EPIDEMIOLOGY OF ROAD TRAFFIC CRASHES AMONG LONG DISTANCE DRIVERS IN IBADAN METROPOLIS, OYO STATE

BY

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MATRIC NO: 167328

B.SC. PHYSIOLOGY (UNIILORIN)

A THESIS IN THE DEPARTMENT OF EPIDEMIOLOGY AND

MEDICAL STATISTICS

SUBMITTED TO THE FACULTY OF PUBLIC HEALTH

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER IN PUBLIC HEALTH

IN FIELD EPIDEMIOLOGY

OF THE

UNIVERSITY OF IBADAN

July, 2014

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DEDICATION

This research work is dedicated to the Almighty God and to my parents Mr. & Mrs. Adejugbagbe who were there for me throughout the course of this programme.

AKNOWLEDGEMENT

My heartfelt gratitude goes to my supervisors, Dr. M. D. Dairo, Dr. Akinola Fatiregun, Dr A. F. Fagbamigbe and the Ag H.O.D. Dept. of Epidemiology and Medical Statistics (Dr Ikeoluwapo O. Ajayi for their optimism, challenging discussion, pragmatic advice and perpetual good humor in guiding me all through this work. I sincerely appreciate their nicely communicated criticisms, kind disposition, and timely attention to my manuscripts. I cherished their mentoring all through this project. They were there for me right from the conception of the topic, and the blossoming forth of the research. I am so grateful.

Most importantly, I am grateful to my parents, who have contributed immensely to every aspect of my life and also my siblings; Aderemi, Seyi and Taiye & Kehinde. I love you all.

Above all, I bless the Almighty God for guiding me throughout the duration of the course and for ensuring my eventual success.

ABSTRACT

Road Traffic Crashes (RTC) are major causes of morbidity and mortality in Nigeria. While previous studies had reported increases in RTC among long distance drivers and had associated this with their risky behaviours, not many have focused on the distribution and determinants of RTC among long distance drivers in Ibadan metropolis. Information about the distribution of the risk factors of RTC among this group of drivers could be used to design, implement and evaluate interventions to reduce the risk. Hence, this study was conducted to describe the distribution of RTC by place, time of occurrence, characteristics of persons involved and identify factors associated with RTC among long distance drivers in Ibadan metropolis.

Using a cross-sectional study, a two-stage sampling technique was used to select 594 consenting long distance drivers from 5 out of 12 major motor parks in Ibadan metropolis. A pretested interviewer-administered semi-structured questionnaire was used to collect data on socio-demographic characteristics, driving history, knowledge of road safety measures, perceived effects of use of psychoactive drugs on the safety behaviours and mobile phone when driving. Also incorporated in the questionnaire were history of RTC including place and time of occurrence of the last crash. Knowledge of road safety measures was scored based on drivers' understanding of 7 road safety measures comprising speed and the six road safety signs, with scores ≥4 indicating good knowledge. Data were analysed using descriptive statistics, Chi-square test and logistic regression with level of significance set at 0.05.

Respondents were males, with median age of 42.0 years (range: 20.0-73.0 years). Secondary education was the highest level of education attained by 38.0%. Most (96.3%) had been driving for more than five years and 77.7% had poor knowledge of road safety measures. About 23.6% reported the use of mobile phone when driving while, 38.7% and 33.8% reported current use of kolanut and alcohol respectively. The life time prevalence of RTC was 35.5% while 16.2% reported having had at least one RTC in the year preceding the study. The RTCs occurred mainly on narrow roads (25.0%) and bad portions of tarred roads (32.0%) with peak occurrence on weekends (Fridays- 20.0% and Saturdays- 21.3%) and in the afternoon (33.1%). Significantly

higher proportions of drivers aged ≤39 years (23.9%), those with no formal education (29.9%), those who reported the use of mobile phone when driving (27.9%), those who reported alcohol (21.9%) and Kola nut use (19.6%) were involved in RTC in the last one year. A significant predictor of the last episode of RTC in the last one year was alcohol use (OR=1.8, CI=1.1-2.9).

Road Traffic Crashes occurred mostly among long distance drivers who were young, non-formally educated, alcohol users and mobile phone users when driving. Discouraging the use of alcohol, kolanut and mobile phones when driving, as well as the implementation of road safety education programme among young and uneducated drivers is recommended.

Keywords: Road safety measures, Road traffic crashes, Long distance drivers

Word count: 474

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LIST OF ACRONYMS

1. RTCs……..Road Traffic Crashes
2. WHO……..World Health Organization
3. RTIs……Road Traffic Injuries
4. DALYs……Disability-adjusted life years
5. TCD……Traffic Control Divice
6. MLA……...Motor Licensing Authority
7. VIO……Vehicle Inspection Office
8. FRSC……..Federal Road Safety Commission
9. VA……..……Visual Acuity
10. MTH……Manipal Teaching Hospital
11. NURTW……National Union of Road Transport workers

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CHAPTER ONE

INTRODUCTION

1.1 Background

Road Traffic crashes (RTCs) have emerged as a major global public health problem of this century and are now recognized as a neglected pandemic (Dinesh, 2003). RTCs accounted for 2.1% of total deaths and 21.0% of total injury globally (WHO, 2004), while developing and underdeveloped countries accounted for 80% of these deaths (Peden, 2004). Extrapolations from a multistate survey suggest that over 4 million people may be injured and as many as 200000 potentially killed as the result of RTCs annually in Nigeria (Labinjo et al., 2009). This statistics show that Nigeria is placed among the fore front nations (especially the third world nations) experiencing the highest rate of road tragedies in the world.

Road crash is an event that produces injury and/or property damage, it involves a motor vehicle in transport and occur on a traffic way or while the vehicle is still in motion after running off the traffic way (Ogunsaya, 2004). Many had agreed that in the case of highways and roadways, crashes are not just a matter of luck or misfortune, but a combination of multiple conditions or actions. Most of these conditions and actions are predictable occurrences, and thus should not be considered "accident" (Ogunsaya, 2004). In this study the term "crash" will be used in lieu of the term "accident". Human, vehicular and environmental factors play roles before, during and after a crash event therefore RTCs have to be studied in terms of an epidemiological model agent (person), host (vehicle) and environmental factors (infrastructure and climatic conditions) and analyzed in relation to time, place and person distribution (Badrinarayan et al., 2010).

Human behavior and incapacitation account for over 85% of the contributing factors reported by police in Africa (Peden et al., 2004). It has been reported that commercial vehicle drivers are a major contributor to RTCs incidents in Nigeria and their impact on RTCs and economic losses are high, and in particular, young commercial drivers engaged in long distance journeys (Geneva, 2009). This category of drivers includes drivers of cars, buses, trucks, trailers, and oil tankers. Most of these drivers has been reported in other studies (Ghafour, 2009; Retiing et al., 1999) not to be knowledgeable about the various road safety codes and signs required to

maintain safety on the road. Lack of knowledge of these road signs and regulations and illiteracy of drivers has been recognized as some of the major contributing human factors to RTCs. In Nigeria, commercial motor vehicles drivers have been observed to pay little attention to road safety regulations and road safety measures leading to RTCs involving other road users (Asogwa, 1996).A study on the knowledge of and attitude towards road traffic codes among commercial vehicle drivers in Eastern Nigeria showed that about two thirds of the respondents had poor knowledge of road traffic codes and safety (Adogu and Ilika, 2006).

Previous studies have illustrated how risky driving behaviour plays a major role in the occurrence of RTCs; leading to the consensus that changes in driver behaviour is one of the key points for traffic safety interventions (Evans, 2003; Redelmeier and Evans, 2003). One of the approaches considered to be effective and long-lasting is to change behaviours towards traffic safety. The pre-crash driver behaviour and attitude is very important in judging the driver's actions, some of these behaviours and attitudes among drivers may include; cigarette smoking habit, alcohol and drug abuse, inattention to the roadway and surrounding traffic, over speeding and disregarding traffic law and/or traffic control devices, reckless and dangerous driving which could result from confusion or unfamiliarity with the roadway (Hendricks et al., 1999).Injuries sustained from RTCs are the most significant problem, so much so that motor vehicle-related mortality has been described as a `disease of development' (Wintemute, 1985). Frequent injuries sustained in most of the reported RTCs among commercial drivers include mainly head injuries and bone fractures, which are often treated in specialized orthopedic hospitals (Labinjo et al., 2009). In Nigeria, commercial drivers have been reported to be more exposed to RTCs and RTIs especially those engage in long distance driving due to their risk taking behaviours and some other risk factors associated with RTCs (Aworemi et al., 2010).

Previous study in Ibadan, Southwestern Nigeria reported that the main causes of RTCs among drivers are mechanical fault and poor road conditions (Charles et al., 2007). Necessitating the need to address the complexities inherent in driving by knowing the risk factors that actually enhance the occurrence of RTCs among the drivers and try as much as possible to guard against their influences so that safety can be achieve on the roads.

1.2 Problem statement

Worldwide, an estimated 1.2 million people are killed in RTCs each year and as many as 50 million are injured. This represents an average of 3,242 persons dying each day around the world (WHO,2004). Projections indicate that these figures will increase by about 65.0% over the next 20years unless there is new commitment to prevention (WHO, 2004). The "Study Global Burden of Disease" undertaken by the World Health Organization (WHO), Harvard University, and World Bank, showed that RTCs were the world's ninth biggest cause of deaths over the years(WHO,2009; Murry and Lopez, 1997) and had been predicted to increase across different regions in the world (Appendix I).

Injuries are being recognized as a leading cause of global death and disability, with RTIs being the greatest contributor**.** About 15-20 million people suffer severe injuries from RTCs (WHO, 2002). Without appropriate action, by 2020, RTIs are predicted to move from the current ninth position of the biggest cause of deaths and disability to the third leading contributor to the global burden of disease and injury after major depression and Ischemic heart disease (Appemdix II) (WHO, 2004).

Projections show that, between 2000 and 2020, road traffic deaths will decline by about 30% in high-income countries but increase substantially in low-income and middle-income countries (WHO, 2009). According to the World Health Organisation (WHO), the burden of disease attributed to RTCs in developing countries is comparable with malaria, HIV/AIDS and tuberculosis.

Mortality due to RTCs in Africa is among the highest in the world, at 28.3 deaths per 100 000 population (Peden et al., 2004).In Nigeria, road safety situation is an abuse of humanity for the exact number of people killed each year is outrageous and it has often generated controversies (Anyaoku 2009). Hence, daily death seriously threatens every family, killing and maiming innocent members and all age group of road users are at the risk of death. RTCs happen almost on daily basis on Nigerian roads and highways. According to Oyeyemi (2003), the frequent crashes experienced on roads and highways in Nigeria over the past years have caused many problems for the development of the country and the carnage arising from it has become the bane of the country's socio-economic development. Also, Odeleye, (2000) submits that there is hardly

any day without the news of loss of lives and properties on highways as a result of road crashes and innocent children are often direct victim. Asogwa, (1992) refer to Nigeria as one of the country that has the worst RTCs records in the world.

Today in Nigeria, death by RTCs far exceeds those by any communicable disease in the country and it had been recognized as a major public health problem in Nigeria for some period of time (WHO, 2004). The overall RTI rate in Nigeria was estimated to be about 41 per 1000 population while mortality from RTCs was about 1.6 per 1000 population (Eze, 2012). According to the World Health Organization (WHO), RTIs ranked as the 11th leading cause of death and the 6th leading cause of disability adjusted life years lost in Nigeria for 2002, and constituted the leading cause of death and DALYs lost from unintentional injuries (WHO, 2004). An analysis of the traffic crashes data recorded over a five year period of 2000-2006 in Nigeria showed that 98,494 cases of RTCs were recorded out of which 28% were fatal and 49% cases resulting to deaths (Federal Road Safety Commission, 2009). A study carried out in Ekiti, Kogi and Kwara States in Nigeria, recorded that a total of 498 and 391 people were killed in the year 2006 and 2007 respectively. This resulted from 402 and 413 crashes respectively. The injured persons for the same period were 1,142 and 1,486 respectively (Omidiji and Ibitoye, 2007).

1.3 Justification

Despite all the programs initiated to fight RTCs in Nigeria, if most preventable causes of RTCs (such as drivers behaviours to road safety measures, road and vehicular conditions) (Mishra et al., 2010) are not dealt with, the probability of achieving the aim of these programs will be impossible. These program should be directed mostly to commercial drivers especially the long distance ones who are more exposed to RTCs compared to the private drivers. This category of drivers has been reported by other studies (Iribhogbe and Odai, 1999; Adekoya et al, 2011) to engage more in risky behaviours compared to the intra-city commercial and private vehicle drivers. The risky behaviours reported in this studies includes drivers' use of alcohol, local herbs, kolanut and cigarette when driving, as they believe this substances will keep them alert when driving for a longer period of time (Adekoya et al., 2011). Previous studies (Charles et al., 2007; Sangowawa et al., 2007; Bekibele et al., 2007) in Ibadan, South Western part of Nigeria had reported increases in RTC involvement among commercial intra-city and private drivers and had

associated it with their behaviours, but not many has focused on the distribution and determinant of RTCs among long distance drivers in this part of the country, which is a gap the study intends to fill by focusing on this category of drivers to explore the conditions that made them more prone to RTCs. Information about this conditions could be used to design, implement and evaluate interventions to reduce the risk of RTCs among the commercial drivers.

Studies have been carried out within and outside Nigeria on RTCs among drivers. But most of this studies (Charles et al., 2007; Bekibele et al., 2007; Arosanyin et al., 2012; Ofonime, 2012; Abdul et al., 2012) did not use large sample size and the result obtained may be limited due to lack of precision. Larger sample size more closely approximate the population and generally lead to increased precision and this can also help to reduce the margin of error that might occur in a study. Hence, this study use a larger sample size to keep the margin of error at an acceptive level of confidence.

1.4.1. General Objectives

The study aimed to describe the distribution of RTCs by place, time of occurrence and characteristics of persons involved among inter-city long distance drivers in Ibadan as well as identify factors associated with involvement in RTCs.

1.4.2. Specific Objectives

1. To describe the characteristics of long distance drivers in Ibadan.
2. To assess the knowledge about road safety signs among long distance drivers in Ibadan.
3. To describe road safety behaviours among long distance drivers in Ibadan.
4. To determine the lifetime and one year prevalence of RTCs among the long distance drivers in Ibadan.
5. To identify site and types of injuries sustained from RTCs among the long distance drivers in Ibadan.
6. To identify risk factors related to RTCs among the long distance drivers in Ibadan

1.5 Research questions

In the course of this study, the following research questions were answered;

1. What are the characteristics of long distance drivers in Ibadan?
2. What do the long distance drivers know about the road safety signs?
3. What are the behaviours of long distance drivers in Ibadan metropolis to RTC preventions practices/ behaviours?
4. What is the prevalence of RTCs among the long distance drivers in Ibadan?
5. What are the types of RTIs sustained and site where it occur among long distance drivers in Ibadan?
6. What risk factors are associated with RTCs among long distance drivers in Ibadan?

CHAPTER TWO

LITERATURE REVIEW

The World Health Organisation's (WHO) in the world report on RTI prevention (2004) defines a RTC as a collision or incident that may or may not lead to injury, occurring on a public road and involving at least one moving vehicle (WHO, 2004). RTCs are among the primary causes of injury and premature death in our society. According to research carried out by Pierce and Maunder, (1998) under the auspices of road research laboratory in United Kingdom, they found out that RTCs worldwide are estimated to a total of 20 million victims for a time period and which 70.0% of the RTCs occurred in developing countries. The number of crashes per registered vehicles was 10.0% to 20.0% higher in developing countries than in the developed world. The severity of RTCs is likely to be much greater in Africa than anywhere else, because many vulnerable road users are involved, and also because of the poor transport conditions such as lack of seat belts, overcrowding, and hazardous vehicle environments. The RTI mortality rate is highest in Africa (28.3 per 100,000 population) compared with 11.0 in Europe. Indeed, if major challenges are not made to reverse the trend, it is feared that RTC fatality rate in Africa as a whole is anticipated to increase by 80 per cent between 2000 and 2020 (Peden et al., 2004).

Nigeria, with an estimated population of 158 million, continues to record a high level of RTCs. This high prevalence of RTCs has been reported in previous studies. Sanni and odusanya, (2003) reported that about 77.0% of all admissions into one emergency medical centre in Lagos were due to RTCs (Sanni and Odusanya, 2003). In a study done by Wade et al., (2011), about 26.2% of commercial drivers within Jos, Nigeria had reported involvement in RTCs since they started working. In a study done among long distance commercial drivers in Ilorin, Nigeria to determine whether driving under the influence of psychoactive agents has been implicated in the occurrence of RTCs, It was reported that about 20.8% of the drivers had been involved in RTCs in the previous 10 years (Adekoya et al., 2011).

2.1 Driver's Knowledge of Road Safety Measures

Driving is a complex and task demanding even for the best of drivers. Information must be obtained and analysed constantly by the driver so as to decide what action to take, initiate the

action, assess the resulting consequences and take remedial action if necessary. Every drivers have different knowledge and attitudes, a driver's knowledge and attitudes have a strong influence on his or her behaviours and decision making skills. The literacy rate among drivers in Nigeria is low and most drivers cannot interpret and read various road safety codes and signs. Traffic signs are the oldest and most commonly used traffic control device (TCD). These signs convey messages in words or symbols and erected to regulate, warn, or guide the road users (motorists, and pedestrians etc). Traffic signs are commonly used traffic safety tools, mainly developed to provide crucial information in a short time to support safe drive; but the success depends on their comprehensibility by the drivers (Kirmizioglu and Tuydes-Yaman, 2012). Traffic signs, however are most effective when they command attention, convey a clear and simple meaning, command respect of the road users and give adequate time for proper response. Traffic signs use color, shape, and words to convey information. However, the traffic signs cannot effectively serve their intended purpose if drivers do not understand the information concerning safe driving behavior that is encoded in the sign (Canfield, 1999).

Different literatures have reported low level of knowledge of road safety measures among drivers. Sangowawa et al., (2007) conducted a study among commercial motorcyclists in both rural and urban parts of Oyo State, Nigeria and find out that among 365 motorcyclists interviewed, up to 292 (80.0%) had poor knowledge of road safety signs (Sangowawa, 2007). Makinde et al., (2012) reported low level (42.0%) of understanding of traffic signs among intra-city drivers in Akure, Southwestern Nigeria and reported that age, education and years of driving played prominent roles in drivers' understanding of signs and road safety regulations. Another study in South Western part of Nigeria showed that less than 20.0% of the drivers studied obeyed the traffic codes more than half the time they saw them (Owoaje et al., 2005).In addition, it was believed that drivers with higher intelligence level are expected to have lower crash rates. Previous studies has investigated the associations between drivers knowledge and RTCs occurrence. Retting et al., (1999) reported that fatal crashes at traffic signals increased by about 19.0%, whereas the number of all other fatal crashes had increased by 6.0%. They found that the main factor contributing to multiple-vehicle crashes at intersections, as well as those involving pedestrians, is non-compliance with traffic control devices, such as stop signs and traffic signals. Ghafour, (2009) found out that nearly 37.0% of all RTCs involving pedestrians on Saudi roads

are caused by the negligence and lack of awareness about driving rules and other safety measures by the drivers. Another researcher (Al-Madani, 2000) investigated the influence of drivers' comprehension of signs on RTCs involvement, citation received and seat belt usage. While knowledge of signs was increasing with seat belt usage, no significant association with crash involvement was observed: even when age was incorporated with the RTCs. Research carried out by (Al-Madani, and Al-Janahi, 2002) examined the influence of drivers' crash involvement and personal characteristic on their understanding of 28 traffic regulatory and warning signs. A sample of 9000 drivers who were residents of Bahrain, Kuwait, Oman, Qatar, and United Arab Emirates was used. Result showed that on average, drivers really understood 56% of all signs. The gulf states, Asian and Arab drivers understood the signs less well and were not much helped by the use of the pictograms rather than written instructions, male drivers score higher than female drivers, age, marital status experience and accident rates had no obvious bearing on comprehension of signs. The overall conclusion was that personal characteristics, rather than crash involvement rates, are most clearly associated with comprehension capabilities.

2.2 Drivers Training and Licensing system

The driver of a vehicle is the most important single factor in RTC. The production of high quality drivers is consequently non-negotiable. The two basic requirements in producing high quality motor vehicle drivers is proper training and licensing programmes. Driver training/education is a programme of organized learning and practice made to provide the knowledge, attitude and skills needed to drive safely, ensuring that advanced knowledge and skill needed for safe driving performance under peculiar circumstances are provided. This is the further training of drivers in stages that bear in mind the different levels of skills that driver must possess before becoming expert road users. This measure is the only means of ensuring that operators entering or remaining in action in the system are first endowed with the necessary skills (Gungul et al., 2012).The assumption is that the attendance of a formal driver training school significantly lowers the risk of the driver not having RTCs. Hence, drivers exposed to formal instruction should have lower crash rates than those who do not receive such instruction, that is, those who learn to drive informally (Beirsness 1996; Fisher and Shapiro 2005).About 68.0% of RTCs investigated in Parkistan occurred among untrained/unskilled drivers (Abdul and Ansa, 2012)and, Mobolaji and Wilfred (2011) had reported that about 82.4% drivers in Owerri,

eastern part of Nigeria involved in RTCs had not been formally trained (Mobolaji and Wilfred, 2011). A study conducted among commercial motorcyclists in Benin, Nigeria reported that about half 448 (45.0%) of motorcyclists received no form of training on the use of motorcycle before they commenced operations (Iribhogbe and Odai, 1999).

