



## Musculoskeletal injuries: A cross-sectional study in Irrua, Nigeria

Edwin O. Edomwonyi\*, Osasuyi Enoma

Department of Orthopaedics and Trauma, Irrua Specialist Teaching Hospital, Irrua, Nigeria

\*Correspondence: [edomwonyi1971@gmail.com](mailto:edomwonyi1971@gmail.com)

<https://dx.doi.org/10.4314/ecajs.v22i3.7>

### Abstract

**Background:** Injury is a leading cause of morbidity and mortality among people of various age groups globally. Its economic impact on victims and family is tremendous. Strengthening of legislation and enforcement of extant rules and regulations on prevention and treatment are crucial. The aim of this study as to determine the pattern of musculoskeletal injuries among patients as they present at Irrua Specialist Teaching Hospital (ISTH), Irrua, Edo State of Nigeria.

**Methods:** This is a prospective cross-sectional study of consecutive patients who presented at the accident and emergency department of ISTH with musculoskeletal injury, severe enough to require inpatient care for at least 24 hours, from January 1, 2014-December 31, 2014.

**Results:** One hundred fifty-one patients were recruited. Median age was 35.6 years. Age range was 4 to 99 years. The majority of participants (72.9%) fell within the 20-to 50-year age group. Road traffic collision was the leading cause of injury (121 patients; 80%), and 67.8% of these injuries were motorcycle-related. Passengers constituted 48.8% of victims. Twenty-six (17.2%) patients had only soft tissue injuries while 125 (82.8%) had both bony and soft tissue injuries. The lower limb was the most frequently injured body part. The tibia and femur were the most frequently injured bones.

**Conclusions:** Injury is a leading cause of morbidity in Irrua. Road traffic collisions were the leading cause, occurring among the economically viable age groups, thereby imposing severe social pressures on the victims, their families, as well as the health system. Enforcement of extant traffic rules and strengthening of trauma prevention and trauma service delivery systems is advised.

**Keywords:** injuries, musculoskeletal, Irrua, Nigeria

### Introduction

Worldwide, about 16,000 people die of injuries daily.<sup>1</sup> It is estimated that by the year 2020, 8.4 million people will die every year from injury.<sup>2</sup> For every death recorded, millions of people require hospital treatment, 10-20 victims are hospitalised, 50-100 receive emergency care and 100 victims sustain minor injuries.<sup>3</sup> In spite of these, statistics on health are far from adequate worldwide.

Injury is a leading cause of mortality and morbidity among people of various age groups in both developing and developed countries in the world<sup>4</sup>. Road traffic collisions (RTCs) account for 2.1% of total deaths and 21% of total injury globally<sup>4</sup> and in developing and underdeveloped countries, they account for 80% of these deaths.<sup>5</sup> If appropriate actions are not taken, RTCs are estimated to become the third-leading cause of death and injury by 2020.<sup>6</sup> A significant proportion of these injuries are motorcycle-related. The growing popularity of motorcycles in Nigeria is attributed to the relative ease of maintenance, flexibility in traffic, offering convenient door to door services and rapid rate of urbanisation in the face of inadequate means of transportation.



Falls within or outside the home is another known cause of musculoskeletal injuries (MSI). The elderly, who constitute a fast-growing part of the population of most developed countries, are particularly vulnerable. Assaults, communal clashes, armed robbery attacks are not excluded. Reported incidence of injury in Pakistan is 41.3/1000/year and 32.7/1000/year in Tanzania, while in South West Nigeria incidence has been reported 100/1000/year.<sup>7</sup>

RTC is a leading cause of death among people aged 19 to 29 years. Its economic impact to victims, their families, and the nation is tremendous. The losses arise from cost of treatment and reduced or lost productivity (in wages, for example) for those killed or disabled by their injuries and the family members who have to take time off work (or school) to care for the injured. Seventy-five percent of all poor families who lost a member to RTC reported a decrease in their standard of living and 61% reported they had to borrow money to cover expenses following their loss.<sup>8</sup>

Global estimates of the cost of injury are sparse. Research in 2010 suggested that RTCs cost countries about 3% the gross national product (GNP). This figure rises to 5% in some low and middle-income countries.<sup>9</sup> To the best of the author's knowledge, studies from Irrua in Edo state of Nigeria on this subject are sparse. The only previous study revealed the characteristics of victims involved in motorcycle-related collisions only.<sup>10</sup> None has looked at the pattern of MSIs from all known causes as they present at Irrua Specialist Teaching Hospital (ISTH), Irrua. This study was conducted to fill this gap. This information can be used to design, implement, and evaluate interventions to reduce the burden of MSI. The aim of this study was to determine the pattern of MSI at ISTH, Irrua and so provide a baseline for effective, efficient planning and mapping out strategies for injury prevention and treatment.

