INJURY PATTERNS AMONG ROAD TRAFFIC CRASH VICTIMS PRESENTING TO THE ACCIDENT AND EMERGENCY UNITS OF TERTIARY HOSPITALS IN LAGOS

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ABSTRACT

BACKGROUND: Road traffic injuries (RTIs) are reportedly the leading cause of trauma in Nigeria, fatality rate rose from 5.3 in 1970 to 5.8 in 2005. An estimated 1.2 million people are killed globally in road crashes each year and as many as 50 million are injured and almost half of those who die in road traffic crashes are "vulnerable road users".

OBJECTIVE: This study aims at investigating Injury Patterns among Road Traffic Crash victims (RTCs) presenting to the Accident and Emergency (A&E) units of tertiary hospitals in Lagos.

METHODS: A cross sectional descriptive study was conducted among two hundred and thirty eight RTC victims who presented to the A&E units of 4 tertiary hospitals in Lagos. A 26-element questionnaire was used to collect the socio-demographic data, injury pattern and types as well as the perceived causal and protective factors.

RESULTS: Findings showed that 58.8% of the respondents were males and 217(91%) of the respondents falls within the productive age group 16-45 years old. Mostly affected body parts were the lower limbs (58, 24%), followed by multiple injuries (40, 17%) and upper limbs (35, 14%). The Majority of the respondents had fractures and bruises. Lateral collisions (96, 40%), Collisions from behind (65, 27%) and Head-on-Collision (56, 24%) were mostly common. At the 0.05 significance level, significant association was recorded between injury pattern and gender, age, collision type, as well as between body part affected and the type of collision. However, no significant association was observed in the RTC victims' sitting position in vehicles in the aftermath of a RTC.

CONCLUSION: This study suggests that upper and lower limbs are at higher risk of injury while fractures and bruises are the major injury types. RTIs still remain a major public health problem that hampers personal and national development.

Introduction

The landmark report, Global Burden of Disease, published in 1996 by the World Health Organization (WHO), World Bank and Harvard University, painted a clear picture of how significant injury is to public health. The report presented data on premature mortality and disability from unintentional injuries (traffic related injuries, poisonings, falls, fires, drowning, and others) and intentional injuries (self-inflicted, violence, and war). In higherincome countries, road traffic accidents were already among the top ten leading causes of disease burden in 1998. The report revealed that, deaths from non-communicable diseases are

expected to climb from 28.1 million a year in 1990 to 49.7 million (which is about a 77% increase) by 2020. The report revealed that, with respect to the burden of disease characterized by mortality statistics, injuries are ranked as the 9th leading cause of death worldwide, and in less developed countries, road traffic crashes were the most significant cause of injuries, ranking eleventh among the most important causes of lost years of healthy life.¹

Traffic crashes has been reported as a major cause of severe injuries in most countries. The first World Health Report, published in 1995 by WHO, revealed that the external causes such as accidents and violence accounted for about 4 million deaths, which is about 8% of the total deaths, and this occurred mostly among adults while developing countries were found to have about four times the number of deaths from these causes as the developed world.²

The 1999 WHO publication on Injury as a leading cause of the global burden of disease, reported that the leading injury related cause of death among people aged 15-44 years is traffic injuries. Deaths due to direct result of injuries sustained in motor vehicle crashes accounted for about 1.2million out of the 5.8 million people who died of injuries in 1998. Worldwide, the WHO reports, that about 38.8million injuries were received by people involved in motor vehicle accidents in 1998.³ World Health Organization's World Report on Violence and Health of year 2002 revealed that nearly 3,500 people die on the world's roads daily, tens of thousands of people are injured or disabled every year, and children, pedestrians, cyclists and the elderly are among the most vulnerable of road users. In order to raise awareness sand the profile of the preventability of road traffic injuries so as to promote good practices related to helmet and seat-belt wearing, not drinking and driving, not speeding and being visible in traffic, WHO works with several partners (governmental and nongovernmental) around the world.. The WHO world report on road traffic injury prevention of year 2004 reported that road traffic injuries are predicted to become the third largest contributor to the global burden of disease by 2020. It is estimated that every year, road traffic crashes cost US\$518 billion globally.^{4,5}

The 2009 and 2012 Global Status Report on Road Safety reported that approximately 1.3 million people die each year on the world's roads, and between 20 and 50 million sustain non-fatal injuries and that if the current trend continues, road crashes are predicted to become the fifth leading cause of death by 2030. The Global status report on road safety is the first broad assessment of the road safety situation in 178 countries, using data drawn from a standardized survey. The results show that road traffic injuries remains an important public health problem, particularly for low-income and middle-income countries. Pedestrians, cyclists and motorcyclists make up almost half of those killed on the roads, highlighting the need for these road users to be given more attention in road safety programmes. The survey results suggested that in many countries road safety laws needs to be made more comprehensive while enforcement should be strengthened. The report advocated for more action to make the world's roads safet.^{6,7}