Valid driver's license should be possessed by all drivers as a proof of their proficiency. All over the world, it is also recognized as a valid means of identification. In Nigeria, the authorities involved in procurement of driver's license are the Motor Licensing Authority (MLA), the Vehicle Inspection Office (VIO) and Federal Road Safety Commission (FRSC). Application forms are obtained from the MLA, driving tests are conducted by the VIO, and the licenses are issued by the FRSC. National Road Traffic Regulations demand that every applicant for driver's license goes through training in an approved driving school and passes the driving test. The applicant also provides a certificate of medical fitness and Visual Acuity (VA) testing from any government hospital (Federal Government of Nigeria, 2004). Study done by Asogwa in Nigeria has revealed that a sizeable proportion of drivers who possesses driving licenses never showed up in any driving school but simply bought their licenses. Abhisek et al., (2011) reported that about 7.4% of the drivers in a tertiary care hospital in Haryana, Indian were without drivers license. Previous study has linked absence of driving license among drivers to increase incidence of RTCs. A study in Selangor, Malaysia reported that a significant proportion (14.3%) of drivers without driving license has been involved in RTCs (Hejar et al., 2005). Therefore, untrained drivers, not unexpectedly, often result in high RTCs rates (Asogwa, 1992).

2.3 Drivers Attitudes and Behaviours to Road Safety Measures

One of the approaches considered to be effective and long-lasting in the prevention of RTCs is to change attitudes and behaviours of drivers towards traffic safety (Hermann et al., 2007). The rationale of this attitudes–behaviour–outcome model assumes that risk-taking attitudes correlate with risk taking behaviour, which in turn predict RTCs. Although the potential of this model is often advocated and sometimes used in traffic safety campaigns, and the causal pathway between attitudes, driving behavior and RTCs risk is rarely studied (Assum, 1997). This gap in knowledge is due to the fact that some studies that have shown a strong relationship between drivers' attitudes and their behavior on the roads did not include data on RTCs (SARTRE, 2004).

Previous studies that had considered drivers' attitudes and behaviours to RTCs produced inconsistent findings. A study by Assum among Norwegian drivers (Assum, 1997) found that the association between attitudes and crash risk disappears when controlling for mileage and for driver's age. Another study from Norway found that attitudes towards rule violations and speeding influenced involvement in risky driving behaviours, which had an effect on RTCs (Iversen and Rundmo, 2004). Unfortunately, crash data were recorded retrospectively and over lifetimes, making it difficult to disentangle the temporal sequence in the associations between attitudes, risky driving, and crashes.

2.3.1 Psychoactive Substances use among drivers

One of the risky behaviours among drivers reported by most studies is psychoactive substance use (Adekoya et al., 2011; Adisa, 2010). Driving under the influence of alcohol or other drug has been known to impair the driver's ability to judge and control the vehicle (Orsay et al., 1994). The WHO has highlighted in the Global Status Report on Road Safety that the frequency of drink driving varies considerably, and there are indications this phenomenon remains a major risk factor of RTCs in developing countries (The Global Status Report on Road Safety, 2009).Analysis of the condition of drivers involved in RTCs showed that use of drugs such as alcohol, kola nut and Indian hemp at time of crashes was an important factor in the occurrence of RTCs (although the use was often denied) (Asogwa 1978). Over 12 % of RTCs were under influence of caffeine in kola nut, 7.74% alcohol, and 1.62% Indian hemp (Asogwa 1980). A case-control study in France found a higher prevalence of alcohol, cannabis and a combination of the two in blood samples of drivers involved in RTCs than in those from controls (Mura, 2003). Studies done on drivers after being involved in RTCs reported that although alcohol is the most prevalent source of driver's impairment, other drugs or substance abuse can also contribute to the problem (Violant et al 1996; Kayombo 1995; Leon 1996). Peden, 1996 found that alcohol was a factor in around 29.0% of non-fatally-injured drivers, and in over 47.0% of fatally-injured drivers in South Africa (Peden, 1996).Adekoya et al., (2011) reported that the prevalence of daily alcohol consumption, cigarette smoking and kola-nut use while driving were 11.5%, 25.8%, and 48.4% respectively among commercial long distance drivers in Ilorin, South western Nigeria. They found out that those engaged in eating kola-nut while driving were twice as likely to have been involved in RTCs in the previous 10 years

2.3.2 Drivers Negligence to Road Safety Measures

Driver's negligence to road safety measures includes reckless driving, improper overtaking, disregard for traffic light, use of mobile phone (Mike, 2009) and non usage of seatbelt when driving (Cummings et al., 2002). Some of these causes may have had alcohol consumption as an underlying factor (Odero et al, 1997; Nakahara et al, 2005; Clarke et al, 2007). One of the causes of deaths and injuries in an automobile crash is the occupant being thrown by inertia during a collision (Evans, 2009). By using seat belts, these deaths and injuries can be reduced drastically because seat belts retain occupants in their seats and prevent them from hitting objects in the vehicle, and from being ejected from the vehicles (Koushkiet al., 2003; Cunill et al., 2004). It has been estimated that using seatbelts can reduce the risk of fatalities in a RTC by 40-50% among front seat occupants and by 25-75% among rear seat car occupants (Routley et al., 2007; WHO, 2009). The effectiveness of seatbelts use in reducing the severity of injury in vehicle occupants involved in collisions has been proven all over the world (Cummings et al., 2003). Crash research in various countries has found that rates of seat-belt wearing are substantially lower in fatal collisions than the general average rate. Compliance with seat-belt usage in the highly motorized countries of Western Europe and North America falls between 79% and 95% among both front and rear occupants (Routley et al., 2007). However, studies from the West African sub-region had shown compliance with seat-belt usage to be generally low. A survey in Kenya found out that among 200 road crash survivors only 1% reported seat-belt use, making the authors of the study to conclude that the demand for seat-belts has yet to become part of the culture in Kenya (Nantulya and Muli-Musiime, 2001).In Ghana, an observational study by Afakaar, et al. in 2010 found aseat belt compliance rate of 17.6% (Afakaaret al., 2010). Studies from the South-western part of Nigeria showed a compliance percentage of between 18.7% and 44.5% (Sangowawa et al., 2010). In Benin, a roadside observational study of 367 vehicles found a compliance percentage of 52.3% in drivers, 18.4% in front seat passengers and 6.1% in rear seat passengers (Iribhogbe et al., 2008).

One of the riskiest driving behaviors is the performance of a secondary task, and most drivers appear to be particularly prone to this distraction (Traffic safety facts, 2010). Drivers engage in many competing tasks (including eating, adjusting the radio, and talking to passengers) that are not related to operating the vehicle in traffic, but the use of electronic devices such as cell phones

while driving has garnered the most public and mass-media interest. An estimated 9% of all persons who drive during the day do so while dialing or talking on a cell phone or sending or receiving text messages (Traffic safety facts, 2010). Driver distractions have been suggested as major contributor to RTCs (White et al., 2004).Numerous governments have introduced regulations governing the use of mobile (cellular) telephones while driving. Studies have examined possible effects of concurrent mobile phone use on driving performance (Tearle, 2004; Haigney and Westerman, 2001). Although interference is often apparent, determining the implications of such findings for 'real world' driving is problematic. It was found that a mobile telephone task had a negative effect upon the drivers' choice reaction time. Previous study has observed that as many as 2,600 drivers on cell phones were killed each year in RTCs (Britt, 2006) and indicate that the crashes risk can increase when a driver is using the mobile telephone in a car (Bouvier, 2004).Estimates based on cell-phone records indicate that cell-phone use among all drivers increases the risk of a crash by a factor of 4 (Redelmeier and Tibshiranim, 1997).

2.4 Epidemiology of RTCs

2.4.1. Distribution of RTCs by Person

Evidences noted that person behaviour is the most common factor accounting for more than 85% of all RTCs (Peden et al., 2004). Epidemiological research has tended to focus on human risk factors because they are most relevant to the search for preventive measures and because they have been identified as the most frequent cause of crashes (Hendricks et al., 1999). This human risk factors of road crashes may include; Age, sex, drivers knowledge of safety measures and road safety behaviours among drivers (Oyeyemi, 2003). The human factor contributes to the majority of road traffic crashes. A report from traffic Police office of Mekelle town indicated that in 2008, there were a total 313 RTCs and in 2009 the total number RTCs increased to 353. On the other hand, the report showed that 96% of the causes were related to human risk behavior whereas 4% was due to vehicle problem **(**Mekelle, 2009**).** A study done by Odero (1995) in Kenya reported that human factors were responsible for 85% of all causes of RTCs (Odero 1995).

2.4.1.1 Age

Age has been known to be an important factor contributing to the occurrence of RTCs. Available literatures has supported the fact that adolescents or young people are frequently involved in RTCs than other age groups (Bjornskau and Gafni, 2000). According to WHO data, adults aged between 15 and 44 years account for more than 50% of all RTCs globally as shown in Figure 2.1 (WHO, 2002; The World's Worst Drivers, 2010). The rates for this age group are higher in low income and middle-income countries with about 400,000 young people under the age of 25 killed every year (Road traffic accident statistics, 2010). Krung et al., (2000) has found out that more than half the people killed in RTCs are young adults aged between 15-44 years. Other studies have also reported higher prevalence of RTCs among young drivers especially drivers between 21 and 30 years of age (Texas Transportation Institute, 2005; Zhang et al., 1998; Kuner et al., 1996). Leon et al (1996) have shown through their various studies that young drivers were more frequently involved in RTCs caused by inappropriate speed and loss of control of the vehicle compared to other age group of drivers.

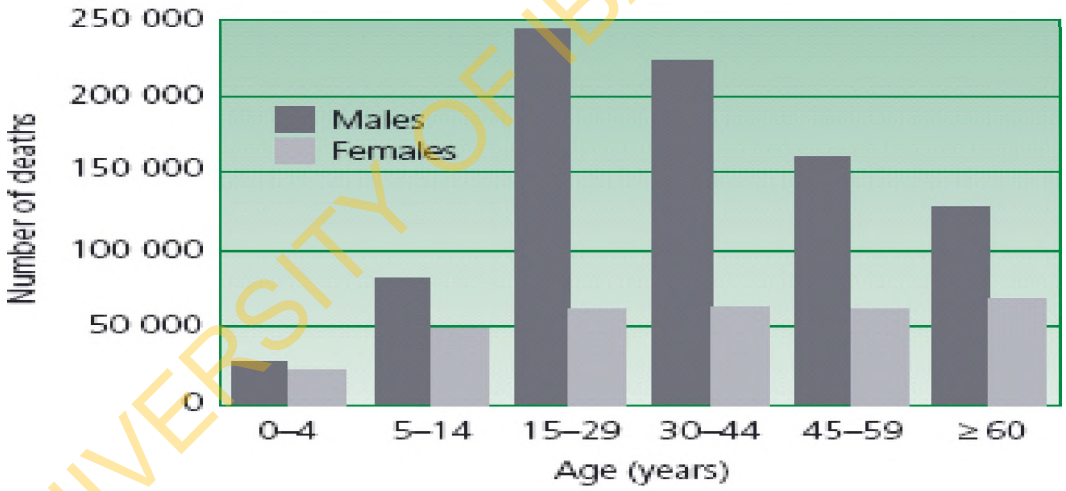


Figure 2.1: Road traffic deaths by sex and age group (WHO, 2002)

Unlike other studies, Massie et al., (1995) have reported higher prevalence of RTCs among older drivers (70 years and above) while younger drivers have highest rates of RTIs sustainability (Massie et al 1995). Also, it was reported in a study in United Kingdom that about 25.4% of all road traffic fatalities were recorded among drivers aged 60 years or above (Mitchell, 2001).

2.4.1.2 Sex

With regards to gender, it appears that males are more involved in RTCs than females. Globally, in 2002, males accounted for 73% of all road traffic deaths, with an overall rate almost three times that for females: 27.6 per 100 000 population and 10.4 per 100 000 population respectively (WHO, 2004; Road traffic accident statistics, 2010).The distribution of road traffic mortality rates by sex globally, as well as for each WHO region, is shown in Table 2.1. Morbidity rates for males are considerably higher than those for females.

Table 2.1: Road traffic injury burden (DALYs lost) by WHO region and sex, 2002

Road traffic injury burden (DALYs lost) by WHO region and sex, 2002

WHO region	Males	Females	Total
All	27 057 385	11 368 958	38 426 342
African Region	4 665 446	2 392 812	7 058 257
Region of the Americas	3 109 183	1 141 861	4 251 044
South-East Asia Region	7 174 901	2 856 994	10 031 894
European Region	2 672 506	937 945	3 610 451
Eastern Mediterranean Region	3 173 548	1 403 037	4 576 585
Western Pacific Region	6 261 800	2 636 309	8 898 110

DALYs: Disability-adjusted life years.

Source: WHO Global Burden of Disease project, 2002.

A comprehensive review of 46 studies in low income and middle-income countries found that, in terms of involvement in RTCs, there was a consistent predominance of males over females; males were involved in 87.0% of RTCs (Waller, 2003). Odero et al.,(1997) found out that in developing countries men are more at risk than women of being injured in crashes. The preponderance of males may be attributed due to their greater exposure to traffic and other associated factors. Massie et al., (1995) found that males compared to females have a higher risk of experiencing fatal crashes, while women have higher rates of involvement in injury crashes (Massie et al., 1995). In a study done among commercial drivers within a tertiary institution in Ibadan, Nigeria, it was reported that all the drivers interviewed and involved in RTCs were males

as they are more exposed to commercial driving than their female counterparts (Charles et al., 2007).

2.4.1.3 Education

Studies have reported that most commercial drivers in Nigeria are uneducated and majority have primary education as the highest level of education (Adekoya et al., 2011). Charles et al, (2007) reported that 82.8%drivers in a tertiary institution in Ibadan, Nigeria had primary six leaving certificate followed by secondary (17.2 %). Studies have reported that most commercial drivers with lower level of education were more exposed to RTCs than those with higher educational level. This can be due to lower level of understanding of various risk factors that can result to RTCs occurrence (Jha et al., 2010; Nilamber et al., 2004). A prospective hospital based study of RTC victims carried out at Bugando Medical Centre in Northwestern Tanzania reported that more than half 952 (57.9%) of the victims of RTCs had no formal education (Phillipo et al., 2012).

2.4.1.4 Driver's Characteristics

It has been reported that commercial vehicle drivers are a major contributor to RTCs incidents in Nigeria and their impact on RTCs and economic losses are high, and in particular, commercial drivers engaged in long distance journeys (Geneva, 2009). This category of drivers includes drivers of cars, buses, trucks, trailers, and oil tankers. In this part of Nigeria, most commercial drivers, mostly the long distance ones prefer using cars and minibuses as a means of transportation because they are economical in fuel consumption. This fact had been supported by findings made by Adekoya et al., (2011) where about half (52.4%) of the long distance drivers in Ilorin drives car followed by buses (41.6%). Mini-buses and car drivers has been significantly linked to RTCs compare to other mode of vehicles due to the fact that they are the major means of transportation in Nigeria. This finding is in agreements with Eke et al. (2000), and Thanni and Kehinde (2006). Thanni and Kehinde (2006) reported that drivers of minibuses (63.9%) and cars (14.8%) reported more RTCs compared to others such as lorries (1.1%) and trailers (1.1%). Atubi, (2012) examined the variation patterns of RTCs in Lagos state using data for 32 years (1970-2001) and observed the number and type of vehicles involved in road traffic crashes. The study revealed that private cars, buses and taxis were more prone to crashes in Lagos State. Other

authors has also linked RTCs with heavy vehicle drivers, The National Transportation Safety Board, (1995) has reported that truck drivers contributes to as many as 30.0% to 40.0% of all heavy truck crashes (National Transportation Safety Board, 1995) while Helina and Heikki, (2001), reported that trailers and trucks of long distance drivers were principally responsible for about 16.0% of all the RTCs in Finland.

Experiences of drivers on the road have been reported to be a contributing factor to RTCs, as some of the drivers are underage and believes they have the ability to move vehicles without knowing the rules and regulations guiding road use especially the commercial drivers (Ohakwe et al., 2011). In 1995, young new 16 years old drivers in the United States were involved in 35 crashes per million miles of travel as compared to 20s and early 40s drivers. Immaturity, inexperienced particularly in the necessary driving skills and capabilities were the main reasons postulated (Mayhew and Simpson, 2002). Enobakhare and Ehikhamenor, (2011) has reported that driving experience of shorter duration (less than 6 months) appears to be a major contributing factor to RTCs among commercial drivers in Nigeria.

2.4.2. Distribution of RTCs by Time

The weather conditions and time of the day have a role to play in the causation of RTCs (Odero et al., 1991; Zhang et al., 1998). Fatal crashes mostly occur during winter season. A study done by Kong et al., (1996) had revealed that most RTCs occur during the night, weekends and during months of October to December. A descriptive study was conducted at Manipal Teaching Hospital (MTH) in the South central part of the Pokhara city, Indian and it was observed that about 269 (81.7%) of the total RTCs reported occurred in rainy and cloudy conditions while maximum crashes (44.16%) was reported in the evening period followed by the morning (24.16%) (Nilambar et al., 2004). Abhishek et al., (2011) has reported more than half (54.1%) cases of RTCs on week days than the weekends 568 (45.88%)in a medical institute in Mullana, Indian. Eke et al., (2000) using data collected form University of Port Harcourt Teaching Hospital (UPTH), Nigeria from January 1986 to December 1995 found that 70% of total accidents in Port Harcourt, Nigeria occurred during the rainy seasons and most RTCs occurred during the weekends.

2.4.3. Distribution of RTCs by Place

The buildup physical and social environment with regards to road network, the types of roads, and quality of the road like black spot, road segments, lane width, junction layout, pot holes and other characteristics of the road have strong effects on road safety in any place. RTCs appear to occur regularly at some flash points such as where there are sharp bends, potholes and at bad sections of the highways. At such points over speeding drivers usually find it difficult to control their vehicles, which then result to fatal traffic crashes, especially at night with most cases occurring on major highways (Atubi, 2009). Nigerian highways are arguably one of the worst and most dangerous in the world (Healnigeria, 2009). Previous studies (Asolor et al, 2008) have demonstrated that the road is a major factor in RTCs. While Majumder et al., (1996)had observed that RTCs occur mostly on broader roads than narrow ones, Charles et al., (2007) reported that 12.5% RTCs reported by commercial school drivers occur on bad roads. Akinyemi, (2009) collected and analyzed 'data on geometric design information system, roadway surface and road side conditions on seven two lane rural roads in the country. He found that rural roads in the country have low levels of design consistency, sight distance on and between geometer features as insufficient for stopping and overtaking adequate traffic control devices and unforgiving road sides'. He then argues that their deficiencies are due largely to inadequate road design specification and maintenance (Gungul, 2012). Anyata, (2009) on the other hand showed that inadequate drainage could render the road a serious crash threat. Another aspect of the road factor is the general condition of the road itself. Issues of potholes, the indiscriminate location of police check points and the reluctance of the appropriate authorities to continually improve on the condition of the roads are significant in road crashes.

2.5 Prevalence and Patterns of Injuries Sustained from RTCs

Injuries represent 12.0% of the global disease burden and are the main cause of death between the ages of one and 40 years. Injuries are the third commonest cause of death globally (Peden et al., 2002). The results of a study in the United States revealed that 5.27 million people had sustained non-fatal RTIs in 2000, 87% of which were considered "minor", according to the maximum injury severity scale (Blincoe, 2002).Middle- and low-income countries are thought to bear up to 90% of the global injury burden. A review of studies in low-income and middle

income countries revealed that road traffic related injury accounted for between 30% and 86% of trauma admissions in these countries (Odero, 1997). Statistics showed that the RTIs mortality rate in Africa is 32.2 per 100,000 of the population, compared to the rate of 13.4 per 100,000 in Europe (Hofman et al., 2005). Individual country studies report similar findings. A population based survey in Nigeria had reported an estimated annual injury rate of 41.2% per 1000 population while about 348 (11.3%) of the people had reported having any injury in the previous 12 months (Labinjo et al., 2009). Also, it was reported that out of a total of 2913 trauma patients who had attended the University of Ilorin teaching hospital in Nigeria over a period of 15 months, about 1816(62.3%), had suffered road traffic injuries (Solagberu, 2002).

Most studies has observed head injuries as the main site of injuries (Sahdev et al., 1994; Salgado and Colombage,, 1998) while others have observed the abdomen (Abhishek et al.,2011). A retrospective study of fatal cases of RTCs in a medical college in Indian, reported that about 50.4% of victims had died from head injury followed by ribs fractures (35.5%) (Ravinda et al., 2011). The head (60.5%) and musculoskeletal (extremities) (60.5%) were the most common body region injured from RTCs, accounting for 52.1% cases in a Medical Centre in Northwestern Tanzania (Phillipo et al., 2012). The common types of RTIs reported by drivers in some studies were fractures and cuts (Thanni and Kehinde, 2006; Ashish et al., 2011). Ravindra et al., (2011)reported skull fractures (77.7%) as the most common type of RTIs followed by sub-dural haemorrhage (73.9%) among victims of RTIs in Indian while open wounds (i.e bruises, abrasions, lacerations, crush wounds, traumatic amputation, etc) and fractures were the most common type of injuries reported by Phillipo et al., (2012) in Tanzania.