## Methods

This was a cross-sectional study of consecutive musculoskeletal (MS) trauma patients as they presented at the accident and emergency department of ISTH Irrua, Edo State, South South Nigeria in the period between January 1, 2014 and December 31, 2014. Approval was sought and obtained from the institutional ethics and research committee. Informed consent was obtained.

ISTH is a 375-bed hospital situated in Irrua, a suburban community in midwestern Nigeria. It is about 90 km northwest of Edo State's capital city, Benin. It serves principally the Edo Central and Northern senatorial zones and the neighbouring states of Delta, Ondo, and Kogi.

Data were collected using a specially designed and structured pro forma to extract relevant information from patients that sustained MSIs severe enough to necessitate hospital admission for at least 24 hours.

Demographic data: age, sex, occupation, aetiology of injury, part injured, presence of fractures, bone involved, status of patients at the time of accident (passenger, pedestrian, driver, or rider) in cases of RTC were entered into the pro forma by resident doctors in the department of orthopaedics and trauma. Excluded were cases of severe injuries to other body systems such as abdomen, head, and chest without significant MSI and thus needing primary management by other hospital units. Data were collated and analysed using SPSS version 17.

## Results

In the period under review 151 patients met our criteria and were recruited. One hundred four were males and 47 were females. The male-to-female ratio of was 2.2:1. Median age was 35.6



years. The age range was 4 to 99 years. Table 1 shows that the 20- to 50-year age group was the most commonly affected (110 patients; 72.8%). Civil servants were the least affected (14 patients; 9.3%), and at the other end of the spectrum were the businessmen or traders (52 patients; 34.4%) (Table 2).

Table 1: Patient age and gender						
Age range (years)	Male		Female		Total	
	n	%	n	%	n	%
1-10	1	0.7	3	2	4	2.7
11-20	8	5.3	3	2	11	7.3
21-30	34	22.5	13	8.6	47	31.1
31-40	29	19.2	12	8	41	27.1
41-50	16	10.6	6	4	22	14.6
51-60	9	6	4	2.7	13	8.6
61-70	3	2	2	1.3	5	3.3
71-80	2	1.3	0	0	2	1.3
81-90	2	1.3	0	0	2	1.3
91-100	0	0	2	1.3	2	1.3

Table 2: Patient occupation		
Occupation	n	%
Business/Trading	52	34.4
Civil Servants	14	9.3
Driving	27	17.9
Students	28	18.5
Others	24	15.9

Table 3: Status of road-traffic collision victims		
Status	n	%
Driver (car) or rider (motorcycle)	47	38.8
Passenger	59	48.8
Pedestrian	15	12.4

Figure 1 shows the causes of injury. RTCs were the causes of injury in 121 (80%) of the patients. The majority (67.8%) of RTC cases involved motorcycles. Domestic accidents included falls in 20 patients (13.2%), armed robbery with gunshot wounds were seen in 4 patients (2.7%), assaults and political hostilities were reported in 6 patients (4%) (Figure 1).

Of the 121 patients involved in RTCs, 59 (48.8%) of them were passengers, 15 (12.4%) were pedestrians, and 47 (38.8%) were drivers or motorcycle riders (Table 3).

Twenty-six patients (17.2%) had soft tissue injuries, and 125 (82.8%) had both bony and soft tissue injuries. Five patients (3.3%) had associated traumatic brain injuries (TBI), while 1 patient (0.7%) had a spinal injury. The 151 patients sustained 165 limb injuries, with the lower limb affected in 82% of cases and the upper limb in 18%. Two hundred three fractures were sustained in the 125 patients who had bony injuries. Fifty-five patients (27.1%) had tibia fractures, while 53 (26%) had femoral fractures, making the tibia and femur the most frequently fractured bones. This was closely followed by the fibula, injured in 49 patients (24.1%) and the humerus in 6 patients (3%) (Table 4).

