of more preventive measures against injuries.

This study also showed that 18.5% of patients had injuries affecting more than one body system. Arbhilash *et al.*<sup>18</sup> in India also reported a similar incidence of polytrauma (13.8%). They noted that polytrauma patients in their study contributed to 7.8% of mortalities among trauma patients in the emergency room. Poly- trauma is a huge challenge to the ER personnel, the patient and the system manager as it has been shown to be an independent predictor of death among trauma patients.<sup>24,25</sup>

Majority of patients in this study (85.4%) were stabilized and either discharged home from the ER or transferred to the ward or theatre for more definitive treatment. Many of these had minor injuries with ISS<15. Abebe *et al.*<sup>21</sup> in Ethiopia also had a similar finding (86%) there study was conducted in a tertiary centre with fairly similar level of expertise like the study centre. Elachi *et al.*<sup>4</sup> in Makurdi North Central Nigeria however reported lower rates (56.2%). They attributed their lower incidence to a high rate of discharge against medical advice (22.4%) and a higher mortality rate of 15.2%.

Discharge against medical advice rates in this study was 2.7% while crude mortality rate was 7.1%. The lower crude mortality rate compared to the study by Elachi *et al.*<sup>4</sup> may be a reflection of better quality of care and perhaps earlier presentation for traumatic cases. Onyemaechi *et al.*<sup>13</sup> reported a crude mortality rate of 4.5% which is similar to rates reported

by other workers<sup>5,22,26,27</sup> within Nigeria and the African sub-region.

The disparities in mortality rates across various tertiary centres within the same region underscores the need for the establishment of national trauma databases to coordinate trauma data across various cities within the nation. It could also highlight the existing disparities in available health equipment and level of trauma expertise among various tertiary centres in the country.

What is common to the existing disparity in trauma-related crude mortality rate is the fact that traumatic brain Injury (TBI) is the leading cause of mortality<sup>3,5,13,26,17</sup> in most centres within the country and in most Low and Middle- Income Countries. TBIs accounted for 82.5% of deaths among trauma patients in this study. This high contribution of TBIs to trauma mortality may result from a cacophony of factors which include but not limited to, the poor adherence to helmet use by motorcycle drivers, the abysmally low number of available neurosurgeons, the unaffordability of brain CT scan by most patients, the absence of intensive care units in most centers as well as failure of trauma personnel to initiate appropriate initial treatment to prevent secondary brain injuries.<sup>28-30</sup>

The present study had some limitations. The study was a retrospective one. It limited the number of variables to be included in the study and the extent of analysis that would have been done.

## CONCLUSION

Our study found out that a quarter of disease burden in the emergency room was from traumatic conditions with the young adult male being the most common victim. RTAs contribute to 46.3% of injury mechanisms. There is however, a relationship between age groups and injury aetiology. Patients from age 1 to 20 years and those from 41 to 90 years had more falls. Road traffic accidents and firearm injuries were more common in those between 21 and 50 years. The disturbingly higher rates of firearm injuries call for strict regulations to curb the proliferation of illegal firearms and proper training of security personnel on appropriate use of arms at their disposal. Crude trauma mortality rate was

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7.1% with TBIs contributing to 82.5% of mortality. The strict enforcement on helmet use, better health insurance coverage and bridging the existing skill and infrastructure gap may help reduce mortality and improve treatment outcome.

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Nil

#### **Conflicts of interest**

There are no conflicts of interest

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