2.6 Aetiological Factors of RTCs.

The causes of RTCs are multi-factorial, and this has been well represented using the epidemiological model. These causes can be divided broadly into human, vehicle and environmental (Muhlrad et al., 2005; Nilambar et al., 2004). These factors play roles before, during and after an event. RTCs, therefore, can be epidemiologically classified into time, place and person distribution (Nilambar et al., 2004). A model for traffic crashes as inspired by the ecological model of a disease was developed by Jørgensen and Abane (1999) who made a adjustment of this basic model to suit RTCs analysis. The model is characterized by three main components:

- The vehicle (corresponding to the vector in disease ecology) which describes vehicles into its composition, age, technical conditions and safety equipments.
- The environment, comprising the road system and the wider physical and built up environment.
- The behavior of the population; including its characteristics such as age and sex ratio as well as attitudes and general traffic behavior.

Superimposed on this model is a system of traffic laws, regulations and mode of enforcement designed to ensure that the population adheres to the controls and regulations so as to maintain some level of road safety i.e. traffic rules (speed restrictions, road signs), speed controls and convictions for various road traffic offences (Jørgensen and Abane, 1999). The model as shown in figure 2.2 below was used as a framework for understanding the multiple causes and prevention of RTCs that occur in developing countries. A study carried out in southwest Nigeria reported that the causes of RTCs were multi factorial and had been attributed to: recklessness and negligence of the drivers (61.3%), mechanical defects in vehicle (8.4%), careless crossing of the road by pedestrians (12.7%), bad road and other less important causes accounted for (17.6%) (Charles et al., 2007).

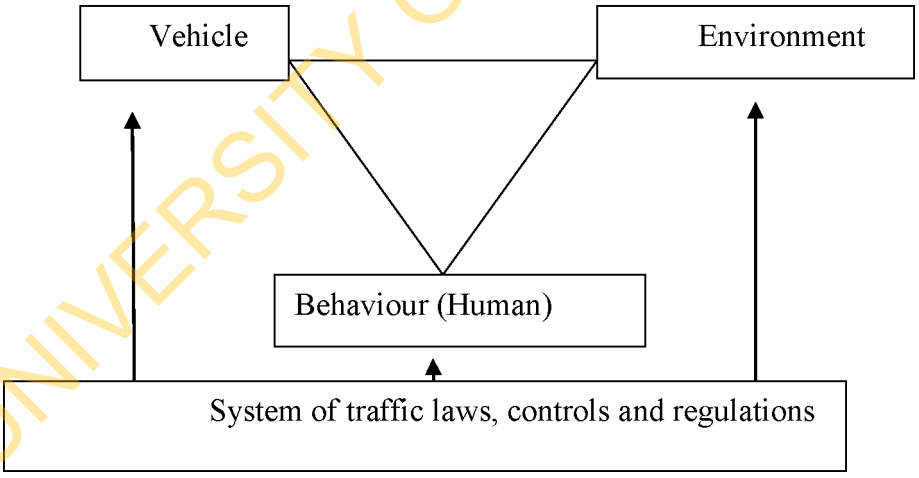


Figure 2.2: A model for road traffic crashes. (Jørgensen and Abane, 1999).

Table 2.2 shows the statistics of the ten most prevalent causes of road traffic crash in Nigeria between 2008 and 2011 (FRSC, 2012). A classification of these ten most prevalent causes of

road traffic crashes shows that the human causative factors accounted for 73 percent of the crashes while the technical factors were responsible for 20 percent of the causes. More specifically speed violation, dangerous driving and loss of control, all human causative factors, explained almost 60 percent of the human causative factors (FRSC, 2012).

Table 2.2: Causative Factors of RTC in Nigeria (2008 – 2011)

Causative Factors	2008		2009		2010		2011	
	Total	Percentage	Total	Percentage	Total	Percentage	Total	Percentage
Speed Violation	2488	21.9	2681	24.7	1419	26.6	1253	27
Dangerous Driving	2190	19.3	2376	21.9	878	16.5	692	15
Loss of Control	631	5.6	774	7.1	508	9.5	721	15
Tyre Burst	631	5.6	703	6.5	246	4.6	394	8
Brake Failure	477	4.2	354	3.3	249	4.7	335	7
Dangerous Overtaking	791	7	955	8.8	296	5.6	293	6
Light/Sign Violation	1277	11.3	314	2.9	188	3.5	219	5
Unclassified	1518	13.4	1094	10.1	301	5.6	251	5
Mechanically Deficient Vehicle	380	3.3	391	3.6	137	2.6	126	3
Route Violation	273	2.4	265	2.4	133	2.5	128	3
Bad Road	107	0.9	185	1.8	178	3.3	76	2
Obstruction/Stationary Vehicle	279	2.5	163	1.5	168	3.2	108	2

Source: FRSC, (2012)

Nigeria Road Safety Strategy (NRSS). 2012 - 2016

2.6.1 Mechanical Deficiency

Road traffic crashes resulting from vehicle defects were quite rare, and only accounted for around 1.5% of the sample while most common defect found was with braking systems (David et al., 2008). According to Ovuworiet al., (2010), tyres, engines, braking system and lights system are among vehicle subsystems which malfunction can cause road crashes. The vehicle itself is a component of the road traffic system. Consequently its reliability is positively correlated with crashes causation on the road network it plies. The reliability of the vehicle is itself a function of

the condition of vehicle. Every vehicle is designed for a specific maximum load in all its ramifications. It is therefore, not surprising that when subjected to stress over and above the provisions of the design specifications, accelerated wear and tear set in on the vehicles. The net effect of this could result in deterioration for the condition of the vehicle. Design defects affect the subsequent condition of the vehicle once it is put on the road and operated either normally or otherwise which may result to possible road crashes.

Hanging parts of the body of a vehicle though rare can greatly affect the stability and hence the level of control by the operator. The brake subsystem, working jointly with the accelerator is the main synchronizer of the speeds of vehicles. Any malfunctioning of the brake sub-system should be taken very seriously as a potential source of unavoidable crash. The tyre is a dominant factor in determining the safety of automobiles on the road. Tyre related causes of road crashes could be due to one or a combination of: tyre (s) (are) overinflated; thread are thoroughly worn-out; tyre(s) is (are) 'pregnant' and;tyre(s) is (are) rear peel-off**.** Vehicle lights fall into two broad categories, namely those that are useful at all times (i.e. in daylight, in darkness and in poor weather) e.g. headlights. Although it is well known that the failure of vehicle light is a major factor in RTCs. As pointed out by Adiele, (2011), light failure (e.g. of one headlight) hasa tendency to misinform and mislead other road users thereby providing a good opportunity for a crash to occur. Similarly, a failed trafficator light will not normally provide the usual warning to the rest of the followers that the vehicle is about to undertake a turning maenovour, for instance. If the vehicle following has a faulty brake subsystem or its operator has not allowed for a sufficient safe-gap, this could result in crash. The engine sub-system may be considered the head of the vehicle and one whose sudden failure on a highway is more likely to cause a crash if the volume of traffic is sufficiently high.

2.6.2 Environment

The environment can be social, economic, cultural, physical or psychological (Rune, 2002). Concerning the physical environment, various climatic threats and geo hazards like heat, fog, high winds, snow, rain, ice, flooding, tornadoes, hurricanes, and avalanches have effects on roads hence on traffic crashes (Moen et al., 2005). The weather (Heavy tropic rainfalls) also threatens

surface transportation and impact road way safety, mobility and productivity. It affects roadway safety through increased crash risk as well as exposure to weather related hazards.

2.6.3 System of traffic laws, control and regulations.

Enforcement and traffic laws have to do with government policy regarding road safety issues. The aim of traffic regulation systems and enforcement is to ensure adequate operations in the traffic environment and system maintenance by legislation and controls. Regulations by traffic signaling systems, speed limits and speed controls as well as the existence of police patrols and checkpoints can lead to some reduction/severity of crashes by influencing the road user's behavior. Jørgensen and Abane, (1999) reported in their study that traffic regulation schemes are not systematically implemented and the police service is generally less well trained and equipped.Behavioural intervention and tighter regulations are important measures (Graham, 1993). However legislative and other counter measures proved effective in Nigeria (Asogwa, 1992). Promotion of road safety through the use of targeted media campaigns at community level can effectively reduce motor traffic crashes (Tripop, 1994).

CHAPTER THREE

METHODOLOGY

3.1 Study Area

This study was conducted in Ibadan metropolis, the capital city of Oyo State and the third largest metropolitan area by population in Nigeria after Lagos and Kano with a population of 2.949 million according to the 2006 census (Wikipedia, 2014). Ibadan is located in South-western Nigeria, 128km inland northeast of Lagos and 530km southwest of Abuja. The town has a tropical wet and dry climate, with a lengthy wet season and relatively constant temperatures throughout the course of the year. Ibadan's wet season runs from March through October, though August sees somewhat of a lull in precipitation. This lull nearly divides the wet season into two different wet seasons. November to February forms the city's dry season, during which Ibadan experiences the typical West African harmattan. The mean total rainfall for Ibadan is 1420.06 mm, falling in approximately 109 days. There are two peaks for rainfall, June and September. The mean maximum temperature is 26.46 C, minimum 21.42 C and the relative humidity is 74.55% (Wikipedia, 2014).

There are eleven (11) Local Governments in Ibadan consisting of five urban local governments in the city and six semi-urban local governments in the fewer cities. In the city, driving is one of the main vocations of the average residents and motor parks are located in each of the eleven local government in Ibadan except Akinyele local government, which have two parks. The other parks at each local government includes, Lagelu park , Egbeda park, Ibadan North East I park, Ibadan north east II park, Ibadan north park, Ibadan north west park, Ibadan south west I park, Ibadan south west II park, Ibadan south east park, Oluyole park and Ido park.

The Commercial drivers belong to the National Union of Road Transport Workers (NURTW), which has an organization structure made up of a state chairman and other officers. The smallest units are the motor parks, each with its unit chairman. Each motor park consists of a large open space surrounded by kiosks and shops where food stuffs and psychoactive substances such as palm wine, kola nuts, cigarette and paraga (alcoholic herbal mixture) are been sold. There are not many miles of dual interstate highways in Ibadan (Wikipedia, 2014). The major expressway

leading outside the city and plied by the long distance drivers includes; Lagos-Ojoo Expressway, Ibadan Ife-Expressway, Ibadan-Oyo road, Ibadan-Abeokuta road and Ibadan-Iwo road. Adding to the weather and terrain, roads typically have few or no speed limit signs or warning signs to alert the drivers of curves, hills, intersections or problems with the road itself such as large potholes or eroded road beds. The mode of transport used by the long distance drivers includes cars, mini-buses, luxurious buses and trucks. In December 2008 Governor Alao Akala Commissioned 55 brand new buses for interstate transport service which is to be used by Trans City Transport Company (TCTC) Eleyele (Wikipedia, 2014). The study was conducted at these motor parks during the month of May, 2013.

3.2 Study participants

Long distance vehicles drivers in Ibadan traveling outside the city or inter-state with not less than 300km per journey participated in the study.

3.3 Sample Size: A minimum sample size in the study was determined based on the formula for estimating a single proportion (Kish, 1965).

$$n = \frac{Z^2 Pq}{d^2}$$

Where : n=Minimum sample size

z^2=Standard Normal Deviate set at 1.96

p= 21.0% (Adekoya et al., 2011)

q= 1-p = 79.1%

d= Level of precision set at 0.05

$$n = \frac{1.96^2 * 0.21 * 0.79}{0.05^2} \text{ X } 2$$

n= 509

Adjusted sample size for cluster effect (n) = 509

n was rounded up to 560, making provision for 10% non response rate

3.4 Study Design.

This was a descriptive cross-sectional study of long distance drivers in Ibadan.

3.5 Sampling Technique

A two stage sampling technique was used to select the respondents. Each of the motor parks in this study represents a cluster. At stage one; a total of 5 clusters were selected from 12 clusters in Ibadan using simple random sampling technique by balloting. The motor parks selected are Ibadan north east 1, Ibadan north east II, Ibadan north, Akinyele park I (Ojoo) and Akinyele park II (Sango). At the second stage, all long distance drivers in the selected parks who met the eligibility criteria were included in the study using cluster sampling technique.

Table 3.1: Selected motor parks in Ibadan, Oyo State

Parks	**Total number of drivers traveling >300km**	**Proportion selected**
Akinyele park 1 (Ojoo park)	140	140
Akinyele park 2 (Sango park)	160	160
Ibadan North east I park	110	110
Ibadan North east II park	124	124
Ibadan North park	90	76

3.6.1 Eligibility Criteria

3.6.1 Inclusion criteria:

1. All inter-state commercial vehicle drivers with distance not less than 300km in Ibadan metropolis.

3.6.2 Exclusion criteria:

1. Those that did not consent during the study
2. Those that were sick or not available during the study

3.7 Method of Data Collection

The study instrument was a pretested interviewer-administered semi-structured questionnaire which was administered to each participant on a one-on-one basis. Information obtained during interview included socio-demographic data, driving history, knowledge on road safety measures, road safety behaviours, life time and one year history of RTCs including place and time of occurrence of the last crash and patterns of injuries sustained from RTCs.

Information on knowledge of drivers were assessed by scoring the drivers based on their understanding of road safety signs. The questionnaire was translated from English to Yoruba language which is the major local language of the people in the city for the people to understand better. The content of the questionnaires was well explained to each participants and each was given the opportunity to ask questions which were answered and all areas of misunderstanding clarified.

3.8. Data Management

A validated scale was used to assess driver's knowledge about seven road safety signs which includes the; "Y- Junction", "Dangerous double bend", "Narrow bridge ahead", "Four-way Junction", "Roundabout", "Dangerous double bend" and "Maximum speed recommended on the high way" (Table 4.3). These was scored by assigning one (1) mark for each correct answer in response to the correct sign, where scores below 4.0 points were considered to reflect bad knowledge of road signs. Data was analysed using Statistical Package for Social Sciences (SPSS) version 16. P value below 0.05 was considered as statistically significant. Descriptive Statistics such as frequencies and percentages was used to explain demographic variables and to compute the epidemiological factors related to RTCs. Inferential Statistics such as Chi-square test and logistic regression was used to find out the association between selected variables and RTCs.

3.9. Ethical Considerations

Ethical approval to conduct the study was obtained from ethical review committee of the Oyo State Ministry of Health and National Union of road transport workers (NURTW), Ibadan head branch before the commencement of the study.

Confidentiality of data: The data collected from the respondents was used for the purpose of this research. The questionnaires were identified with numbers, and every data collected from the participants was safely locked and protected from a third party.

Translation of protocol to local language: To avoid lack of communication/ understanding of the terms involved in the research, the protocol was translated to Yoruba language, which is the predominant language in the area. A research assistant who can write and speak Yoruba fluently was used during the interview to aid proper communication.

Beneficence to participants: The interviews were conducted in a friendly manner that enabled participants to communicate better. The study results and recommendations will be communicated properly in a way that will enhance planning for interventions that will help improve the situation. Participants will benefit from these interventions directly as drivers.

Non-maleficience to participants: The research pose no harm to the respondents, as no new procedure was being tested and the results obtain was used for the purpose of the study.

Voluntariness: The participants were free to decide whether or not to take part in the study. A voluntary consent form was attached to the questionnaire, which anyone who was approached to participate in the study carefully read through with the aid of a research assistant, and voluntarily decides to participate after understanding all the procedures involved in the study. There was no penalty attached to those who do not want to take part in the study

CHAPTER FOUR

RESULTS

4.1 Socio-demographic characteristics of long distance drivers in Ibadan in May, 2013

A total of five-hundred and ninety-four long distance motor vehicle drivers were interviewed. The respondents were males with median age of 42.0 years (range- 20.0 and 73.0years) (Table 4.1). Most (88.2%) of the drivers were married. More than half (51.5%) of them were Moslems followed by Christians (47.3%). Most (80.0%) of the respondents were of the Yoruba ethnic group followed by Igbo (10.6%).

Table 4.1: Socio-demographic characteristics of long distance drivers in Ibadan.

	Number of Divers (n=594)	Percentage (%)
Gender		
Male	594	100.0
Female	0	0.0
Age		
20-29	33	5.4
30-39	186	31.8
40-49	205	34.1
50-59	110	18.5
>60	60	10.3
Marital Status		
Single	30	5.1
Married	524	88.2
Divorced/separated	23	3.9
Widowed	17	2.9
Religion		
Christian	281	47.3
Islam	306	51.5
Tradition	7	1.2
Tribe		
Yoruba	475	80.0
Igbo	63	10.6
Hausa/Fulani	51	8.6
Others	5	0.8

Secondary education was the highest level of education attained by 38.0% while 13.0% had no formal education (Figure 4.1).

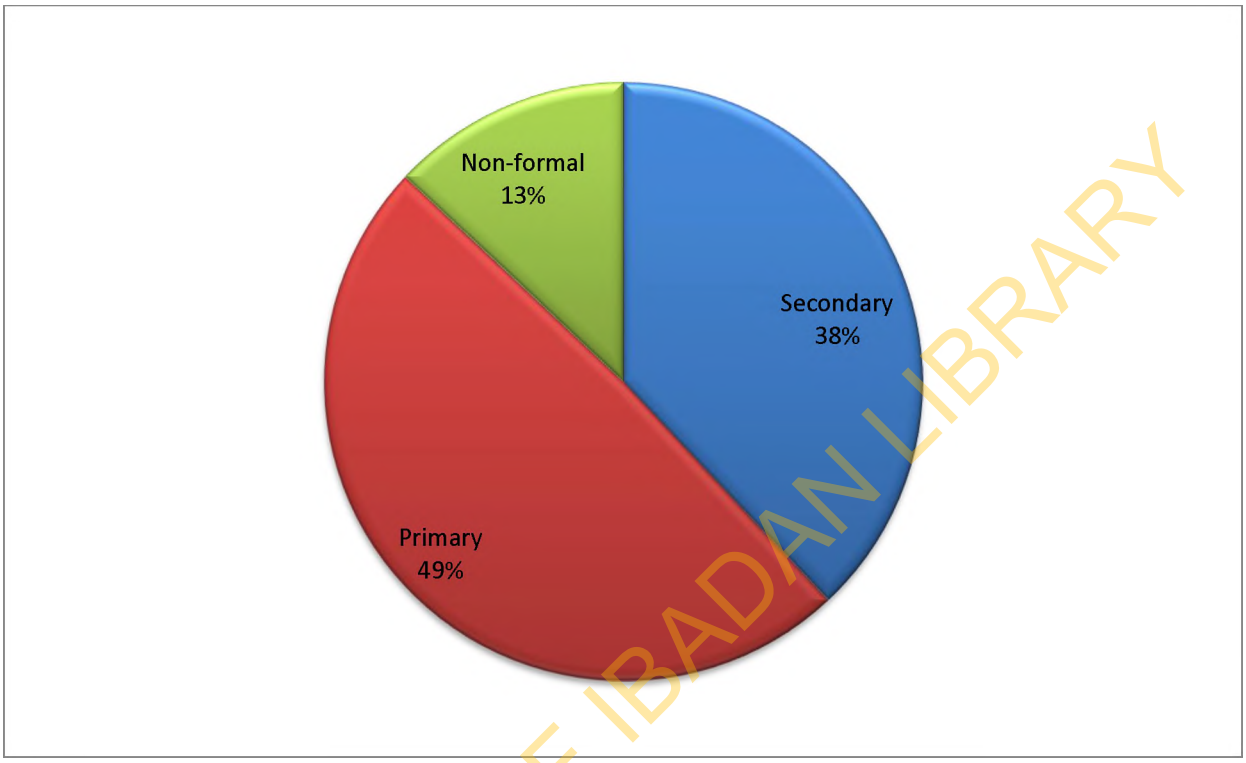


Figure 4.1: Educational status of long distance drivers in Ibadan in May, 2013

4.2 Driving history of long distance drivers in Ibadan in May, 2013

As shown in Table 4.2 below, 96.5% of the respondents had driving license and 73.6% had the E-type of driving license. More than a quarter (39.1%) had been driving for more than 20 years with median years of driving of 17 years (range- 2 and 57 years). More than half (56.1%) of the respondents reported driving minibus followed by cars (23.4%). Most (82.8%) of the drivers did not attend driving school before driving, among which, 82.7% reported they learnt how to drive from their bosses. About 62.8% of the respondents reported they can travel anytime of the day followed by the morning (19.9%), with mean time of travel of 10.1±4.1 hours.

Table 4.2: Driving history of long distance drivers in Ibadan in May, 2013

	Number of Divers (n=594)	Percentage(%)
Do you have driving license		
No	21	3.5
Yes	573	96.5
Type of driving license ((n=573)		
A	29	5.1
B	1	0.2
C	112	19.5
E	422	73.6
G	3	0.5
No response	6	1.0
Driving Experience(Years)	22	3.7
<5	68	11.4
5-9	129	21.7
10-14	143	24.1
15-19	232	39.1
>20		
Kinds Of Vehicles	139	23.4
Car	333	56.1
Minibus	86	14.5
Truck	32	5.4
Luxirious bus	4	0.7
Others		
Ever attend Driving Training School	492	82.8
No	102	17.2
Yes		
Reasons For Not Attending		
Driving Training School n=492	22	4.5
Insufficient fund	407	82.7
I learnt it from my boss	28	5.7
Is not compulsory	25	5.1
Others	10	2.0
No response		
Time of travel	118	19.9
Morning	23	3.9
Afternoon	20	3.4
Evening	60	10.1
Night	373	62.8
Anytime		
Time travelled (hours)	334	56.2
5-9	199	33.5
10-14	31	5.2
15-19	30	5.1
>20		

4.3 Knowledge of road signs among long distance drivers in Ibadan in May, 2013

Table 4.3.1 showed the result of driver's knowledge of road signs. The signs that were well understood by the respondents were "Roundabout" (62.3%) and "Narrow Bridge Ahead" (50.5%), while the least understood traffic sign was "Dangerous bend right" (19.9%). Hence 77.7% of the respondents had poor knowledge of road signs (Table 4.3.2).