A research on the neglected epidemic of road traffic injuries in developing countries revealed that road traffic injuries in developing countries mostly affect pedestrians, passengers and cyclists as opposed to drivers who are involved in most of the deaths and disabilities occurring in the developed world.⁸ The reasons for the high burden of road traffic injuries in

developing countries had also been reported to include growth in the numbers of motor vehicles; higher number of people killed or injured per crash in low-income countries, poor enforcement of traffic safety regulations; inadequacy of health infrastructure, and poor access to health care.⁹ Nigeria, a developing economy belonged to this category of the developing countries affected by the high burden of road traffic injuries largely because of the fact that the economy is growing and the consequent effect of huge investment and myriad of investors scattered all over the country had greatly increased the number of businesses, of people, of motor vehicles.

Statement of Problem

The road traffic death rate by WHO region and income level showed that low- and middleincome countries have higher road traffic fatality rates (21.5 and 19.5 per 100 000 population, respectively) than high-income countries (10.3 per 100 000 population). While road traffic death rates in many high-income countries have stabilized or declined in recent decades, data suggest that in most other regions of the world the global epidemic of traffic injuries is still increasing.⁴

The Abuja and Lagos State Command of the Nigerian Federal Road Safety Corps reported a total of 926,666 and 26,725 road crashes respectively between 1960 and 2005. The agency also reported a total of 260,857 deaths and 802,703 injuries for the period.^{10,11}

The need to set aside the traditional perceptions about road safety - that road traffic crashes and injuries are random, inevitable and unpredictable events that may occur for a new paradigm cannot therefore be over emphasized. Road traffic crashes are largely predictable and preventable, and can be effectively curtailed by concerted multi-sectorial efforts since accidents are often the result of a complex interaction of multiple causes which include Human factors (such as age, sex, education, medical condition, unfamiliar terrain and lack of personal protection amongst others), Environmental factors (includes defective narrow roads, poor lighting, bad weather, rugged terrain, inadequate enforcement of laws and mixed traffic) and Agent factors (e.g. vehicle excessive speed, poor vehicle maintenance, overloading as well as poor driving standards). ⁹ A study on Spatial analysis and socio-economic burden of road crashes in south-western Nigeria also reported that death and injuries resulting from road crashes in the country have been on the increase over the years and that fatality rate rose from 5.3 in 1970 to 5.8 in 2005 and that each victim on average spent a minimum of US\$17 per day on medical expenses and had at least one person attached to him or her throughout the period of admission.¹² This has grave implications on the welfare of the families and the socio-economic development of the country especially when injuries sustained are grievous and affect daily productive life. It is these pertinent problems that prompted this research study into Injury Patterns of Road Traffic Crash Victims in Lagos a busy commercial hub and former capital of Nigeria.

Objectives of the Study

The objectives of this study are;

1. To determine the pattern of injury among victims of Road Traffic Crash in the A&E units of tertiary hospitals in Lagos.

- 2. To determine how injury pattern affects the position of RTC Victims in the A&E units of tertiary hospitals in Lagos.
- 3. To assess the manner in which injury pattern depends on type of collision among RTC Victims in the A&E units of tertiary hospitals in Lagos.

Research Questions

- 1. What is the pattern of injury among victims of Road Traffic Crash in the A&E units of tertiary hospitals in Lagos?
- 2. What is the injury pattern affects the position of RTC Victims in the A&E units of tertiary hospitals in Lagos?
- 3. What is the manner in which injury pattern depends on type of collision among RTC Victims in the A&E units of tertiary hospitals in Lagos?

Overview of Road Traffic Crashes

A road traffic crash is an event which involves a motor vehicle in transport, occurs on a roadway or while the vehicle is still in motion after running off the roadway, and which produces injury and/or property damage. A fatal crash is a police-reported crash involving a motor vehicle in transport on a roadway in which at least one person dies within 30 days of the crash. An injury crash is a police-reported crash involving a motor vehicle in transport on a roadway in which at least one person was reported to have: an incapacitating injury, a visible but not incapacitating injury, a possible but not visible injury, or an injury of unknown severity. An injury is a bodily lesion at the organic level, resulting from acute exposure to energy (mechanical, thermal, electrical, chemical, or radiant) in amounts that exceed the threshold of physiologic tolerance.^{9,13}

Road Traffic crashes (RTCs) are the common causes of hospitalization and mortality in all parts of the world. As an epidemiological problem, the control of the host (accident victim), the agent (the vehicle), and environmental factors involved in their causation should be considered.¹⁴ The health personnel who look after accident victims need to know the injury types and their mechanisms encountered in RTC. The accident victims can be the occupants of a motorcar, a motorcyclist, pillion passenger, a cyclist or a pedestrian. Motorcar occupant can be the driver who may sustain injury to the wrist, forearm and pelvis or fracture of the ribs from the steering wheel. The driver and other front seat passenger may have lacerations on the face on hitting the windscreen, characteristics bruises and lacerations to the knees and skin from the dashboard or cervical spine injury through whiplash injury if there are no headrests on seats. Any of the occupants can be thrown out of the vehicle if the door swings open. Motor cyclist, pillion passengers, cyclists and pedestrians hit by a moving vehicle may sustain primary and secondary impact injuries from the impact with the body of the vehicle, and or secondary injuries when they hit the ground or other objects.¹⁴

