COST EVALUATION OF ROAD TRAFFIC ACCIDENT IN NIGERIA USING HUMAN CAPITAL APPROACH: ACASE STUDY OF ABUJA-LOKOJA ROAD

BY

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DEDICATION

This work is dedicated to my late father, my lovely and caring mother and the family of sheikhAbdulsalam Alkali. May Allah (SWT) continue to shower His mercy and blessings on us,Amin.

DECLARATION

I hereby declare that this thesis titled "Cost Evaluation of Road Traffic Accident in Nigeria, Using Human Capital Approach: A Case Study of Abuja-Lokoja Road" is a product of my research effort under the supervision of DR. A.T. OLOWOSULU and DR JOEL MANASSEH. It has not been presented in any previous application for higher degree. All quotations and their sources are specifically acknowledged by means of references.

....

Abdulsalam,GARBA Date

CERTIFICATION

This thesis titled "Cost Evaluation of Road Traffic Accident In Nigeria, Using Human Capital Approach: A Case Study of Abuja-Lokoja Road" by GARBA, Abdulsalam, meets the requirement governing the award of the degree of Master of Science (Civil Engineering) of the Department of Civil Engineering, Ahmadu Bello University, Zaria and is approved for its contribution to knowledge and literary presentation.

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ABSTRACT

Nigeria experiences the highest rate of road traffic accidents resulting in fatalities and various levels of injuries. On Abuja-Lokoja road, traffic accident takes the lion's share of the risk having highest number of vehicular accidents withcorresponding fatalities and injurieswhich has a great impact on cost and the socio-economic development of the society. It is therefore necessary to gauge the monetary value of these losses in order to highlight the extent of damage incurred to society as a whole. This research is focused on using Gross-Output Model or Human Capital Approach to compute the cost of traffic accident on Abuja-Lokoja road. The aim of this research is to formulate a model that can be used for estimating the total cost of road accidents at all levels of severity. The extent of injury levels, property damaged and general cost resultingfrom an accident using secondary data were obtained from thePolices, Research and Statistics department of the Federal Road Safety Corps (FRSC) for a period of eleven years (2000-2010).The research was carried out with the aid of questionnaires and interview. The data collected were analyzed using the percentage frequency distribution table and the result was used to cost the property damage cost and the medical cost. The accident cost was decomposed and quantified based on the accident severity levels.The cost per fatal accident is₦ 24, 853, 524, the cost per of serious injuries accident is₦633.520, and the cost of per minor accident is₦ 10, 575. 36, the total human cost is₦ 55, 714, 330,477, the total properties cost is₦ 890, 067, 000, the police administrative cost is₦ 65, 446, 757. 76 and the total accident cost is₦ 56,669,844,234.Therefore the cost per vehicle per kilometer is ₦ 60,804.03Km^{-1}, the cost per kilometer is ₦318,369,911 $Km^{-1}$for Abuja-Lokojaroad. This result is in agreement with other researches carried out using gross output method.

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LIST OF SYMBOLS/ABBREVIATIONS

1. AD_{in-p}	Average Days for In-Patient
2. AD_{out-p}	Average days for Out-Patient
3. AV_{age}	Average Age
4. CMT	Cost of Medical Treatment
5. CR_F	Cost of Repair For Fatal Accident
6. CR_M	Cost of Repair for Minor Accident
7. CR_S	Cost of Repair for Serious Accident
8. GC_T	Total General Cost
9. GOP	Gross Output Cost
10. HC_T	Total Human Cost
11. In-PC_F	In-Patient Cost for Fatal (Death)
12. In-PC_S	In-Patient Cost for Serious Injury
13. In-PC_M	In-Patient Cost for Minor Injury
14. LDD	Loss Due to Death
15. LDM	Loss due to Minor Injuries
16. LDS	Loss Due to Serious Injuries
17. LOP	Loss of productivity
18. LPC_F	Lost of Productivity for Fatal (Death) Case
19. LPC_M	Lost of Productivity for Minor Case
20. LPC_S	Lost of Productivity for Serious Case
21. MC_F	Medical Cost for Fatal (Death) Case
22. MC_S	Medical Cost for Serious Case
23. MC_M	Medical Cost for Minor Case

24. N_F Number of Fatality (Death)

25. N_i Number of Injury (Serious/Minor)

26. NON/VCD Non Vehicular Damage Cost

27. NV_F Number of Vehicle Involved in Fatal Accident

28. NV_M Number of Vehicle Involved in Minor Accident

29. NV_S Number of Vehicle Involved in SeriousAcciden

30. Out-PC_M Out Patient Cost for Minor Injury Accident

31. Out-PC_S Out Patient Cost for Serious Injury Accident

32. OV_F Overhead Cost for Fatal (Death) Case

33. OV_M Overhead Cost for Minor Accident

34. OV_S Overhead Cost for Serious Accident

35. PAC Police Administrative Cost

36. PAC_D PoliceAdmin. CostforDamageOnlyAccident

37. PAC_F Police Administrative Cost for Fatal Accident

38. PAC_M Police Administrative Cost for Minor Accident

39. PAC_S Police Administrative Cost for Serious Accident

40. PAC(VCD-ONLY) Police Admin. Cost for Vehicular Damage-Only

41. PDC Property Damage Cost

42. PDC_D Property Damage Cost for V/Damage Only

43. PDC_F Property Damage Cost for Fatal (Death)

44. PDC_{NON} Property Damage Cost for Non V/Damage

45. PDC_S Property Damage Cost for Serious

46. PDC_T Total Property Damage Cost

47. $PDC_{(F,S,M,D)}$ Property Damage Cost for (Fatal,Serious,Minor)

48. $SPGS_F$ Sum assign to Pain/Grief/Suffering for F/Injury

49. $SPGS_M$	Sum assign to Pain/Grief/ Suffering M/Injury
50. $SPGS_S$	Sum assign to Pain/Grief/Suffering for S/ Injury
51. TLDD	Total Loss Due to Death
52. T(LDS)&(LDM)	Total Loss Due to Serious and Minor Injury
53. THC	Total Human Cost
54. TOTAL PD	Total Property Damage Cost
55. T(VCD)/VCD-ONLY	Total V/ Damage Cost/Vehicular Damage-Only
56. VDFA	Vehicular Damage Cost for Fatal Accident
57. VCDSA	Vehicular Damage Cost for Serious Accident
58. VCD	Vehicular Damage Cost
59. VCD-ONLY	Vehicular Damage Cost Only
60. W_{annual}	Annual Wages
61. W_{Daily}	Daily Wages

CHAPTER ONE

INTRODUCTION

1.1Background to the study

Accident can be defined as an unpleasant incident that happens unexpectedly; it can also be defined as an incident that happens by chance. Road traffic accident is therefore an unexpected phenomenon that occurs as a result of the use or operation of vehicles, and trucks, on thehighway, when a traffic accident occurs it may be fatal, resulting in deaths of road users (passenger, drivers, or pedestrians); serious when there is no deaths but a person is seriously injured, and minor when it is not serious enough as to cause substantial hardship. When there is no fatality, serious injury, minor or slight injury and only vehicular damage or property damage occurs, it is referred to as damage only accident.

Most citizens use the road at one point in time or the other, and therefore face a risk of road accident. Through road accidents, hundreds of productive citizens die every year. By these, many families have lost their bread winners, many wives have become widows and many husbands rendered widowers, countless number of children have become orphans many songs of victory and jubilations had been turned into morning and wailing overnight. Many dreams are shattered; plans and aspirations are laid to rest in the graves all in name of road accident.

In Nigeria today according to the Inspector General of Police's Statement (Atta, 1990), there are more reported cases of death on the road through road accidents than there are cases of murder, suicide or death by any atrocious crimes.Road traffic accidents may at first seem to bea relatively unimportant problem to developing countries, such as Nigeria, when compared with the more obviously acute problems of malnutrition, education, poorly developed

infrastructures, terrorism, Niger Delta militant and thuggery.However, an analysis of causes of death in a number of countries in the developing world, including Nigeria,showedthat deathscaused by motor vehicle accidents ranked third behind those caused by diseases and natural death (Akoto and Wiredu, 1986).World Health Organization (WHO, 2004) sources indicate that Nigeria leads eleven other countries in the world in terms of accident involvement and severity. The tremendous toll of motor- vehicle accidents on Nigerian roads, not only causes much suffering, pain and misery but leads to a waste of scarce human and material resources.Many papers have been written in the past, notably within the period of 1972 to 1979, and several data giving statistics of road accidents in Nigeria. For example," Road Traffic Accident in Nigerian", a Nigerian Army publication(1977) on road safety, it was claimed that on the average, 3.1 persons died on road accidents every 12 hour in 1976.

Nigeria road is a death trap, a bomb ready to explode, going by the report given by the Federal Road SafetyCorps (2005), that out of 192 countries, Nigeria ranks 191 in number of deaths caused by road accidents, coming as the 2nd worst country in the world. It states further that 162 people die from road accidents for every 100,000 Nigerians. This report clearly showed that road accidents are gradually overtaking deaths from Malaria and Tuberculosis in Nigeria as it has claimed thousands of life.

Owing to the global and massive scale of the issue, and with the predictions that by year 2020 road traffic death and injuries will exceed HIV/AIDS as a burden of death and disability, United Nation and its subsidiary bodies have passed resolutions and held conferences on the issue of traffic accident. The first United Nation General Assembly resolution and debate was held in Moscow 2003,the World Day Remembrance for Road Traffic victims was declared on 26th October 2005.The

United Nations adopted a resolution which calls for Government to mark the third Sunday in November each year as World Day of Remembrance for Road Traffic Victims(UN, 2005).

Transportation constitutes one of the major features of development in Nigeria as it does for any other country of the world. In contemporary times, the country has experienced an unprecedented general economic boom (mainly imports) which has led to increased activities within the industrial and commercial sector. Thus the movement of goods, services and people has become critical to the continued development of the country's economy. One cannot therefore ignore the importance of transportation to any society as first; it enhances mobility from one place to another. Secondly; it contributes immensely to man's economy fortune via easy movement of goods and services. Perhaps, this was what Lord Luggard saw when he stated in 1922 that "The material development of Africa may be summed up in one word Transport"(Clement,2009).

Specifically, the contribution of road transport to the development of the country is not only significant but decisive. It is significant in the sense that it makes possible realization of the broad development objective of government and achievement of the average citizen's social economic desires. On the other hand, it is decisive in changing the pattern of internal communication to meet the demand of an independent, self-sustaining economy. As Adebayo (2007), andAbdullahi (2008) stated- road transportation is so vital to Nigeria that hitherto, it provides or accounts for about 90% of total passengers and goods carried within the national economy, thus providing a sound, efficient, safe and environmentally friendly and sustainable transport system is essential to the developmental efforts of Nigeria.

The over dependence on road transportation in Nigeria has meant that it is the mode of transportation which is mostly used and therefore often abused. The abuse of this mode of transportation is mostly always resulting to road traffic accidents. According to Encarta dictionaries, accident is defined as a collision or similar incident involving a moving vehicle, resulting in property damage, personal injury or death. Road traffic accidents are serious problems facing not only Nigeria but most countries of the world. In the Nigeria situation, with so much money in circulation, the number of vehicles on the roads has increased far beyond what the necessary infrastructure and related man – power can cope with.

Consequently, the continued dangerous trend of road traffic accidents in Nigeria has placed the country as one of the most road traffic accident prone countries worldwide, only second to Ethiopia as at 2008 (FRSC, 2009).

According to Edeaghe (2005) data released by a nongovernmental organization revealed that in Nigeria, one out of every three accident victims dies, and since the civil war, no other pathology or phenomenon has claimed the lives of more Nigerian than have road traffic accident, and in response, the world bank has described the roads in Nigeria as the most dangerous, yet the medical response to these accidents is abysmally poor.

Being that deaths that occurred from road traffic accidents have a higher percentage in Nigeria, this prompted the Nigeria Government to establish the present Federal Road Safety Corps (FRSC) in 1988 to address road safety crisis in Nigeria. The commission was therefore established with the goal and objective of reducing to the barest minimum, accident rates on roads and therefore to guarantee safety on our highway. It is this reality that the researcher is seeking to unravel the cost of road traffic accidents in Nigeria

1.2 Statement ofResearch Problem

A nation is as developed as her transport sector, as this sector has great influence on the other sector and economic activities. This is due to the fact that transport is hardly in demand for its own sake, rather the demand for transport is derived demand, since it arises from the desire to meet certain needs, such as economic, social, recreational, political or educational. One of the major road in Nigeria that link parts of the country including most of the Northern, Eastern and Western states is the Abuja-Lokoja road. This makes the road a very busy one in terms of volume of traffic.

The socio-economic activities in Nigeria require an effective transportation system as the people are engaged in farming, trading, or civil service which require a lot of movements. Unfortunately, this development has also generally created serious problem in terms of traffic flow. As vehicles increased on roads there is normally an increase in traffic problems. These include traffic congestion, noise, traffic hold-ups and accelerating rate of accidents which now constitute a menace on the Abuja-Lokoja road. It is, therefore, become necessary to study the trends of traffic accident patterns on Abuja- Lokoja road. As a result the research problem tackled in this project is to analyse the cost of road traffic accidents on Abuja-Lokoja road with a view to working out countermeasures.

1.3Aim and Objectives

The aim of this research is to compute Road Traffic Accident on Abuja-Lokoja road using the Gross Output Approach that can be used forestimating the total cost of road accidents at all levels of severity. The above can be used toachievethe following objectives:

1. To quantify, in monetary terms, the cost of road accidents onAbuja-Lokoja road.
2. To provide a rational basis of assessment of financial claims to the family of accident casualties.
3. To estimate the cost of road accident per vehicle per kilometre level on Abuja-Lokoja road.
4. To advise economists, planners and engineers on a workable method that can be used to cost road accident.

1.4Scope and Limitations

The study is limited to 178km Abuja-Lokoja highway. Specifically, it is concerned with the total cost of road accidents, and causes of road crash. This study covered road accidents on Abuja-Lokoja road covering a period of 11 years from 2000-2010.But generally, the study will assess critically the implication that road traffic accident has on the society.

1.5 Research Justification

The FRSC Zonal Commanding Officer, Zone RS 10, says road traffic accidents claimed 21,090 lives out of 35,300 cases recorded in Nigeria between 2007 and 2010,but latest audit report from Federal Road Safety Corps showed that 41 people died along the Abuja-Lokoja Road between January and May 2010 owing to the deplorable condition of the road. The report also rated the road as the worst in terms of accidents in Nigeria (Bulus, 2011). Every account entails an overall loss to the community far beyond what the country can afford. It is obvious, from an economic standpoint, that highway improvements that result in decreased accident

rates shallindirectly bring about monetary savings to the road users and the public, a good justification for these investigations. An estimate of the total national cost of road accidents will help Governments realize the heavy economic losses being incurred annually.This will encourage them to invest in road safety improvements to reduce these losses.

CHAPTER TWO

LITERATURE REVIEW

2.1 Background

This chapter presents the documentations by scholars in relation to the problem under study that is Cost Evaluation of Road Traffic Accident in Nigeria. It also examines more closely and in detail the evolution of road transportation in Nigeria, social economic and developmental importance of transportation, the implication of its abuses and the function of the Government agency responsible for road safety. The chapter finally concludes by analysing various causes of road accidents; and the place of RTA in the cost analysis and operation of a traffic system.

2.2 Evolution of Road Transportation in Nigeria

In the pre-colonial era, there were no efficient land transportation systems in the area called Nigeria today. With human and animal porter-age, the amount of goods that could be carried and the distance that could be covered were limited, (Onakomaiya, 1981). This problem was partly as a result of the kind of social organizations that existed during this period. Each region or settlement mostly were subsistence in their economy and therefore had little or no interaction with long distance area. For their intra transport system, the southern part of Nigeria depended mainly on water, i.e. they travelled usually by canoes, boats etc.; while for the north it was mostly by the use of donkeys, camels and horses. Thus the need for a road network was inconsequential for the people, at least for the period.This transportation bottleneck was however removed in the colonial era with the construction of roads and rail networks in the country. The mechanization of road transport helped to generate a new spatial economic integration for Nigeria.

According to Clement (2010), the history of road transport in Nigeria dated back to the first decade of the 20th century (colonial era) when some major paths were developed into motor able routes. Such roads were meant to serve two objectives. The first was the inland evacuating of local exports product by linking up the nearest urban centre with major rail stations. Second was to reduce the social and economic strain on the province as a result of inaccessibility. Road network therefore came with the introduction of the motor car. Road development started with the building of narrow earth of gravel paths with wooden bridges across small rivers and streams.

The post-independence period (from 1960 till date) has witnessed a number of changes both in economic formation and land transport characteristics. In this post-colonial era, industrial activities are far more numerous than the colonial era and many more roads are being constructed over the country. Thus, the use of railway has rapidly declined. This means that in the initial years in Nigeria, the road played a secondary role to the railways as the major means of transportation. However, with time the flexibility of the road transport system created new demands in certain areas and sectors, thereby allowing road transport to compete successfully with the railway. Thus the road initially complemented the railway, later competed with it and today has completely replaced the railways as the most important means of transportation in Nigeria. After an initial period of slow growth, associated with financial and manpower constraints, the total length of road constructed and maintained by the national and regional governments as well as native authorities rose to about 57,000KMs in 1946 and 74,000KMs in 1960 and today it stands at an estimated 200,000KMs out of which federal roads account for 34,000KMs (FRSC, 2006).