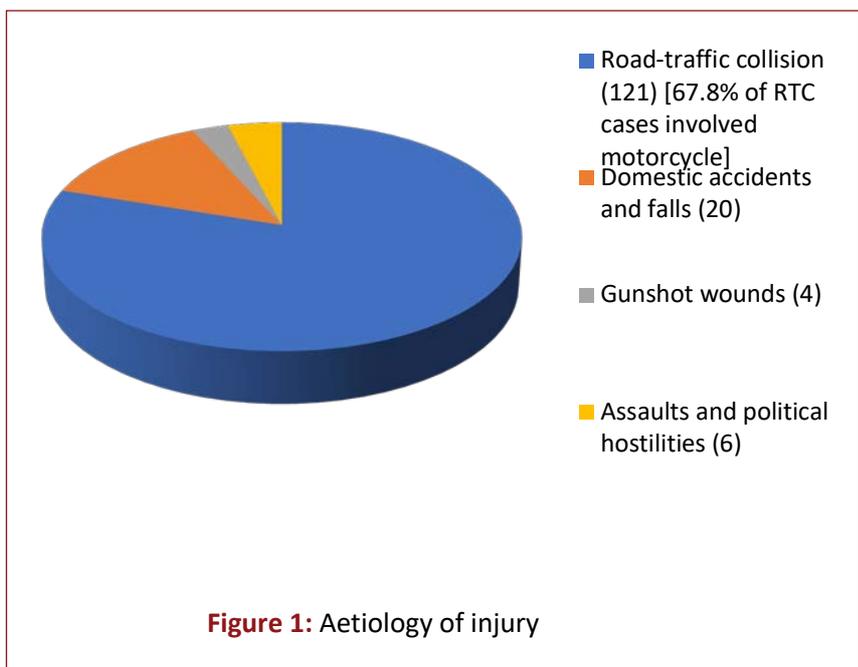


Figure 1: Aetiology of injury

**Table 4: Bony injuries**

Bone involved	n	%
Humerus	6	3
Radius	9	4.4
Ulnar	7	3.5
Carpal and hand bones	5	2.5
Femur	53	26
Patella	3	1.5
Tibia	55	27.1
Fibula	49	24.1
Foot bones	8	3.9
Skull	7	3.5
Spine	1	0.5

## Discussion

The World Bank estimates that injury sustained from RTC costs 1-2% of GNP in developing countries or twice the total amount of development aid received worldwide by developing countries.<sup>11</sup> RTC is a leading cause of injury worldwide.<sup>7,12,13</sup> It has emerged as a major global public health problem and is now recognised as a neglected pandemic.

Of all the injuries in this study, 80% were caused by RTCs. Reports from Qatar, South East (SE) Nigeria, and Delta State in South South (SS) Nigeria, had RTC proportions of 56%, 40.5%, and 74%, respectively.<sup>12,14,15</sup> The location of the study area, which is along the busy Benin–Abuja road (the only link between SE and SS to the northern part of Nigeria) and the deplorable state of the road contribute to the high figure recorded in this study.

About 67.8% of all MSIs from RTCs were motorcycle-related in aetiology. Odatuwa<sup>15</sup> recorded 50%. In Thailand,<sup>16</sup> hospital records showed 75% to 80% of RTCs were among 2-wheeled vehicles. These are not easily visible to larger vehicle operators. Quite often street lights are not functional, roads are in bad shape, they ride their vehicles without functioning headlamps, making them vulnerable particularly at nights. Reckless driving, overloading, inadequate training, disregard for traffic rules and regulations, poor licensing of users in the study areas may account for the high figures recorded in this study.