Alcohol is an important factor in the cause of RTC, but additionally some medical conditions such as advanced diabetes, hypertension, some prescribed drugs like tranquillizers and sedatives, stress and disease that blunt locomotion and sensation in the elderly can influence

the causation of accidents. Prevention will involve the control of the host factors – illnesses, alcohol, accident repeaters, and enforcement of driving regulations: agent factors – through better vehicle design using human engineering and environmental factors through better road design and management.¹⁴

Similarly, in a study carried out in Southern India in year 2004 by a group of researchers, a road traffic crash was defined as an accident which took place on the road between two or more objects, one of which must be any kind of a moving vehicle.¹⁵ Road Traffic Crashes (RTCs) are increasing with rapid pace and presently these are one of the leading causes of death in **developing countries** and several studies have also shown an increase in many developed countries. This is attributed in part to urbanization, industrialization, as well as the increase in the number of motor vehicles on the roads. In Nigeria many lives are lost daily through motor vehicle accidents.^{16,17} The causes of RTA were also attributed to recklessness and negligence of driver, mechanical defects in vehicles, careless crossing of the road by pedestrians, bad road, use of drugs and other health conditions including mental condition, hypertension and visual impairment.^{18,19,20,21,22}

The Global Burden of Disease Study of year 2002 carried out by a group of researchers highlighted the overall toll from injury in the developing world. The study shows the major causes of death for the 2 main age groups affected by injury. Injury-related causes account for 3 of the top 6 killers of older children and 4 of the top 6 killers of young adults. Road traffic accidents alone are second only to AIDS as a killer of young adults. Other major causes include non-intentional or accidental causes (such as drowning, fires and burns, poisoning, falls, and home injuries) and intentional causes (such as violence and suicide). In addition to mortality, disability is often due to injury, especially with the success of the global efforts to control polio. Injury is also a leading contributor to health-related economic losses.^{23,24}

Epidemiology of Road Traffic Crashes

Road traffic injuries are presently the leading cause of death by injury, accounting for approximately 23% of all injury deaths worldwide in 2002. This translates to a loss of over 3000 lives daily around the world. In 2002, the global mortality rate due to road traffic crashes was 19 per 100,000 population; road traffic injuries ranked 11th on the list of leading causes of death worldwide, and accounted for 2.1% of all deaths globally.^{25,26}

On regional basis, the statistics on RTA mortality are just as grim. Global mortality rate was 18.8 per 100,000. WHO African region reported 32.2 per 100,000. WHO Eastern Mediterranean had 32.2 per 100,000. WHO South East Asia reported 16.6 per 100,000. The Americas had 15.8 per 100,000. Western Pacific Region reported 15.6 per 100,000 and the European Region had 13.4 per 100,000.

The Nigerian situation did not differ as the data from the Federal Road Safety Corps (FRSC) Abuja revealed that: a total of 926,666 road traffic crashes were reported in Nigeria between 1960 and 2001. 255,874 persons died and 787,619 persons were seriously injured. 1976 had

the highest number of road traffic crashes reported in the nation's history - 40,881 crashes, 6761 deaths and 20,132 injury cases. 1982 was reported with the highest number of deaths reported - 11, 382. Some of the factors responsible for the progressive rise in road traffic crashes in the 1970s and 1980s include economic growth, economic empowerment resulting in increased motorization, and increased use of motorization in commuting.¹⁰

The trend continued in Lagos State, the commercial nerve center of the nation. The Lagos chapter of the FRSC revealed that: the total number of accidents between 2000 and 2005 was 26,725 involving 39,482 vehicles, of which 4,220 were fatal. This resulted in 4,983 deaths and 15, 084 injured persons over the period. The Male: Female ratio of road traffic deaths and injuries were approximately 2.5:1. The statistics were not broken down by age group to provide data on the morbidity or mortality in children within the state, as it was also with the national data.¹¹

The study on Road War in Africa of year 2001, reported that Africa is faced with two major types of wars: civil and regional wars, and road wars, leading to a great number of mortalities and tremendous economic loss. The road war rage between moving vehicles on one side and an innocent and productive population on the other. It reported that three quarters of the global deaths from road accidents occurred in the developing countries and that 12-15% of hospital beds are occupied by accident patients. It also reported that in the developing countries, RTAs are the first or second cause of death in the age group 15-45 years.²⁷