Adebayo (2007) stated that the initial objective for road building was to facilitate administrative and evacuation of export products. It is obvious that modern road development came with the country'sIndependence. Wide and stronger roads and bridges were built when the economy improved due to oil boom, which became Nigeria's main foreign exchange earner. Therefore, it was in the seventies (70s) that road development in Nigeria witnessed the greatest increase in road length for instance, the Lagos-Ibadan expressway was built in 1978. Since then more dual carriage ways were constructed. The Lagos-Badagry was completed in 1978, Ibadan by-pass was 1979 and a host of others. The Nigerian road system is classified into three (3) broad divisions namely, federal trunk-A-roads, state trunk-B-road and local government trunk-C-roads. The three tiers of government as out lined above share the responsibility for developing and maintaining the roads in Nigeria.

2.3Social Economic and Development Importance of Road Transport

Transportation developments that have taken place since the beginning of the industrial revolution have been linked to growing economic opportunities. This is because;transportation links together the factors of production in a complex web of relationships between producers and consumers. The outcome is commonly a more efficient division of production by an exploitation of geographical comparative advantages, as well as the means to develop economics of scale and scope. The production of space, capital and labour is thus enhanced with the efficiency of distribution and personal mobility.Transportation infrastructure (roads, rail, airports and seaports) are the arteries for the free flow of people, goods and information, they are necessary in a manufacturing and export economy (Ipingbemi, 2008).

The developmental importance of transportation clearly explains why within the last century or so, railways have been constructed in Nigeria, thousands of kilometres of roads built, seaports and airports constructed, airlines and shipping imported or locally assembled. Transportation represents a critical sector in regional growth since it determines the extent to which an area can capitalize on its economic endowments. Transportation has not only aided in the facilitation of human mobility, it has helped in social interaction and exchange of ideas among peoples and cultures.

Ipingbemi(2008) maintains that road transport affects nearly every aspects of the socio-economic and developmental sphere of a society which includes, access to land, labour, services and related resources through them, minerals and resources are been tapped, expansion in the area of making of goods and services also depend on road transport.

Generally, at the very basic level of infrastructural provision, it is undeniable that transport is indispensable to modern economic development especially in developing country such as Nigeria. This is because transport, especially road transport is essential to the execution of daily economic and social activities in any given area. As Ipingbemi (2008) puts it, every Nigerian farmer, industrialists and retailer depend on domestic and international supply chain which the major input are transportation.

2.4Menace of Road Accident in Nigeria

Sociologically,Spencer(1985)defined death as the law of natural selection but the deaths that trap our people through road traffic accidents are definitely not that, that was defined by Spencer because Road Traffic Accident are basically untimely.

Throughout the country there is a deep feeling of sympathy for the wanton loss of human lives through road traffic crashes on Nigerian roads. Indeed, there is a growing concern in the country regarding the menace of road traffic accidents but paradoxically, road traffic accidents in Nigeria seem to be on the increase, and these contributed to the fact why writers, scholars and observers alike have described Nigerian roads as death traps.However, the trend of road traffic accident has continued to increase up to contemporary times. According to FRSC (2006) road traffic accident occurs daily in Nigeria, killing an average of 14 people, and about 400 Nigerians every month. And about 80% of the victims of road traffic accident in the country are male who fall within the productive labour force of between 20-50 years of age.

According toUthman (2009) and FRSC(2009) Annual report, a total of 21,971 Nigerians lost their lives on road traffic accidents between 2006 and 2009. In the breakdown, 4,944 died in 2006, 4,673 died in 2007, 6,661 died in 2008 and 5,693 died in 2009 while 90,434 people sustain varying degree of injuries within the same period. Of the four years, 2008 recorded the highest number of death (6,661) – more than one fifth (1/5) of the number of fatalities for 37 European countries (39,000) for the same year.

Furthermore, Clement (2010), stated that about 522 people lost their lives in road traffic accidents in the first quarter 2010 (February 22 to March 7) according to the weekly traffic crash enforcement and travel monitoring data from the FRSC. According to the data, there was a total number of 1,055 road traffic crashes with 1,627 vehicle involved, and a total number of 2,893 injured. However, a total of 322 persons have died in road crashes that occurred between January and December 2010, while over 1,500 were seriously injured in 417 road accidents across the

country. The Corps Marshall of the Federal Road Safety Corps (FRSC), disclosed in Lokoja, the Kogi State capital, while monitoring the situation of traffic during pre-Charismas vehicular and human movement for holiday. While delivering a speech on the topic “Moscow experience in road safety partnership” at a conference held at the Vatican City in May 2010, the Corps Marshal/Chief Executive of the FRSC, observed the increasing rate of road carnage globally, with Sub-Sahara Africa alone accounting for 10% of the statistics while Nigeria and South Africa account for about 50% of the figure (Osita 2010).

The case of the road under study (Abuja-Lokoja), Daily Trust Nigeria via allafrica.com 9th November,2008, investigation by Uthman (2008), reveals that on the average, 2 cases of accident occur on the Abuja-Lokoja road on a daily basis – between July and October 2008, 50 people lost their lives and about 650 others sustain varying degrees of injuries. Despite this, the FRSC sees it as an improvement;this was according to the Assistant Corps Marshal, Dele Browne, who stated that the death rate has actually reduced based on the figure (Uthman, 2008).

According to Josef (2010), Unit Commander of the FRSC in – charge of Abaji, who quoted lamenting thus “it is very difficult to have an accident – free week on the Abuja – Lokoja road. He further stated that their severity differs, according to him sometimes only minor injuries are sustained by the victim, but sometimes, the accident are as fatal as claiming the lives of between 15 –20 passengers”. He described the Abuja-Lokoja expressway as a death trap after a road audit carried out by the Corps: The Audit covered 50km stretch of the road from Chikara to Karara near Lokoja. The exercise which was carried out by Corps shows that the 50km stretch suffers serious defects such as sharp bends, pot holes, undulating road surfaces, bad hard shoulders/bridges and absences of appropriate road

mark.Similarly, it was discovered that the whole stretch of the road has eight (8) bridges, including the popular MuhammedMurtala Bridge with unpainted guard rails, without reflective entrance even as there are 17 critical bends without any form of warning signs. And this kind of roads that we have round the country helped in accounting for the high number of death on road accident.

Based on the statistical data available, the rising rate of road traffic accidents in the country raises a lot of questions, not only on the effectiveness of the existing methods of preventing and controlling road accidents, but also on the depth of our knowledge and understanding of the phenomenon of road traffic accidents. This development no doubt questions the relevance and the capability of the FRSC which is the led Government agency saddle with the responsibility of maintaining sanity on Nigerian roads.

As Adeleye (2002) put it, when the various causes of road accidents are considered, at least in Nigeria, it is quite obvious that poor road and traffic education is the core of it. This is even more worrisome for a highway like Abuja-Lokoja road which serves as a major link between the north and south. It is against this backdrop that this research seeks to ask the following research questions. What are the causes of road traffic accidents and the total cost of road accident? Who are the victims of Road Traffic Crashes (RTC)? How the Road Traffic Accident affect our economic?

2.5Significance of Costing Road Accident

Road accidents, besides causing a large amount of personal suffering and bereavement which cannot be valued directly, also cause considerable direct losses on which a monetary value can be placed. An estimate of the totalmonetary cost of accidents helps to put the problem of road accidents in proper perspective. An

average cost of accidents is required for use in the economic assessment of road improvement schemes, this however, include an allowance for suffering and bereavement. It might be very difficult to quantify loss in any accident because, it is impossible to place a value upon a human life.However, at least an implicit value has to be put on life under many different circumstances. Casualty and accident costing methodologies have been developed by researchers in this field over more than five decades. Some of the studies are briefly described below:

Onakomaiya (1981) stated that in Nigeria there were an annual range of 8,000 to 10,000 deaths by road accident between 1980 and 1989, with an average of 32 deaths per 100,000 people. He stressed that this is very high when it is compared with the United States of America (USA) which has 19.1 deaths per 100,000 population and United Kingdom (U.K.) with 10.3 deaths per 100,000 people with an average of 15 accidents per 100 vehicles.

Jones (1938) published estimates of the cost of accidents in the United Kingdom (Dawson, 1967).He suggested that the total cost of an accident was made up of three components: compensation for personal injury, repair for damage to property and administrative costs. The personal injury costs were valued at the rates of compensation awards handed down by courts. The sample used by Jones was taken from army vehicle accident records. Reynolds (1956), in Dawson (1967), used a more detailed approach to evaluate loss of output. The three main differences in evaluation of loss of output were:

a. Gross national product was used to make a valuation of the actual loss of output of an individual who sustained the injury rather than using average earning;

b. Housewives services were taken into account in the valuation process by using the average female wage rate;

c. For fatalities, the Net Loss of Output was used to calculate the value of the expected whole life.

The Bureau of Transport and Regional Economics of Austrian (2003) identified road accident costs in the country as the sum of human costs, vehicle costs and general costs. Human costs included medical / ambulance / rehabilitation costs, long term care, labour in the workplace and in the house hold, quality of life, legal, correctional service, workplace disruption, and funeral and coroner costs. The vehicle costs comprised the cost of repair and towing. General costs consisted of travel delays, insurance administration, police, non-vehicle property damage and the costs of fire and emergency services.

The Traffic Engineering Division of the Institute of Road Engineering Bandung (1990) carried out the first study concerning the costs of road accidents in the country. In the study, the accident cost components included vehicle repair costs, lostoutput costs, cost of hospital treatment, police administrative costs and the cost of pain, grief and suffering.

Overseas Development Administration (1995) use gross output approach to estimate the cost of road accident in Cyprus.Ismail, (2008) used Gross-loss-of-output approach to estimate the cost of road traffic accidents in Egypt to be around 10 million Egyptian pounds with an average cost per accident of 500 thousand Egyptian pounds.

Benson, (1996) used “Net Gross Output approach” to estimate the cost of road accident in Kaduna state from 1989 to 1993 and put the average cost per fatal, serious, and minor accident to be ₦453, 187:69, ₦279, 258:41 and ₦99, 999:39

respectively. In his work he considered all wives are age sixty when their husbands retired. In the case of child casualties the estimate of the cost of their death to the community could be based on the amount of money that had already been spent on them instead of the discounted value of their future net out-put. In the case of length of stay as in-patient and out-patient he considered 4 days for slight injuries and used the data from hospital for other casualty levels. Though many countries do not have the same definition for length of stay, for example, in Czechoslovakia, a slight injury requires up to 42 days hospitalisation and severe injuries more than 42 days. Austria requires more than 21 days for a severe injuries. German requires 1 day for minor injuries.

Road accident costing was introduced recently in Nepal where the lack of national accident data required many assumptions to be made. Detailed instructions were produced to guide the Nepal Department of Roads in updating the accident cost estimates in future years.

Nwadoka,(2005) an Officer of the Federal Road Safety Corps and the Head of Department, Polices, Research and Statistics (PRS) conducted a research on the cost analysis of road traffic accident in Nigeria between 1999 and 2004 using medical cost of road accident. The research shows that road traffic accident prevention saved estimated sum of three hundred and twenty three million, nine hundred and ninety six thousand and eighty four naira (₦323,996,084) in the year 2004 alone. This figure represents 10% of FRSC budget for the year. The research further claims, that as more money is voted to road safety, the cost borne by road accident victims decreases, which inversely implies that FRSC has actually added value to the economy.

2.6 Methods That Can Be Used To Cost Road Accidents

Hills (1981) and Jones Lee (1983) identified six different methods that have been proposed for placing a cost on road accidents as follows:

1. The “gross output” (or human capital) approach.
2. The “net output” approach.
3. The “life-insurance” approach.
4. The “court award”approach.
5. The “implicit public sector valuation”
6. The “value of risk change” or “willingness to pay” approach.

2.6.1 The “Gross Output” (Or Human Capital) Approach

In this method, the cost of a traffic accident involving a fatality can be divided into two main categories. Firstly there are the costs that are due to a loss or diversion of current resources and secondly there are the costs that are due to a loss of future output. Included in the former will be the cost of vehicle damage, medical treatment and police administrative costs. Determining the loss of future output of the persons killed however, is less clear cut. Usually average wage rates are used to determine lost output both for the year in which death occurred and then for future years. Costs in future years that the casualty might have lived have to be discounted back to give present day values. This is not done separately for every individual killed (injured) in a road accident; estimates are based on average (i.e. national) output or earnings data together with appropriately estimated damage, medical and police costs. In some variants of this approach, a significant sum is added to reflect the “pain, grief and suffering” of the accident victim and to those who care for him or her.

2.6.2The "Net Output" Approach

This differs from gross output method in this method; the discounted value of the victim's future consumption is subtracted from the gross output figure. Again, it may be difficult to visualize how an estimate can be derived of what a person "consumes" (in terms of food, fuel etc.) throughout his or her lifetime. When this method was used in the UK to cost road accidents (being replaced in the early 1970's by the gross output approach), the 'total consumer expenditure and the public authorities' current expenditure on goods and services were divided by the total population. Crude estimate of "consumption per head" was thus obtained. In this approach the difference between an individual's gross output and future consumption may be regarded as a measure of the rest of society's economic interest in his continued survival.

2.6.3The "Life-Insurance" Approach

In this method the cost of a road accident or the value of accident prevention is directly related to sums for which 'typical' individuals are willing (or even able) to insure their own lives (or limbs). However, while the amount of insurance cover provided might be considered to be some estimate by the insured person of the value of his life to his dependants, it says nothing whatsoever about the value of the insured person himself. Thus, a wealthy bachelor with no dependants may have little or no life cover, while a much poorer person with several children may have his or her life insured for a much greater sum. The wealthy bachelor may well, nonetheless, place a very high value indeed upon his own continued survival. Another problem with this approach is that the level of life insurance cover may be well below what it ought to be if the intention is to provide sufficient income on

which his or her dependants are to survive. Further, to base any analysis on the insured population alone is almost certainly to choose a biased sample. This approach is of particularly limited value in developing countries where relatively few people carry life insurance.

2.6.4The "Court Award" Approach

With this approach, the sums awarded by the courts to the surviving dependants of those killed or injured as a result of either crime or negligence are regarded as an indication of the cost that society associates with the road accident or the value that it would have placed on its prevention. In the Nigeria, the sum awarded by the court must take into account complex issues such as degree of negligence of the defendant, whether the person killed or injured was partly to blame, whether or not the employer of the injured person is continuing to pay them any wages and whether industrial injury benefits are to be paid. In addition, any sum awarded by the court will have all taxes removed. From the above it can be seen that to use court awards as implied values for the loss of life (or limb) in a road accident would be very much an imperfect solution.

2.6.5The "Implicit Public Sector Valuation" Approach

With this method an attempt is made to determine the costs and values that are implicitly placed on accident prevention in safety legislation or in public sector decisions taken either in favour of or against investment program that affect safety. Unfortunately, an examination of some values as derived in Britain reveals a very wide range of implied values of life not only between different sectors but also within the same sector, Mooney (1977). Thus following the partial collapse in London of a block of high-rise flats, changes were made to building regulations.

According to estimates made by Sinclair(1972), a few lives may have thus been saved at very high cost giving an implied minimum valuation of life over £20 million. However it was also claimed at about the same time by Heys, (1968) that a method of preventing stillbirths could be standard practice at a cost of only £50 per life saved since this method was not widely practiced in the UK at the time, it suggested that £50 could be regarded as a maximum value for life, giving from the two examples a range of less than £50 to over £20 million per life saved. These examples provide at the very least an indication that there is (or was) some misallocation of resources in life-saving activities and suggests that this would be a very imprecise method for valuing human life.

2.6.6The "Value of Risk Change" Or "Willingness to Pay" Approach

This approach is based on the fundamental premise that decisions made in the public sector concerning the allocation of scarce resources should reflect the preferences and wishes of those individual citizens who will be affected by the decisions, Jones-Lee (1976and 1989). Accordingly, the value of a given improvement in road safety (i.e. a reduction in risk) is defined in terms of the aggregate amount that people are prepared to pay for it. Conversely the cost of a reduction in safety is defined in terms of the amount people would require in compensation for the increased risk more specifically, the value of a particular safety improvement is defined as the sum of all the amounts that people (affected by the improvement) would be willing to pay for the (usually very small) reductions in risk provided by the safety improvement. Thus the value of prevention of one accident involving one fatality is defined as the total amount that all affected individuals would pay for the very small risk reduction, both for themselves and for those they care about.

2.7Advantages of Gross Output Approach

Not surprisingly, these six approaches produce substantially different costs and values for accidents involving one fatality. But as stated earlier, Hills and Jones-Lee (1981, 1983) emphasis the point that the method used for costing road accidents depends on the objectives being pursued in a country by those planners and economists responsible for investment planning. The reasons for costing road accidents are most likely to be either the maximization of national output or the pursuit of social welfare objectives (such as minimization of injury accidents or fatalities in relation to traffic). The only accident costing/valuation methods that appear to be directly relevant to these two objectives are the gross output method and the willingness to pay method.

The human capital approach (HC) is based on the assumption that human being is a resource for economic production;prevention of accidents will then prevent the loss in productivity due to human deaths or injuries caused by accident. The willingness to pay approach (WP) hinges on a person's conception of probability ofbeing involved in an accident and the price he is willing to pay in order to reduce or minimize the chances of that accident. The willingness to pay approach is preferred in developed economies such as the UK, Sweden and USA. This research, is however, opted for human capital approach which has been employed in similar studies in many developing countries, such as Vietnam, Bangladesh, Thailand, Korea, Nepal, Tanzanian, Zambia, Malawi and Egypt as well as number of developed countries including Germany, Norway, Denmark and Australia. The mainadvantages of the Human Capital Approach are its simpler calculation method than that of the Willingness to Pay Approach. Lastly it may be more difficult to value changes in risk

in developing countries because of the difficulty in respondents providing a monetary value where the markets do not necessarily involve money exchange, i.e. a much greater use of the informal sector of the economy. Association of South East Asian Nation (ASEAN) in their Executive Summary Paper on Regional Road Safety and Action Plan compared the cost of Traffic Accident in Thailand, Indonesia, Brunei, Cambodia, Loa, Myanmar, Philippines, Singapore, (Human Capital Approach) and Malaysia (Willingness to Pay Approach), that the cost of fatality for Singapore and Brunei are much higher than that of Thailand due to the much higher per capital incomes of those two countries. For the same reason, the cost of fatality for Thailand is higher than those of Indonesia and Philippines. Conclusively, Human Capital Approach is simple and is applicable in developing countries where data are not up to date. These are the more reason why the method is being used to cost road accident on Abuja-Lokoja Road.