Table 4.3.1: Knowledge of road signs among long distance drivers in Ibadan in May, 2013

Signs	Variables/Meaning	Number of Divers with correct response (n=594)	Percentage (%)
	Y – Junction	220	37.0
	Dangerous Double Bend	118	19.9
	Narrow Bridge Ahead	300	50.5
	Four-Way Junction	30	5.1
	Roundabout	370	62.3
	Dangerous Bend Right	108	18.2
	Maximum speed recommended on the high way	217	36.5

Table 4.3.2 Categorised scores of road signs among long distance drivers in Ibadan.

Categorised scores (n=7)	Number of drivers (n=594)	Percentage (%)
Poor(<4/7)	462	77.7
Good(≥4/7)	132	22.3

4.4 Risky road safety behaviours among long distance drivers in Ibadan in May, 2013

The substances most commonly used by the respondents were kolanut (38.7%), alcohol (33.8%), cigarettes (26.3%), and herbs (5.3%) (Table 4.4). Most (85.0%) of the respondents reported using seatbelt when driving, among which, 89.5% reported regular usage of seatbelt. About 23.6% of the respondents reported mobile phone use when driving, while 81.6% reported mobile phone use during an emergency.

Table 4.4: Risky road safety behaviours among long distance drivers in Ibadan in May, 2013

Behaviours	Number of Divers (n=594)	Percentage (%)
Kolanut use		
No	364	61.3
Yes	230	38.7
Cigarette smoking		
No	438	73.7
Yes	156	26.3
Alcohol use		
No	393	66.2
Yes	201	33.8
Herbs use		
No	563	94.7
Yes	31	5.3
Seatbelt Use		
No	89	15.0
Yes	505	85.0
How often do you use seatbelt (n=505)		
Regularly	453	89.7
Sometimes	52	10.3
Mobile Phone Usage		
No	454	76.4
Yes	140	23.6
Circumstances of phone usage (n=140)		
During an emergency	115	81.6
Anytime I felt like	26	18.4

4.5 Experiences of RTCs among long distance drivers in Ibadan in May, 2013

The life time prevalence of RTCs was 35.5%, and 16.2% reported having had at least one RTC in the last one year preceding the study (Table 4.5). Less than half (43.1%) of the respondents who reported involvement in RTCs at last crash were of the age group 35-44 years followed by 25-34 (38.0%), while 3 respondents provided no data on age at last crash. About (49.2%) reported they had one RTCs in life time while 80.2% reported having it once in the preceding year.

Table 4.5: Prevalence of RTCs among long distance drivers in Ibadan in May, 2013.

	Number of Divers(n=594)	Percentage (%)
Ever Had RTC in life time		
No	383	64.5
Yes	211	35.5
Number of times involved in RTC in life time (n=211)		
1	104	49.2
>1	104	49.2
Unwilling to respond	3	1.4
Ever Had RTC in previous 1 year		
No	498	83.8
Yes	96	16.2
Age at last crash (n=211)		
<15	1	0.5
15-24	19	9.0
25-34	80	38.0
35-44	91	43.1
>45	18	8.5
Unwilling to respond	3	1.4
Numbers of times involved in the previous 1 year (n=96)		
1	77	80.2
>1	19	19.8
Unwilling to respond	3	3.1

4.5.1 Reported personal damages and nature of collisions experienced by long distance drivers in Ibadan in May, 2013

About 49.3% of the reported RTCs were mild with no serious bodily injuries or damage to the vehicle followed by moderate crash (34.6%) (Table 4.5.1). Most (83.0%) of the respondents reported there was no death at last crash with mean number of 2.1±2.2 respondents injured. About 26.0% of the collisions at last crash were car and bus.

Table 4.5.1: Reported personal damages and nature of collisions experienced by long distance drivers in Ibadan in May, 2013

	Number of Divers (n=211)	Percentage(%)
Number of deaths recorded		
0	175	83.0
≥1	21	10.0
Unwilling to respond	15	7.1
Number of people injured		
0	42	20.0
1	54	25.6
2	33	15.6
≥3	67	14.8
Unwilling to respond	15	7.1
Nature of collision		
Car vs car	25	11.8
Car vs pedestrian	4	2.0
Car vs bus	55	26.0
Bus vs trailer	48	22.7
Others	23	11.0
Unwilling to respond	56	26.5

4.5.2 Environmental conditions during the last RTC among long distance drivers in Ibadan in May, 2013.

About 33.1% of RTCs reported at last crash occurred in the afternoon period followed by the night (22.3%) while 11.8% respondents had no data on time of crash. Less than half (40.0%) of RTCs reported occurred during the sunny period followed by the raining (31.3%) at last crash while 9.5% respondents could not remember the climatic condition during the last crash (Table 4.5.2).

Table 4.5.2: Reported environmental conditions during the last RTC among long distance drivers in Ibadan in May, 2013

	Number of Divers (n=211)	Percentage (%)
Time of crash		
Morning	26	12.3
Afternoon	74	33.1
Evening	43	20.4
Night	43	22.3
Not specific	1	0.5
Unwilling to respond	25	11.8
Climatic conditions		
Raining	66	31.3
Sunny	80	40.0
Windy	11	5.2
Others	34	16.1
Unwilling to respond	20	9.5

The peak days of occurrence of RTCs was on weekends (Fridays-20.0% and Saturdays-21.3%), while the least was on Wednesdays (6.5%) (Figure 4.5.2.1).

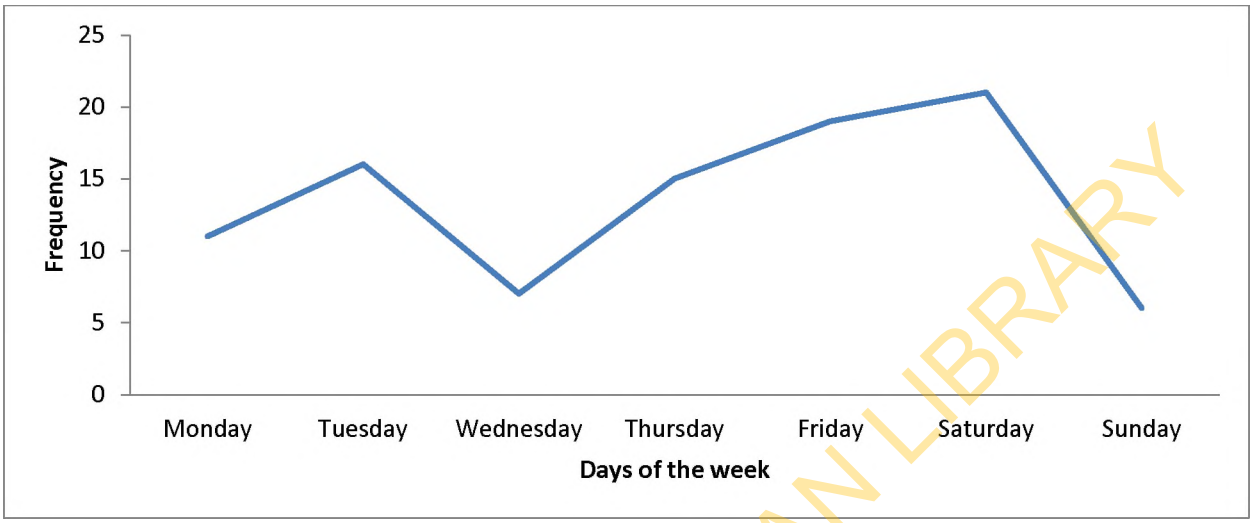


Figure 4.5.2.1: Distribution of RTCs among long distance drivers in Ibadan by days of the week

The peak months of occurrence of RTCs was on February (18.0%) followed by January (12.0%), while the least was in August (2.1%) (Figure 4.5.2.3).

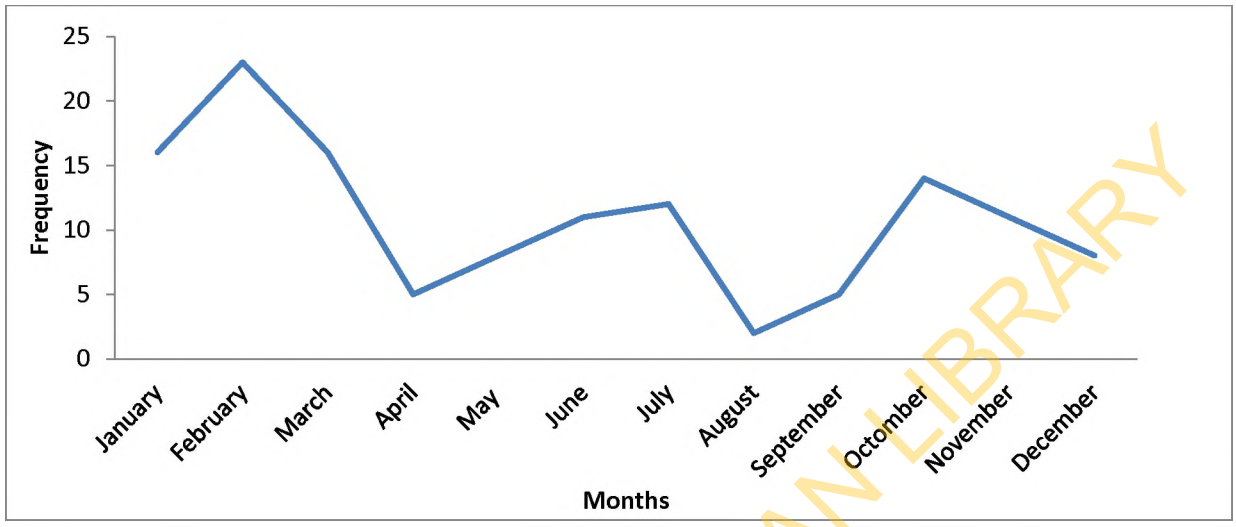


Figure 4.5.2.3: Distribution of RTCs among long distance drivers in Ibadan by months

The RTCs occurred mainly on bad portions of tarred roads (32.0%) and narrow roads (25.0%) (Figure 4.5.2.4).

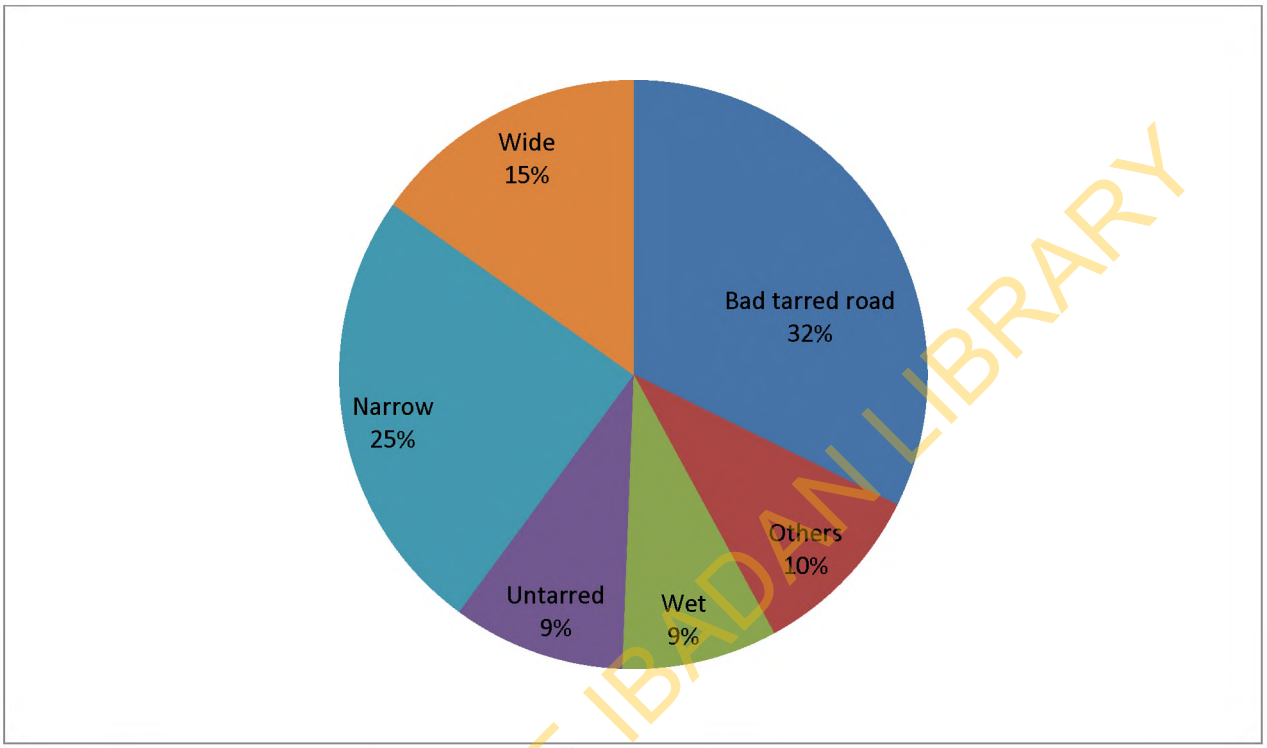
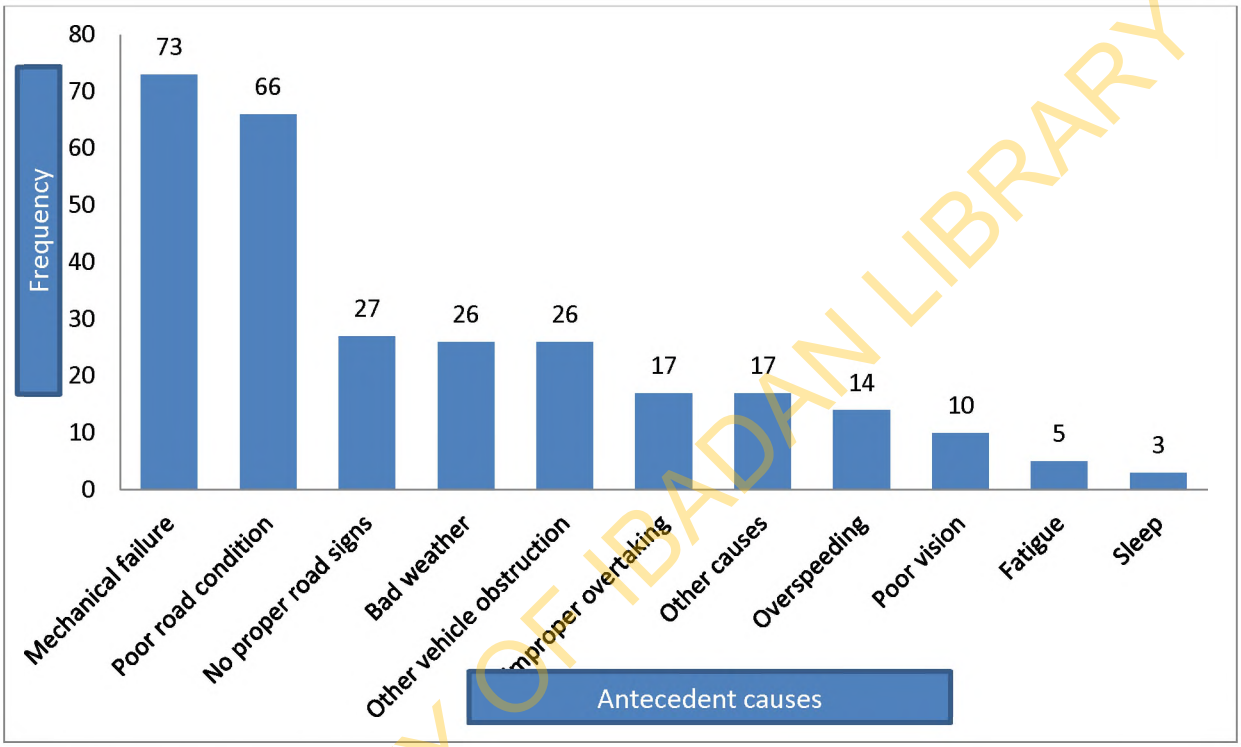


Figure 4.5.2.4: Nature of the road during the last RTC among long distance drivers in Ibadan in May, 2013

4.5.3 Antecedent causes of RTCs among long distance drivers in Ibadan in May, 2013

About 73 (34.6%) of the drivers reported mechanical fault as the highest perceived caused of crashes at last crash followed by poor road conditions 66 (31.3%) as shown in Figure 4.5.3.1.



***Multiple responses was provided**

Figure 4.5.3.1: Antecedent causes of road traffic crashes among long distance drivers in Ibadan in May, 2013

Among the reasons of the crashes due to mechanical failure as at last RTC, 44.4% of the drivers reported break failure followed by bursted tyres (29.2%) (Figure 4.5.3.2).

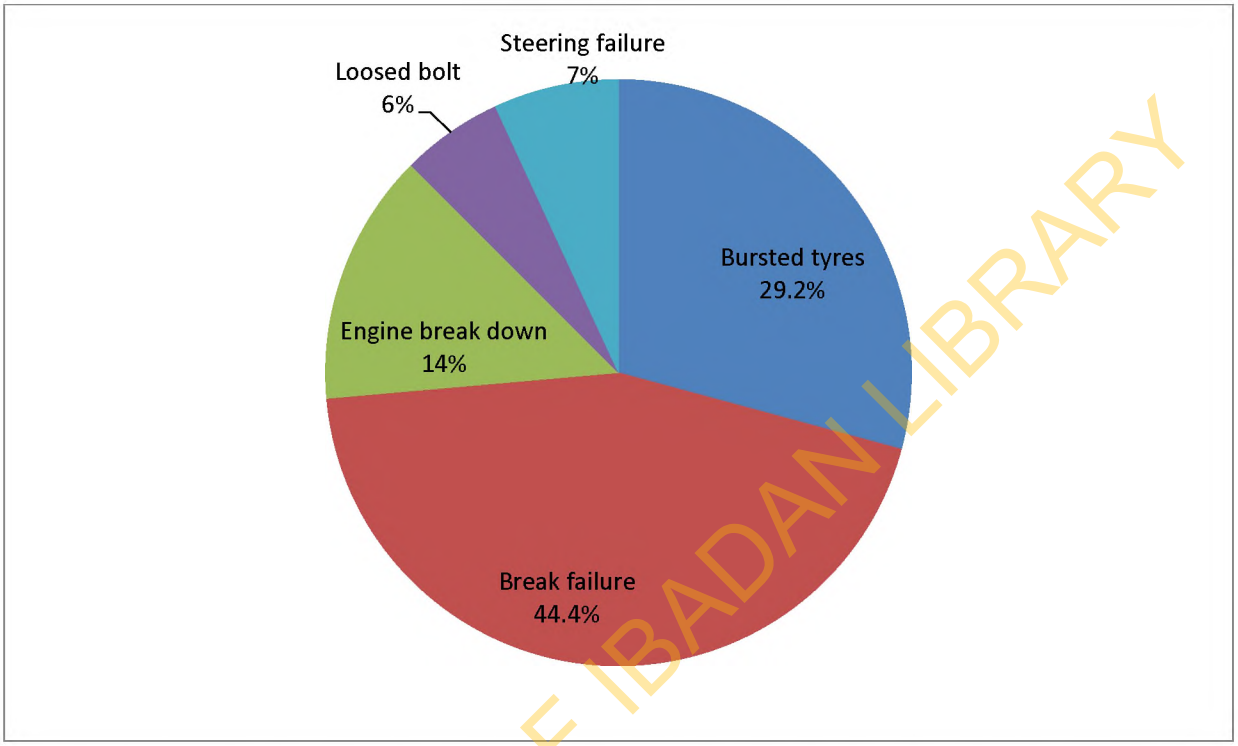


Figure 4.6.3.2: Mechanical causes of road traffic crashes among long distance drivers in Ibadan in May, 2013

4.5.4 Post crash experiences of RTCs among long distance drivers in Ibadan in May, 2013

Most (80.0%) of the respondents reported there was no standby ambulance during the last RTC, while 23.2% reported private vehicle as the major mode of transportation used for reaching medical center, followed by police vehicle (16.6%) (Table 4.5.4). More than half (57.0%) of them reported there was no medical aid at the site of the crash. About 41.2% of them reported they were admitted after the crash, while 77.0% reported they were admitted in a government hospital followed by the private (20.6%). About 51.7% of them reported they were not able to resume driving activities immediately, while 38.5% reported less than a week before resuming driving activities.

Table 4.5.4: Post crash experiences of RTCs among long distance drivers in Ibadan in May, 2013

	Number of Divers(n=211)	Percentage (%)
Standby ambulance availability		
No	169	80.0
Yes	25	11.8
Unwilling to respond	17	8.0
Other mode of transport for accessing medical center		
Private	49	23.2
Police	35	16.6
Commercial	20	9.5
Others	15	7.1
Unwilling to respond	92	43.6
Medical aid availability at the crash site		
No	120	57.0
Yes	74	35.1
Unwilling to respond	17	8.0
Admitted after the crash		
No	106	50.2
Yes	87	41.2
Unwilling to respond	18	8.5
Where were you admitted (n=87)		
Government hospital	67	77.0
Private	18	20.6
Others	1	1.1
Unwilling to respond	1	1.1
Were you able to resume driving activities immediately (n=211)		
No	109	51.7
Yes	85	40.3
Unwilling to respond	17	8.1
Period used before resuming driving activities (n=109)		
<1 week	42	38.5
1 week-1 month	30	27.5
>1 month	37	33.9

4.6 Experiences of road traffic injuries (RTIs) among long distance drivers in Ibadan in May, 2013

The life time prevalence of RTIs was 28.1%, and 11.8% reported having had at least one RTI in the last one year preceding the study (Table 4.6).