Injury Types and Pattern in Road Traffic Crashes

A research on the public health burden of injury in developing countries reported that injury is the commonest cause of death for children and young adults in developed and middle-income countries while in low-income countries, deaths in this age group are most often due to infectious disease, and that there is a rising rate of deaths from injury.²⁸

In a study on Motor-vehicle injury patterns in emergency-department patients in a South-European urban setting by a group of researchers, it was reported that of the nearly 17,000 injured traffic victims during 1998, 62% were men. Young people between age 15 and 39 (71.6%) were mostly affected. 42% were users of two-wheeled motor vehicles, followed by car occupants (32%) and pedestrians (24%). Neck sprain (33%) was the most common injury among car occupants, multiple contusion and contusion of lower limbs among two-wheeled motor vehicles (23.5% and 14% respectively) and pedestrians (17.3% and 14.4% respectively) and upper limb fractures (20%) among cyclists were also common. Motorcycle and moped users, mainly young males, have the highest probability of suffering injuries, with lower limbs being the most affected anatomical region. Elderly pedestrians sustaining injuries to the lower limbs and the head contribute substantially to the overall injury situation.²⁹

An analysis of Injury patterns carried out in Scotland by a group of Researchers on injury difference between Drivers and Front Seat Passengers (FSPs) revealed that the body regions

mostly affected include; Head, face, chest (tension pneumothorax, isolated rib fractures and sternum fractures), Abdomen (colon rupture and mesenteric laceration), Cervical spine (c-spine fracture), Thoracic spine (t-spine fracture cord laceration), Lumbar spine (l-spine fracture) and Pelvis. The chest (29% & 41.4%), head (14.5 & 15.2%), pelvis (14.3% & 14.8%) and the face (9.6% & 9.0%) had the highest injuries for the drivers and front passengers respectively. It was also reported that mortality was higher in the FSP group and that seven of the eight body regions selected showed higher rates of injury in front seat passengers. It concluded that FSPs are at increased risk of injury relative to drivers in actual road traffic accidents as recorded in the Scotland Trauma Audit Group (STAG) database. It opined further that this result contradicts the crash test data, which suggest that drivers are less well protected than FSPs in laboratory conditions.³⁰

A retrospective case record analysis was conducted on injured patients seen at the Accident and Emergency unit over a 12 month period from January to December 2003 in a Nigerian hospital. The results revealed that a total of 1078 records of injured patients that attended the A&E were analyzed. The mean age was 31 years (ranging from 3 months to 85 years). Laceration (n = 408) and fractures (n = 266) representing 62.5% of injuries were seen. Injuries to the lower limb occurred in 239 patients, multiple anatomical sites 224, head 224, upper limb 203, the neck 20, and the abdomen 11 patients. Trauma was found to be due to road traffic accident in 977 patients, fall in 39, assault in 14 while burns and firearm injuries were reported in 5 and 7 patients respectively.³¹The mean injury severity score (ISS) was 4. Severe injuries, ISS > 15 occurred in 54 patients with mean ISS of 21, and resulted from RTA in 92.6% of cases. Mortality from severe injuries occurred in 31.5% of cases while overall mortality was 2%. Most deaths were associated with multiple injuries (60.9%) and head injury (30.4%). Incomplete documentation of accident and injury data was found to have occurred frequently, from 2% of some data to 100% of others. The report concluded that lacerations and fractures were the most common injuries, and that mortality was due usually to head and multiple injuries. Research into appropriate strategies for prevention of injuries, especially RTA and the establishment of institutional and regional trauma registries for complete documentation of relevant data was recommended.³¹

Besides, a research carried out to analyze road traffic accidents in Imo State; South-eastern, Nigeria revealed that RTAs were characterized to have an upward trend and significant seasonal influences. Significant differences were also observed among the various causes of accidents and accident cases which may be Minor, Fatal or Serious with respect to types of vehicles involved over the years. Reckless driving, inexperience and mechanical fault and road defects accounted for 30.3%, 21.5% and 21.1% respectively out of the 5921 accident cases. Two motorcycles, motorcycle-vehicle and vehicle-vehicle crashes were found to be the leading types of crashes (38.9%, 37.5% and 14.9% respectively of the total 855 deaths) recorded within the period of study. Private cars, minibuses and taxis accounted for 94.7% of the total accidents.³²

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A population-based survey of the burden of road traffic injuries in Nigeria of year 2005 revealed that the male respondents constituted 50.9% of the total injuries and that 60.5% of the respondents lived in urban areas. The study reported a high proportion of the never married (64.11%) respondents compared to the married (33.1%). Estimated injury rate was 112.9 per 1000 population while annual RTI rate was 41.2 per 1000 population. The rate of RTI for men of all ages was significantly higher than that of women. It reported the lower extremities as the most commonly injured body part (47.2%), followed by the upper extremities. The most common road user category reported for RTIs was motorcyclists (54.3%) with pedestrians contributing 11.8%. It revealed that private vehicles were the most commonly involved single type of vehicle (37.4%), however, a combination of public buses and taxis comprised nearly half of those involved. It further revealed that the respondents who had secondary education contributed the greatest proportion of RTIs (28% for each group).³³</sup>