2.8Causes of Road Traffic Accident

The fact remains that the faster drivers choose to travel, the more likely they are to be involved in an accident, and that higher speeds on roads with otherwise similarcharacteristics are associated with more accidents. Road traffic is broadly made up of three components which operationally are inter-related. They include vehicles, road users and the road. Accident therefore occurs as a result of improper co-ordination between these major components. In effect, accident occurs during wrong co-ordination of which the road user should be responsible. Specifically, when the operation of one or more of the components becomes questionable or defective, the accident that will result will usually be damaging to one or more of the components, that is, damage to person, vehicle, road or a combination of

these.However, of particular interest to policymakers is damage to the users. This damage to human being is the main variable of this study; this is because such damage may lead to loss of life, injury and or loss of output of goods and services due to death and injury.

According to Ipingbemi, (2008), three kinds of road accidents can be identified; fatal, serious and minor accidents. They also stated that there are various causes of accident. These according to them include inattention, confusion, and lack of judgment, carelessness of drivers at road junction, improper overtaking or cutting in, in experienced driving, intoxication and overloading, indiscriminate parking, poor vehicle care, tiredness, as well as over-confidence. Lack of education is causing pedestrian life in Nigeria road, despite the fact that there is no special walk-way for them. They are said to neither be looking out before crossing the road nor crossing from where they can be seen.

CHAPTER THREE

MATERIALS AND METHOLDS

3.1 METHODS

This chapter presents the methodology of the study. That is, the methods and specific techniques that were employed to collect analyse data on the cost of road traffic crash on the Abuja-Lokoja highway. This chapter therefore examines the cost of road accident: medical cost,loss of productivity cost, cost of pain, grief and suffering to the family of the victims. Properties damage cost, and police administration cost are also included. While the cost of a life cannot be completely quantified, it is possible to assign an economic cost to a lost life, or man-hour lost from work. The material costs of equipment, infrastructure and goods combined with the human losses can be estimated to give a realistic economic cost of losses incurred on road traffic crashes. For instance, the cost of damaged vehicles, the cost of medical treatment involving burns, suture, internal head injury, in case of deaths, the cost of medical treatment, the cost of ambulance, mortuary, etc. Another item, which is difficult to measure and therefore excluded from the estimate, is the cost of the delays to other road users that frequently result from road traffic crashes.

Hills and Jones-Lee (1981) emphasized that the method used for costing road accidents depends on the objectives being pursued in a country by planners and economists responsible for investment planning. The reasons for costing road accidents are most likely to be either the maximization of national output or the pursuit of social welfare objectives (such as the minimization of injury accidents or fatalities in relation to traffic). The only accident costing/valuation method that

appear to be directly relevant to these two objectives is - The “gross output” method.

In this study, the “gross output” or “human capital” approach was used to determine the costs of the five main items of:

I. Vehicle repair cost

II. Loss of productivity. This is calculated as the present value of the expected loss of earnings.

III. Cost of hospital treatment.

IV. Police and administrative costs.

V. Costs of pain, grief and suffering to the casualty, relatives and friends.

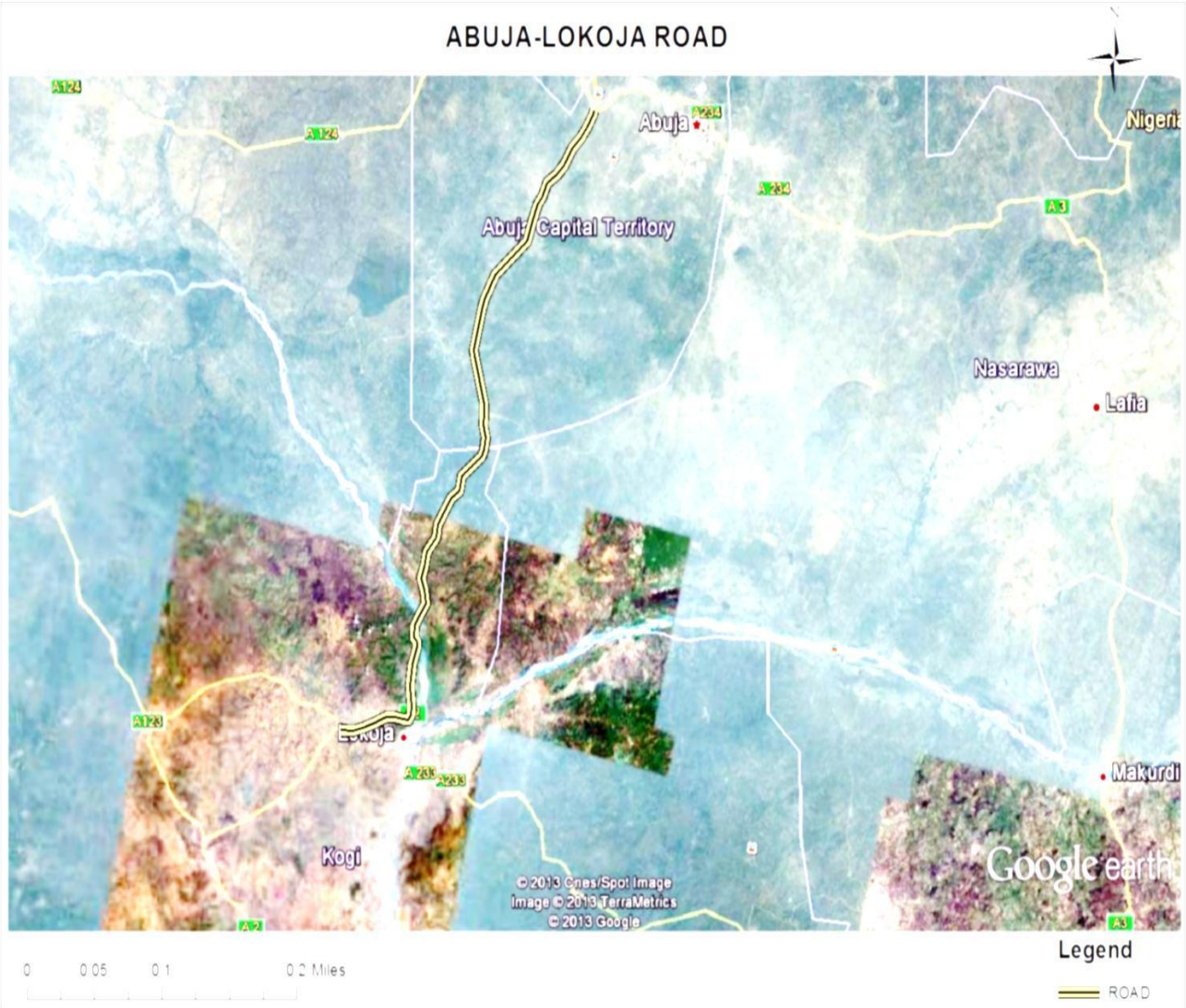


Figure 3.1 Satellite View of Abuja – Lokoja Road

3.2 MATERIALS

3.2.1Location of the Study and the Condition of the Pavement

The area used for study is the Abuja-Lokoja express road. However the study is restricted to the 178km road corridor from Gwagwalada-Lokoja. Perhaps, 178km is made up of some part of Federal Capital Territory-Abuja (Gwagwalada-Abaji) and some part of Kogi state (Chikara-Lokoja). The Abuja part of the road has 79km stretch which covers Gwagwalada, Angwandodo,Kwali, Sheda, Tungamaji and Abaji.The 79km stretch of road has five (5) bridges. The residents of this area are mostly migrants, and their settlement pattern is somehow clustered at certain nodes while others take the form of linear growth along the highway. The residents are mostly students, civil servants, while others are farmers.

The Kogi state side of the road has 99km stretch which covers Chikara, Lagbeta, Kotifi, Ahoko, Gbaeyi, Kotoku, Adantu, Gebubeki, Achobo, Orehi, Umhana, Uwahakpogu, Ozi, Sensenyi, Okpara, Koto Karfi, BaroJamata, Akpanya, Ohono, Ijiho, Gbaude, Karara, Bander and the Confluence City lokoja. The 99km stretch has 9 bridges of which one of the bridges located at barojamata was named after Nigerian former head of state, late General MuhammedMurtala(Murtala bridge). The residents of this part of the road are mostly indigenous, famers, with a relatively smaller proportion as civil servants and traders. The settlement pattern is only clustered in Lokoja while other villagers took residence along the highway.

However, the 178km Abuja-Lokoja highway has approximately 14 bridges, 25 villages, 3 area council districts and a state capital. The FRSC has an office along this

road which is located at Gwagwalada, Kotokarfi, and Lokoja. There are also Police stations as well, naval base situated at bander.

3.2.2. Data Collection

Datawas collected from the following sources:

1. Federal Road Safety Corps Data (Vehicle type, nature of accident, no of casualties, name and address of Hospital or Mortuary).
2. Hospital Records (Medical records which contain: names, age, and profession, the percentage of serious or fatal casualties who become in-patients, the average length of stay in hospital and the average cost per out-patient visit).
3. Other Primary Sources.(Road side mechanic, panel beater, and garage, specializing in repair work)

3.2.3 Technique of Data Collection

The research was carried out on the Gwagwalada-Lokoja road with the aid of questionnaire and interview. One hundred and fifty questionnaires are administered in two phases; 30 for the road side Mechanics, Panel-beater and Automobile Mechanics workers, While 120 were given distributed as follows: Thirty (30) in Gwagwalada, thirty (30) in Abaji, twenty (20) in Kotokarfi, forty (40) in Lokoja and twenty for the Officers of Federal Road Safety Corps.Questionnaires for medical cost of road accident are strictly given to the Medical Doctors and Senior Nurses on Accident and Emergency Section at Federal Medical CenterLokoja and University of Abuja Teaching Hospital Gwagwalada.

3.2.4 Method of Data analysis

Data collected from the questionnaires were analyzed using the percentage frequency distribution table. In doing this, the data was first edited then coded. Furthermore, a code book was prepared for translation of responses given to the Question into numerical codes. This was done to facilitate data analysis and interpretation with the aid of code sheet. The code responses were then fed into the computer terminal for the commencement of actual analysis. The third step in the analysis of the quantitative data was the use of the computer prints-outs, which contained the result of coded responses. This was achieved through the Statistical Package for the Social Sciences (SPSS)facilities. With this, frequencies were drawn to the variables.

3.2.5 Problems Encountered in the Field

One of the major problems that were encountered in carrying out this research was that of logistics. Also, there was problem oflanguage barrier; another problem was that of insufficient time and resources for this research work. Restriction of information's and man power in terms of assistance in the compilation of the questionnaires.

3.2.6 Data Analysis and Interpretation

This chapter analysed, interprets and presented the findings of the data that was collected on the field. A total of one hundred and fifty (150) questionnaires were administered to the respondents. Focus group interview were also conducted. The information collected wasanalysed using quantitative method i.e. simple

percentages and univariate analysis, for the data collected via questionnaires. The Table 3.1 below represents respondent's data and other variables that reflect the objective of the study.

Table 3.1: Distribution of Respondents for the Current Average Monthly Wages in Nigeria

S/N	Monthly Average wages	Frequency	Percentages %
1	25, 000	7	4.8
2	30, 000	27	18.5
3	40, 000	7	4.8
4	50, 000	56	38.4
5	60, 000 and above	39	26.7
6	No response	10	6.8
7	Total	146	100

Source:field work (2010)

The distribution from the above table shows that most respondents are of the belief that, the average monthly wage in Nigerian is N50, 000, which is 56 out of the 146 respondents, with38.4%. This followed by those who favour 60, 000 and above with the percentage of 26.7%. As usual with questions pertaining to income, 10 out of the 146 respondent (6.8%) did not answer the question

Table 3.2: Cost of vehicular damage for fatal accident or total lost

S/N	Cost of Vehicle repair for fatal accident	FREQUNCY	PERCENTAGE
1	400, 000	2	6.7
2	200, 000	15	50
3	100, 000	5	16.7
4	50, 000	3	10

5	30, 000	2	6,7
6	No response	3	10
7	Total	30	100

Sources: field work (2010)

The Table above shows that most of the respondents put vehicle repaired cost for fatal accident to be N200, 000, pulling the total frequencyof 15 with fifty percentages(50%), with three respondent abstained.

Table 3.3: Cost of vehicular damage for serious accident (Badly damage but with salvage value)

S/N	Cost of vehicle for serious accident	Frequency	Percentage
1	200, 000	5	16.7
2	100, 000	13	43.4
3	50, 000	5	16.7
4	30, 000	2	6.6
5	20, 000	2	6.6
6	No response	3	10
7	Total	30	100

Source: field work (2010)

From the distribution of responsein the above table, 13 (43.4%) of the respondents thinks, the cost of repaired vehicle for serious accident is N100, 000.

Table 3.4: Cost of vehicles repaired for minor accident (minor repaired)

S/N	Cost of vehicle repair for minor accident (minor repair)	Frequency	Percentages
1	100, 000	1	3.3
2	50, 000	2	6.7
3	30, 000	4	13.3
4	20, 000	16	53.4
5	10, 000	4	13.3
6	No response	3	10
7	Total	30	100

Source:field work (2010)

The distribution of the responses in the above table shows that 16 (53.4%) of the respondents put the cost repaired of vehicle involved in minor accident to be N20, 000.Three respondent also abstained.

Table 3.5: Cost of vehicle repaired in Damage-Only accident.

S/N	Cost of vehicle repair in Damage-Only accident	Frequency	Percentage
1	50, 000	1	3.3
2	30, 000	2	6.6
3	20, 000	4	13.3
4	10, 000	12	40.0
5	5, 000	8	26.8
6	No response	3	10
7	Total	30	100

Source: field work 2010

From the above table, 40% of the respondents believed that, the cost of vehicle repaired for the Damage-Only accident is N10, 000. The cost for Non-Vehicular damage was taking as a fifty per cent (50%) of the total cost of property damage accident excluding damage-only accident.

3.2.7 Data for Medical Cost of Accident

The accident data so obtained were classified into the following groups to ensure easy estimation of the number of persons killed and injured, used in

quantifying, in monetary terms, medical cost of road traffic accidents see Tables 3.5 for the detail:

a) Fatal

b) Serious injury

c) Minor or Slight injury

Overall cost per accident was then worked out which have been taken as a model for accident cost on Abuja-Lokoja road.

Detail calculation to determine the cost associated with the above items is showing in Table 3.4.

Table 3.6 Description of Human Cost Category in Accident Costing Model

Human Cost Category (**A)**	**Element**	**Estimating Formula**
	Loss of productivity (A1)	(1) Lost output in terms of income loss from fatality=[No. of fatalities by age range] * [forgone income] (2) Lost output in terms of income loss from serious injuries =[No. of serious injuries by age range] * [forgone income] (3) Lost output in terms of income loss from slight injuries =[No. of slight injuries by age range] * [forgone income]
	Medical cost**(A2)**	(1) Medical cost in terms of fatality = [No. of fatality]* [Average Hospital Expenses] (2) Medical cost in terms of Serious injury=[No. of serious injury] * [Average Hospital Expenses] (3)Medical Cost in terms of slight injury=[No. of slight injuries] * [average Hospital Expenses]
	Sum to Reflect Pain, Grief and Suffering (A3)	(1) Fatal Accident 38%. (2) Serious Accident 100% **(3)** Slight Accident 8%

Table 3.7 Description of Property Damage Cost Category in Accident Costing Model

Element	**Estimating Formula**	
	Vehicular Damage	Total Vehicular Damage Cost = [No. of

Property Damage Cost Category (B)	Cost (B1)	Vehicle involved]$_{severity}$* [Average Vehicular Damage cost]$_{severity}$
	Non Vehicular Damage Cost (B2)	Total non – Vehicular Damage Cost = [No. of Crashes]$_{severity}$ * [Average non- vehicular Damage Cost]$_{severity}$

Source: The study of traffic accident cost in Thailand.