Driving at excessive speeds while under the influence of alcohol or drugs, while sleepy or tired, when visibility is compromised, with or without protective gear for all vehicle occupants are major factors in collisions, serious injuries and deaths. Enforcement of road and traffic legislation, safety rules on speed limits and alcohol-ignition interlock systems that detect alcohol on the breath of drivers are advised. The alcohol-ignition interlock system is an electronic driver improvement monitor that connect individual driver profile assessment and his vehicle operator actual performance. Improving the visibility of drivers in other instances such at nights or during



fog can reduce the risk of injuries. Daytime running light and high mounted stop lamps have significantly reduced collisions as have reflectors and colourful lighting. In contrast to the above finding, Awasthi et al.<sup>17</sup> in northwest India, reported RTC as a cause of MSI was less common than falls.

Regarding figures obtained for injuries arising from domestic accidents (13.2%); assaults, communal clashes, and political hostilities (4%); and gunshot wounds (2.7%), those recorded by Odatuwa-Omagbemi et al.<sup>15</sup> from Delta State were remarkably different (domestic accidents 4.6%, assaults and political hostilities 12.3%, armed robbery with gunshots 9.2%). The lower levels of volatility, political tension, and proliferation of firearms in our study area as compared to that from the Niger Delta region may explain this sharp contrast. Findings of other authors<sup>12,13,14</sup> align with ours.

Domestic accidents were from falls, particularly among children and the elderly at home and school. Trauma surgeons and physicians must be trained and institutions well-equipped with material resources to handle these injuries.

The male-to-female ratio was 2.2:1. Various researchers<sup>7,13,15,18</sup> have reported a similar male preponderance, although ratios vary from study to study. Among motorcycle accident victims, male-to-female ratios of 3.3:1 and 3.9:1 were reported by Dongo<sup>10</sup> from SS Nigeria and Mubashir<sup>13</sup> from Pakistan, respectively. Solagberu<sup>18</sup> found a ratio of 7.6:1 in North Central Nigeria. Males are known to be more aggressive, more exposed to traffic, to travel longer distances to work, and engage in more social and outdoor activities, therefore rendering them more vulnerable to MSIs, as reinforced by this study.

Individuals in the age range of 20 to 50 years are the most active and highly productive. We recorded 72.9% of injury patients in this group; Bharrath<sup>19</sup> in India reported 71.3%; Omagbemi<sup>15</sup> from SS Nigeria 77%; and Olawale<sup>7</sup> from SW Nigeria 58%. In Barcelona, Spain, Ferrando<sup>20</sup> had 71.6% of study patients fall within the age group of 15 to 39 years. A retrospective review of hospital charts of all patients admitted after RTCs between October 2001 and December 2005 at a teaching hospital in Nigeria observed that a total of 47.3% of trauma admissions were in the third to fourth decades of life. These are the most productive earning years. People in these age groups contribute to the economic development of the nation. Injuries affecting these individuals create enormous economic hardship due to disability or death of family breadwinners. Seriousness in maintaining a viable work force should be expressed by engaging in all measures to prevent injuries in both outdoor and indoor activities, with prompt and appropriate treatment when it occurs. In contrast to the above, Verma<sup>3</sup> in a study in Delhi reported that the age group 5 to 25 years had the highest proportion of injuries (48%), followed the 25- to 45-year group at 28%.

Predilection of the lower limb, especially in those admitted after RTC, has been documented consistently in the past.<sup>7,10,13,19</sup> The unprotected nature of the lower limb coupled with the locomotive function may explain this. The tibia and femur were the most fractured bones. Previous studies<sup>10,13,15</sup> identified the tibia and the fibula. The exposed and subcutaneous nature of the tibia and partly the fibula may be reasons. The higher impact of injuries sustained along the busy Benin–Abuja express road may account for the high femoral involvement compared to other studies.

In RTCs, passengers were the most frequently injured (48%). Odatuwa-Omagbemi,<sup>15</sup> similarly, found that 51% of patients injured in RTCs were passengers. Other authors<sup>13,18</sup> found drivers and



riders as the most common victims. Dongo,<sup>10</sup> in a review of 31 patients with head injuries sustained in accidents involving motorcycles revealed that riders (67.7%) had the most head injuries, followed by passengers (25.8%). Of the 57 patients with extremity fractures, 40.3% were passengers.

## Conclusions

RTCs account for most of the MSIs in Irrua. The highly productive age groups were the most affected, and with this comes serious and far-reaching economic implications. Adequate enforcement of road and traffic laws should be emphasised. Trauma centres should be better equipped with human and material resources to enhance capacity to manage MSIs.