The study on Road Way in Africa of year 2001 revealed that RTAs are responsible for the majority of head and spinal injuries in Africa, causing 80% of all head injuries in Nigeria alone.²⁷ Pedestrians' injuries are particularly common in Zambia especially in the first two decades of life. In South Africa, RTAs are responsible for 38% of all spinal injuries. 2200 cases of head trauma and 200 spinal traumas due to RTA were recorded in a period of 2 years in Burkina Faso. In Ghana, the annual incidence of injuries is over 900 per 100,000 persons and urban areas injuries were caused by minibus and taxi crashes while bicycle crashes and commercial vehicle accidents are common in the rural areas. For Ethiopia, pedestrians account for 50% of RTA deaths compared to 13% in the United States.²⁷

An 8-year review of the Pattern and trend of trauma in the A&E of a tertiary health institution of year 2010 revealed that 69.7% of the 13755 patients presenting to the A&E unit over an 8 year period presented on account of trauma. Of these 72.7% were males and 26.7% were females. Road Traffic Injuries (RTIs) was the commonest causes of trauma with 61.0% of the total injury cases. Drivers, pedestrians and passengers accounted for21.1%, 23.4% and 55.5% of the victims of RTIs. It was concluded that RTI is the leading cause of trauma.³⁴

A study carried out in Western Maharashtra, Indian to examine the pattern of road traffic Injuries in year 2008 showed that the highest number of victims (103, 29.4%) was between age group 20-29 years. The people of the third decade are more commonly involved in road traffic injuries. 64.9% (227) of the victims were between 15 and 44 years. It reported that several human and environmental risks factors such as age, alcoholism, driving without license, type of vehicles were found associated in the occurrence of road traffic injuries. It was concluded that if these factors are controlled appropriately, mortality and morbidity can be prevented.³⁵ Similar observation was reported by WHO in the 2002 Injury Chartbook which shows that the people of the most active and productive age groups are involved in road traffic injuries, which add a serious economic loss to the community.³⁶

A prospective descriptive study conducted on 837 RTA victims at the Orthopaedic unit of a tertiary hospital in Pakistan in 2011, revealed that majority of subjects were between 14 to 58 years (68.2%) and males (71.3%). Maximum number of cases were motor bike riders (76.4%) followed by public transport passengers 107 (12.8%), pedestrians 53 (6.3%) and

private vehicles drivers 27 (3.2%). 68% had only limb injuries while 32% had associated head, pelvis/spine & thoraco-abdominal injuries.³⁷

An urban centre hospital based prospective study of limb injuries in a developing country using A&E department of Obafemi Awolowo University Teaching Hospital Complex, Ile-Ife, Osun State in Nigeria as a case study reported that 115(79.3%) of the 145 victims of motorcycle accidents that reported to the hospital had injuries involving their limbs.³⁸ Male: Female ratio was 2.8:1. Mean age was 31.9+/-16.7(S.D) years and 20-29years was the most commonly involved age group. 42.2% were due to collision with automobiles, 22% pedestrian while 8.7% were collisions between motorcycles. The use of protective/safety devices were practically non-existence. 76 (66.1%) patients had lower limbs injuries, 25 (21.7%) had upper limbs injuries while the remaining 14 (12.2%) injured both upper and lower limbs. The tibia was the most commonly fractured bone (32 patients, 27.8%) followed by the femur (25 patients, 21.7%). 86 patients (74.8%) with fractures were managed by close reduction and splinting. 18 (15.7%) patients had internal fixation. It was concluded that motorcycle is an important cause of limb injuries in developing worlds. Motorcyclists need to be encouraged to use protective devices.³⁸

Hospital-based trauma registries study in Uganda carried out in the A&E department of an urban tertiary health facility reported that gender distribution was 27.7% female and 71.3% males. The younger than 5 years old category was 7.4%, whereas 3.9% were older than 55 years old. The Kampala Trauma Score (KTS) is highly predictive of need for admission or death. It was concluded that a trauma registry and injury severity measurement are both possible and useful in sub-Sahara Africa.⁴⁰ Pattern and distribution of trauma deaths in a Nigerian teaching hospital reported that three quarter (75.0%, 63) of deaths occurred in patients involved in RTAs and the patients were brought by the Police, Good Samaritans or relatives in nearly equal proportions.⁴¹

A retrospective study of cases of Road Traffic Accidents in Ikpoba-Hill (a sub-urban community in Benin City, Nigeria) carried out between 2003 and 2007, revealed that of the total of 825 patients who had road traffic accidents, about 55.8% were males while 44.1% were females. Lacerations and abrasions were the commonest injuries (64.3%) followed by fractures (12.5%). Humerus was the most commonly fractured bone (33.3%), while 24.9% had compound fracture. The incidence was lowest in year 2003 (17.6%) and higher in year 2007 (23.5%). Mortality rate was 7.0% and the commonest cause of death was head injury (48.3%). Cases of discharge against medical advice constituted 14.7%.⁴²