Table 4.6: Prevalence of RTIs among long distance drivers in Ibadan metropolis in May, 2013

	Number of Divers (n=594)	Percentage (%)
Ever sustained injury from RTCs in life time		
No		
Yes	427	71.9
	167	28.1
Ever sustained injury from RTCs in the last 1 year		
No	524	88.2
Yes	70	11.8

Twenty-nine percent of the drivers reported lower extremities as the site most injured followed by the head (19.0%) as at last RTI (Figure 4.6.1).

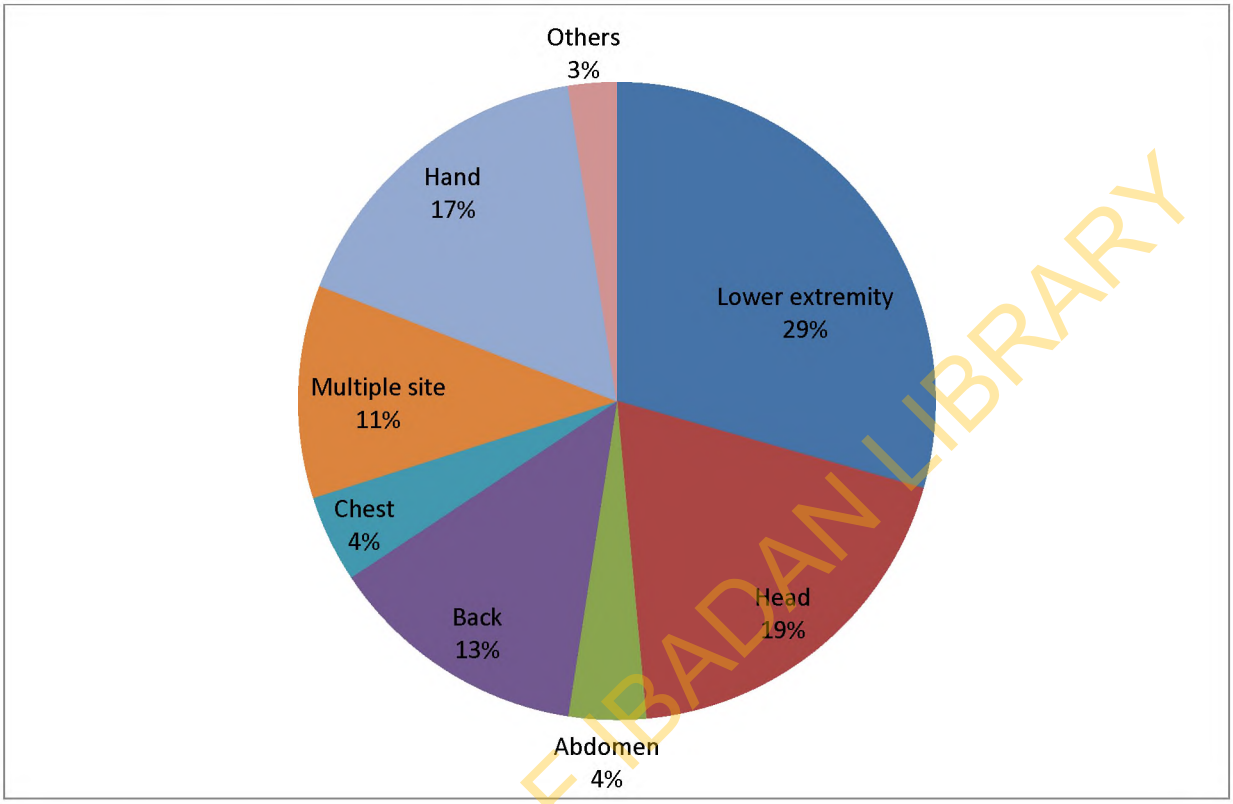
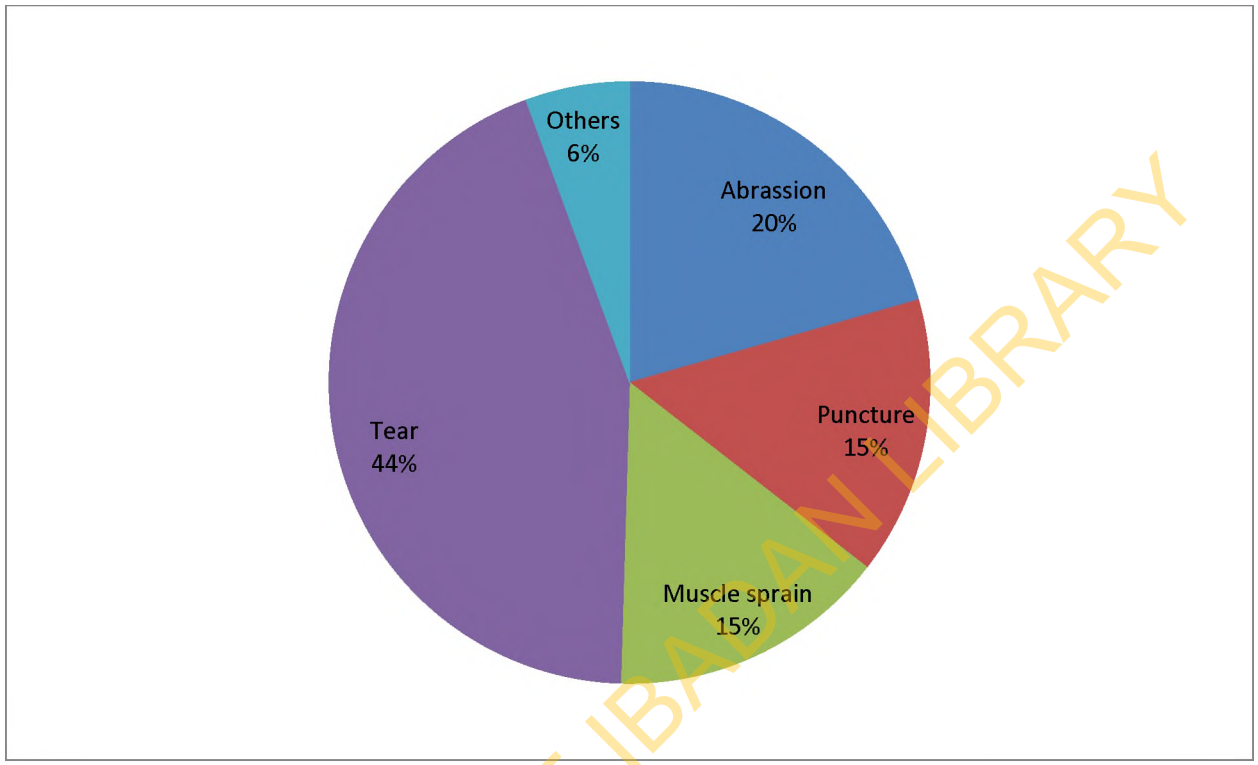


Figure 4.6.1: Site of injury at last road traffic crash among long distance drivers in Ibadan

About 44.0% of the respondents reported tear as the type of injury sustained, followed by abrasion (20.0%) at last RTC (Figure 4.6.2).



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injury sustained at last RTC among long distance drivers in Ibadan

4.7 Associations between variables and occurrence of RTCs in the last one year among long distance drivers in Ibadan in May, 2013

4.7.1 Associations between demographic variables and occurrence of RTCs in the last one year among long distance drivers in Ibadan in May, 2013

Only age-groups and educational status were statistically significant in Table 4.7.1. About 23.9% of those ≤39 reported they had RTCs in the last one year compared to those >39 years (11.7%) p=0.04. More than a quarter (29.9%) of those with no formal educational background reported RTCs in the last one year compared to those that was educated (16.2%), p=0.04.

Table 4.7.1: Associations between demographic variables and occurrence of RTCs in the last one year among long distance drivers in Ibadan in May, 2013

Demographic Variables	Occurrence of RTCs in the last 1 year		Total	Chi-square	P-Value
	No n(%)	Yes n(%)			
Age groups					
≤39	172(75.8)	50(23.9)	222	3.8	0.04
>39	328(84.9)	44(11.7)	372		
Education					
No education	54(70.1)	23(29.9)	77	12.3	0.04
Educated	444(85.9)	73(14.1)	517		
Marital Status					
Single	20(67.7)	10(33.3)	30	7.7	0.05
Married	443(84.5)	81(15.5)	524		
Divorced/Separated	21(91.3)	2(8.7)	23		
Widowed	14(82.4)	3(17.6)	17		
Tribe					
Yoruba	396(83.4)	79(16.6)	475	2.6	0.45
Igbo	57(90.5)	6(9.5)	63		
Hausa/Fulani	41(80.4)	10(19.6)	51		
Others	4(80.0)	1(20.0)	5		
Religion					
Christianity	239(85.1)	42(14.9)	281	2.2	0.34
Islam	252(82.4)	54(17.6)	306		
Traditional	7(100.0)	0(0.0)	7		

4.7.2 Associations between driving history and occurrence of RTCs in the last one year among long distance drivers in Ibadan in May, 2013

None of the association between driving history and occurrence of RTCs in the last one year was significant. A higher proportion (18.9%) of respondents with driving experience <10 years had RTC compared to those with 10-19 years (17.4%%) and ≥20 years (13.4%), p= 0.31. A higher proportion (16.9%) of those that does not attend driving training school had RTC compared to those that attended (12.7%), p= 0.30. About 28.6% of respondents without valid driving license had RTC more compared to those with driving license (15.7%), p=0.11 (Table 4.7.2)

Table 4.7.2: Association between driving history and occurrence of RTCs in the last one year among long distance drivers in Ibadan in May, 2013

Variables	Occurrence of RTCs in the last 1 year		Total	Chi-square	P-Value
	No n(%)	Yes n(%)			
Driving experience					
<10	107(81.1)	25(18.9)	132	2.0	0.31
10-19	190(82.6)	40(17.4)	230		
≥20	201(86.6)	32(13.4)	232		
Attend driving training school					
No	409(83.1)	83(16.9)	492	1.1	0.30
Yes	89(87.3)	13(12.7)	102		
Have a valid driving license					
No	15(71.4)	6(28.6)	21	2.5	0.11
Yes	483(84.3)	90(15.7)	573		
Kinds of Vehicle					
Car	122(87.8)	17(12.2)	139	3.0	0.55
Mini Bus	275(82.6)	58(17.4)	333		
Truck	71(82.6)	15(17.4)	86		
Luxurious bus	26(81.2)	6(18.8)	32		
Others	4(100.0)	0(0.0)	4		
Time of the day most travel					
Morning	100(84.7)	18(15.3)	118	0.6	0.96
Afternoon	18(78.3)	5(21.7)	23		
Evening	17(85.0)	3(15.0)	20		
Night	50(83.3)	10(16.7)	60		
Anytime	313(83.9)	60(16.1)	373		
How long per trip					
5-9	332(85.6)	56(14.4)	388	2.5	0.12
>10	166(80.6)	40(19.4)	206		

4.7.3 Associations between knowledge of road signs and occurrence of RTCs in the last one year in May, 2013

A higher proportion (25.8%) of respondents with good knowledgeable about road signs had been involved in RTCs in the last 1 year compared to those with poor knowledge (13.4%), even though it was not significant. p=0.06. (Table 4.7.3).

Table 4.7.3: Associations between knowledge of road signs and occurrence RTCs in the last one year among long distance drivers in Ibadan

Knowledge of road safety measures	Occurrence of RTCs in the last 1 year		Total	Chi-square	P-Value
	No n (%)	Yes n (%)			
Poor	400(86.4%)	62(13.4%)	462	11.5	0.06
Good	98(74.2%)	34(25.8%)	132		

4.7.4 Associations between risky road safety behaviours and occurrence of RTCs in the last one year in May, 2013

Among the association between risky road safety behaviours and the occurrence of RTCs in the last one year, alcohol, kolanut and mobile phone use were statistically significant (Table 4.7.4). About 21.9% of those who use alcohol were involved in RTCs in the last one year compared to those that does not use (13.2%), p=0.01. A higher proportion (19.6%) of those using kolanut were involved in RTCs in the last 1 year compared to those that does not use (14.0%), p=0.04. A significant proportion (27.9%) of those that used mobile phone while driving had RTCs in the last 1 year compared to those that does not use (12.6%), p=0.03.

Table 4.7.4: Associations between risky road safety behaviours and occurrence of RTCs in the last one year among long distance drivers in Ibadan in May, 2013

Safety behaviours	Occurrence of RTCs in the last 1 year		Total	Chi-square	P-Value
	No n(%)	Yes n(%)			
Cigarette smoking					
No	372(84.9)	66(15.1)	438	1.6	0.21
Yes	125(80.6)	30(19.4)	155		
Alcohol use					
No	341(86.8)	52(13.2)	393	7.4	0.01
Yes	157(78.1)	44(21.9)	201		
Drug use					
No	475(84.4)	88(15.6)	563	2.2	0.13
Yes	23(74.2)	8(25.8)	31		
Kolanut use					
No	313(86.0)	51(14.0)	364	3.8	0.04
Yes	185(80.4)	45(19.6)	230		
Seatbelt use					
No	71(79.8)	18(20.2)	89	1.3	0.26
Yes	427(84.6)	78(15.4)	505		
Mobile phone use					
No	397(87.4)	58(12.6)	454	3.2	0.03
Yes	101(72.1)	39(27.9)	140		

4.8 Logistic regression analysis between variables and occurrence of RTCs in the last one year among long distance drivers in Ibadan in May, 2013

Among variables that can affect occurrence of RTC in the last one year, a significant predictor was alcohol use. Those that are taking alcohol are almost twice likely to have RTC (OR=1.8, 95%CI=1.08-2.90). (Table 4.8).

Table 4.8: Logistic regression of variables and occurrence of RTCs in the last one year among long distance drivers in Ibadan

Variables	Odd ratio	95% Confidence interval Lower	Upper	P-value
Age				
<30	1.4	0.73	2.83	0.30
>30				
Educational status				
Non educated	2.6	0.86	4.30	0.11
Educated				
Marital status				
Single	2.7	0.20	5.84	0.06
Divorced	0.5	0.12	2.31	0.40
Widowed	1.2	0.34	4.25	0.78
Married				0.08
Have a driving license				
No	2.1	0.81	5.68	0.12
Yes				
Length of journey				
5-9 hours	1.6	0.83	2.88	0.17
10-14 hours	1.3	0.77	2.23	0.33
15-19 hours	1.6	0.82	3.10	0.17
20-24 hours				0.37
Knowledge of road safety measures				
Good knowledge	0.5	0.63	2.23	0.07
Bad Knowledge				
Cigarette				
Yes	1.0	0.57	1.67	0.93
No				
Alcohol use				
Yes	1.8	1.08	2.90	0.02
No				
Kolanut use				
Yes	1.5	0.93	2.31	0.10
No				
Drug use				
Yes	1.5	0.64	3.61	0.35
No				
Mobile phone usage while driving	2.6	0.58	4.27	0.06
Yes				
No				

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

The study described the epidemiology of RTCs and identifies factors associated with involvement in RTCs among long distance drivers in Ibadan metropolis for one month period. The study assessed driver's knowledge of road safety measures and behaviours; determines both the lifetime and one year history of RTCs and assessed the patterns of injuries sustained from RTCs.

5.1 Characteristics of long distance drivers in Ibadan and RTCs

This study found that 65.9% of the respondents are within 30 and 49 years of age. This category of people belongs to the most productive age group, this finding was in support of earlier studies (Labinjo et al., 2009; Bamisoa et al., 2007). The study reported significant higher prevalence (23.9%) of RTCs among drivers aged <39years compared to those ≥39years. Similar report was made by Quazi et al., (2005) and Nilambar et al., (2004). Although age was not a significant predictor of RTCs in this study, it has been documented in other study that the risk of involvement in RTCs tends to decrease among the more elderly drivers aged over 59 years compared to the younger drivers (Freeman et al., 2006).

The finding of this study is corroborated by a previous finding (Adisa,2010) that commercial motor vehicle drivers are more dominated by male than their female counterparts. This could be due to greater exposure of males to commercial driving as an occupation and the number of hours they spend on the road travelling compared to the females. According to a study carried out by Nilamber et al., (2004) in South Indian, most of the drivers involved in RTCs and admitted into a tertiary institution were males. Previous studies in Nigeria also confirm that males are more prone to RTCs than the females (Charles et al., (2007; Owoaje et al., 2005).

The level of education of the respondents in the study reveals that more than one-tenth do not have formal education or have dropped out of school at an early stage, this may account for high level of ignorance among them as most of the respondents cannot interpret road traffic

regulations or signs. Secondary school education was the highest level of education attained by two-third of the respondents. This differs from findings by authors that have carried out similar work (Bekibele et al., 2007; Johnson et al., 2011). Significant higher proportion of non-educated respondents was involved in RTCs compared to those educated. Similar report had been made in a study conducted in a medical center in Northwestern Tanzania where more than half of the victims of RTCs admitted have no formal education. Although level of education of respondents was not a significant predictor of RTCs in this study, Labinjo et al., (2009) has reported that drivers with secondary education were 4 times more likely to be involved in RTCs than those with no formal educational background (Labinjo et al., 2009).

5.2 Driving history of long distance drivers in Ibadan and RTCs

About two-third of respondents in this study had been driving for more than 20 years with driving experience ranging from 2 to 57 years and median of 17 years. Similar findings had been recorded by Adekoya et al., (2011) in Ilorin; however, they reported higher proportion of drivers with over 20 years driving experience. Although, driving experience does not significantly affect RTC in this study, other study has reported that drivers with less than 6 months driving experience were more involved in RTCs compared to those with over 6 months (Enobakhare and Edeaghe, 2011). Most of the drivers reported they did not attend driving training school before driving while most of them claimed they learnt how to drive from the senior drivers, so they did not see the reason why they should attend driving school. Also some reported that there was no enough fund to attend the driving school even though they were willing to. Previous studies had reported similar conditions among drivers (Akinlade, 2000; Adisa, 2010; Mobolaji and Wilfred, 2011). This may be the reason why crash rate among commercial motor vehicle was on the increase because most drivers are ignorant of attending a driving school before embarking on their driving expenditure.

A higher proportion (18.8%) of those driving luxurious bus compared to car (12.2%), mini bus (17.4%) and truck (17.4%) had been involved in RTCs, even though it was not significant. Previous studies has reported different findings, for instance, Obuekwe et al., (2003) reported that significant higher proportion of minibus drivers were more involved in RTCs compared to other categories of vehicle drivers, while Thanni and Kehinde, (2006) reported that the most

popular mode of commercial transportation involved in RTCs were minibuses and cars (14.8%) while truck and trailers drivers were involved in 1.1% of cases each.

We found that all of the respondents drive more than 5hrs per journey. This result agrees with an earlier study (Häkkänen and Summala, 2000). The Nigeria road safety corps have stated that drivers shall observe at least a thirty (30) minutes rest on every four (4) hours journey covered, and for any journey time beyond six (6) hours will require auxiliary driver who should have the same driving status as the main driver (Federal Road Safety Corps, 2014).A higher proportion of drivers travelling more than 10 hours were more involved in RTCs compared to those travelling below 10 hours, even though it was not significant. However, differences report had been made by other author (Enobakhare and Edeaghe, 2011) that drivers driving for up to 6 hours or more per journey were more likely to be involved in RTCs compared to those driving for lesser periods.

5.3 Knowledge of Road Safety Measures among Long Distance Drivers in Ibadan and RTCs

Driver's poor knowledge of road signs and speed limits shows their poor knowledge of the highway code or non familiarity. Road sign design should be guided by established ergonomics principles namely sign-content compatibility, familiarity and standardization to enhance comprehension (Ben-Bassat and Shinar, 2006). Over-estimation of speed limits by the drivers implies that they may be over-speeding most of the time. Olapade et al., (2007) reported that commercial drivers in Southwest Nigeria were better at interpreting road signs, however, several other factors such as age, education, location and driving experience, influence drivers' knowledge of road safety measures (Fleet News, 2008). The presence of possible confounders should be considered and thus opens up areas for further research. Less than a quarter of respondents in the study had good knowledge of road safety measures, which is very low. Previous studies has reported similar findings; About a third of drivers has been reported by Fleet news, (2008) and Adogu and Ilika, (2006) to have good knowledge of road traffic codes and safety. While Makinde et al., (2012) reported low level of understanding of traffic signs among intra-city drivers in Akure, Southwestern Nigeria and reported that age, education and years of driving played prominent roles in drivers' understanding of signs and road safety

regulations. Knowledge of road safety measures was found not to be significant with drivers involvement in RTCs in the previous one year. Previous authors has also made similar reports (Al-Madani, 2000; Al-Madani, and Al-Janahi, 2002).

