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Original Research Article

Characteristics and outcome of road traffic injured patients in the emergency department of a tertiary teaching hospital in Nigeria

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ABSTRACT

Background: The exit modes from the emergency department (ED) for road traffic injury patients are namely planned discharge; admission to the wards/intensive care unit or transfer to the operating theatre; discharge against medical advice (DAMA). The aim of this study was to assess the characteristics and outcomes of non-poly-traumatized road traffic injury (RTI) related ED admissions of a tertiary health care facility in a developing country and the exit pattern from the ED.
Methods: This was a retrospective hospital data-based study of outcome of RTI patients seen in the ED of a tertiary teaching hospital in Nigeria from January to December 2017.
Results: 1120 RTI patients were recruited consisting of 774 males and 346 females with a male: female ratio of 2.24:1. The age range was 1 to 94 years with a mean age of 37.5±17.5 years. Peak ages were in the fourth (24.2%) and third (20.4%) decades of life respectively. 85.5% of the patients were commercial vehicles passengers. Motorcycle accidents constituted 44% of the patients while 41.8% were in cars. The commonest injuries were head injuries (31% m:f 2.7) and fractures (21% m:f 3). There were 11.5% DAMA and 7.1% deaths. Motorcycles injuries had the highest mortality rate while the motorized tricycles injuries had the highest DAMA rates.
Conclusions: Motorized tricycles may be considered as a safer means of commercial mode of transportation compared to motorcycles despite its own limitations. There is a need to educate patients against the common practice of discharge against medical advice.

Keywords: Trauma outcome, RTA, Emergency, DAMA

INTRODUCTION

Road traffic injuries (RTI) occur when a vehicle collides with another vehicle, pedestrian, animal or other stationary objects. Road traffic injuries have become an important public health issue and the global burden of road traffic accident related injuries is about 40 million annually with about 1.3 million fatalities.[1] The increased burden from road traffic injuries may be partly due to economic development, which has led to an increased number of vehicles on the road. The increase in the number of vehicles is less in developing countries than in the developed countries. However despite the lower vehicular population in developing countries, there is a higher incidence of road traffic related injuries in these countries.[2] Nigeria is ranked second highest in the rate of road accidents among 193 countries of the world.[3] Trauma remains a major cause of hospitalization and emergency department (ED) utilization and road traffic accident related injuries may range from small lesions to life-threatening multi-organ injuries (poly-trauma).[4-6]

In developing countries there is often lack of necessary cooperation and communication between the public and private hospitals. Many of these private facilities are not favorably disposed to managing victims of road crashes

and providing them with the desired care with dispatch which leads to poor outcome.[7] Mandatorily the ED of the government hospitals receive these patients with road traffic injuries and a significant proportion of these patients are often in critical conditions thus creating untold hardship on both personnel and equipment in the ED.

The ability of the ED in the government owned hospitals to effectively treat trauma patients is dependent on the quality of the medical personnel and equipment available in the hospital. While poly-trauma patients have limited choices of treatment facilities because of the dearth of secondary and tertiary centers with supportive facilities such as the intensive care unit, patients with minor injuries may often be misguided in terms of choice of facilities. In all EDs, there is a continuous inflow and exit of patients and the modes of exit from the ED are classified into three processes namely (a) planned discharge; (b) admission to the wards/ intensive care unit or transfer to the operating theatre; (c) discharge against medical advice (DAMA).

Objectives

To assess the proportion, trend, characteristics and outcomes of non-poly-traumatized RTI related ED admissions of a tertiary health care facility in a developing country and relate the exit pattern from the ED to the injury sustained.

METHODS

This was a retrospective hospital data-based study of outcome of RTI patients seen in the ED of a tertiary teaching hospital in Nigeria from January 2017 to December 2017 using data generated by the University College Hospital in collaboration with the Federal Road Safety Commission (FRSC).