A study on Risk factors for road traffic accidents among drivers of public institutions in Ibadan, Nigeria in 2003 revealed that the prevalence rate of reported RTA was 16.2%. Majority of the accidents (47.8%) were mild with no serious bodily injuries or damage to the vehicle. Twenty five percent and 31.2% of the accidents were moderately serious or very serious with major injuries/mortality or damage to the vehicle.²²

A combination of a community survey and a hospital based prospective study carried out in 2008 in Sri Lanka, reported that the incidence of RTI was 12.7 per 1000 population per year, the case fatality rate was 10.7%, under-reporting of RTI was 56.4% while prevalence of disability was 4.8 per 1000 population in the Community based study. The hospital based

study in two teaching hospitals recorded 683 RTI patients with RTI incidence of 70.3per 1000 surgical causalities per year with case fatality rate of 9.2%.⁴³

Materials and Methods

Background to the Study Area: The study setting includes the Accident and Emergency units of tertiary health facilities in Lagos viz: Lagos University Teaching Hospital (LUTH), Idi-Araba, Lagos State University Teaching Hospital (LASUTH), Ikeja, National Orthopaedic Hospital Igbobi Lagos (NOHIL), and Federal Medical Center (FMC), Ebute Metta.

Lagos University Teaching Hospital (LUTH), Idi-Araba: The Lagos University Teaching Hospital (LUTH) and the Medical school complex grew out of a cabinet decision of April 1961 when the Council of Ministers set up a cabinet committee to consider the recommendations of Sir Ashby's Commission on post secondary education in Nigeria. Two out of the many recommendations of the committee approved by the Council of Ministers were; the effective and rapid re-organization of hospital in Lagos, Ibadan, Kaduna and Enugu for the teaching of clinical medicine, and the establishment of a full fledged Medical School in Lagos as soon as possible to make use of the existing medical institution. The objective was to train at least 400 doctors annually in Medical Schools in Nigeria from 1975 onwards. This brought about the eventual commissioning of Lagos University Teaching Hospital and the first patient was admitted sometimes in September, 1962. Luth being the only teaching hospital and the apex referral centre in Lagos before the advent of LASUTH had been experiencing high patronage hence the various efforts and programmes of its management to expand service base infrastructures at various times. The Federal government through the Viamed Project had recently re-equipped Luth alongside other five (5) teaching hospitals. It is worthy of note that Luth has two annexes; the Harvey Road Annex at Yaba and the Pakoto Annex at Ifo, at the outskirt of Lagos.⁶²

Study Method: A descriptive cross sectional research design was adopted for this study amongst RTA victims representing at the Accident and Emergency units of the selected tertiary health facilities in Lagos.

Study Population: The target population includes all injured RTC victims seen at the Accident and Emergency Units of LUTH, LASUTH, NOHIL and FMC during the study period.

Sample Size Determination: The minimum sample size for descriptive study was obtained from the Kish and Leslie⁶⁵ formula:

 $n = \frac{z^2 p q}{d^2}$

where n = minimum sample size

z = 1.96 (2 Standard Deviation at 95% Confidence Interval (CI)

Sampling Methodology: No sampling was employed. All RTC victims present at the Accident and Emergency Units of the case study areas who met the inclusion criteria formed

the research sample. A total of 238 (two hundred and thirty eight) RTC victims were assessed at the four centers. The distribution are as follow; LUTH - 18, LASUTH - 51, NOHIL - 93 and FMC - 76.

Inclusion Criteria: All injured RTA victims present at the A&E units of the research settings were included in the research study.

Exclusion Criteria: All unconscious and victims in critical situations were excluded from the study.

Data Collection: A 26-item Interviewer–administered questionnaire was the research instrument used for data collection. The questionnaire was divided into three (3) sections which are Respondents demographics, Injury Pattern and Perceived Causal & Protective Factors. A team of two (2) trained Research Assistants attached to each of the research setting administered the questionnaires to the respondents supervised by the researcher. The Health Records personnel at the A&E units of the research settings who were co-opted into the research team were charged with the responsibility of alerting the researcher and the other research assistants each time an RTC victim was admitted at the A&E. The victims were approached after each alert to seek their consent for participation in the study. Data collection lasted for four weeks in each of the research setting. The data collection was done after each Accident Victim had been given the required medical attention.

Ethical Consideration: A letter of introduction from the department of Community Health and Primary Care was presented to the Ethical and Research Committees of the research settings. Ethical clearances were obtained from all the settings where data were collected after interviews with the researcher and critical examination of research proposal had been done by members of the committees. This ethical and research committees are; Lagos University Teaching Hospital Health Research and Ethics Committee, Lagos State University Teaching Hospital Health Research and Ethics Committee, National Orthopaedic Hospital Igbobi Lagos Ethical Committee and Federal Medical Centre Health Research and Ethics Committee.