5.4 Risky Road Safety Behaviours among Long Distance Drivers in Ibadan and RTCs

This study showed that the proportion of respondents with risky driving behaviors was high. Long distance vehicle drivers tend to use psychoactive substances. These substances are commonly used by drivers to avoid falling asleep and to boost their performance when driving (Bamisoa, 2007). Apart from the deleterious effects of these substances on the general health of individual using them, they also have some effects as far as vision in driving is concerned. It is a source of distraction for drivers. In this study, the substances most commonly used by the drivers were kolanut, alcohol and cigarette. These findings were similar to that made by Bamisoa. et al., (2007) among long distance drivers in Ilorin where the substances reportedly used were mild stimulants (31.9%) and cigarettes (30.4%) (Bamisoa et al., 2007). Kola-nut is widely consumed for traditional and social reasons in Nigeria, as well as for its stimulant effect, therefore it is not surprising that More than a quarter of the drivers consumed it in this study. Asogwa in his study among drivers involved in RTCs in Nigeria hypothesized that extensive use of kola-nut, especially among long distance drivers might be a contributor to RTCs. Our study found out that significant higher proportion of respondents who use kolanut were involved in RTCs compared to those that does not use, even though kola-nut was not a significant predictor of RTCs. Similar findings has been reported by Adekoya et al., (2011), where significant proportion of long distance drivers in Ilorin, Nigeria that engaged in regular intake of kola-nut when driving were involved in RTCs compared with those that does not take.

Alcohol depresses the central nervous system and therefore increases the response time of the user, making him/her less responsive to the challenges of driving particularly coping with emergencies on the road (Lemoine and Ohayon, 1996). In this study, alcohol use was found to be significantly associated with RTCs. Impairment by alcohol has been identified as an important factor influencing both the risk of RTCs and the severity of injuries by other researchers (Odero, 1998; Romoao, et al., 2003). This finding and that of the previous studies provide a scientific

justification for advocating for legislation against alcohol use among commercial drivers during their working hours.

Negligence of drivers has been recognized as a major contributing factor to RTCs, this includes the use of mobile phone and non-usage of seat-belts when driving (Mike, 2009; Cummings et al., 2002). Regular use of safety measures like seat-belts when driving is less prevalent among drivers in Nigeria. This study has found a higher compliance rate (85.0%) of seatbelt use among the respondents, this can be related to the existing law on seatbelt use that was introduced in Nigeria in 2003 by the Federal Road Safety Commission making it an offence for front seat occupants of vehicles not to wear seat-belts (Sangowawa et al., 2010). Different from this study, other studies have reported a lower compliance rate ranging between 17.6% reported by Afakaar, et al., (2010) in Ghana, to 18.7% reported by Sangowanwa et al., (2010) in South-western part of Nigeria. By using seat-belts, road traffic deaths and injuries can be reduced drastically because seat-belts retain occupants in their seats and prevent them from hitting objects in the vehicle, and from being ejected from the vehicles (Koushkiet al., 2003; Cunill et al., 2004). While seatbelt use was not significant with RTCs, it has been reported in other studies to reduce the risk of fatalities in a RTC by 40-50% among front seat occupants and by 25-75% among rear seat car occupants (Routley et al., 2007; WHO, 2009).

This study found that overall 23.6% of the participants used mobile phone when driving, lower than 81.0% reported by Poysti et al., (2005) and higher than 3.3% reported by Taylor et al., (2003). In light of the rapidly increasing development of the cell phone market, the use of such equipment when driving raises the question of whether it is associated with an increased crash risk (Laberge and Maag, 2003). Several studies have shown increased reaction time and risk of crash with the use of mobile phones while driving (Patten et al., 2004; Irwin et al., 2000; Labergeand Maag, 2003). Akande and Ajao, (2006) reported that the use of cellular telephones in motor vehicles is associated with a quadrupling of the risk of a collision during the brief time interval involving a call while Bouvier, (2004) also reported that cell-phone use (both dialing and talking) was associated with an increase in the risk of a crash by a factor of 4. This Contrast the findings in this study, where mobile phone use was not significant.

5.5 Experiences of RTCs among Long Distance Drivers in Ibadan

The life time prevalence of RTCs in this study was lower when compared to 41.1% reported by Ashish et al., (2011) among young drivers in Bhanvagar city, India. Compared to this study, other studies in Nigeria had also reported lower prevalence rate of RTCs among commercial drivers. Wade et al., (2011) reported that about 26.2% commercial drivers in Jos, The one year prevalence of RTCs (15.9%) in this study was higher when compared to the five year prevalence reported among drivers of a tertiary institution (11.1%) and a teaching hospital (4.0%) in a previous study in Ibadan (Charles et al., 2007). This marked disparity can be attributed to the differences in study population. The present study was on commercial drivers while the study in reference was on government drivers, who may be generally more careful and spend less time on the road. About 53.3% of RTCs reported were mild with no serious bodily injuries or damage to the vehicle and 89.3% reported there was no death during the period of the crash. This corresponds to a study done by Charles et al., (2007) were about half (47.8%) of the drivers reported mild RTCs with no serious bodily injuries or damage to the vehicle.

5.5.1 Distribution of RTCs by time among long distance drivers in Ibadan

From the results of the study, it is clear that the incidences of RTCs are on the increase and characterized by seasonal factors. Unlike in this study, where higher prevalence of RTCs were reported in the dry season periods i.e. in the month of February and January while the least was reported in August, Eke et al. (2000) reported that majority of the RTCs cases reported in a teaching hospital in Port Harcourt occur more during the rainy season period (June, July and August). Considering the fact that heavy road traffics lead to more RTCs, the difference may be explained by the facts that there are usually holidays in Nigeria during this period and most of the people do go home in the month of December and return in the month of January/Febuary for re-opening. Therefore most of the drivers will be more engaged in driving during these periods. Our findings which however similar to the report made in South India, where the highest proportion of RTCs reported was in January followed by August (Nilambar et al., 2004).

The highest proportion of RTCs reported at last crash occurred on Saturdays (weekends) when compared to other days of the week (Monday-Fridays). This differs from reports of other studies where a higher prevalence of RTCs was reported during the week days (Abhishek et al., 2011;

Ghosh, 1992). A high proportion of RTCs reported at last crash took place during the afternoon period (daytime) followed by night. This corresponds to a study in Khulna city, Indian, where examination of RTCs by time shows that majority of the crashes took place during daytime (Quazi et al., 2005). Also, a Nigeria study reported that most of RTCs was reported more during the day followed by the night (Charles et al., 2007).

5.5.2 Distribution of RTCs by place among long distance drivers in Ibadan

RTCs appear to occur regularly at some flash points such as where there are sharp bends, potholes and at bad sections of the highways. At such points over speeding drivers usually find it difficult to control their vehicles, which then result to fatal traffic crashes, especially at night with most cases occurring on major highways (Atubi, 2009). This study reported that about 32.0% of RTCs reported occurred on bad portion of tarred road followed by narrow roads (25.0%), similar report had been made in previous studies (Abhishek et al., 2011; Charles et al., 2007). While Majumder et al., (1996) observed that RTCs occur mostly on broader roads than the narrow ones.

5.6 Prevalence and Patterns of RTIs among Long Distance Drivers in Ibadan

Previous studies have reported that traffic crash is the cause of major injury (Montazeri, 2004; Ghahri-Saremi et al., 2008). The high incidence of multiple injury, morbidity, permanent disability and mortality from RTCs indicate the necessity of an urgent change in driving and road safety legislation (Khaji et al., 2006). About 11.8% of the respondents in this study reported having had at least one RTC in the last one year preceding the study. This is similar to the injury rate (11.3%) in the last 12 months reported in a population based study in Nigeria (Labinjo et al., 2009). Solagberu, (2002) reported a higher injury rate of 62.3% among trauma patients in University of Ilorin compared to 11.8% in this study. A higher proportion of the respondents reported lower extremities as the most common site of injury followed by the head at last RTC. Previous studies have also reported similar findings (Labinjo et al., 2009; Ravinda et al., 2011; Phillipo et al., 2012). However, this study contrast those of Abhishek et al., (2011), where upper extremities (abdomen) was the most commonly site of injury reported and Sanaei-Zadeh et al., (2002) which showed that due to a lack of seat belt use, the most common cause of death from RTIs in Iran is head injury, and they recommended the obligatory use of seat-belts. The common

types of injury reported in this study were tear and abrasion, this contrast the findings of Ashish et al., (2011) and Thanni and Kehinde, (2006) where fractures and cuts requiring suturing of wound were reported.

5.7 Antecedent caused of RTCs among long distance drivers in Ibadan

Various causes have been studied as contributory to RTCs but a combination of two or more factors may often be responsible. Mechanical factors such as brake failure do occur rarely but human factors are by far the most important in the causation of crashes. In this study, about a quarter of the respondents reported mechanical fault as the most perceived cause of crashes followed by poor road conditions. A similar report had been made in previous studies (Wade et al., 2011; Charles et al., 2007; Mobolaji et al., 2011). Unlike this study, Atubi, 2012) reported that human factors is the most potent contributor to motor vehicle accidents in Nigeria. A full understanding of the many factors which contribute to RTCs in Nigeria is needed before effective measures can be applied to alleviate the present situation. Moreover, alleviating the situation requires a coordinated approach by all stakeholders including the Police, The Federal Road Safety Commission, teacher, parents, planners, doctors and individuals members of society.

5.8 Limitations of the Study

There are some limitations encountered during the course of the study, and these includes,

- RTCs and injuries were reported among survivors and those who were not severely disabled by a RTC. Therefore information was not obtained on fatal and severe injuries.
- The survey relied on the reports of respondents which could not be independently validated. There was tendency to underreport crashes due to poor recall, thus the prevalence of crashes was likely to be underestimated in this study.
- The survey requested for self-reported behaviours, this could result to drivers reporting safer behaviours and under reporting unsafe behaviours such as alcohol consumption.

5.9 Conclusions and Recommendations

5.9.1 Conclusion

The study describe the distribution of RTCs by place, time of occurrence and characteristics of persons involved among long distance drivers in Ibadan metropolis as well as identify factors associated with involvement in RTCs. Using a cross-sectional study design, a total of 594 intercity long distance drivers were interviewed with a pretested interviewer-administered semi-structured questionnaire in the five major parks in Ibadan. From the findings of the study, the RTCs occurred commonly on bad roads, in the afternoon and weekends; and among young and uneducated long distance drivers studied who use alcohol, kolanut and mobile phone when driving.

5.9.2 Recommendations

The following are recommended based on the findings of this study.

(1) There is a need for repair and reconstruction of bad roads including proper design of road networks as well as the planning of the general public transport system to ensure that it runs in an effective and efficient manner as this would reduce traffic on the highway.

(2) There is a need to implement road safety education programmes targeting drivers that were young and uneducated and discouraging the use of alcohol, kolanut and mobile phone when driving.

(3) Anti-drug abuse messages in print or electronic media should be taken to the motor parks, with particular emphasis on using the drivers and their trade unions as a pressure group. Efforts should also be made to encourage giving rewards to drivers who are not only free of psychoactive substances use but with least recode of RTCs.

(4) The FRSC should intensify their efforts towards carrying out routine test aimed at detecting and sanctioning drivers who have substances beyond regulated safety limits in their systems.

REFERENCES

Abdul, M.K. and Ansa, T. 2012. Causes of Road Accidents in Parkistan. Journal of Asian Development Study March, 2012. 1 (1): 22-29.

Abhishek, S., Anu, B., Rambha, Pathak, S.K. and Ahluwalia, 2011.An Epidemiological Study Of Road Traffic Accident Cases At A Tertiary Care Hospital In Rural Haryana. Indian journal of Community Health 2011, 23 (2): 53-55.

Adekoya, B.J, Adekoya, A.O., Adepoju, F.G. and Owoeye J.F. 2011. Driving under influence among long distance commercial drivers in Ilorin, Nigeria. International Journal of BioMedical Research. 2011; 2 (3):870-873.

Adiele, S.C.K. 2011. An Empirical Investigation into Nigeria Road Accident Causation Factors. University Press Ibadan.

Adisa, R.S. 2010. A study of the use of intoxicants among Rural Commercial Motorcyclists in Kwara State, Nigeria. Journal of Social Sciences. 22 (2):85 – 91.

Adogu O.U. andIlika A.L. 2006. Knowledge of and attitude towards road traffic codes among commercial motorcycle riders in AnambraState:Niger. Post Grad Med J. 2006;13 (4):297–300.

Afukaar, F.K., Damsere-Derry J. and Ackaah W.2010. Observed seat belt use in Kumasi Metropolis, Ghana. Journal of Prevention and Intervention in the Community 2010; 38 (1):280-289.

Akande, T.M and Ajao, M.S. 2006. Awareness of Hazards and Use of GSM Mobile Phone among Non-Commercial Drivers in Ilorin, Nigeria. Annals of African Medicine 2006. 5 (4): 166 – 169.

Akinlade, C.O. 2000. Knowledge, Attitudes, and practices of Road Safety and First Aid among Commercial Motorcyclists in the Ibarapa District of Oyo State. An unpublished dissertation for the award of master of public Health/Health Education submitted to the

sub-Department of Health Promotion and Education. Department of Preventive and Social Medicine, University of Ibadan. 187 P.

Al-Madani, H. 2000. Influence of Driver's Comprehension of Posted Signs on their Safety Related Characteristics, Accident Analysis and Prevention 32 (4): 575–581.

Al-Madani, H. and Al-Janahi, A. R. 2002. Assessment of Drivers' Comprehension of Traffic Signs Based on their Traffic, Personal and Social Characteristics, Transportation Research Part F 2002. 5 (1): 63-76.

Anyaoku, E. 2009. An article on Federal High Way Death written in The Nation Newspaper 15th November, pg. 13.

Arosanyin, G.T., Olowosulu, A.T., Oyeyemi G.M. 2012. Compliance with Road Safety Regulations Among Commercial Motorcyclists in Nigeria. Canadian Social Science, 8 (1): 92-100.

Asalor, J.O. 2008. Towards Improved Road Safety in Nigeria, Technical Report No. Rts/00/82/011, Faculty of Engineering University of Benin.

Ashish, T. and Devang, R. 2011.Prevalence of road traffic accidents and driving practices among young drivers. Accident Anal Prevention 2011. 2 (2) : 862-869.

Asogwa, S. E. 1996. An overview of autocrashes in Nigeria, 1970–1994. An abstract submitted for the 40th Proceedings of the Association for the Advancement of Automotive Medicine; October 7–9, 1996; Vancouver, British Columbia. 1996. pp. 187–198.

Asogwa, S.E. 1992. Road traffic accidents in Nigeria. A review and a reappraisal. Accident Annal Prevention 1992 April. 24 (2); 149-155.

Asogwa, S.E., 1980. Some characteristics of drivers and riders involved in road traffic accidents in Nigeria. East African Medical Journal. 1980; 57:399-404.

Asogwa, SE., (1978). Kolanut and Road Traffic Accidents In Nigeria. American Journal of Public Health. 1978; 68 (12):1170-1172.

Assum, T. 1997. Attitudes and road accident risk. Accidents Anal Prevention 1997; 29 (2):153–159.

Atubi, A.O. 2009. "Urban Transportation: An Appraisal of Features and Problems in the Nigerian Society". International Journal of Geography and Regional Planning. Vol. 1, No. 1, Pp. 58-62.

Atubi, A.O. 2012. Determinants of Road Traffic Accident Occurrences in Lagos State: Some Lessons For Nigeria. International Journal of Humanities and Social Science 2012. Vol. 2 No. 6: 252-259.

Aworemi, J. R., Abdul-Azeez, I. A. and Olabode, S. O. 2010. Analytical study of the causal factors of road traffic crashes in southwestern Nigeria. Educational Research 2010. Vol. 1(4) pp. 118-124.

Badrinarayan, M., Nidhi, D.S., Sukhla, S.K. and Sinha A.K.2010. Epidemiological Study of Road Traffic Accident Cases from Western Nepal. Indian Journal of Community Medicine. 2010 January; 35 (1): 115–121.

Bamisoa A. M., Sabitiu A. O. and Tanimola M. A. 2007. Psychoactive Substance Use Among Long Distance Vehicle Drivers In Ilorin, Nigeria. Nigerian Journal of Psychiatry 2007. 5 (1) : 14-18.

Beirsness DJ. 1996. The relationship between lifestyle factors and collision involving young drivers. In: H Simpson (Ed.): New to the Road: Reducing the Risk for Young Motorist. Proceedings of the first Annual International Symposium of the Young Enhancement Service, June 8-11, 1996,Los Angeles, CA: Young Enhancement Service, UCLA, pp 103-114.

Bekibele, C.O., Fawole O.I., Bamgboye., A. E., Adekunle., L. V., Ajav R. and Baiyeroju A. M. 2007. Prevalence of Refractive error and attitude to Spectacle use among drivers of public institutions in Ibadan, Nigeria. Ann Afr Med. 2007; 6 (1) :26-30.

Ben-Bassat T, Shinar D. 2006. Ergonomic guidelines for traffic sign increase sign comprehension. Human factors 2006; 48 (1): 182-195.

Bjornskau, M., Gafni, D. 2000. Globalization in road safety. Explaining the downward trend in road accident rates in a single country (Israel). Accident Anal Prevention 2000; 32 (1):71-74.

Blincoe L. 2002. The economic impact of motor vehicle crashes, 2000. Washington, DC, National Highway Traffic Safety Administration, 2002. (DOT HS-809-446).

Bouvier R. 2004. Mobile telephone use among Melbourne drivers: a preventable exposure to injury risk. Medical Journal of Australia 2004; 180 (1): 43-45.

Britt R.R. 2006. Cell Phones Make Drivers as Bad as Drunks. From *http://www.livescience.com/health/060629_cell_ phones.html.* (Retrieved on January 02, 2006.

Canfield, R.R. 1999.: Traffic Signs and Markings. In: Pline, Journal (Ed.), Traffic Engineering Handbook, 5th Edition. Institute of Transportation Engineers, Washington DC, pp 411-452.

Charles O.B, Fawole O.I., Bamgboye., A. E., Adekunle., L. V. 2007. Risk Factors for Road Traffic Accidents among Drivers of Public Institutions in Ibadan, Nigeria. Africa Journal of Health Sciences, 2007; 14 (1):137-142.

Clarke, D.D., Ward, P., Bartle, C. and Truman, W. 2007. The role of motorcyclist and other driver behavior in two types of serious accident in UK. Accident Analysis and Prevention. 39 (1): 974-981.

Cummings, P., Wells, J.D. andRivara, F.P. 2003. Estimating seat belt effectiveness using matched-pair cohort methods. Accidents Analysis and Prevention 2003; 35 (1): 143-149.

Cunill, M., Gras, M.E., Planes, M., Oliveras, C. and Sullman, M.J. 2004. An investigation of factors reducing seat belt use amongst Spanish drivers and passengers on Urban roads. Accident analysis and prevention 2004. May; 36 (3): 439-445.

Dinesh M. 2003. Road Traffic injuries- a neglected Pandemic. Bull World Health Organisation. 2003; 81 (9):684-685.

Eke, N., Etebu, E.N. and Nwosu S.O. 2000. Road traffic accident mortalities in port Harcourt, Nigeria. Anil Aggrawals internets Journal of Forensic Medicine and Toxicology Vol 1 (2).

Enobakhare, U. and Edeaghe E. 2011. Contribution of Psychological Symptoms and Lifetime Drinking to the Risk of Road Traffic Accidents. 2011 Dec; 4(4): 145-149.

Evans, L. 2003. A new traffic safety vision for the United States. America Journal of Public Health 2003; 93 (9): 1384–1386.

Evans, L. 2009. Traffic Safety. Bloomfield, MI: Science Serving Society; 2004.

Eze, B. 2012. Road Traffic Accidents in Nigeria: A Public Health Problem. AFRIMEDIC Journal. Volume 3, No. 2, July -December, 2012.

Federal Government of Nigeria (FGN), 2004. Federal Republic of Nigeria, Official Gazette 79 (91). Federal Road Safety Commission Act (CAP 141 LFN): National Road Traffic Regulations, 2004. FGN; 2004.

Federal Road Safety Commission, 2012. News Bulletin 2012. http:// Road Traffic Crashes Leading Causes of Death among Youth People. FRSC Abuja.

Federal Road Safety Commission, 2009. Nigerian traffic accidents (January to October, 2009). FRSC Report 2009.

Federal Road Safety Corps, 2014. Safety Requirements / Guidelines For Articulated Lorries (Tankers/Trailers) Operations In Nigeria. Frsc.gov.ng/rtcenglish.pdf. Acessed on 18/02/2014.

Fisher, R. and Shapiro, D. 2005. Beyond reason using emotions as you negotiate. New York: *Viking / Penguin. http://ombudsfac.unm.edu/../beyond_reasons.pdf.* [Accessed 24/04/2014].

Fleet News, 2008. Survey shows a lack of speed limit knowledge. Fleet Available from: *http://www.news.co.uk* [Last accessed on 2009 April 6].

Freeman, E. E. Munoz, B. and Turano, K. A. 2006. Measures of Visual Function and their Association with Driving Modification in Older Adults. Invest Ophthalmology Visual Science 2006; 47 (2): 514-520.

Geneva, 2009. Global status report on road safety: time for action. Geneva, World Health Organization, 2009 (www.who.int/violence injury_prevention/road_safety_status/2009). [Accessed on 4/5/2009].

Ghafour, P.K. 2009. "Pedestrian negligence causes 33% of accidents."From *<http://arabnews.com/?page=1&section=0&article=117736&d=2&m=1&y=2009&pix =kingdom. jpg&category=Kingdom>* (Retrieved on May 12, 2010).

Ghahri-Saremi, S.,Soroush, A.R. and Rambod, M. 2008. Pattern of injury in Shiraz. China Journal of Traumatology 2008; 11(1): 8-11.

Ghosh, P. K. 1992. Epidemiological study of the victims of vehicular accidents in Delhi. Journal of Indian Medical Association 1992; 90 (12): 309-312.

Graham, J. D. 1993. Injuries from traffic crashes: meeting the challenge. Anals of Rev Public Health; 14:515-543.