RTI patients with isolated injuries were included in the study. Patients who were dead on arrival at the ED and patients with injuries in more than one anatomical region (poly-traumatized) were excluded from the study. Data retrieved from patients and records of RTI patients seen in the ED included patient's demographics, vehicle type, and anatomical site of the injury and exit or admission outcome.

The data was analyzed using SPSS version 20.

RESULTS

Patient attendance at the ED in 2017 was 14011. A total of 1320 (9.4%) RTI patients were admitted to the ED in 2017. Only 1120 RTI patients were included in the study. There were 774 males and 346 females with a male: female ratio of 2.24:1. The age range was 1 to 94 years with a mean age of 37.5+/-17.5 years. Peak ages were in the fourth (24.2%) and third (20.4%) decades of life respectively (Table 1).

Table 1: Demographic data.

	Frequency	Percent (%)
Age group (years)		
≤5	39	3.5
6-10	23	2.1
11-20	92	8.2
21-30	229	20.4
31-40	271	24.2
41-50	160	14.3
51-60	118	10.5
>60	109	9.7
Not documented	79	7.1
Total	1120	100.0
Sex		
Male	774	69.1
Female	346	30.9
Total	1120	100.0

A review of the vehicular type revealed that 85.5% of the patients were in commercial vehicles while 17.5% were in private vehicles (Figure 1).

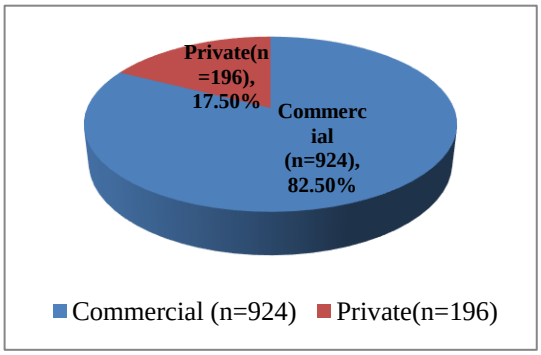

Figure 1: Pie chart showing the type of vehicle.

Further analysis of the types of vehicles revealed that 44% of the patients were on motorcycles while 41.8% were in cars (Figure 2).

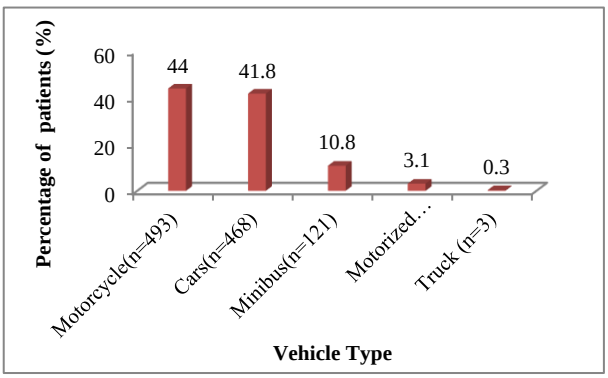

Figure 2: Percentage of patients based on type of vehicular accidents.

Table 2: Mode of transportation by age group.

Age group (years)	Vehicle category		Total
	Commercial	Private	
0-5	27(69.2)	12(30.8)	39
6-10	11(47.8)	12(52.2)	23
11-20	72(78.3)	20(21.7)	92
21-30	207(90.4)	22(9.6)	229
31-40	233(86.0)	38(14.0)	271
41-50	142(88.8)	18(11.2)	160
51-60	94(79.7)	24(20.3)	118
>60	77(70.6)	32(29.4)	109

Chi-square =53.669[a], p=0.0001

Table 3: Distribution of nature of injury sustained and sex.