Table 3.8 Description of Police Administrative Cost in Accident Costing Model

Police Administrative Cost (C)	**Element Formula**	
	Police Administrative Cost (C1)	Total Police Administrative Cost = [No. of Administrative Attendance by police]$_{severity}$* [Average police Administrative cost]$_{severity}$

Source: The study of traffic accident cost in Thailand

The yearly and monthly accident record from federal road safety corps are showing below:

Table 3.9.Abuja-Lokoja Yearly Accident Record(2000-2010)

YEARS	NO OF ACC	NO VEHICLE	NO KILLED	NO INJURED	TOTAL
2000	182	434	163	340	503
2001	153	397	209	552	761
2002	216	505	228	672	900
2003	169	411	135	445	580
2004	192	479	168	585	753
2005	196	498	172	607	779
2006	192	438	214	603	817
2007	110	258	164	424	588
2008	298	469	198	701	899
2009	454	699	222	761	983
2010	258	648	210	434	644
TOTAL	2420	5236	2083	6124	8207

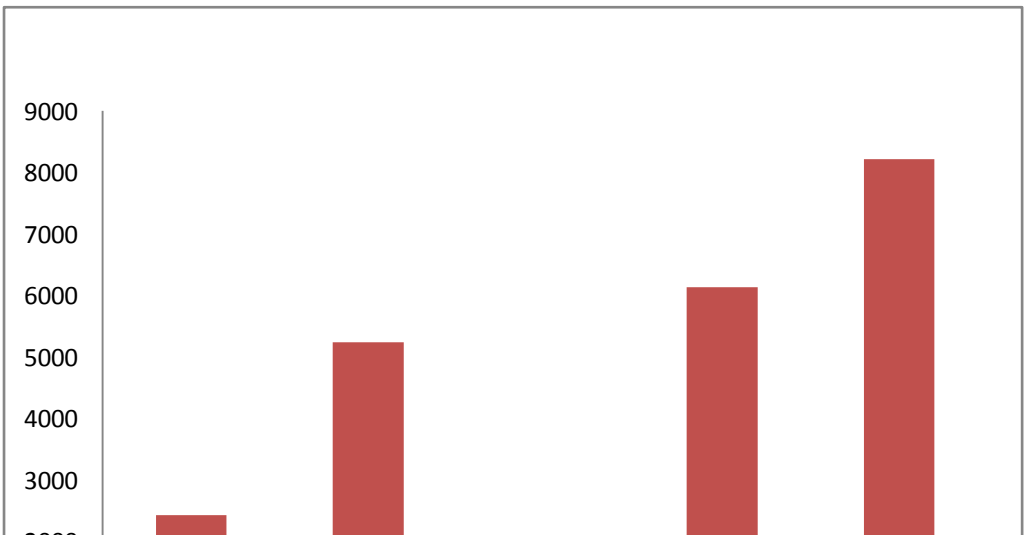


Table 3.10 Abuja-Lokoja Monthly Accident Record of Year 2000

S/NO	MONTHS	NO OF ACC	NO OF VEHICLE	NO KILLED	NO INJURED
1	JANUARY	20	35	18	38
2	FEBRUARY	14	37	14	23
3	MARCH	15	41	12	25
4	APRIL	18	45	13	27
5	MAY	17	42	14	31
6	JUNE	13	31	10	22
7	JULY	16	41	11	25
8	AUGUST	12	29	10	21
9	SEPTEMBER	16	44	15	32
10	OCTOBER	10	23	11	22
11	NOVEMBER	10	19	13	26
12	DECEMBER	21	47	22	48
	TOTAL	182	434	163	340

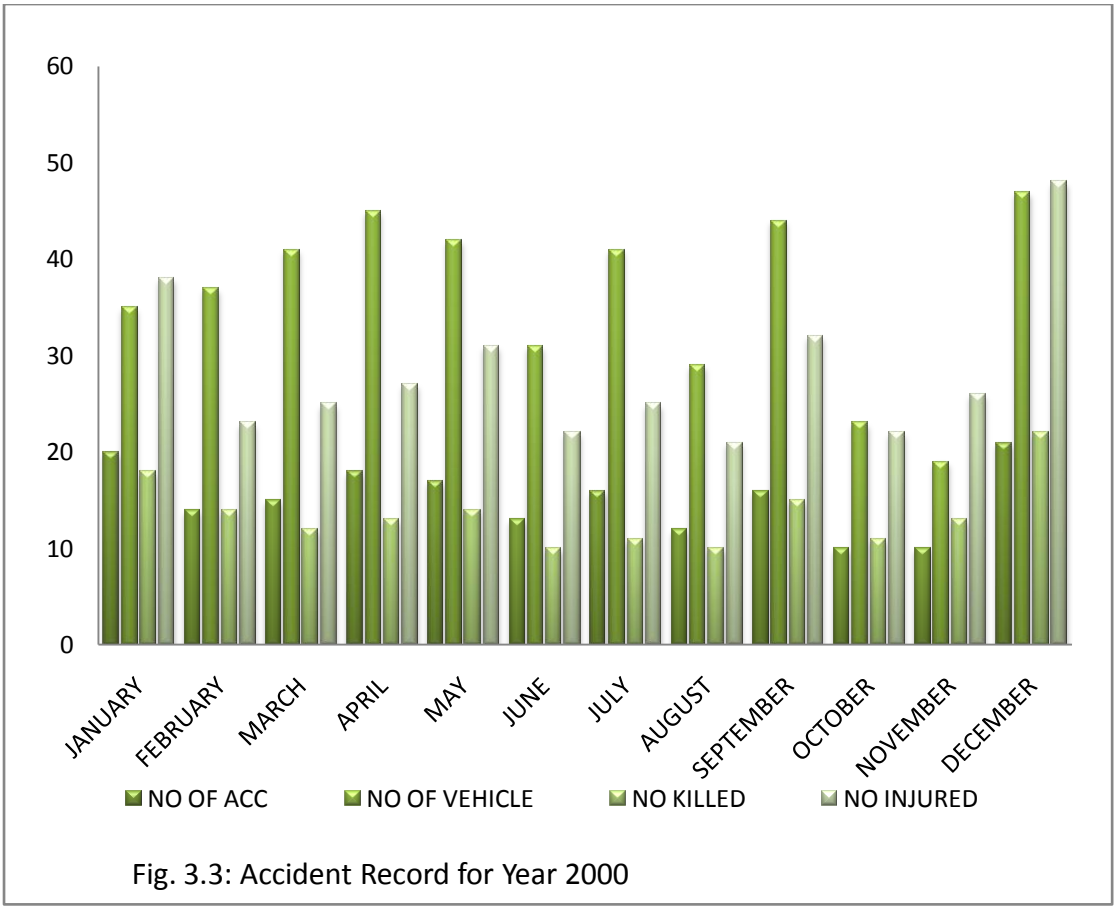


Fig. 3.3: Accident Record for Year 2000

Tabl.3.11 Abuja-Lokoja Monthly Accident for Year 2001

MONTHS	NO OF ACC	NO VEHICLE	NO KILLED	NO INJURED
JANUARY	14	24	11	34
FEBRUARY	10	30	17	41
MARCH	15	41	23	63
APRIL	12	29	10	25
MAY	8	31	9	23
JUNE	11	28	18	36
JULY	19	50	25	70
AUGUST	14	31	25	67
SEPTEMBER	9	23	13	34
OCTOBER	12	35	19	57
NOVEMBER	13	32	16	48
DECEMBER	16	43	23	54
TOTAL	153	397	209	552

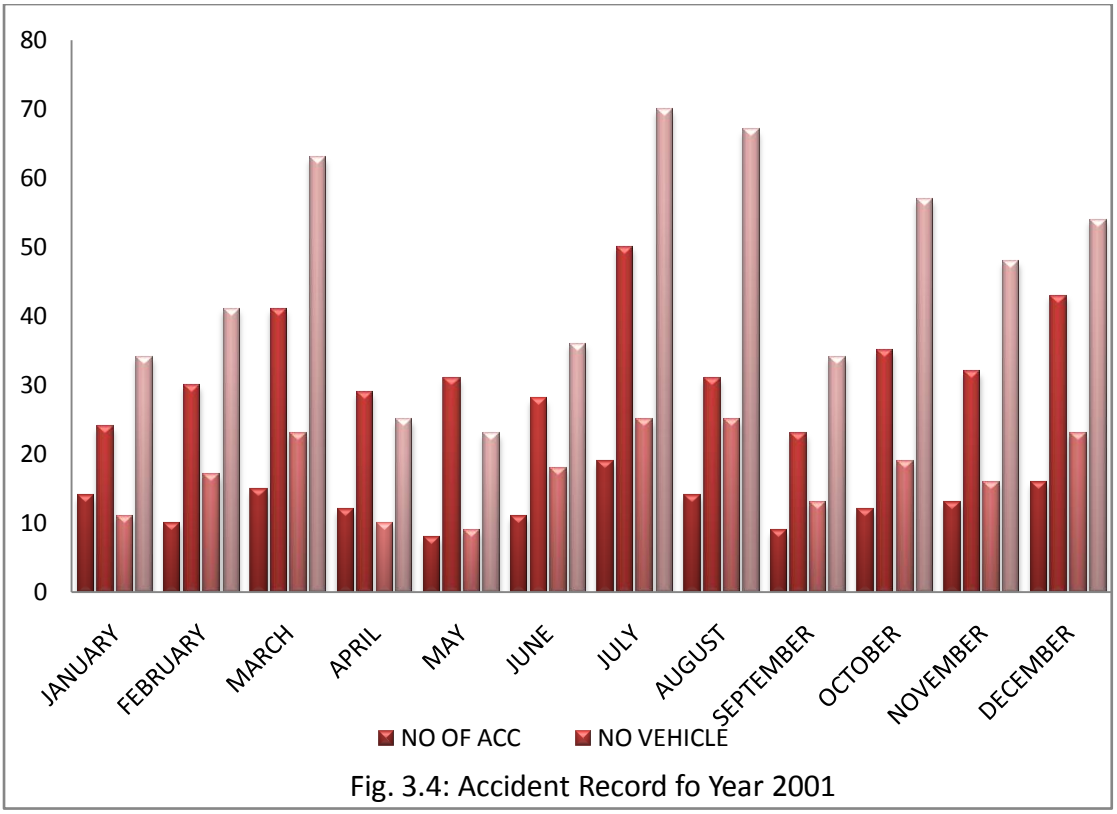


Fig. 3.4: Accident Record fo Year 2001

Table 3.12 Abuja-Lokoja Monthly Accident Record for Year 2002

MONTHS	NO ACC	NO VEHICLE	NO KILLED	NO INJURED
JANUARY	18	41	24	76
FEBRUARY	16	39	13	34
MARCH	14	29	14	30
APRIL	19	44	29	93
MAY	18	39	19	62
JUNE	24	55	31	102
JULY	17	38	9	23
AUGUST	16	40	11	33
SEPTEMBER	19	48	21	61
OCTOBER	15	37	18	41
NOVEMBER	18	41	15	30
DECEMBER	22	54	24	87
TOTAL	216	505	228	672

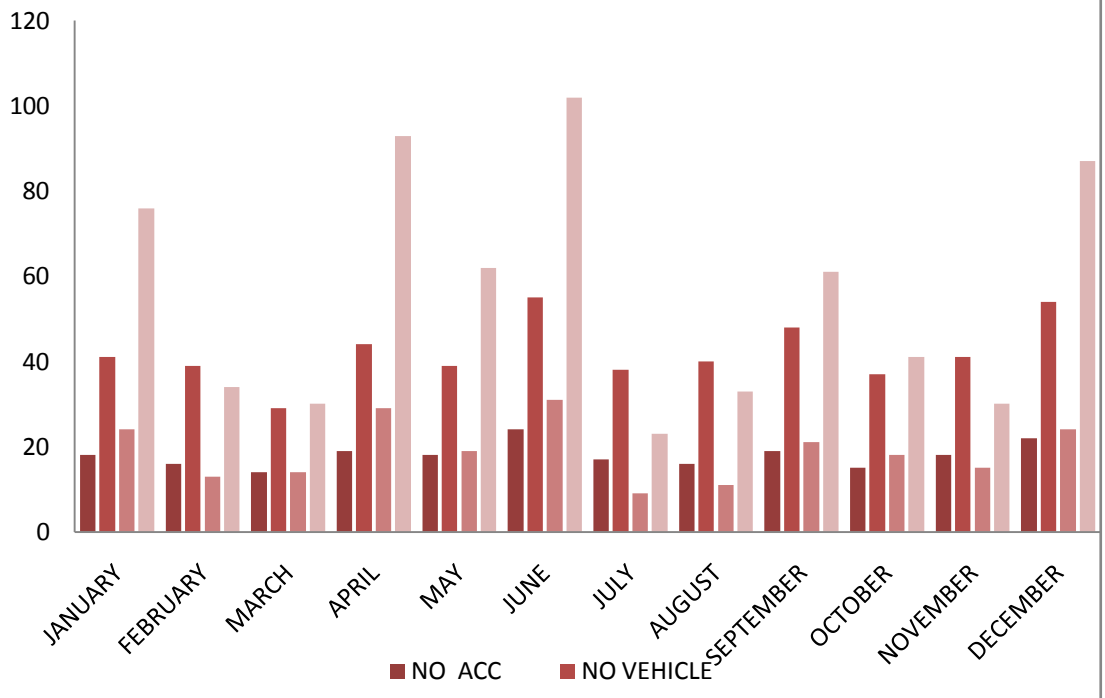


Fig. 3.5: Accident Record for Year 2002

Table 3.13 Abuja-Lokoja Monthly Accident Record for Year 2003

MONTHS	NO OF ACCIDENT	NO OF VEHICLE INVOLVED	NO OF PEOPLE KILLED	NO OF PEOPLE INJURED
JANUARY	18	41	14	51
FEBRUARY	12	28	7	22
MARCHE	17	43	14	43
APRIL	19	51	16	54
MAY	16	39	10	33
JUNE	12	27	9	23
JULY	14	31	13	34
AUGUST	8	17	5	25
SEPTEMBER	10	27	8	34
OCTOBER	12	29	14	32
NOVEMBER	14	33	12	41
DECEMBER	17	45	13	53
TOTAL	169	411	135	445

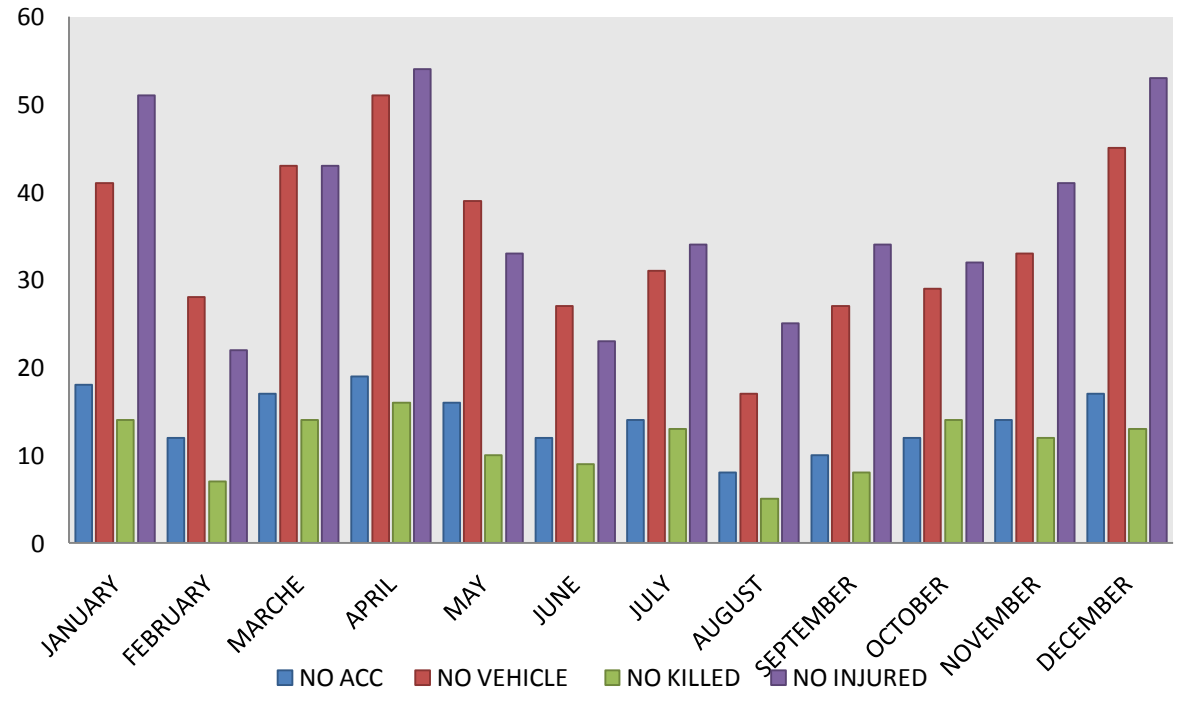


Fig. 3.6: Accident Record for Year 2003

Table 3.14Abuja-Lokoja Accident Record for Year 2004

MONTHS	NO OF ACCIDENT	NO OF VEHICLE INVOLVED	NO OF PEOPLE KILLED	NO OF PEOPLE INJURED
JANUARY	18	43	14	46
FEBRUARY	16	41	9	29
MARCH	20	53	19	76
APRIL	16	39	9	31
MAY	9	23	11	39
JUNE	19	49	15	48
JULY	12	27	10	38
AUGUST	17	33	12	42
SEPTEMBER	19	50	21	63
OCTOBER	15	40	14	35
NOVEMBER	10	27	12	49
DECEMBER	21	54	22	89
TOTAL	192	479	168	585