Gungul, T. T. 2012. Road Traffic Accidents in Nigeria: Causes and Control. Journal of Applied Science and the Environment 2012, 3 (1) : 25-29.

Haigney, D. and Westerman, S.J. 2001. Mobile (cellular) phone use and driving: a critical review of research methodology. Ergonomics 2001;44 (2):132-143.

Häkkänen, H., and Summala, H. 2000. Sleepiness at work among commercial truck drivers. Sleep, 23 (2): 49–57.

Healnigeria, 2009. Blogspot,. *Http://healnigeria.blogspot.ca/2009/04/roadtraffic- accidents-in-nigeria.html.* Accessed on March, 2009.

Hejar, A.R, Nor-Afiah, M.Z, Kulanthayan, S. and Law T.H. 2005. Car Occupants Accidents and Injuries among in a State in Malaysia. Eastern Asia Society for Transportation Studies, 2005; Vol. 5 (1), pp. 1867 – 1874.

Helina, H. and Heikki S. 2001. Fatal traffic accidents among trailer truck drivers and accident causes as viewed by other truck drivers. *http://dx.doi.org/10.1016/S0001-4575(00)00030-0.* Accessed on January, 2001.

Hendricks, D.L., Fell J.C. and Freedman, M., 1999. The relative frequency of unsafe driving acts in serious traffic crashes. National Highway Traffic Safety Administration, US Department of Transport Summary Technical report. Available online at *http//www.nhsta.dot.gov/people/injury/research/UDAshortrpt/index.html*.

Hermann, N., Louis, R.S., Sylviane, L., Mireille, C., Marie, Z. and Emmanuel, L. 2007. Attitudes associated with behavioral predictors of serious road traffic crashes: results from the GAZEL cohort. Injury Prevention 2007;13 (1): 26–31.

Hofman, K.Primack, A.Keusch, G.and Hrynkow, S. 2005. Addressing the Growing Burden of Trauma and Injury in Low- and Middle-Income Countries. America Journal of Public Health. 2005; 95 (1): 13–17.

Iribhogbe, P.E. and Osime, C.O. 2008. Compliance with seat belt use in Benin City, Nigeria. Pre-hospital Disaster Medicine 2008; 23 (1):16‑19.

Iribhogbe, P.E. and OdaiL. R. 1999. Pattern of stimulant drug use on Western Austrialian heavy transport routes. Transport Research part F: Traffic psychology and behavior 1999; 2 (2):115-130.

Irwin, M., Fitzgerald, C.and Berg, W.P. 2000. Effect of the intensity of wireless telephone conversations on reaction time in a braking response. Percept Mot Skills 2000; 90 (3): 1130-1134.

Iversen, H. and Rundmo, T. 2004. Attitudes towards traffic safety, driving behavior and accident involvement in the Norwegian Public. Ergonomics 2004;47 (5) :555–572.

Jha, S., Yadav, B.N., Karn, A., Aggrawal, A. and Gautam, A.P. 2010. Epidemiological study of fatal head injury in road traffic accident cases: a study from BPKIHS, Dharan. Health Renaissance, May-Aug 2010; 8 (2): 97- 101.

Johnson O.E. and Adebayo A.M. Effect of safety education on knowledge of and compliance with road safety signs among commercial motorcyclist in Uyo, Southern Nigeria. Ghana Medical Journal Sep 2011; 45 (3): 89-96.

Jørgensen, S. H. and Abane, A. M. 1999. A comparative study of urban traffic accidents in developing and developed countries: Empirical observations and problems from Trondheim (Norway) and Accra (Ghana). Bulletin of Ghana Geographical Association. No. 21, 113-128.

Kamrèn, B. 1992. Seat belt use among fatally injured in the county of Stockholm 1991–1992. Stockholm, Folksam, 1992.

Kayombo, E. J. 1995. Motor traffic accidents in Dar esSalaam. Tropical and geographical Medicine; 47 (1): 37-39.

Khaji, A. and Eftekhar, B. 2006. Announcement of the Sina Trauma Data Bank (STDB). East Mediterranean Health Journal 2006; 12 (6): 930-931.

Kirmizioglu, E. and Tuydes-Yaman, H. 2012. Comprehensibility of Traffic Signs among Urban Drivers in Turkey, Accident Analysis and Prevention 2012. 45 (1): 131– 141.

Kish, L. (1965). Survey Sampling. New York: John Wiley & Sons, Inc.

Kong, L. B., Lekawa, M., Navarro, R.A., McGrath, M., Margulies and Hich J.R. 1996. Pedestrian Motor vehicle trauma an analysis of injury profiles by age. America College of Surgeon; 182 (1): 17-23.

Kopits, E. and Cropper, M. 2003. Traffic fatalities and economic growth. Washington, DC, The World Bank, 2003 (Policy Research Working Paper No. 3035).

Koushki,P.A., Bustan, M.A. and Kartam, N. 2003. Impact of safety belt use on road accident injury and type in Kuwait. Accident analysis and prevention. 35, pp. 237-241.

Krug, E.G., Sharma, G.K. andLazano, R. 2000. The global Burden of injuries. America Journal of Public Health 2000; 9 (4): 523-526.

Kuner, E.H., Schlickewei, W. and Oltmanns, D. 1996. Injury reduction by the airbag. Injury 1996; 27 (3): 185 –188.

Laberge, N.C., Maag, U., Bellavance F., Lapierre S, D., Desjardins D., Messier S., Saidi A. 2003. Wireless telephones and the risk of road crashes. Accident Analysis Prevention 2003; 35 (5): 649-660.

Labinjo, M., Juillard, C., Kobusingye, O.C. and Hyder, A.A. 2009. The burden of road traffic injuries in Nigeria: results of a population-based survey. Injury prevention : journal of the International Society for Child and Adolescent Injury Prevention 2009; 15 (3): 157-162.

Lagarde, E. 2007. Road Traffic Injury is an Escalating Burden in Africa and Deserves Proportionate Research Efforts. PLOS Med, 4(6): 967 – 971.

Land Transport, 2005. Facts Sheet 24: Retrieved on June 17 2007 from *http://www.landtransport.govt.nz/factsheets/24.html*.

Lemoine, P. and Ohayon, M. 1996. Abuse of Psychotropic Drugs During Driving. Encephale. 1996; 22 (2):1-6.

Leon, S.R. 1996. Reducing death on the Road. The effects of minimum safety standards, Unpublicised crash test, seat belts and alcohol. America Journal of Public Health; 86 (1): 313.

Majumder, B., Karmakar, R., Bose, T., Dasgupta, S. and Basu, R. 1996.Some host factors and Seasonal variations in fatal road traffic accidents occurring in Eastern Sub urban Calcutta. Indian Journal of Public Health; 40 (2): 46-49.

Makinde, O. O. and Opeyemi D. A.. 2012. Understanding of Traffic Signs by Drivers – A Case of Akure City, Ondo State, Nigeria. ARPN Journal of Science and Technology 2012. 2 (7): 608-612.

Massie, D.C., Campbell, K.L., Williams, A.F. 1995. Traffic accident involvement rates by drivers age and gender. Accident Analysis Prevention; 27 (1): 73-87.

Mayhew,D.R. and Simpson, H.M. 2002. The safety value of driver education and training. Injury Prevention, 8 (2): 23-27.

Mekelle, 2009. Town Police Commission Office. Report on road traffic accident. Mekele; 2009.

Mike, M. 2009. Traffic crash victimizations of California children and teenagers by drinking over-21 drivers. Californian Journal of Health Promotion. 2009; 7 (1): 92–101.

Mishra, B., Sinha, N.D.,Sukkla, S.K. and Sinha, A.K., 2010. Epidemiological Study of Road Traffic Accident Cases from Western Nepal, Indian Journal of Community Medicine. 35 (1): 115-121.

Mitchell, K. 2001. Older persons and road safety: dispelling the myths. World Transport Policy and Practice, 2001, 8 (1): 17–26.

Mobolaji, S. S. and Wilfred, I. U. 2011. Accidents and Level of Intelligence: A View from the Nigerian Experience. Journal of Human Ecology 2011, 35 (2): 75-84.

Moen, B.E. and Rundmo, T. 2005. Worrying about Transport Risks In: Rundmo, T. and B.E. Moen (eds). Risk Judgement and Safety in Transport. Rotunde Publication Number 87, Trondheim.

Montazeri, A. 2004. Road-traffic-related mortality in Iran: a descriptive study. Public Health 2004; 118 (2): 110-113.

Muhlrad, N. and Lassarre, S. 2005. Systems approach to injury control. New Delhi, Macmillan India Ltd.

Mura, P. 2003. Comparison of the prevalence of alcohol, cannabis and other drugs between 900 injured drivers and 900 control subjects: results of a French collaborative study. Forensic Science International, 2003, 133 (1-2): 79–85.

Murray, C.J. and Lopez, A.D. 1997. Regional patterns of disability-free life expectancy and disability-adjusted life expectancy: global Burden of Disease Study. Lancet 1997; 349 (9064): 1498–1504.

Nakahara, S., Chadbunchachai, W., Ichnikawa, M., Tipsuntornsak, N. and Wakai, S. 2005. Temporal distribution of motorcyclist injuries and risk of fatalities in relation to age, helmet use, and riding while intoxicated in KhonKaen, Thailand. Accident Analysis and Prevention 37:833-842. Retrieved 15th March, 2011. from *www.hinar.com.*

Nantulya, V.M. and Muli-Musiime F. 2001. Uncovering the social determinants of road traffic accidents in Kenya. In: Evans T et al., eds. Challenging inequities: from ethics to action. Oxford, Oxford University Press, 2001:211–225.

National Transportation Safety Board, 1995. Factors that affect fatigue in heavy truck accidents. National Transportation Safety Board. Safety Study 1995, NTSB/SS-95/01.

Nilambar,Jha, D.K.,Srinivasa, Gautam, R.S and Jagdish S. (2004). Epidemiological Study Of Road Traffic Accident Cases: A Study From South India. Indian Journal of Community Medicine Vol. Xxix, No.1, Jan.-Mar., 2004.

Obuekwe, O.N., Ojo, M.A., Akpata, O. and Etetafia, M. 2003.Maxillofacial Trauma Due To Road Traffic AccidentsIn Benin City, Nigeria: A Prospective Study. Annals of African Medicine.Vol. 2, No. 2: 58 – 63

Odeleye, J.A. 2000. Improved road traffic environment for better child safety in Nigeria. 14th ICTCT Workshop Proceedings, 2000; 22.

Odero, W., Garner, P. and Zwi, A. 1997. Road traffic injuries in developing countries: a comprehensive review of epidemiological studies. Tropical Medicine and International Health, 1997, 2 (1): 445–460.

Odero, W.O. and Zwi, A.B. 1995. Alcohol-related traffic injuries and fatalities in LMICs: a critical review of literature. In: Kloeden CN, McLean AJ, eds. Proceedings of the 13th International Conference on Alcohol, Drugs and Traffic Safety, Adelaide, 13–18 August 1995. Adelaide, Road Accident Research Unit, 1995:713–720.

Odero, W. and. Garner, P. 1991.The problem of trauma in Nigerian pattern as seen in multcentre study. Troical Geography and Medicine; 43 (1-2): 80-84.

Odero, W. 1998.Alcohol related road traffic injuries in Eldoret Kenya. East Afr. Med J 1998,75 (12): 708-711.

Ofonime E.J., 2012. Prevalence and pattern of road traffic accidents among commercial motorcyclists in a city in Southern Nigeria. Educational Research Vol. 3 (6) pp. 537-542, June 2012.

Ohakwe, J.,Iwueze, I.S. and Chikezie, D.C. 2011. Analysis of Road Traffic Accidents in Nigeria: A Case Study of Obinze/Nekede/Iheagwa Road in Imo State, Southeastern, Nigeria. Asian Journal of Applied Sciences, 4: 166-175.

Omidiji, A.A. and Ibitoye, S. 2007. Crime And Road Crashes Prevention In Public Transportation System In Nigeria: The Case Study Of Kwara, Kogi And Ekiti States Federal Road Safety Corps, Nigeria 2007.

Orsay, E.M., Dowan,W.L., Lewis, R. and Rama, K.V. 1994. The impaired driver:Hospital and Police detection of alcohol and other drugs of abuse in motor vehicle crashes. Ann Emerg Med;24 (1): 51-55.

Ovuwori, Onibere and Asalor, J. O. 2010. Road Traffic Accident in Developing Countries Vol. I, Joja Press, Lagos.

Owoaje, E.T., Amoran, O.E, Osemeikhain, O.O, Ohnoferi, O.E. 2005. Incidence of road traffic accident and patterns of injury among commercial motorcyclists in a rural community in south western Nigeria. Journal of Community Medicine and Primary Health Care. 2005;17 (1): 7–12.

Oyeyemi, B.O. 2003. Productivity and Road Traffic Administration in Nigeria: Issues, Impediments and Strategies. Ibadan: Clemeve Media Konsult, 2003, p.2.

Patten, C. J., Kircher, A., Ostlund, J. and Nilsson, L. 2004. Using mobile telephones: cognitive workload and attention resource allocation. Accident Analysis and Prevention; 36 (2004): 341-350.

Peden, M., McGee, K. and Sharma, G. 2002. The Injury Chart Book: A Graphical Overview of the Global Burden of Injuries. Geneva, Switzerland: World Health Organization. *http://whqlibdoc.who.int/publications/924156220X.pdf*. Accessed on February, 2002.

Peden, M., Scurfield, R., Sleet, D., Mohan, D. and Hyder A. A. 2004. World report on road traffic injury prevention. Geneva: World Health Organization. Available: *http://www.who.int/world-health-day/2004/infomaterials/world_report/en/*. Accessed 22 May 2007

Peden, 1996. Injured pedestrians in Cape Town: the role of alcohol. South African Medical Journal, 1996, 16:1103–1105.

Phillipo, L.C., Joseph, B.M., Ramesh, M.D., Isdori, H.N., Alphonce, B.C. and Japhet, M.G. 2012. Injury characteristics and outcome of road traffic crash victims at Bugando Medical Centre in Northwestern Tanzania. Journal of Trauma Management & Outcomes 2012, 6:1.

Pierce, Q. and Maunder P. 1998. Road and Traffic Authority Statistical report "Road Traffic Accidents in NSW-1997". [Motor Accidents Authorities of NSW 1998].

Poysti, L., Rajalin, S. andSummala, H. 2005. Factors influencing the use of cellular (mobile) phone during driving and hazards while using it. Accident Analysis and Prevention 2005; 37 (1): 47-51.

Quazi, S.H., Sajal, K.A., Wan-Hashim, W.I. and Rezaur, R.B. 2005. Proceedings Of The Eastern Asia Society For Transportation Studies, Vol. 5, Pp. 65 - 74, 2005. Road Traffic Accident Situation In Khulna City,Bangladesh.

Ravi, K.E., Muralidhar, K.S. and Vijaya, K. 2003. Prospective Study OnRoad Traffic Accidents.Journal Of Punjab Academy Of Forensic Medicine and Tocicology, Vol 4.

Ravindra, S.H., Sunil, C.A., Vijay, K.A., Ajay, K.T. andPrasanna, S.J. 2011. An Epidemiological Survey of Fatal Road Traffic Accidents and their Relationship with Head Injuries. J Indian Acad Forensic Med. April-June 2011, Vol. 33, No. 2.

Redelmeier, D.A. and Tibshirani, R.J. 1997. Association between cellular-telephone calls and motor vehicle collisions. New England Journal of Medicine, 1997, 336:453–458.

Redelmeier, T. and Evans L., 2003. Traffic-law enforcement and risk of death from motor-vehicle crashes: case-crossover study. Lancet 2003;361 (1): 2177–2182.

Retting, R.A., Ulmer, R.G., Williams, A.F. 1999. Prevalence and characteristics of red light running crashes in the United States. In: Proceedings of the Presentation at the 78th Annual Meeting of the Transportation Research Board. National Research Council, Washington, DC.

Road traffic accident statistics, 2010. [Accessed February 2010]. From *http://roadtrafficaccidents.net/*

Routley, V., Ozanne-Smith, J., Li, D., Hu, X., Wang, P. and Qin, Y. 2007. Pattern of seat belt wearing in Nanjing, China. InjPrev 2007; 13 (1): 388-393.

Rune, E. 2002. Human Ecology: A New Social Science. Teachers College Record 39, 488-493.

Salgado, M.S. andColombage, S.M. 1998. Analysis of fatalities in road accidents. For Scientific International 1998; 36 (1): 91-96.

Sanaei-Zadeh, H., Vahabi, R., Nazparvar, B., Amoei M. 2002. An epidemiological study and determination of causes of traffic accident related deaths in Tehran, Iran (during 2000-2001). Journal of Clinical Forensic Medicine 2002; 9 (2):74-77.

Sangowawa, A.O., Alagh, B.T., Ekanem, S.E., Ebong, I.P., Faseru, B., Adekunle, B.J, et al. 2010. An observational study of seatbelt use among vehicle occupants in Nigeria. Injury Prevention 2010; 16:85‑89.

Sangowawa, A.O. 2007. Incidence of road traffic accidents and pattern of injury among commercial motorcyclists in Oyo State: A rural-urban comparative study. 2007. Dissertation submitted in partial fulfillment of the requirement for the award of the Fellowship in Community Health of the West African College of Physicians.

Sanni, A.O. and Odusanya, O.O. (2003). Patterns of injury at an emergency medical centre in Lagos. Abstract of 43rd Annual Scientific Conference of West African College of Surgeons, Abuja. 2003; 23 – 24.

SARTRE, 2004. European car drivers and road risk. Part 1: Report on principal results, INRETS, Arcueil, 2004.

Solagberu, B. 2002. Clinical spectrum of trauma at a university hospital in Nigeria. European Journal of Trauma, 2002, 6 (1): 365–369.

Taylor, D.M., Bennett, D.M., Carter, M., Garewal, D. 2003. Mobile telephone use among Melbourne drivers: a preventable exposure to injury risk. Medicine Journal of Australia 2003;179:140-142 .

Tearle, P. 2004. Safe driving for business. Communicable Diseases of Public Health 2004; 7:158-160.

Texas Transportation Institute, 2005. "HOV/Carpool Lanes Cause Accidents." From <*http://www.thenewspaper.com/ news/02/292.asp*> (Retrieved on July 02, 2008).

Thanni, L., Kehinde, O. 2006. Trauma at a Nigerian teaching hospital: pattern and documentation of presentation. Afr Health Sci. 2006; 6 (2): 104–107.

The World's Worst Drivers, 2010. Car accident statistics from around the world. [Accessed February 2010]. *http://www.articlesbase.com/cars-articles/the-worlds-worst-drivers-car-accident-statistics-from-around-the-world-609862.html*. Accessed on January, 2010.

Traffic safety facts, 2010. Driver Electronic Device Use in 2010 (technical report no. DOT HS 811 517). Washington, DC: National Highway Traffic Safety Administration, 2010.

Tripop, R.M. and Wilde G.J. (eds) 1994. Challenges for Accident Prevention – The issue of risk compensation behaviour, Amsterdam.

Violant, J.M., and Marshall, J.R., 1996.Cellular phones and traffic accidents:an Epidemiological Approach. Accident Analysis and Prevention; 28 (2): 265-275.

Wade, P. D., Odugbo, O. P., Velie L. D., kyari, F. 2011. Visual Function as a Risk Factor for Road Traffic Accidents among Vehicle Drivers Commercial Intercity in Jos, Nigeria. Journal of Medicine in the Tropics (2011) 13 (2): 81-85.

Waller, P, 2003. The genesis of GDL. Journal of Safety Research, 2003, 34:17–23.

White, M.P, Eiser J.R, Harris, PR. 2004. Risk perceptions of mobile phone use while driving. Risk Anal 2004; 24:323-334.

Wikipedia, 2014. Ibadan. *http://en.wikipedia.org/wiki/Ibadan.* Accessed on August 9, 2014.

WHO, (2002.). Department of Injuries and Violence Prevention. The injury chart book: a graphical overview of the global burden of injuries. Geneva: World Health Organization, 2002.

WHO, (2004). World port on road traffic injury prevention. Geneva, World Health Organization,2004.*(http://www.who.int/violence_injury_prevention/publications/road_traffic/world_report/en/index.html*).

WHO. (2009). Global status report on road safety. Time for action. World Health Organisation, Geneva.

Wintemute, G., 1985. Is motor vehicle-related mortality a disease of development? Accident Analysis and Prevention, 17, 223–237.

Zhang,J., Fraser,S., Lindsay, J., Clarke, K. and Mao, Y. 1998. Age specific pattern of factors Related to fatal motor vehicle traffic crashes: Focus on young and elderly drivers. Public Health; 112 (5): 289-95.

APPENDIX 1

Predicted World Road Traffic Fatalities by Regions (in thousands, adjusted for underreporting) 1990–2020

Region[a]	Number of countries	1990	2000	2010	2020	Change (%) 2000–2020	Fatality rate (deaths/ 100 000 persons)	
							2000	2020
East Asia and Pacific	15	112	188	278	337	79	10.9	16.8
East Europe and Central Asia	9	30	32	36	38	19	19.0	21.2
Latin America and Caribbean	31	90	122	154	180	48	26.1	31.0
Middle East and North Africa	13	41	56	73	94	68	19.2	22.3
South Asia	7	87	135	212	330	144	10.2	18.9
Sub-Saharan Africa	46	59	80	109	144	80	12.3	14.9
Sub-total	121	419	613	862	1 124	83	13.3	19.0
High-income countries	35	123	110	95	80	–27	11.8	7.8
Total	156	542	723	957	1 204	67	13.0	17.4

Data are displayed according to the regional classifications of the World Bank. (Kopits and Cropper, 2003).