Method of Data Analysis: The collected data were entered into the Statistical Package for Social Sciences (SPSS) and edited for analysis. Tables of frequencies were generated for the demographic characteristics, injury types and perceived causal and protective factors. The Pearson Chi-square test was done to explore interaction between collision type and part of the body injured, collision type and type of injury sustained, age and type of injury sustained, gender and type of injury sustained, sitting position in vehicle and type of injury sustained, sitting position on a motor cycle and type of injury sustained, and seating position in a bus and type of injury sustained.

Table 1: Demographic Characteristics of the Respondents			
Variable	Frequency	Percentage	
Age (Years)			
0-15	6	3	
16-20	28	11	

Data Presentation and Analysis of Respondents' Variables

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21-25	56	24	
26-30	45	18	
31-35	40	17	
36-40	29	12	
30- 4 0 41 45	10	12 Q	
41-43	19	8	
46-50	9	4	
51+	6	3	
Total	238	100%	
Gender			
Male	140	58.8	
Female	98	41.2	
Total	238	100%	
Marital Status	5		
Single	113	47.5	
Married	108	45.4	
Divorced	7	2.9	
Widowed	6	2.5	
Separated	4	1.7	
Total	238	100%	
Academic Qua	alification		
No Formal Educat	tion 0	0	
Primary	40	16	
Secondary	102	43	
Tertiary	96	40	
Total	238	100%	

Table 1 shows the Demographic Variables of the Respondents. Across the hospitals, the affected age groups are mostly between 16 and 45years. The distribution showed that 217(91%) of the total respondents fell within the productive age group 16-45 years old. The mean age was 32+/-1.9SD. The result shows that the incidence in males was higher than that of females in the four hospitals. 140(58.8%) of the victims were males while 98(41.2%) were females. The table also shows that most of the respondents are either single or married with 113(47%) and 108(45%) respondents respectively. The distribution revealed that all the respondents had at least basic primary education. Majority 102 (43%) & 96(40%) of them had either secondary or tertiary education.

Variable	Frequency	Percentage
Body Part Injured		
Lower limb	58	24.0
Multiple injuries	40	17.0
Upper limb	35	14.0
Head	29	12.0
Thoracic spine	19	8.0
Maxillofacial	8	3.4

 Table 2: Respondents' distribution according to body part injured & type of injury sustained

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Abdomen	6	2.5	_
Pelvis	5	2.1	
Total	238	100%	_
Type of Injury Sust	tained		_
Fracture	47	51	
Bruises	30	32	
Lacerations	9	10	
Sprains	4	4	
Contusions	3	3	
Total	238	100%	

Table2 revealed the Respondents' distribution according to the body part affected and the type of injury sustained. The affected body part were the lower limbs (58, 24%), followed by multiple injuries (40, 17%), upper limbs (35, 14%), head (29, 12%), thoracic spine (19, 8%), chest (18, 8%), cervical spine (16, 7%), maxillofacial (8, 3%), abdomen (6, 3%), pelvis (5, 2%) and lumbar spine (4, 2%) respectively. The distribution for the type of injuries sustained in RTA also showed that most of the respondents had fractures, bruises and lacerations. 88 (37%) sustained fractures, 79 (33%) had bruises, 35 (15%) had sprains, 33 (14%) had lacerations while 3 (1%) had contusions.

Variable	Frequency	Percentage
Vehicle type		
Motorcycle	70	37.2
Motor Vehicle	65	34.6
Combi bus	40	21.3
Molue/Brt/luxurious buses	13	6.9
Total	188	100%
Number of Vehicles		
1	19	8
2	206	86
3	9	4
4	4	2
Others	0	0
Total	238	100%

Table 3: Respondents' Distribution according to types & number of vehicles involved in RTA

Table 3 is the distribution of the respondents according to the type of vehicles they were in at the time RTA and number of vehicles involved in RTA. The result indicated that majority (70, 37.2%) of the respondents were on motorcycles, followed by those in private vehicles (65, 34.6%), and other vehicles types (40 & 21.3%, 13 & 6.9%). Majority of the crashes (206, 86%) occurred between two vehicles.