Nature of injury sustained	Sex		Total
	Male	Female	
Head injuries	255(73.1)	94(26.9)	349
Fractures	185(75.2)	61(24.8)	246
Burn	5(45.5)	6(54.5)	11
Scald	4(50.0)	4(50.0)	8
Laceration	39(69.6)	17(30.4)	56
Bruises	33(54.1)	28(45.9)	61
Abrasion injuries	17(63.0)	10(37.0)	27
Blunt chest trauma	20(69.0)	9(31.0)	29
Avulsion injuries	11(44.0)	14(56.0)	25
Spinal cord	25(62.5)	15(37.5)	40
Dislocation	12(66.7)	6(33.03)	18
Crush injuries	6(100.0)	0	6
Blunt abdominal injuries	5(45.5)	6(54.5)	11
Others	72(58.1)	52(41.9)	124

Chi-square =37.848, p=0.0001

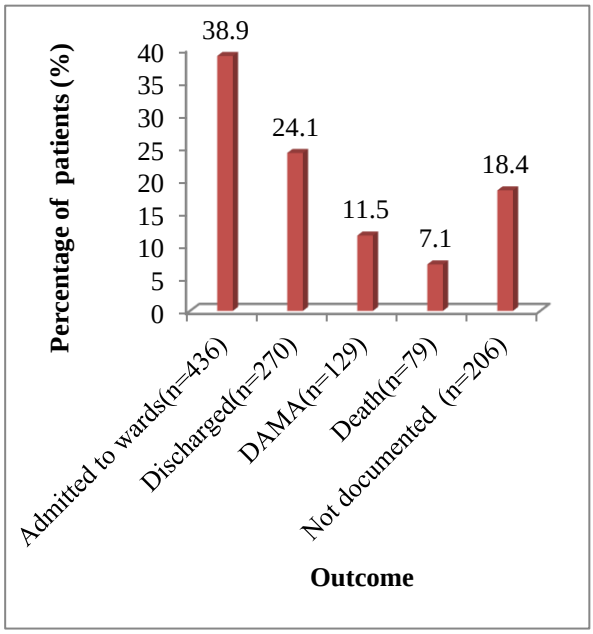

Figure 3: Outcome of patients in percentage.

The mode of transportation also varied between the different age groups (Table 2). The predominant mode of transportation for the most active age groups was commercial transport. However, the involvement of the commercial mode of transport was lower in the population within primary school age group (6-10 years).

The distribution of the anatomical sites of injury and patient's sex is demonstrated in Table 3.

The analysis of exit mode from the ED is represented by Figure 3.

A further comparison of the exit mode from the ED represented in Table 4 reveals that the highest DAMA incidence and death were from car accidents and motorcycle related accidents respectively.

Table 4: Comparison of the exit mode from the emergency department.

Vehicle type	Out come			
	Admitted to ward (%)	Discharged (%)	DAMA (%)	Death (%)
Motor-cycle	44.1	31.8	13.3	10.8
Cars	50.0	27.1	15.4	7.6
Minibus	58.8	24.7	12.4	4.1
Motorized tricycle	24.0	52.0	16.0	8.0
Truck	100.0	0	0	0

DISCUSSION

Globally, the number of road traffic deaths has continued to increase, reaching 1.35 million in 2016.[8] Increased urbanization and motorization in developing countries in general and Nigeria in particular over the past few decades has been accompanied by an exponential increase in road traffic injuries and fatalities with consequent burden on the inadequate health care system in the country. While some developed countries have made progress with regard to post-crash care and legislations to regulate road traffic accident risk factors such as vehicle safety standards, many developing countries are yet to fully grasp the enormity of the problem. Subsequently there are no extant laws or health care plans to ameliorate the burden of this 'disease'. Adequate information is required to propose appropriate intervention both at the Prehospital phase and hospital phase of care.

This study focused on injury characteristics and out-come of ED attendances of road traffic accident victims attending the University College Hospital Ibadan. Consequently, the findings from this study may be regarded as a preview of the current situation of road

traffic accident victims and the outcome of ED care in the study area

The demographics of the population when compared to other developing countries are as in the table below. The similarity in demographics is demonstrated in the male predominance, and the peak population in the third and fourth decades (Table 5).[9,10] These are the most mobile and active age groups in the population. The relatively higher male predominance in the study in India may be a reflection of the culture where a significant proportion of the female population do not work outside the home.

Table 5: Vehicle utilization pattern.