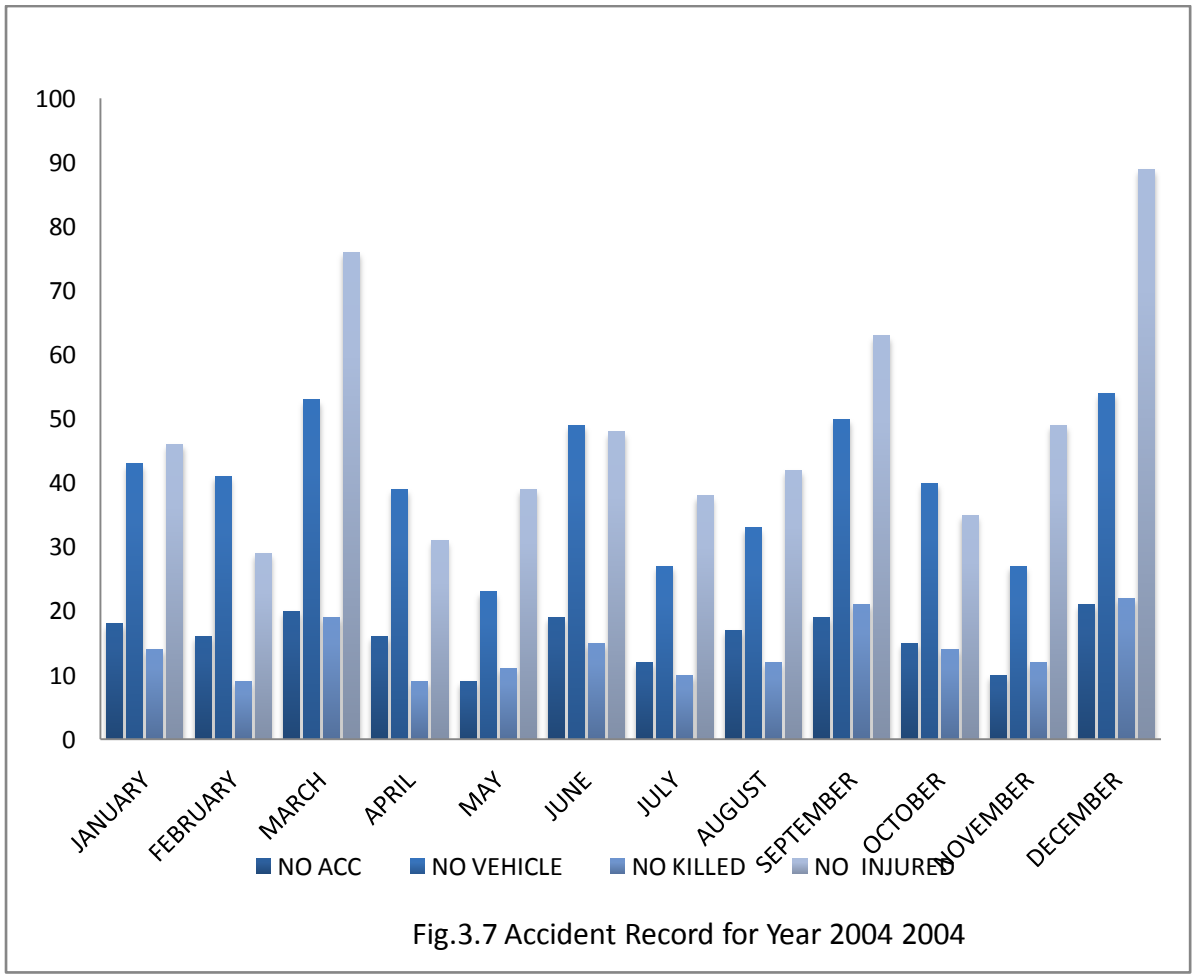


Fig.3.7 Accident Record for Year 2004 2004

Table 3.15 Abuja-Lokoja Monthly Accident Record for Year 2005

	ACCIDENT	VEHICLE INVOVED	KILLED	PEOPLE INJURED
JANUARY	23	56	18	72
FEBRUARY	16	49	11	65
MARCH	15	39	9	21
APRIL	17	37	13	34
MAY	20	50	18	51
JUNE	8	19	7	19
JULY	21	51	20	76
AUGUST	17	44	18	60
SEPTEMBER	19	56	27	85
OCTOBER	9	16	5	16
NOVEMBER	11	32	9	34
DECEMBER	20	49	17	74
TOTAL	196	498	172	607

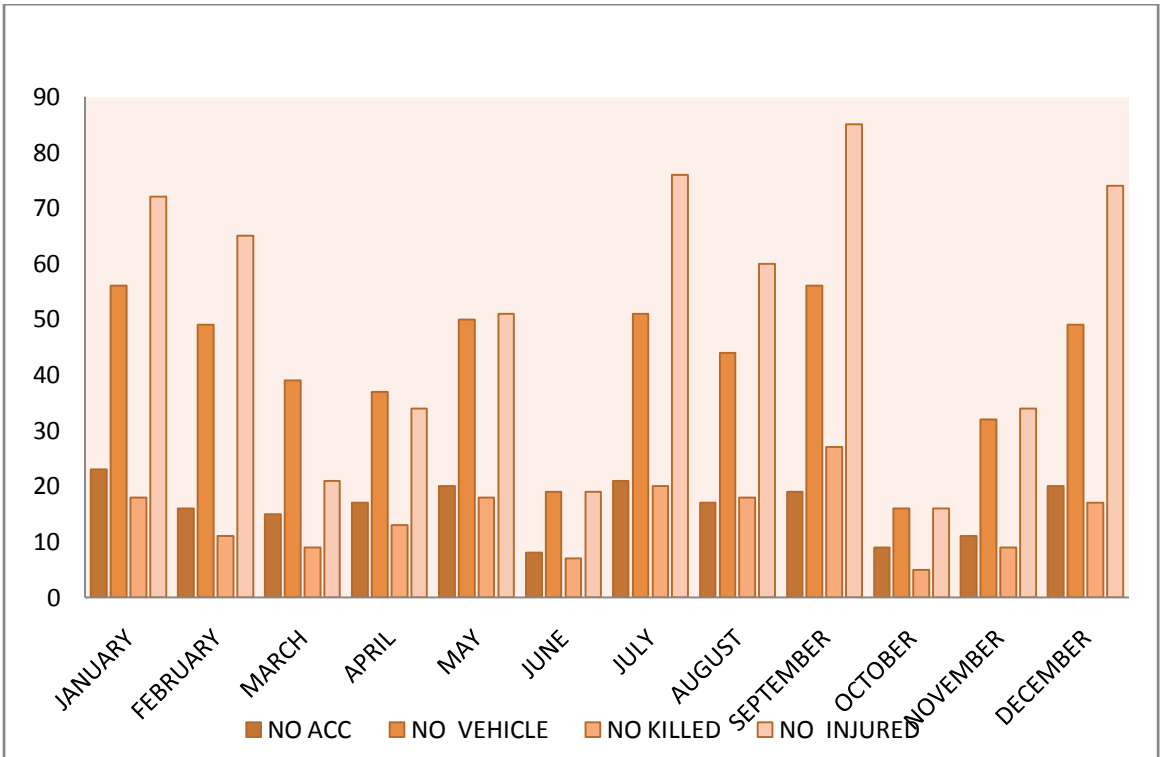


Fig.3.8 Accident Record For Year 2005

MONTHS	NO OF ACCIDENT	NO OF VEHICLE INVOLVED	NO OF PEOPLE KILLED	NO OF PEOPLE INJURED

JANUARY	20	45	19	70
FEBRUARY	15	32	17	37
MARCH	12	23	17	39
APRIL	19	30	16	28
MAY	16	39	18	40
JUNE	14	28	21	73
JULY	10	26	16	34
AUGUST	17	45	14	20
SEPTEMBER	18	51	15	52
OCTOBER	15	38	19	57
NOVEMBER	14	30	16	51
DECEMBER	22	51	26	102
TOTAL	192	438	214	603

Table 3.16 Abuja-Lokoja Monthly Accident Record for Year 2006

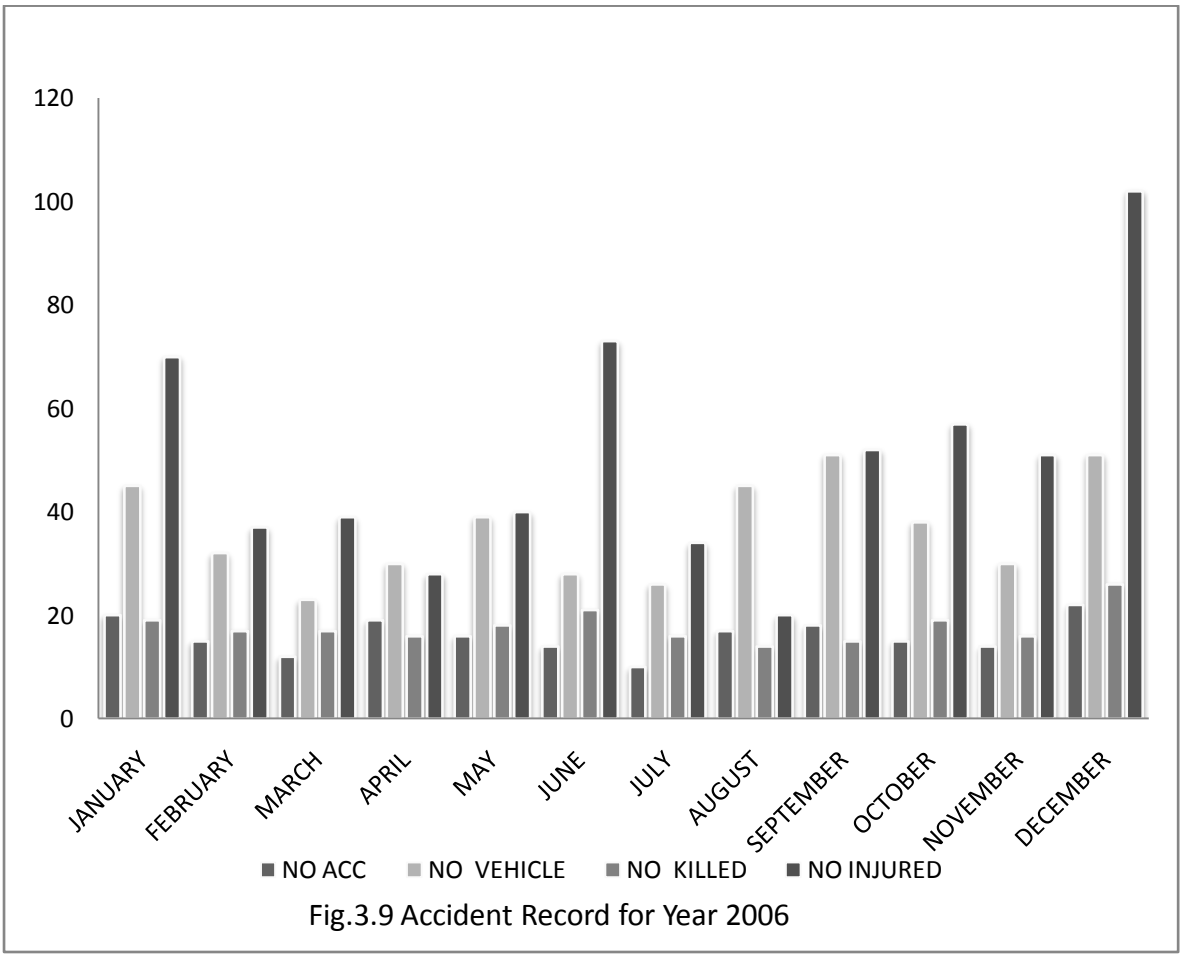


Fig.3.9 Accident Record for Year 2006

Table 3.17 Abuja-Lokoja Monthly Accident Record for Year 2007

MONTHS	NO OF	NO	NO OF PEOPLE	NO OF PEOPLE

	ACCIDENT	OFVEHICLE INVOLVED	KILLED	INJURED
JANUARY	14	15	18	50
FEBRUARY	7	19	14	37
MARCH	8	22	11	26
APRIL	9	19	10	23
MAY	6	25	7	20
JUNE	10	22	13	19
JULY	7	20	27	68
AUGUST	8	19	9	21
SEPTEMBER	9	21	20	36
OCTOBER	9	24	8	24
NOVEMBER	10	23	10	43
DECEMBER	13	29	17	57
TOTAL	110	258	164	424

MONTHS	NO OF ACCIDENTS	NO OF VEHICLE INVOLVED	NO OF PEOPLE KILLED	NO OF PEOPLE INJURED

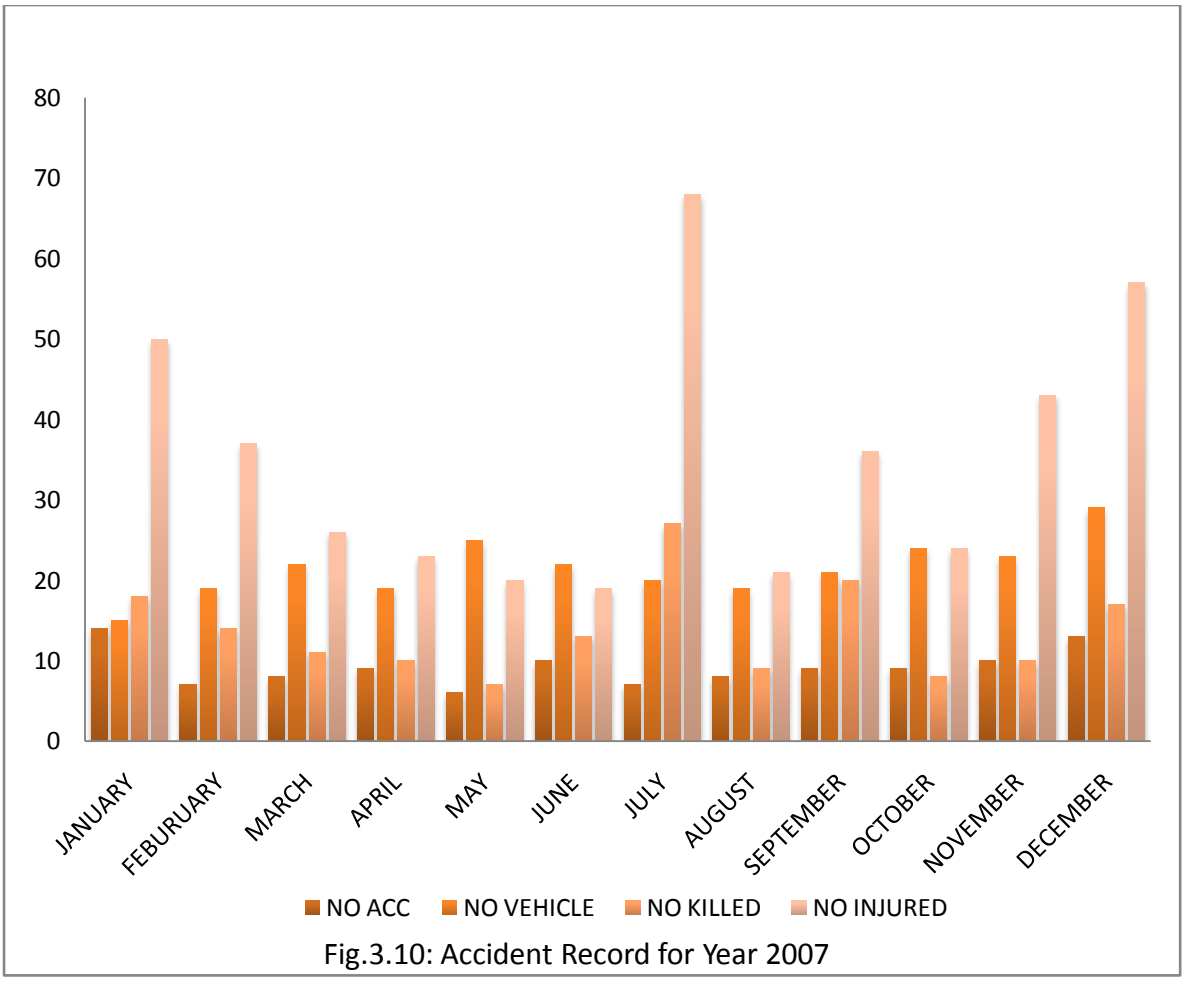


Fig.3.10: Accident Record for Year 2007

Table 3.18 Abuja-Lokoja Monthly Accident Record for Year 2008

JANUARY	28	54	21	104
FEBRUARY	24	48	13	60
MARCH	27	35	19	75
APRIL	26	37	23	61
MAY	31	61	24	74
JUNE	23	32	13	52
JULY	20	29	10	31
AUGUST	24	33	17	39
SEPTEMBER	20	26	12	37
OCTOBER	18	24	8	29
NOVEMBER	21	32	11	25
DECEMBER	36	58	27	114
TOTAL	298	469	198	701

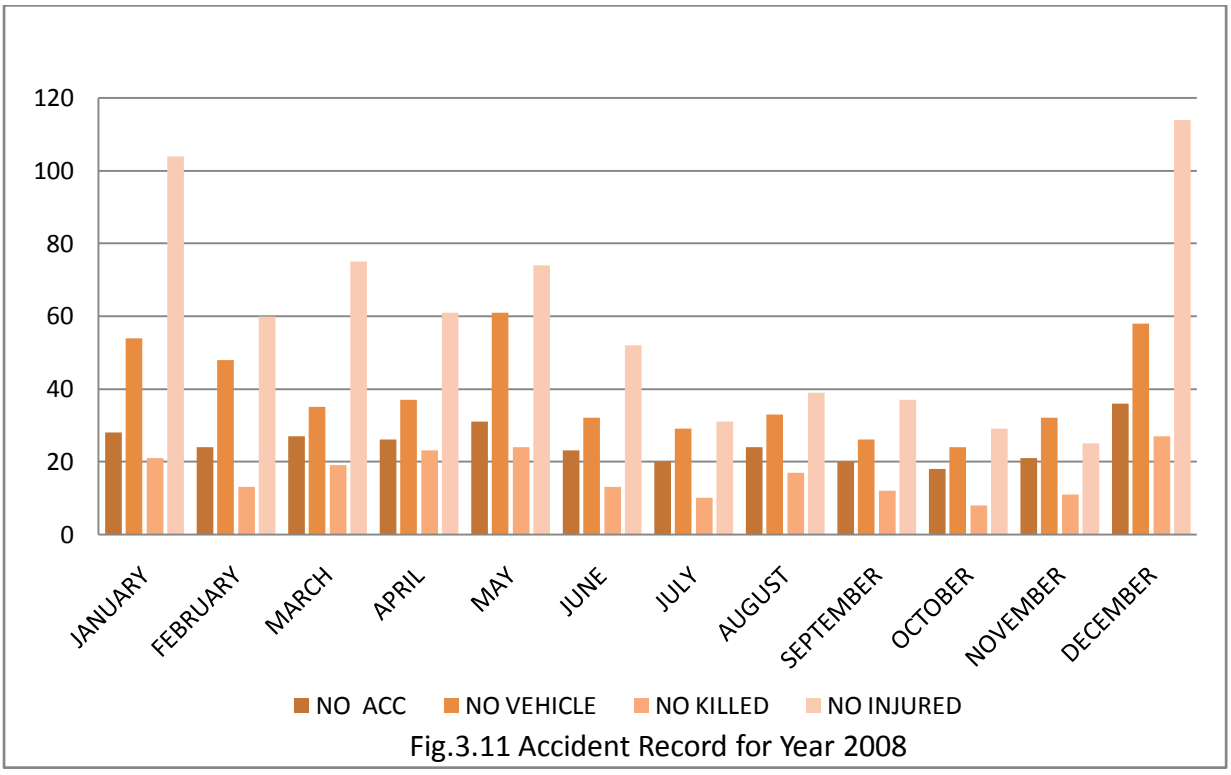


Fig.3.11 Accident Record for Year 2008

Table 3.19Abuja-Lokoja Monthly Accident Record for Year 2009

MONTHS	NO OF ACCIDENTS	NO OF VEHICLE INVOLVED	NO OF PEOPLE KILLED	NO OF PEOPLE INJURED
MONTHS	NO OF ACCIDENT	NO VEHICLE INVOLVED	NO OF PEOPLE KILLED	NO OF PEOPLE INJURED
JANUARY	52	71	28	87
FEBRUARY	34	45	16	73
MARCH	39	68	15	79
APRIL	42	69	15	68
MAY	36	71	17	55
JUNE	37	42	13	43
JULY	34	54	22	44
AUGUST	31	56	20	55
SEPTEMBER	25	58	18	66
OCTOBER	37	37	15	67
NOVEMBER	39	74	19	68
DECEMBER	48	54	24	56
TOTAL	454	699	222	761