Table 4: Respondents' d	istribution accord	ling to sitting position in	n vehicles
Variable	Frequency	Percentage	
Motorcycle			
Front Seat Rider	10	14.3	
Middle Seat Passenger	24	34.3	
Back Seat Passenger	36	51.4	
Total	70	100%	
Motor car			
Front Seat Driver	10	15.4	
Front Seat Passenger	26	40.0	
Back Seat Passenger	29	44.6	
Total	65	100%	
Molue/Brt/Luxurious bu	ises		
Front Seat Driver	2	15.4	
Front Seat Driver	2	15.4	
Middle Seat Passenger	6	46.2	
Back Seat Passenger	3	23.0	
Total	13	100%	
Combi bus			
Front Seat Driver	6	15.0	
Front Seat Passenger	6	15.0	
Middle Seat Passenger	19	47.5	
Back Seat Passenger	9	22.5	
Total	40	100%	

Table 4 showed the distribution of the respondents according to their sitting position in Vehicles at the time RTA. The result indicated that back seat passengers are at higher risk of RTIs when compared to middle seat passengers (24, 34.3%) and the motorcycle rider (10, 14.3%). The distribution indicated for car occupants, majority (29, 44.6%) of Back Seat Passengers (BSPs) are more prone to RTIs, followed by Front Seat Passengers (26, 40%) and Front Seat Drivers (10, 15.4%). The distribution of the respondents according to their sitting position in buses at the time of RTA showed that Middle Seat Passengers (MSPs) are more prone to RTI than passengers (46.2% & 47.5% respectively).

Table 5: Respondents'	distribution	according to geographical location	on and time of RTA
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Variable	Frequency	Percentage	
Location			
Within Lagos	190	80	
Outside Lagos	48	20	
Total	138	100%	
Time of RTA			
7am-7pm (Day)	163	68	
7pm-7am (Night)	75	32	
Total	238	100%	

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Table 5 showed the distribution of respondents according to geographical location and time of RTA. Most of the accident (190, 80%) occurred within Lagos while 48 (20%) occurred outside Lagos especially on the border highways. Majority (163, 68%) of the RTAs occurred during the day (between 7am & 7pm) as compared to the incidence at the dark hours (75, 32%) between 7pm &7am.

Discussion

The study sample consists of 238 accidents victims who presented to the accident and emergency units of the tertiary health facilities visited. The victims' ages ranged from 0 - 15 to 55 years and above. The overall mean age was 32 years. Majority (217, 91%) of the respondent were within the productive age group of 16-45 years old. This is similar to the age distribution found in several other studies.^{35,36} The highest number of victims aged 15 and 44 years age group were reported in a similar study carried out in Western Maharashtra, Indian.³⁵ Similar observation was reported by WHO in The Injury Chartbook which shows that the people of the most active and productive age groups are involved in road traffic injuries, which add a serious economic loss to the community.³⁶Age was found to significantly affect injury pattern at 5% level of significance in the present study. The middle ages are mostly affected, adolescents and young adults were found to be at high risk of traffic injuries. This had implications for the design and implementation of more targeted intervention.

There was a high prevalence of male victims of between 53.9% and 62.7% across the four hospitals. Result of tested hypothesis showed that gender significantly affect injury pattern. The overall male to female ratio was 1.4:1 among the victims. However, higher ratios were reported in other studies. Male to female ratio of 3:1 was reported at the WHO regional forum in 2004.³⁹ The Lagos FRSC reported a male to female ratio of 2.5:1¹¹ Other researches also reported high male victims incidence.^{34,37,38,39} The gender difference is probably related to both exposure and risk taking behaviour.

Conclusion

To achieve the aim and objectives of this study, a descriptive cross sectional study was conducted among two hundred and thirty eight (238) RTC victims who presented to the A&E units of 4 tertiary hospitals in Lagos. The research instrument was a 26-element questionnaire used to collect the socio-demographic data, injury pattern and types as well as the perceived causal and protective factors. Findings showed that 58.8% of the respondents were males and 217(91%) respondents fell within the productive age group of 16-45 years old. Mostly affected body parts were the lower limbs (58, 24%), followed by multiple injuries (40, 17%) and upper limbs (35, 14%). Majority of the respondents had fractures (37%), bruises (33%), sprains (15%) and lacerations (14%).

It was therefore concluded based on the research findings, that socio-demographic factors, age and gender in particular influenced road traffic accidents, protective and safety devices were not put to optimum use by the victims, sitting positions were also found to affect injury pattern, collision type influenced injury pattern and that the lower and upper limbs were the mostly affected body parts in RTAs. RTIs remain a major public health problem that

hampers personal and national development, there is therefore the need for continuous concerted efforts for effective and sustainable prevention.

Recommendations

Based on the findings of this study, the following are recommended at all levels of government;

- 1. Increased awareness and health education on road safety at the community level through the various agents of socialization and at the various levels of government.
- 2. All traffic rules should be strictly enforced by the authorized federal and state government agencies such as the FRSC, LASTMA, VIO, especially licensing for drivers and riders should be enforced and under age driving discouraged; deviants should be sanctioned accordingly.
- 3. The Ministry of Education at the Federal and State levels should ensure the introduction of Road Safety Consciousness into Nigerian educational curricula.
- 4. The United Nations and World Health Organization in conjunction with the International Organization of Motor Vehicle Manufacturers (OICA) and Association of International Automobile Manufacturers (AIAM) should ensure the provision of additional safety gadgets for lower and upper limbs in vehicles.

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