APPENDIX II

Globally Disease Burden (DALYs lost) for 10 leading causes

1998 Disease or Injury	2020 Disease or Injury
1. Lower respiratory infections	1. Ischaemic heart disease
2. HIV/AIDS	2. Unipolar major depression
3. Perinatal conditions	3. **Road traffic injuries**
4. Diarrhoeal diseases	4. Cerebrovascular disease
5. Unipolar major depression	5. Chronic obstructive pulmonary disease
6. Ischaemic heart disease	6. Lower respiratory infections
7. Cerebrovascular disease	7. Tuberculosis
8. Malaria	8. War
9. **Road traffic injuries**	9. Diarrhoeal diseases
10. Chronic obstructive pulmonary disease	10. HIV/AIDS

(WHO, 2004)

APPENDIX III

Motor parks in Ibadan, Oyo State

Parks	Total number of drivers traveling >300km
Akinyele park 1 (Ojoo park)	140
Akinyele park 2 (Sango park)	160
Lagelu park	50
Egbeda park	40
Ibadan North east I park	110
Ibadan North east II park	124
Ibadan North park	90
Ibadan north west park	140
Ibadan south west I park	137
Ibadan south west II park	126
Ibadan south east park	130
Oluyole park	70
Ido park	98

APPENDIX IV

Informed Consent Form/ Questionnaire in English

QUESTIONNAIRE ON EPIDEMIOLOGY OF ROAD TRAFFIC CRASHES AMONG LONG DISTANCE VEHICLE DRIVERS IN IBADAN METROPOLIS, OYO STATE.

Dear Respondent,

My name is Adejugbagbe Adewale, I am a postgraduate student of faculty of public health, University of Ibadan. I am currently undertaking a study which focuses on the epidemiology of road traffic crashes among long distance vehicle drivers in Ibadan metropolis. This questionnaire is divided into six sections; Socio-demography characteristics, Driving history, Knowledge about road safety measures, Road safety behaviours and driving practices, patterns of injuries and History on road traffic crashes and risk factors.

I admonished you to please answer all the question with complete sincerity, as you are assured that the information you will be providing in this questionnaire will be use mainly for this study and no third-party will have assess to this data apart from the researcher. Your name will not be require in this study. This study will help these nation in reducing the rate of road traffic crashes occurrence and death due to this crashes.

However, this study is entirely voluntary, you have no risk or any form of disadvantage if you do not want to participate. Please in order to be sure that you actually accepted to take part in the study voluntarily, kindly sign your signature in the space provided.

Thank you for giving your audience.

Date _____ Signature of respondents _____

Serial Number ……..

Section A: SOCIO-DEMOGRAPHY CHARACTERISTICS

1. Age of Respondent …… years
2. Location (1) Urban (2) Rural
3. Gender (1) Male (2) Female
4. Educational status (1) None (2) Quranic education (3) Primary (4) Secondary (5) Tertiary
5. Marital Status (1) Single (2) Married (3) Divorced/separated (4) Widowed
6. Tribe (1) Yoruba (2) Igbo (3) Hausa/Fulani (4) Others (Please specify)……
7. Religion (1) Christianity (2) Islam (3) Traditional (4) Others (Please specify)……

SECTION B: DRIVING HISTORY

8. How long have you been driving? ……
9. Did you attend any driving training school before driving? (1) Yes (2) No
10. If no, what where the reasons for not attending a driving training school? (1) Insufficient fund (2) Lack of awareness (3) Is not compulsory (4)Others please specify……...
11. Do you have a valid driving license? (1) Yes (2) No
12. If yes, what class of driving license do you have?.....
13. Which of the following kinds of vehicles are you driving? (1) Car (2) Mini bus (3) Truck (4) motor cycle (5) Luxurious bus (6) Others please specify……...
14. Around what time of the day do you travel most? (1) Morning (2) afternoon (3) evening (4) Night (5) Any time
15. How many trip(s) do you make per day? ……
16. How long do you travel per trip? ……
17. What is the maximum distance travelled per journey? (1) 400km (2) 400km-1000km (3) >1000km

SECTION C: KNOWLEDGE ABOUT ROAD SAFETY MEASURES

18. What is the maximum speed recommended when driving on the highway?

(1) 50km/hr (2) 50-100km/hr (3) 100km/hr (4)>100km

19. What is the meaning of the following road traffic signs?

a)  ..... b)  .....

c)  ..... d)  .....

e)  ..... f)  .....

SECTION D: ROAD SAFETY BEHAVIOURS AND DRIVING PRACTICES

20. How often do you perform the following behaviours?

S/N	Behaviours	Never	Rarely	Sometimes	Always

a.	Cigarette smoking				
b.	Alcohol usage				
c.	Herbs use				
d	Kola nut use				

21. Do you use seatbelt when driving? (1) Yes (2) No

22. If yes to Q21, how often do you use the seatbelt? (1) Always (2) Sometimes (3) Rarely

23. If no, which of the following where the reasons for not using the seatbelts

S/N	Reasons	Yes	No
a.	Feeling uncomfortable		
b.	Forgetfulness		
c.	Not a habit		
d.	In a hurry		

e. Others please specify……

24. Do you use mobile phone when driving? (1) Yes (2) No

25. If yes to Q24, under what circumstances do you use it? (1) During an emergency (2)Any time I feel like (3) Others please specify……

SECTION E: PATTERNS OF INJURIES

26. Have you ever sustained injury from road traffic accident before? (1)Yes (2) No

27. If yes to Q26, have you sustained injury from road accident since the past 1 year? (1) Yes (2) No

28. How severe was your last injury sustained? (1) minor injury (2) moderate injury (3) severe injury

29. Which site on your body did you sustained the last injury?

S/N	Site of injury	Yes	No
a.	Lower extremities		
b.	Head and neck		

c.	Abdomen		
d.	Spinal cord		
e.	Chest		
F	Multiple site		

g. Others please specify……..

30. Which of the following were the types of injury sustained?

S/N	Types of injury	Yes	No
a.	Abrasions		
b.	puncture wounds		
c.	muscle sprain		
d.	Tear		

f. Others please specify……..

SECTION F: HISTORY ON ROAD TRAFFIC CRASHES AND RISK FACTORS

31. Have you ever been involved in any form of road traffic crash before as a driver?
    (1) Yes (2) No
32. If yes, what is your age group at first road traffic crash as a driver (1)<15years
    (2)15-24 years (3)25-34 years (4)35-44years (5)>45 years
33. Have you ever been involved in any form of road traffic crash since the past 1 year as a driver? (1) Yes (2) No
34. If yes to Q35, how many times have you been involved in the past 1 year as a driver?
    ……
35. How serious was your last road traffic crash? (1) Not serious (2) serious
    (3)Very serious
36. How many death(s) were recorded during that accident? .....
37. How many people were injured? .....
38. What was the nature of the collision of these last crash?
    (1) Car versus car (2) Car versus pedestrian (3) Car versus Bus (4) Bus versus trailer

(5) Other please specify……

39. What was the climatic condition during the period of these crash? (1) raining (2) sunny (4) winding (5) Others please specify……

40. Which of the following were the nature of the road on which these crash occur?

S/N	Nature of the road	Yes	No
A	Bad portion of tarred road		
b.	Bumpy		
c.	Wet		
d.	Untarred		
E	Narrow		
f.	Wide		

g. Others please specify……

41. What time of the day did the crash occur? (1) Morning (2) Afternoon (3) Evening (4) Night (5) Not specific

42. In which day of the week did the crash occur? ……

43. In which month in the year did the crash occur? ……..

44. In which of the following were the reasons of the accident?

S/N	Reasons	Yes	No
a.	Vehicle fault		
b.	Poor Road Condition		
c.	Pedestrian fault		
d.	Over speeding		
e.	No proper road signs		
f.	Bad weather		
g	Improper overtaking		
h	Poor vision		
i.	Fatigue		
j.	Sleep		

k. Others please specify……..

45. If it was as a result of vehicle failure, what type of failure occured? (1) Bursted tyres (2) Break failure (3) Engine breakdown (4) Loosed bolt from the vehicle parts (5) Others please specify……

46. Was there a standby ambulance after the road traffic crash? (1) Yes (2) No

47. If no, how long does it takes the ambulance to arrive at the site of the carsh? (1) <10mins (2) >10 mins

48. What was the other mode of transportation used for reaching medical centre?. (1) private vehicle (2) police vehicles (3) taxi (4) Others please specify……

49. Was there a medical aid available at the site of the carsh? (within 500 meters from the site of the injury) (1) Yes (2) No

50. Were you admitted after the crash? (1) Yes (2) No

51. If yes to Q52, in which of the following were you admitted into? (1) Hospital (2) clinic (3) Others please specify……

52. Were you able to resume your driving activities immediately? (1) Yes (2) No

53. If no, how long does it takes you to resume your driving activities as a result of the admission? (1) <1week (2) 1week- 1month (3) >1month

Thank you for your time.

APPENDIX V

Informed Consent Form/ Questionnaire in Yoruba

Iwe Ibeere Lati beere fun ohun to n pakun si ijanba oko larin awon awa oko ti o n wako lo si ona jijin ni ijoba ipile Ariwa Ibadan, ni ilu Oyo

Iree Olukopa,

Orukomini Adejugbagbe Adewale, mo wa lati ile iwe giga unifasity Ibadan. Iwe ibeere yi je eyi ti o fe se iwadi ohun to n pakun ewu ijanba oko larin awon to n wa oko lo si ona jijin ni arinwa ipinle Ibadan. iwe ibeere yi wa ni ipin mefa; ipin kini – Sosio demografik data; Ipin keji- itan nipa wiwa oko; Ipin keta – Imon nipa isesi ti o dara ti a ba n wa oko; Ipin kerin –_isesi awako nipa ipaofinmo; Ipin karun- nipa ifarapa ijanba oko; Ipin kefa- itan ijanba oko ati ohun ti o le mu ijanba oko wa

Jowo dahun awon ibeere wonyi pelu otito, a si fi dayinloju pe, a o da abo bo gbogbo oliun ti e ba ko sile pelu gbogbo agbara wa. Lati fun yin ni idaniloju pe enikeni ko ni ni anfaani si ohun ti e ba ko sinun iwe ibeere yi yato si olukowe ibeere naa, a ko ni ko oruko yin sile. Ise iwadi je nkan ti o ma ran ijoba ipinle wa yi lowo lati dikun ewu ijanba oko ti o n sele dede, ti o si n mu emi lo.

Ise iwadi yi je ise ifarayin, ko si ni ewu kankan. Jowo ki a le ni idaniloju pe o finufindu farajin lati kopa ninu idahun ibeere wonyi, buwolu ibi ti a peese ninu iwe yi.

Ese pupo fun gbigba aaye yin.

Ojo

Ibuwolu olukapa

Serial number yin……

IPIN KINI: SOSIO-DEMOGRAFIK

1. E to omo odun melo bayi?.....
2. Ilu wo le n gbe? (1) Ilu nla (2) Ilu kekere
3. Se okunrin tabi obirin ni yin? (1)Okunrin (2) Obirin
4. Nibo le kawe de? (1) Mi ko lo si ile iwe kankan (2) Mo ka iwe keu (3) Mo pari ile iwe alako beere (4) Mo pari ile iwe oni pele keji (5) Mo pari ile iwe giga
5. Se e ti fe iyawo? (1)mi ko ti fe iyawo (2) mo ti fe iyawo (3) mo ti fi iyawo mi sile (4) Iyawo mi ti se olon gbe
6. Iru eya wo ni e n se? (1) Yoruba (2) Igbo (3) Hausa/Fulani (4) iru eya miran ko……
7. Iru esin wo ni e n se? (1) esin onigbagbo (2) esin musulumi (3) esin ibile (4) esin yiowu ti e le ko……

IPIN KEJI: ITAN NIPA WIWA OKO

8. Oto odun melo ti e ti n wa oko?……..
9. Se e lo si ile eko nipa wiwa oko ri? (1)Beeni (2)Rara
10. Ti o ba je rara, kini awon idi ti e ko fi le kopa ni eko oko wiwa yi? (1) Emi ko lowo pupo dani lati kopa (2) Emi ko mo nipa ile eko oko wiwa (3) Ko je ohun dandan fun mi (4) E ko idi imi ti ko ba si ni bi……..
11. Se e ni iwe iwako? (1)Beeni (2)Rara
12. Ti e bani, bi iru kilaasi iwe oko wo leni?……
13. Bi iru oko wo ni e n wa la siko yii? (1) oko ayokele (2)Busi kekere (3) oko gungun (4) Okada (5)Busi nla (6) E ko imi ti o ba si ni bi……..
14. Asiko igba wo ni oojo le ma n rin irin ajo ju? (1) Igba aro (2) Igba osan (3) Igba irole (4)Igba ale (5) Igba ti o ba wumi
15. Igba melo ni e ma ri irin ajo yi lo oojo?……
16. E ma lo to wakati melo lori irin ajo kan?……
17. Kini oye kilometer to poju ti e ma n lo lori irin ajo kan? (1) 400km (2) 400km-1000km (3) >1000km

IPIN KETA: IMON NIPA ISESI TO DARA TI A BA N WA OKO

18. Kini oye kilometer ti e ko le koja ti e ba sare ni ori ona pelu oko yin?

(1) 50km/hr (2) 50-100km/hr (3) 100km/hr (4)>100km

19. Kini itumo awon nkan elo ona won yii?

a)  .....b)  .....

c)  ..... d)  .....

e)  ..... f)  .....

IPIN KERIN: <u>ISESI NI PA IPA OFINMO AWAKO</u>

20. Bawo le se ma n se awon iwa won yi si?

S/N	Iseesi	Rara	O loye igba	Igbakankan	Igbagbogbo
a.	Mimu Cigar				
b.	Mimu otin				
c.	Lilo ogun ni ona ti ko to				
d	Lilo obi				

21. Se e ma n lo beliti ijoko oko ti e ba n wa oko yin? (1)Beeni (2) Rara

22. Ti o ba je beeni, bawo le se ma n lo si? (1)Nigbagbogbo (2) Nigba Kankan (2) oni oye igba

23. Ti o ba je beeko, ninu awon wo yi ni idi ti e ko fi n lo beliti ijoko oko yin?

S/N	Idi	Beeni	Beeko
a.	Ki n je ki n raye temi		
b.	Mo ma n gbagbe		
c.	Ko si ni isesi mi		
d.	Mo n koju		

e. Eyi ti o ba ku, e se afihan e ……

24. Se e ma n lo ero ibanisoro ti e ba n wa oko yin? (1)Beeni (2)Rara

25. Ti o ba je beeni, bi iru igba wo ni e ma n lo? (1) ni igba ti o ba se Pataki la ti lo (2) Ni igba ti o ba wu mi (3) Eyi ti o ba ku, e se afihan e ……..

IPIN KARUN: <u>NIPA IFARAPA IJANBA OKO</u>

26. Se e ti fi arapa nitori ijanba oko ri? (1)Beeni (2) Rara

27. Ti o ba je beeni, ije se e ti fi arapa ri bi odun kan seyin nitori ijanba oko? (1)Beeni (2) Rara

28. Bawo ni ifarapa yi se buru to? (1) Ko buru pupo (2) Di e lofi buru (3) O buru gan

29. Apa ibo ni eya ara yin ni e ti ni ifarapa yii?

S/N	Apa ara	Beeni	Beeko
a.	Ni isale ara		

b.	Ori ati orun		
c.	Ni ikun		
d.	Ni eyin		
e.	Ni aya		
f	Ni gbogbo ara		

g. Eyi ti o ba ku, e se afihan e ……

30. Ninu awon woyi ni iru ifarapa ti e ni?

S/N	Iru ifarapa	Beeni	Beeko
a.	Ara bibo		
b.	Ara lilu		
c.	Isan riro		
d.	Ara yiya		

e. Eyi ti o ba ku, e se afihan e ……

IPIN KEFA: <u>ITAN IJANBA OKO ATI NKAN TI O LE MU IJANBA OKO WA</u>

31. Se e ti ni ijanba oko ri? (1) Beeni (2) Rara
32. To ba je beeni, oye omo odun melo niyin nigbati ti e ni ijanba oko akoko?……
33. Se e ti ni ijanba oko ri bi odun kan seyin ? (1)Beeni (2) Rara
34. Ti o ba je beeni, o to oye igba melo ti e ti ni ni odun kan yi?……
35. Bawo ni ijanba oko ti o sele seyin yi se buru to? (1) Ko buru rara (2) O buru die (3) O buru gan
36. Oye eyan melo lo ku ni ijanba oko yi?……..
37. Oye eyan melo lo farapa ni ijanba oko yi?……
38. Bi iru oko wo lo kolu ara won nigba ti ijanba oko yi sele? (1) ayokele ati ayokele (2) ayokele ati eyan to n koja (3)Ayokele ati bus (4) Bus ati trailer
    (5) Eyi ti o ba ku, e se afihan e ……
39. Bawo ni oju igba seri ni asiko ijanba oko yi? (1) ojo n ro (2) orun n ran (3) Ategun n fe gan

(4) Eyi ti o ba ku, e se afihan e ……

40. Bi iru ona wo ni ijanba oko yi ti sele?

S/N	Iru ona	Beeni	Beeko
a.	Ona ti won da oda si ti o ti baje		
b.	Ona ti o se gelete		
c.	Ona to ni omi		
d.	Ona ti won ko da oda si		
e.	Ona to kere		
f.	Ona to fe		

a. Eyi ti o ba ku, e se afihan e ……..

41. Asiko igba wo ni ijanba oko yi sele ?(1) Aro (2) Osan (3) Irole (4) Ale (5) Mo ko lee so

42. Ninu ojo wo ni ose ni ijanba yi sele?……..

43. Ninu osu wo ni odun yen ni ijanba yi sele?……..

44. Kini idi ti ijanba yi fi sele?

S/N	Reasons	Beeni	Beeko
a.	Mi ko wa oko na daradara		
b.	Oko naa ko dara		
c.	Ona ko dara to		
d.	Eni to n fi ese n rin lo koba mi		
f.	Ere asa pojude		
g.	Ko si amin itokasi lona		
h.	Oju igba o da nigba naa		
I	Mo koja oko miran lona ti ko ye		
J	Mi ko riran daradara		
k.	O ti re mi/ mo sun ni ori oko wiwa		

l. Eyi ti o ba ku, e se afihan e ……..

45. Ti o ba je nitoripe oko ko dara lasiko ijanba oko yii, ki ni nka to sele si oko naa? (1)Tyre fo lese oko (2)Brakii oko ko lati da oko duro (3) Ile ise e daku patapata (4)Nkan ti won fi de ara oko naa tu

46. Se oko ambulanci to n gbe ni lo si ile iwosan wa ni tosi ti ijanba na ti sele (1) Beeni (2) Rara
47. Ti o ba je rara, o to iseju melo ti oko naa to de? (1) o dikun iseju marundinlogun
    (2) O le iseju marundinlogun
48. Yato si ambulance, iru oko wo lo gbe yin ni igbati ijanba yi sele (1)Oko privati (2) oko olopa (3)oko taxi (4) ti o ba ni oko miran, e ko sile……
49. Se ile iwosan kankan su mo si itosi ijanba oko yi? (1) Beeni (1)Rara
50. Se won gba yin si ile iwosan nigbati ijanba naa sele? (1)Beeni (2) Rara
51. Ti o ba je beeni, bi iru ile iwosan wo lo gba yin si? (1) Ile iwosan nla (2) Ile iwosan kekere (3) Ti o ba ni imi, e ko si le……..
52. Se e le pada si enu ise yin kiakia nigba ti ijanba yi sele (1)Beeni (2) Rara
53. Ti o ba je rara, o to ojo melo ti e lo ki e to pada si enu ise yin (1)Ose kan din (2) Ose kan si osun kan (3) Osun kan le

Mo dupe fun akoko ti e lo pelu mi

APPENDIX VI

Certificate of Ethical Approval

TELEGRAMS..... TELEPHONE.....

MINISTRY OF HEALTH

DEPARTMENT OF PLANNING, RESEARCH & STATISTICS DIVISION

PRIVATE MAIL BAG NO. 5027, OYO STATE OF NIGERIA

Your Ref. No. .....
All communications should be addressed to
the Honorable Commissioner quoting
Our Ref. No. AD 13/ 479/382

15th April, 2013

The Principal Investigator,
Department of Epidemiology and Medical Statistics
Faculty of Public Health,
University of Ibadan.

Attention: Adejugbagbe Adewale. M.

Ethical Approval for the Implementation of your Research Proposal in Oyo State

This acknowledges the receipt of the corrected version of your Research Proposal titled: "Epidemiology of Road Traffic Crashes among Long Distance Vehicle Drivers in Ibadan Metropolis, Oyo State."

2. The committee has noted your compliance with all the ethical concerns raised in the initial review of the proposal. In the light of this, I am pleased to convey to you the approval of committee for the implementation of the Research Proposal in Oyo State, Nigeria.

3. Please note that the committee will monitor closely and follow up the implementation of the research study. However, the Ministry of Health would like to have a copy of the results and conclusions of the findings as this will help in policy making in the health sector.

4. Wishing you all the best.

OYO STATE RESEARCH ETHICAL REVIEW COMMITTEE
Signature & Date

Sola Akande (Dr)
Director, Planning, Research & Statistics
Secretary, Oyo State, Research Ethical Review Committee