## References

1. Krug EG, Sharma GK, Lozano R. The global burden of injuries. *Am J Public Health*. 2000 Apr;90(4):523-6.
2. Murray CJ, Lopez AJ. Alternative projections of mortality and disability by cause 1990-2020: global burden of disease study. *Lancet*. 1997 May 24;349(9064):1498-504.
3. Verma PK, Tewari KN. Injury prevention and control. World Health Organization (WHO) Project No. ICP DPR 001. WHO; 2003. p. 1-13.
4. Peden M, Scurfield R, Sleet D, et al., editors. World report on road traffic injury prevention. Geneva: World Health Organization; 2004.
5. Peden M, Scurfield R, Sleet D, et al., editors. World report on road traffic injury prevention: summary. Geneva: World Health Organization; 2004.
6. Murray CJL, Lopez AD, editors. The global burden of disease: A comprehensive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected to 2020 (summary). Global Burden of Disease and Injury Series. Cambridge, MA: Harvard University Press; 1996.
7. Olawale OA, Owoaje ET. Incidence and pattern of injuries among residents of a rural area in South-Western Nigeria: a community-based study. *BMC Public Health*. 2007 Sep 17;7:246.
8. TRL, Silcock R. Guidelines for estimating the cost of road crashes in developing countries [Internet]. London: Department for International Development; 2003. Available from: <https://www.gov.uk/dfid-research-outputs/guidelines-for-estimating-the-cost-of-road-crashes-in-developing-countries>.
9. WHO. World report on Road traffic injury prevention, Geneva Switzerland 2016.
10. Dongo AE, Kesieme EB, Eighemherio A, Nwokike O, Esezobor E, Alufohai E. Motorcycle related injuries among rural dwellers in Irrua, Nigeria: characteristics and correlates. *Emerg Med Int*. 2013;2013:569103. doi: 10.1155/2013/569103. Epub 2013 Oct 20.
11. Peden M, Hyder A. Road traffic injuries are a global public health problem. *BMJ*. 2002 May 11;324(7346):1153.
12. Al Sheikhly AS. Pattern of trauma in the districts of Doha/Qatar: causes and suggestions. *E3 J Med Res*. Mar 2012;1(2):25-8.
13. Aslam M, Taj TM, Ali SA, Mirza WA, Badar N. Non-fatal limb injuries in motorbike accidents. *J Coll Physicians Surg Pak*. 2008 Oct;18(10):635-8. doi: 10.2008/JCPSP.635638.



14. Chapp-Jumbo AV, Adisa AC. Pattern of trauma among paediatric in-patients – the Abia State University Teaching Hospital experience. *Eur J Sci Res.* 2009; 29(3) 411-4.
15. Odatuwa-Omagbemi DO, Inikori AK, Otene CI, Enemudo RET. Musculoskeletal injuries: a cross-sectional study in a sub-urban teaching hospital. *Niger J Orthop Trauma.* 2013;12(1):66-70.
16. Worley H. Road traffic accidents increase dramatically worldwide [Internet]. Washington, DC: Population Reference Bureau; 2016 Mar 1. Available from: <https://www.prb.org/roadtrafficaccidentsincreaseddramaticallyworldwide/>.
17. Awasthi B, Raina SK, Kumar N, Sharma V. Sociodemographic determinants of traumatic musculoskeletal injuries: A register-based study from North-west India. *Int J Health Allied Sci.* 2015;4(1):54-7.
18. Solagberu BA, Ofoegbu CKP, Nasir AA, Ogundipe OK, Adekanye AO, Abdur-Rahman LO. Motorcycle injuries in a developing country and vulnerability of riders, passengers, and pedestrians. *Inj Prev.* 2006 Aug;12(4):266-8.
19. Guntheti BK, Singh UP. The pattern of injuries due to fatal road traffic accidents in and around Khammam. *J Res Forensic Med Toxicol.* 2016 Dec;2(2):8-13.
20. Ferrando J, Plasència A, Ricart I, Canaleta X, Seguí-Gómez M. Motor-vehicle injury patterns in emergency-department patients in a south-European urban setting. *Annu Proc Assoc Adv Automot Med.* 2000;44:445-58.