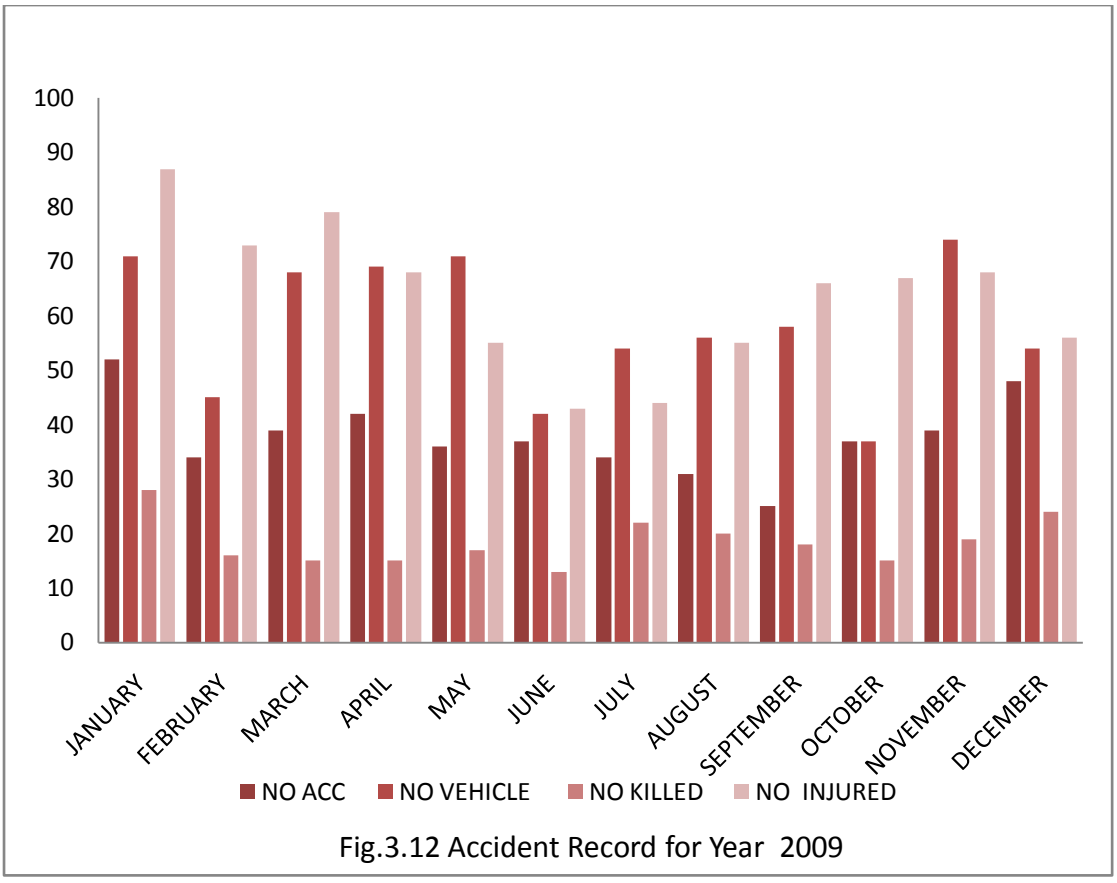


Fig.3.12 Accident Record for Year 2009

Table 3.20 Abuja-Lokoja Monthly Accident Record for Year 2010

JANUARY	26		61		19		42			
FEBRUARY	19		44		16		31			
MARCH	20		52		17		27			
APRIL	22		56		18		39			
MAY	16		41		21		45			
JUNE	22		49		15		32			
JULY	18		44		13		24			
AUGUST	19		54		16		33			
SEPTEMBER	23		60		18		38			
OCTOBER	20		55		19		40			
NOVEMBER	23		54		18		31			
DECEMBER	30		78		20		52			
TOTAL	258		648		210		434			

YEAR	F/ CASE	S/CASE	M/ CASE	T/ CASE	PERSONS KILL	PERSONS INJURE		T/CASULTY
2000	34	121	27	182	163	340	32	503
2001	47	77	29	153	209	552	24	761
2002	95	110	11	216	228	672	33	900

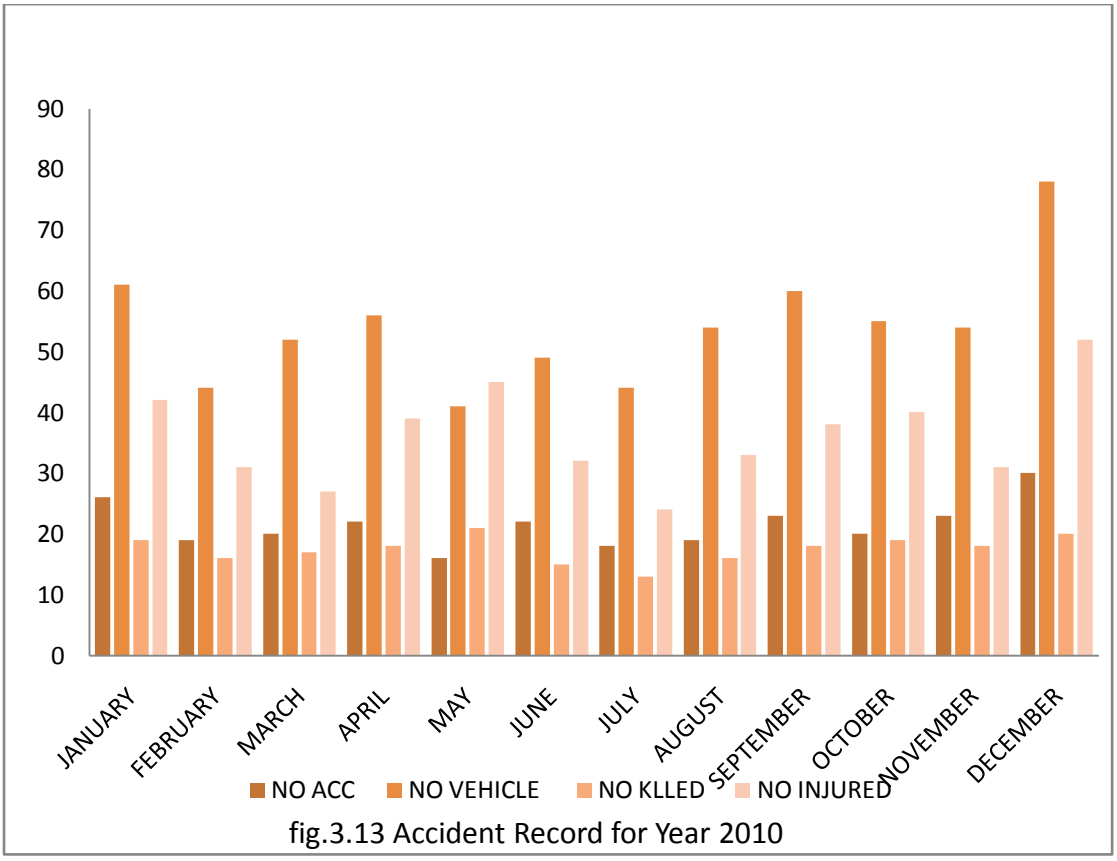
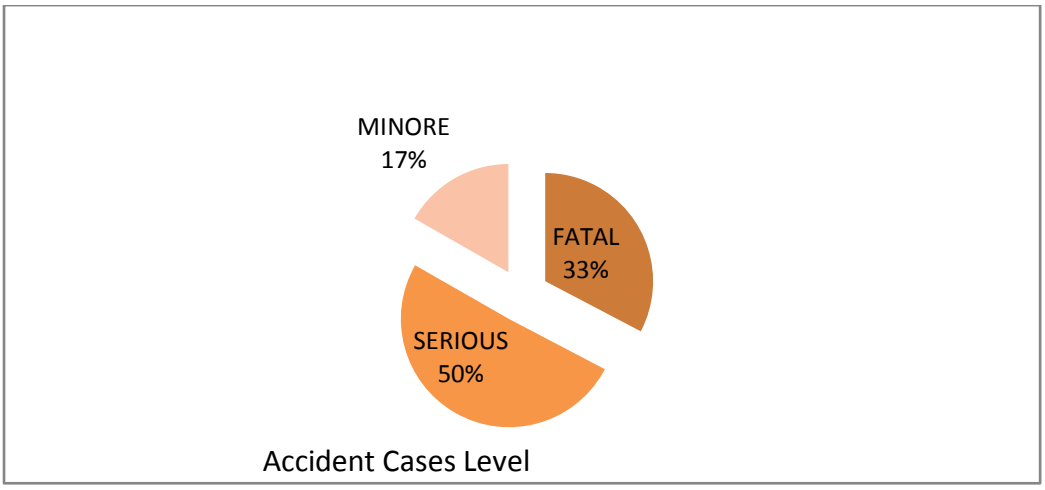


fig.3.13 Accident Record for Year 2010

Table 3.21Abuja-LokojaAccident Record by Casualty Level

2003	46	104	19	169	135	445	580
2004	54	106	32	192	168	585	753
2005	59	99	38	196	172	607	779
2006	73	88	31	192	214	603	817
2007	48	51	11	110	164	424	588
2008	96	130	72	298	198	701	899
2009	115	247	92	454	222	761	983
2010	124	91	43	258	210	434	644
TOTAL	791	1224	405	2420	2083	6124	8207

YEAR	TY KILL	MALE	FEMALE	CHILD	ADULT	TYINJ	MALE	FEMALE	CHILD	ADULT
2000	163	114	49	25	138	340	265	75	33	307
2001	209	145	64	19	190	553	453	99	116	436
2002	228	180	48	37	191	672	447	225	61	611



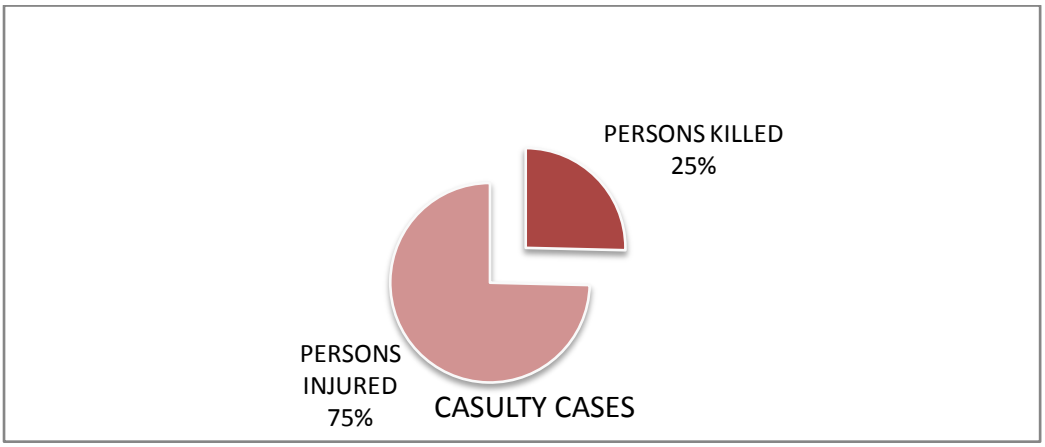


Fig.3.14 Accident Record by Casualty Level

2003	135	105	30	32	103	445	351	94	54	391
2004	168	114	54	26	142	585	409	176	141	444
2005	172	127	45	35	137	607	497	110	104	503
2006	214	169	45	30	184	603	497	106	100	503
2007	164	139	25	12	12	424	345	79	48	384
2008	198	148	50	22	176	701	546	155	99	602
2009	222	166	56	36	186	761	585	176	84	677
2010	210	157	53	30	180	434	321	113	74	360
TOTAL	2083	1564	519	304	1779	6124	4716	1408	914	5218

Table 3.22Abuja-LkojaAccident Record by Gender/Age Killed Level

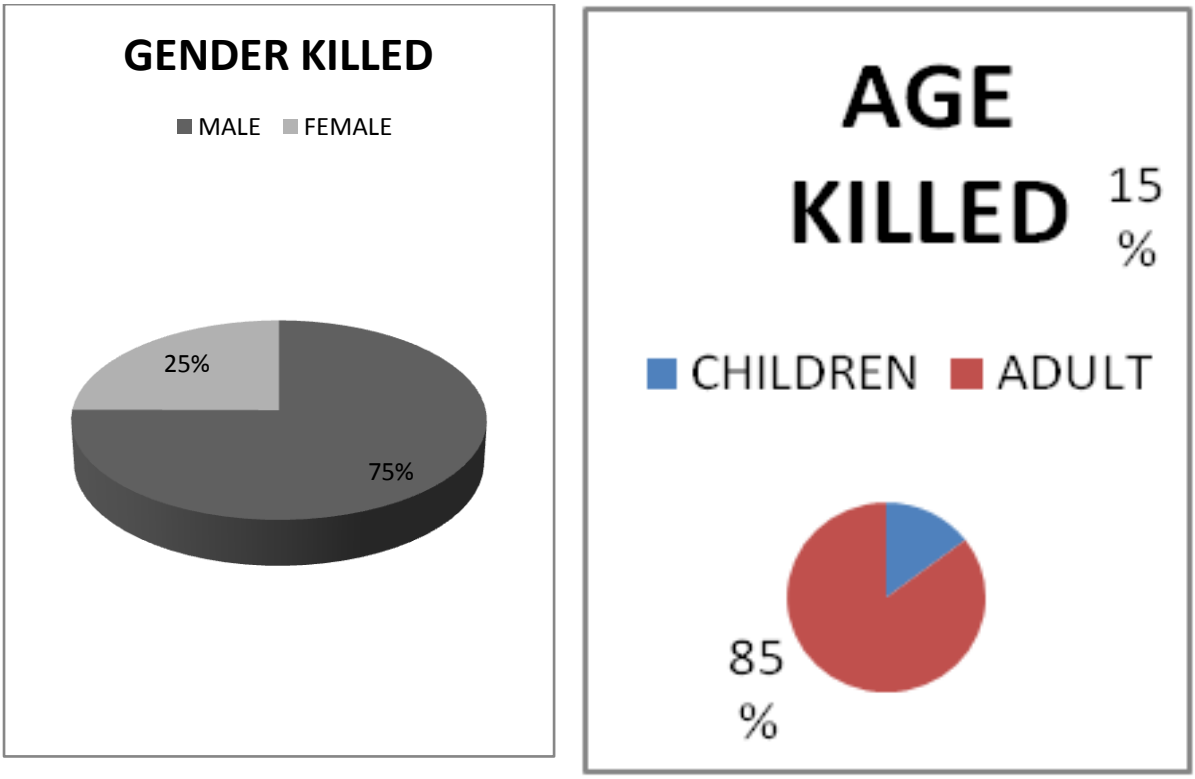


Fig. 3.15 Accident Record Showing Gender/Age Killed

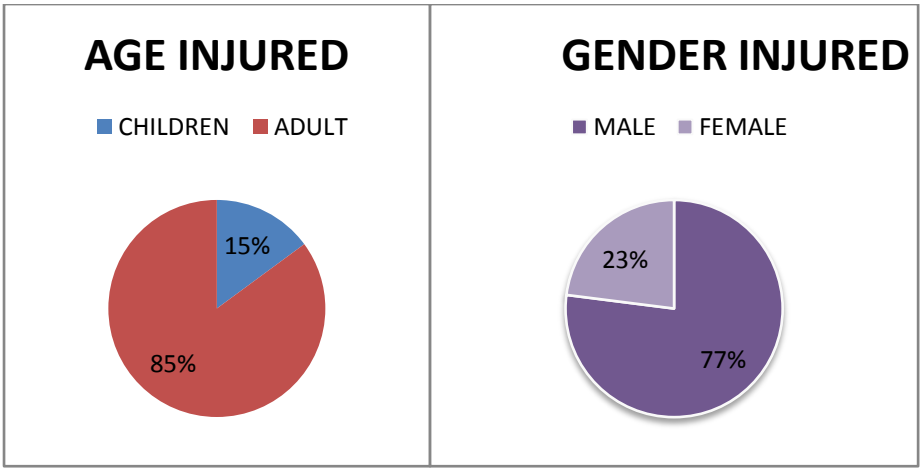


Figure: 3.16 Accident record showing Age injured/Gender Injured

Table 3.23Vehicles Involved in Accident by Severity level along Abuja-Lokoja Road (2000-2010)