Country	Male/Female	Peak age range (years)
Nigeria	2.24	31-40
Ethiopia	2.26	15-24
India	5.25	30-40

The vehicle utilization pattern in RTI revealed a preponderance of commercial vehicles. Motorcycles are the most frequent mode of transportation (44%) for victims involved in RTI and this mode of transportation is often adopted by members of the public because of its relative speed and ability to ride through traffic apart from being readily available. It is readily available. The commercial motorcycles are often under pressure to meet required financial targets with the owners. In addition, motorcycles are at a higher risk for both collision traffic accidents as well as non-collision accidents than other vehicles.[11] There are no laws in Nigeria controlling the use of motorcycles as means of transportation as well as no strict laws in place to ensure the riders are trained to ride and comply with traffic regulations.

Consequently, the riders and passengers are susceptible to road traffic accidents. The economic challenges in the country may be responsible for the dearth of private vehicles but however the data obtained from this study demonstrates the relative safety of motorized tricycles compared to motorcycles. The age-related pattern of vehicular use demonstrates the predominance of commercial vehicles in all age groups except the primary school age children (6-10 years) who have a slight preponderance of private vehicles (Table 2). This may be due to the preference of some parents to pick up their children from school in their private vehicles.

Injury pattern

In agreement with previous studies the present study found that head and musculoskeletal injuries were the most common body region injured.[12,13] Similarly, in this study, head injury was the most common injury (34.7%) closely followed by fractures (24.9%) (Table 6). In addition, head injury occurred predominantly in victims of motorcycle injury. This is not unexpected as most motorcycle riders and passengers do not wear crash helmets.[14,15] Secondly the pressure on the drivers to meet required obligations compounded by the lack of knowledge of traffic laws may predispose them to RTI. This significant burden of head injuries and fractures should as demonstrate in previous studies necessitate the promulgation of appropriate traffic laws and preventive measures to ensure early, appropriate and affordable treatment at every health facility.[7,16]

Table 6: Nature of major injuries sustained.

Nature of major injury sustained	Total (%)
Head injuries	34.7
Fractures	24.9
Burn	0.1
Scald	0.9
Laceration	5.7
Bruises	5.7
Abrasion injuries	2.8
Blunt chest trauma	2.9
Avulsion injuries	2.3
Spinal cord	4.1
Dislocation	2
Crush injuries	0.57
Blunt abdominal injuries	1.2
Others	11.5

The review of the outcome of admissions in the ED revealed that 47.7% of the RTI patients were either admitted to the wards or transferred to the theatre for further care while 29.5% were discharged formally from the ED. However, 14.1% DAMA for various reasons while 8.6% of the patients died in the ED.

This outcome analysis demonstrates a similarity in the incidence of DAMA with other developing countries and similar studies in Nigeria when compared with 17.7% in Iran (17), 12.7% in a report in Nigeria.[18] However, this is a sharp contrast to reports from USA (1.1%) and Korea (0.2%).[19] The high incidence of DAMA in developing countries may be due to lack of funds, lack of an effective health insurance scheme, preference for other hospitals for various reasons, poor attitude of the health workers in the ED and patient's desire for alternative therapy.[20]

Limitations

There were some limitations in this study. The data collected on the numbers of road traffic collisions and consequent injuries was on patients attending the ED. Consequently, many RTI referred to other hospitals were not recruited. The cross-section design and lack of clinical data on the severity of the RTIs are among other weaknesses of the study.

CONCLUSION

This study showed diverse injury characteristics and high morbidity and mortality among the victims attending the

ED. There is also the need to health educate patients against the common practice of discharge against medical advice. Motorized tricycles may be considered as a safer means of transportation compared to motorcycles despite its own limitations. The strength of this study is that it was conducted in one of the main tertiary hospitals in Nigeria and it probably reflects the operational realities of a public hospital ED in the urban environment. Our study also provides pilot data on trends, burden and outcomes of RTI victims which may guide policy makers in improving the planning of hospital resources and staffing.

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