YEARS	NO ACC	NO VEHICLES	MINOR/C	SERIOUS/C	FATAL/C
2000	182	434	65	325	44
2001	153	397	58	309	30
2002	216	505	85	398	22
2003	169	411	79	312	20
2004	192	479	93	368	18
2005	196	498	102	375	21
2006	192	438	78	332	28
2007	210	258	58	185	15
2008	298	469	92	356	21
2009	329	699	119	552	28
2010	257	648	98	505	45
TOTAL	2394	5236	927	4017	292

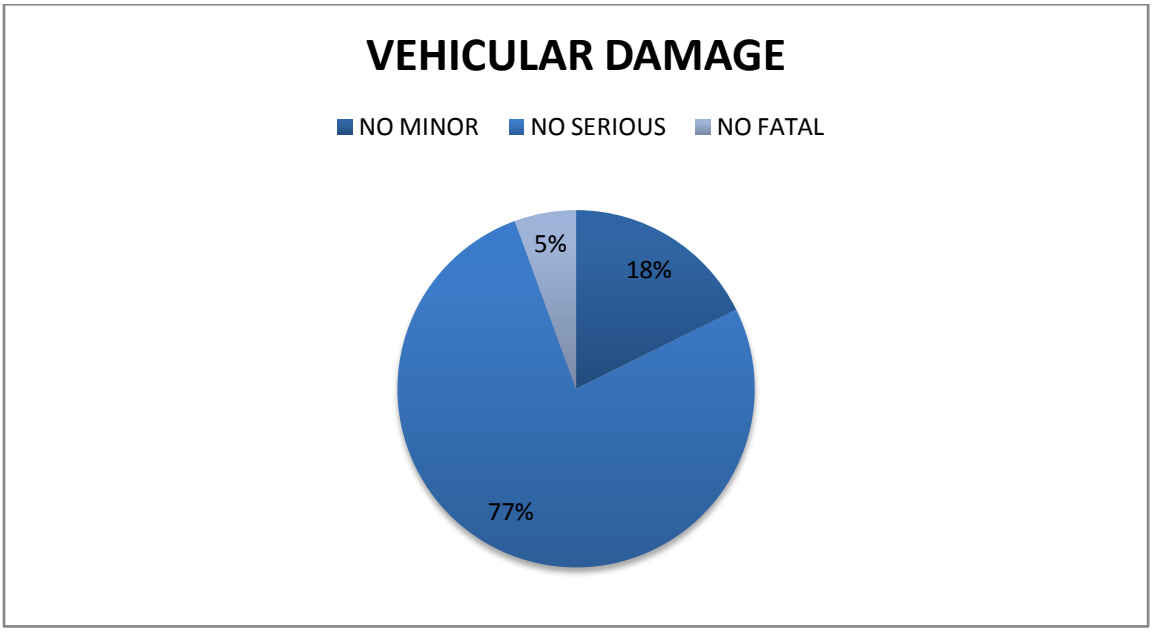


Figure 3.17 Accident Record Showing Vehicular Damage

3.2.8Vehicle Repair Costs

There are three basic sources of information on cost of damage to vehicle: the insurance companies, local garages and large fleet operators such as bus companies. The best method to use depends on local circumstances. In Nigeria the large majority of cars are not carrying comprehensive insurance therefore, information were obtained from road side mechanics, panel beaters and garages on the cost of vehicle repaired.

Having collected information on the average cost of repair of vehicles involved in fatal, serious, slight and damage- only accidents, the average number of vehicles involved in these classes of accident were obtained from PRS Department of Federal Road Safety Corps. By multiplying cost per vehicle by number of vehicles involved the average cost of vehicle repair per accident (by degree of severity) are obtained.

In the repaired cost in fatal, serious, slight damage only accident and non-vehicular damage are clearly illustrated as well as the total properties damage cost.

S/No.	Accident Cases	No. of Cases	Repair Cost	Vehicular Cost (N)
1	Fatal Accident	927	200,000	**185,400,000**
2	Serious Accident	4017	100,000	**401,700,000**
3	Minor Accident	292	20,000	**5,840,000**
4	Damage-Only Accident	15%(292)	10,000	**438,000**
5	Non Vehicular Damage		50%	**296,689,000**
6	Total Damage Cost			**890,067,000**

Table 3.24 Properties Damage Cost (B)

3.2.9Loss of Productivity (A1)

The 'Gross Output' method requires an estimate of current average wage rates. In the case of fatal accidents current wage rate were multiplied by the number of years lost due to the road accident, and in the case of serious and slight accidents, day lost were multiplied by the daily wage rate.

The average age of a person killed in a road accident was obtained from information provided by the Department of Statistics and Research Office of University of Abuja Teaching Hospital Gwagwalada.The average retirement age of civil servant is 60year. The average number of years of loss of output following a fatal road accident was thus about 30years and the average monthly wages in Nigeria is ₦50, 000 and wage per annum per person is ₦600, 000.

The average number of days spent in hospital for a serious injured was 90days as in patient while further average 30days were spent recovering at home as outpatient. Thus the average lost output for a serious road accident casualty was estimated to be 120days. With an average daily wage of ₦1, 648 per person the cost of loss of productivity for serious injury was ₦197, 760.

The lost productivity from slight injuries was small and on average 4days was lost. Therefore the lost output following a slight road accident was estimated to be ₦ 6,592 per casualty.

The above amount was calculated on a per casualty basis. In order to obtain total cost of accident:

The costs per casualty had to be multiply by the total number of casualties over the preceding 11 years.

Table3.25Loss of Productivity Cost (A1)

S/No.	Loss of Productivity by Casualty Level	Cost ((N)
1	Fatal (Death) Accident	**18,000,000**
2	Serious injuries	**197,760**
3	Minor injuries	**6,592**
4	Total Cases	**18,204,352**

3.2.10Cost of Medical Treatment

The department of statistics and research office of University of Abuja Teaching Hospital provide the following information

1 day hospital charges=?

Cost of operation=?

Cost of medicine=?

Treatment cost=?

These values (which were in fact charges made to patients) did not reflect the true cost to the hospital because of subsides received by patients from the government. The economic or resource costs were therefore considerably greater. Information collected from University of Abuja Teaching Hospital showed that the overall average cost perday in-patient treatment (including staff costs, cost of medicines, and cost of operations) was N1200. Using this estimate cost of medical treatment for road accident casualties were derived as follows.

(A)Cost of Fatal Casualty:Assuming 4 days spent in hospital before dying at a daily variable cost of ₦1200, together with fixed cost covering overhead cost of the following:

Capital cost of ambulance.
Capital cost of hospital
Hospital administration cost
Mortuary cost

} Estimated average overhead costs of ₦5000.

Medical cost per fatal (death) accident: (1200*4)+5000 =**₦9, 800**

(B)Cost of Serious Casualty: Assuming 90 days spent in hospital as in-patient at daily variable cost of N1200 per day together with 30 days spent as outpatient visit at daily cost of₦300, together with fixed cost of the following:

Capital cost of ambulance
Capital cost of hospital
Hospital administrative cost

} Estimated average overhead costs of ₦2000.

Medical cost per serious injury: (1200*90) +(30*300) +2000 =**₦119, 000**.

(C)Cost of Minor Casualty: Assuming 4 days spent for recovery at home as an outpatient. The daily variable cost of outpatient visits was ₦300, together with fixed cost of the following

Capital cost of ambulance Estimated

Capital cost of hospital average overhead

Hospital administrative cost costs of ₦2000

Medical cost per minor injury: (300 * 4) +2000 = **₦3, 200.**

Taking in to account that the total cost of medical treatment are calculated per accident casualty.

Table 3.26 Cost of Medical Treatment (A2)

S/No	Breakdown Cost of Medical Treatment (A2)	Cost (N)
1	Cost of Medical Treatment for Fatal (Death) Accident	**9,800**
2	Cost of Medical Treatment For Serious Injuries	**119,000**
3	Cost of Medical Treatment For Minor Injuries	**3.200**
4	Total Cost	**132,000**

3.2.11Police Administrative Costs (C)

Police declined to give any information about their administration charges, therefore the values derived in Overseas Road Note 10TRL (Transport Research Laboratory) UK was used to cost police administrative fees as follows:

0.2 percent of the total cost of fatal accidents.

4.0 percent of the total cost of serious accidents.

14.0 percent of the total cost of minor accident.

10.0percent of the total cost of damage-only accidents.

Table 3.27 Police Administration Charges (C)

	POLICE ADMINISTRATION CHARGES	COST(N)	NO OF CASES	TOTAL(₦)
1	0.2% of the total fatal accident costs	3, 6000	927	**33, 372, 000**
2	4.0% of the total serious accident costs	7, 910.4	4017	**31, 776, 076. 8**
3	14.0% of the total minor accident costs	922.98	292	**269, 480. 96**
4	10% of the total damage-only accident costs	1, 000	29.2	**29, 200**
5	Total Costs	45, 833.38	5, 265	**65, 446, 757.76**

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Analysis and Discussion of the Results

In arriving at cost for accidents of various severity levels, using unit costs per person per casualty class, the knowledge of all the casualties of various classes within a specific severity level is required. This work has tried to illustrate how data should be structured to facilitate the computations of unit accident costs at different severity levels. Different accident types have different severity classifications and different numbers of vehicles and other severities involved. The following method has been used for calculating the average cost of any accident type:

Table 4.1Cost Summary

A. Cost of Fatal Accident

Loss of productivity	₦18, 000,000
Medical cost	₦9, 800
Total	**₦18, 009,800**

B. Cost of Serious Accident

Loss of productivity	₦197, 760
Medical cost	₦119, 000
Total	**₦316, 760**

C. Cost of Slight Accident

Loss of productive	=₦6, 592.
Medical cost	=₦3, 200.
Total	=**₦9, 792.**

4.2Sum to Reflect Pain, Grief, and Suffering (A3)

The percentage of cost used to reflect pain, grief and suffering were based on research carried out by Hills and Jones-Lee (1981, 1983) on the cost of traffic accidents and evaluation of accident prevention in developing countries.

Fatal accident 38%

Serious accident 100%

Slight accident 8%

Using these percentages, the estimated total cost of road traffic accident along Abuja-Lokoja roads were as follows:

Table 4.2 Total Human Cost Par Severity Level

a) Total Fatal Accident Cost

I.	Fatal accident	₦18, 009,800
II.	Pain, Grief and Suffering (38%)	₦6, 843,724
III.	Total Cost	**₦24, 853,524.**

b) Total Serious Accident Cost

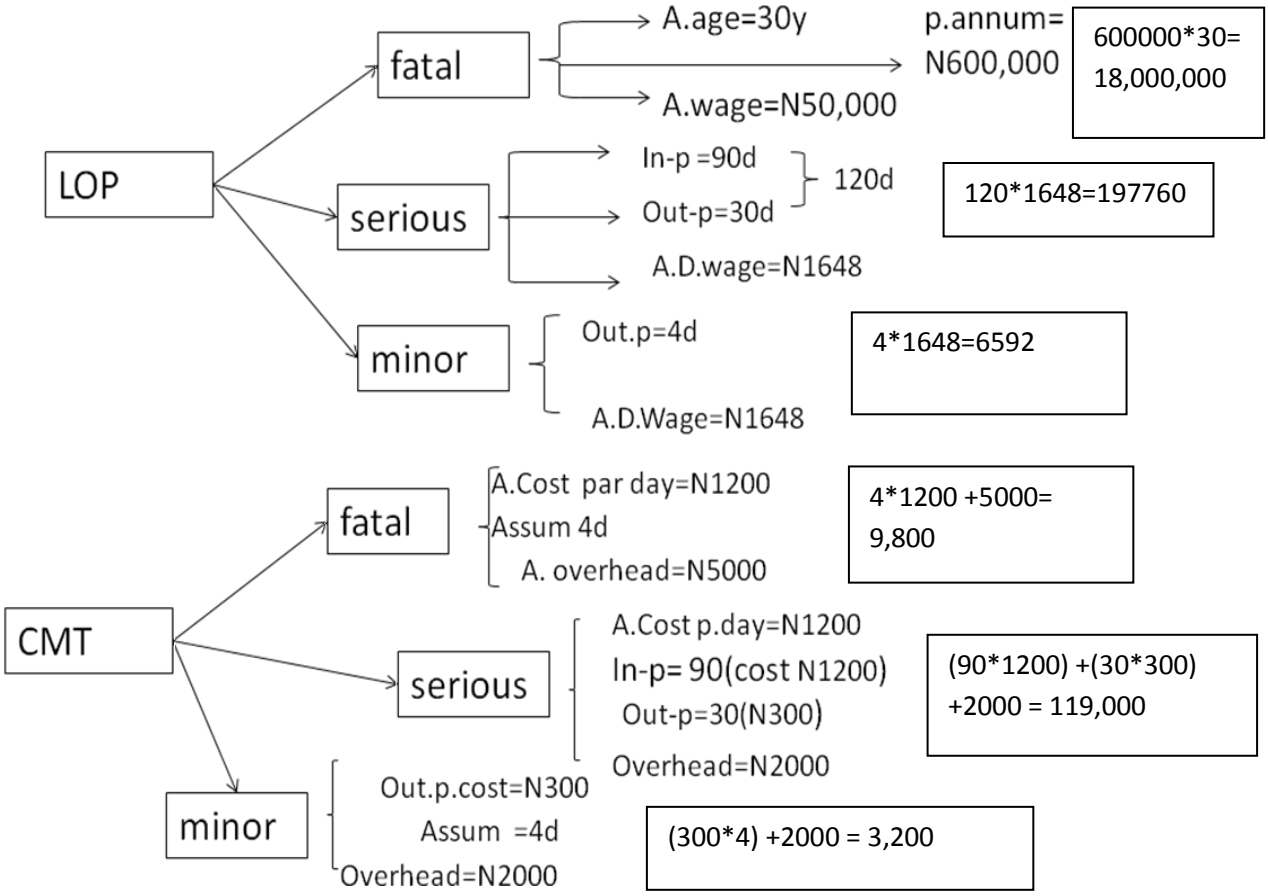
I.	Serious Accident	₦316, 760
II.	Pain, Grief and Suffering (100%)	₦316, 760
III.	Total Cost	**₦633, 520**

c) Total Slight Accident Cost

I.	Slight Accident	₦9, 792
II.	Pain, Grief and Suffering (8%)	₦783.36
III.	Total Cost	**₦10, 575.36.**

TABLE 4.3The Total Human Cost (A)

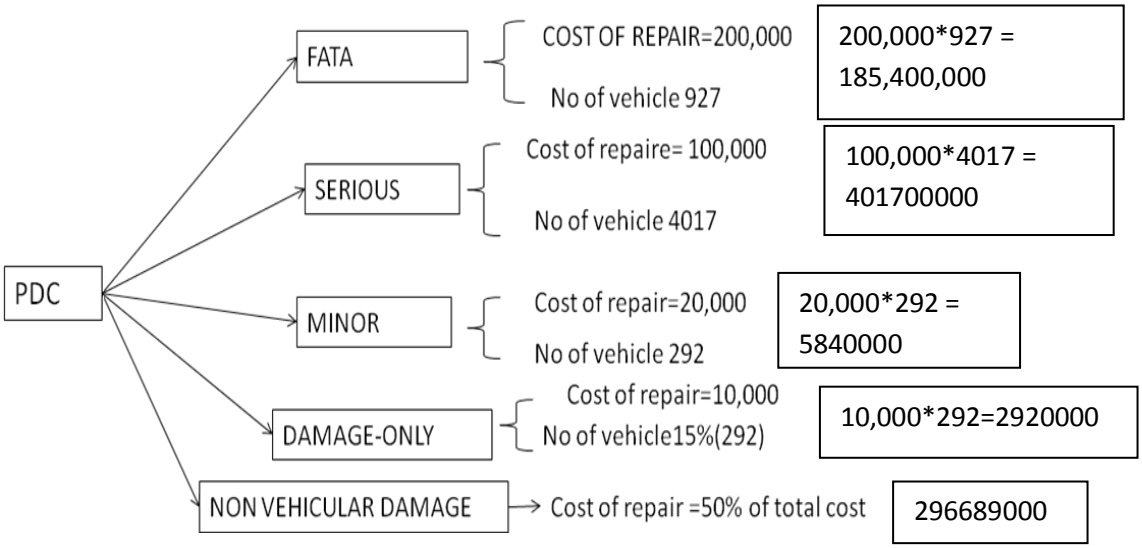
S/NO	SEVERITY LEVEL	TOTAL COST	NO OF CASES	TOTAL COST(₦)
1	FATAL(DEATH)	24853524	2083	**51769890492**
2	SERIOUS INJURIES	633520	6124	**3944439985**
3	MINOR INJURIES	1057.36		
4	HUMAN COST	25497619.36	8207	**55714330477**



LOP: Loss of Productivity

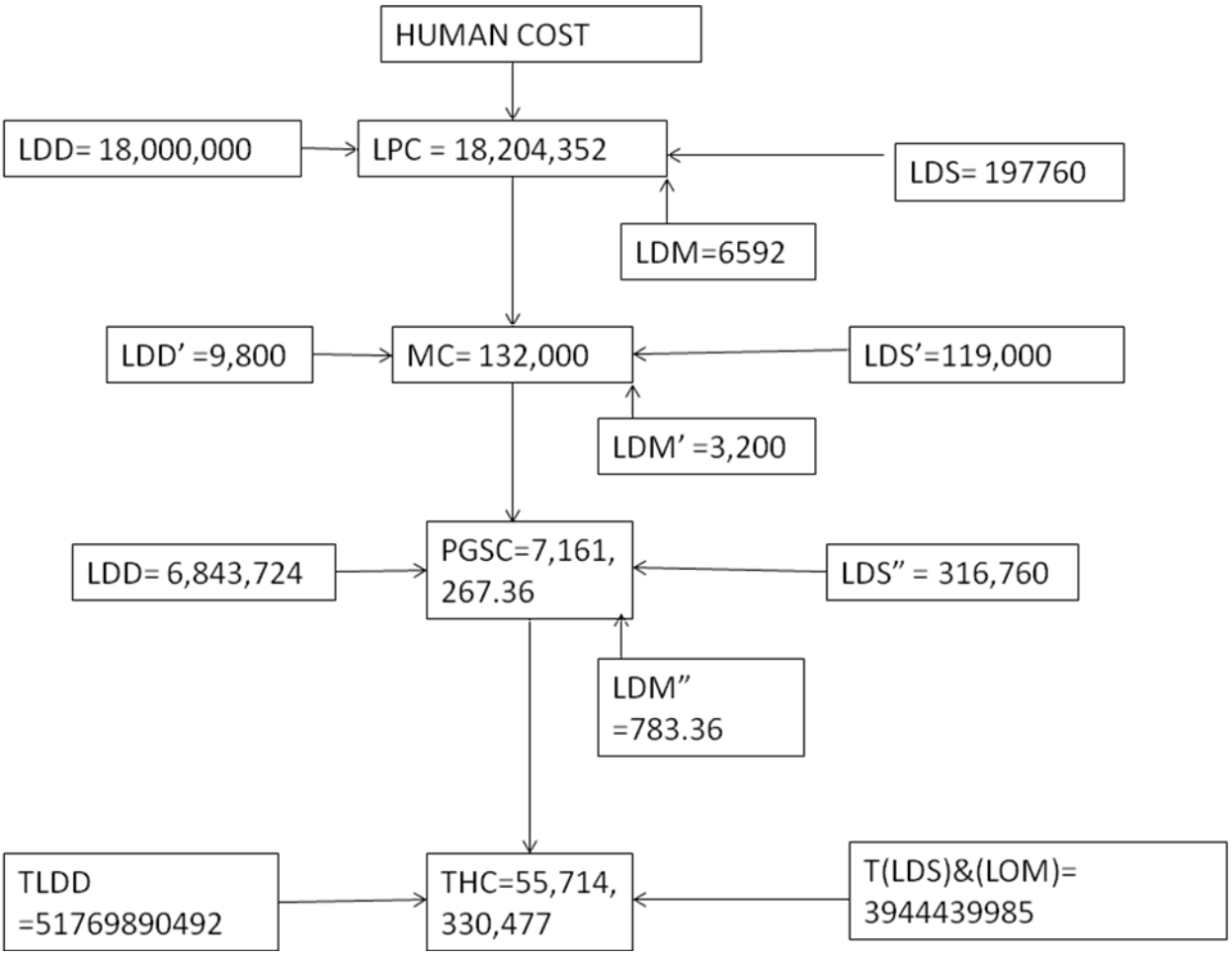
CMT: Cost of Medical Treatment

Figure 4.1 Loss of Productivity Cost and Cost of Medical Treatment Par severity level.



PDC: Property Damage Cost

Figure 4.2 Property Damage Cost Chart (PDC)



LDD: Loss due to Death

LDS: Loss due to Serious Injuries

LDM: Loss due to Minor Injuries

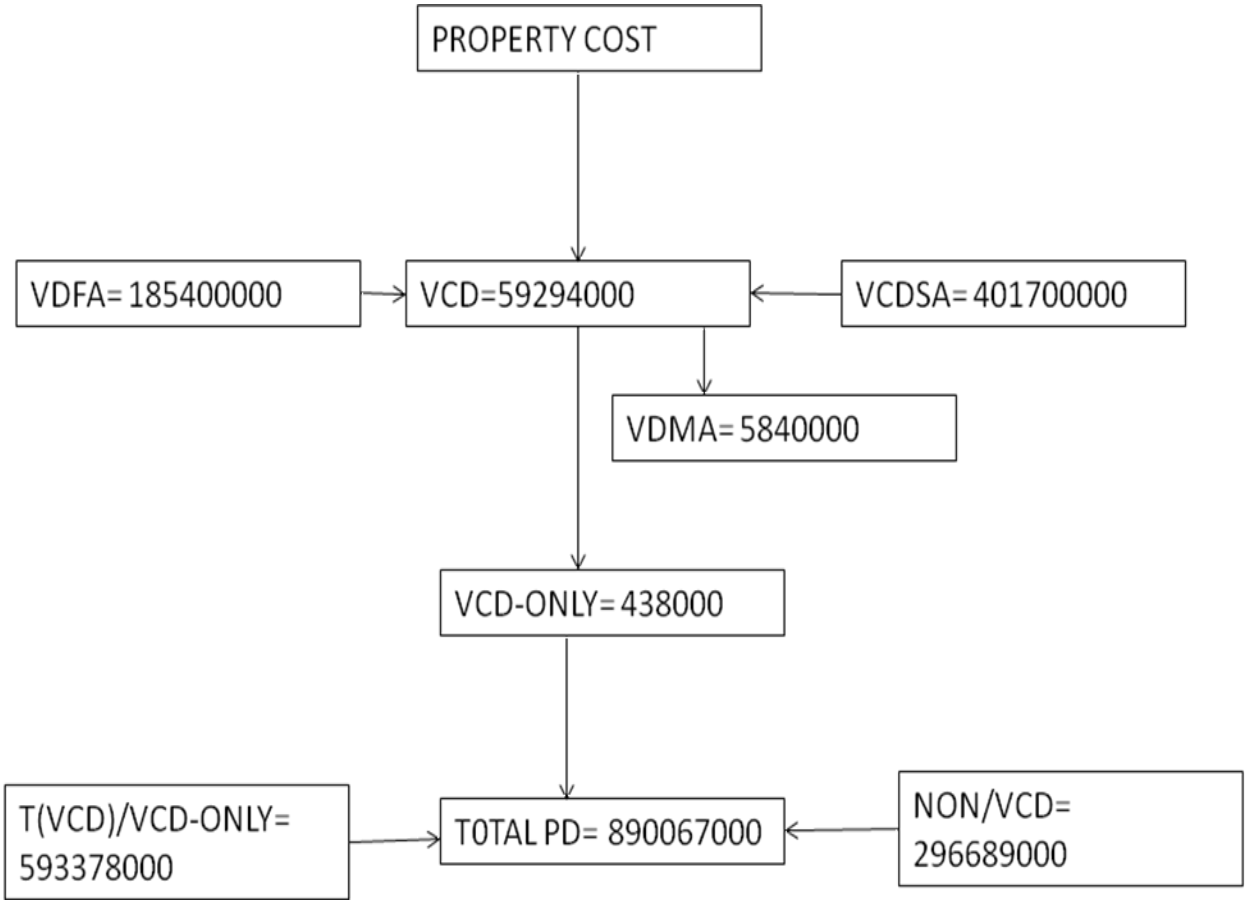
TLDD: Total Loss due Death

TLDD: Total Loss due Death

THC: Total Human Cost

T(LDS)&(LDM):Total Loss due to Serious and Minor Injuries

Figure 4.3 Breakdown of Human Cost



VDFA: Vehicular Damage Cost for Fatal Accident

VCD: Vehicular Damage Cost

VCDSA: Vehicular Damage Cost for Serious Accident

VDMA: Vehicular Damage Cost for Minor Accident

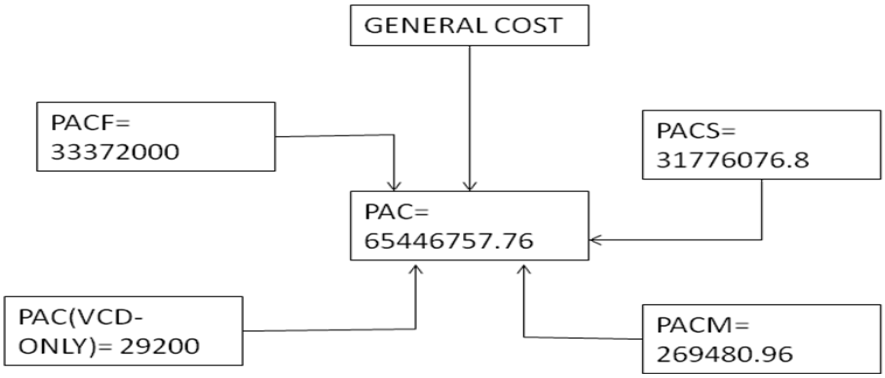
VCD-ONLY: Vehicular Damage Cost Only

T(VCD)/VCD-ONLY: Total Vehicular Damage Cost/Vehicular Damage-Only

TOTAL PD: Total Property Damage Cost

NON/VCD: Non Vehicular Damage Cost

Figure 4.4 Property Damage Cost



PACF: Police Administrative Cost for Fatal Accident

PACS: Police Administrative Cost for Serious Accident

PACM: Police Administrative Cost for Minor Accident

PAC (VCD-ONLY): Police Administrative Cost for Vehicular Damage Only

PAC: Police Administrative Cost

Figure 4.5 General Cost

4.3.Volume of Road Traffic Accident

This would be considered by restricting the study to a period within 2000-2010. As at the year 2000, the total road accident cases were at 182, out of whichFatal cases were at 34, total number of people killed stands at 163 and 340 were injured, while the total casualty stands at 503. And by 2001, the figures dropped for the total accident cases to 153, fatal cases increase to 47, serious accident case decrease to 77. The number of the people killed stand at 209 an increment of 46 people while 552 was injured and the total casualty stood at 761.

By year 2002, the figure experienced some increased to that of the previous year with the total road accident cases increasing by 40% (216), the fatal cases by 50% (95), number of person killed by 9% (228), person injured by 21% (672) and the total casualty by 18% (900).

By year 2003, some of the figures were decreased only minor accident cases was increase by 42% (19). The reversed is the case in year 2004. In year 2009 heavy casualty were recorded, with 454 number of accidents cases, 115 fatal case, 247 serious cases, while minor accident was on a record high of 92.The total casualty were 983. This was closely followed by year 2002 were we recorded total casualty as 900. See table 3.6.0-3.7.4for detail.The total numbers of accident cases were 2420 which has 17% minor cases, 33% final cases and 50% serious cases. The total number of person killed stand at 2083 while those injured are 6124.Table (3.6-3.1.11) shows the analysis of the figure.To the FRSC, according to their latest annual report 2010, there were progresses made in reducing the rate of accident rates on our roads. But considering the figures of year 2002 and compare it with 2009 you would discovered that there is really no progress made. Although, their analysis shows some form of

reduction in percentage but looking at the figure which grows drastically, it simply indicate that there is no progress because the rise of the figure shows the number of person we are losing to road traffic accidents.The rate at which road traffic injuries occur, place a heavy burden not only on global and natural economy but also household finance, because many families are driven deeply into poverty by the loss of the bread winner and add the burden of caring for its members. As human beings, been a man, woman and child in this nation has a right to life, and to a life in which all his/her faculties are intact, not a right to life as an amputee, or afflicted by an aura of visual handicap; not as a patchwork freak, the result of multiple skin grafts after third-degree burns in a highway inferno, not, worst at all, as a mere vegetable in a wheel chair hearing without the ability to respond, impervious to sensations, which you and I accept as the norm of meaningful existence (Soyinka). The incidents of people dying in large numbers, year-in year-out, as a result of incessant road mishaps have become more or less institutionalized in Nigeria. The very ugly monster for the past two decades or three has remained the veritable cankerworm that has continually eaten deep into the fabric of many households happiness.

According to Adeleye (2002), the future implications of road accident for Nigeria would be gradual extermination of leaders and technocrats of future Nigeria, increasing gradually the number of disable and handicapped individual in our future population. Socio-economic implications in terms of dependency, hospital bill and sovereign nation security that effects of road accident are no doubtusually negative if not catastrophic, which goes along way hurting the ones you love and left behind.

4.4CALCULATION

Human Capital Approach

Loss of productivity cost can be calculated by using the following formula:

$\mathbf{LPC_F} = AV_{age} * AW_{annual}$

$\mathbf{LPC_S} = (AD_{(In\text{-}P)} + AD_{(Out\text{-}P)}) * W_{Daily}$

$\mathbf{LPC_M} = AD_{Out\text{-}P} * W_{Daily}$

Loss of Productivity Cost (LPC) = $\mathbf{LPC_F}$ + $\mathbf{LPC_S}$ + $\mathbf{LPC_M}$

Where: $\mathbf{LPC_F}$ = Loss of productivity Cost for Fatal Accident

$\mathbf{LPC_S}$ = Loss of Productivity Cost for Serious Accident

$\mathbf{LPC_M}$ = Loss of Productivity Cost for Minor Accident

AV_{age} = Average Age

AW_{annual} = Average Annual Wage

$AD_{(In\text{-}P)}$ = Average Days for In-Patient

$AD_{(Out\text{-}P)}$ = Average Days for Out-Patient

W_{Daily} = Daily Wage

Medical Treatment Cost

Cost of Medical Treatment can be obtained by aid of this formula:

$MC_F = (AD_{(In\text{-}P)} * In\text{-}PC_F) + Ov_f$

$MC_S = (AD_{(In\text{-}p)} * In\text{-}PC_S) + (AD_{(Out\text{-}P)} * Out\text{-}PC_S) + Ov_S$

$MC_M = (AD_{(Out\text{-}P)} * Out\text{-}PC_M) + Ov_M$

Medical Cost (MC) = $\mathbf{MC_F}$ + $\mathbf{MC_S}$ + $\mathbf{MC_M}$

Where: MC_F = Medical Cost for Fatal Accident

MC_S = Medical Cost for Fatal Accident

MC_M = Medical Cost for Fatal Accident

$AD_{(In\text{-}P)}$ = Average Days for In- Patient

$In\text{-}PC_F$ = In-Patient Cost for Serious Injury

Ov_f = Overhead Cost for Fatal Accident

$In\text{-}PC_S$ = In-Patient Cost for Serious

$AD_{(Out\text{-}P)}$ = Average Days for Out-Patient

$Out\text{-}PC_S$ = Out-Patient Cost for Serious Injury

Ov_S = Overhead Cost for Serious Injury

$Out\text{-}PC_M$ = Out-Patient Cost for Minor Injury

Ov_M = Overhead Cost for Minor Injury

Sum Assign for Pain, Grief and Suffering

Cost Assign for Pain, Grief and Suffering for the Parent of Accident Victims can be also calculated by following formula.

$SPGS_F = 38\% (LPC_F + MC_F)$

$SPGS_S = 100\% (LPC_S + MC_S)$

$SPGS_M = 10\% (LPC_M + MC_M)$

Sum Assign for Pain, Grief and Suffering (SPGS) = $SPGS_F + SPGS_S + SPGS_M$

Where: $SPGS_F$ = Sum Assign for Pain, Grief, and Suffering for the Parent of Fatal Accident Victims.

$SPGS_S$ = Sum Assign for Pain, Grief and Suffering for the Parent of Serious Accident Victims.

$SPGS_M$ = Sum Assign for Pain, Grief and Suffering for the Parent of Minor Accident Victims

LPC_F = Loss of Productivity Cost for Fatal Accident

LPC_S = Loss of Productivity Cost for Fatal Accident

LPC_M = Loss of Productivity Cost for Minor Accident

MC_F = Medical Cost for Fatal Accident

MC_S = Medical Cost for Serious Accident

MC_M = Medical Cost for Minor Accident

Property Damage Cost

The following formula can be used to obtain Property Damage Cost:

$PDC_F = CR_F * NV_F$

$PDC_S = CR_S * NV_S$

$PDC_M = CR_M * NV_M$

$PDC_D = CR_D * NV_D$

$PDC_{NON} = 50\% \ PDC_{(F,S,M,D)}$

Property Damage Cost (PDC) = $PDC_F + PDC_S + PDC_M + PDC_D + PDC_{NON}$

Where: PDC_F = Property Damage Cost for Fatal Accident

PDC_S = Property Damage Cost for Serious Accident

PDC_M = Property Damage Cost for Minor Accident

$CR_{F = Cost}$ of Repair for Fatal Accident

CR_S = Cost of Repair for Serious Accident

CR_M = Cost of Repair for Minor Accident

CR_D = Cost of Repair for Damage

NV_F = Number of Vehicular Damage for Fatal Accident

NV_S = Number of Vehicular Damage for Serious Accident

NV_M = Number of Vehicular Damage for Minor Accident

NV_D = Number of Vehicular Damage for Damage Only Accident

General Cost

General Cost which Comprises of Police Administrative Cost are calculated as follows:

$PAC_F = 0.2\% \ LPC_F$

$PAC_S = 4\% \ LPC_S$

$PAC_M = 14\%LPC_M$

$PAC_D = 10\% LPC_D$

General Cost (GC) = $PAC_F + PAC_S + PAC_M + PAC_D$

Where: $PAC_F =$ Police Administrative Cost for Fatal Accident

$PAC_S =$ Police Administrative Cost for Serious Accident

$PAC_M =$ Police Administrative Cost for Minor Accident

$PAC_D =$ Police Administrative Cost for Damage Only Accident

$LPC_F =$ Loss of Productivity Cost for Fatal Accident

$LPC_S =$ Loss of Productivity Cost for Serious Accident

$LPC_M =$ Loss of Productivity Cost for Minor Accident

$LPC_D =$ Loss of Productivity Cost for Damage Only Accident

Total Human Cost

Total Human Cost can be calculated by the aid this formula:

$\mathbf{HC_T} = (LPC_F + MC_F + S_{PGSF}) * N_F + (LPC_S + LPC_M + MC_S + MC_M + S_{PGS(S)} + S_{PGSM}) * Ni$

Where $HC_T =$ Total Human Cost

$LPC_F =$ Lost of Productivity Cost for Fatal Accident

$MC_F =$ Medical Cost for Fatal Accident

$S_{PGSF} =$ Sum Assign for Pain, Grief and Suffering for the Parent of Fatal Accident Victims

$N_F =$ Number of Fatal Accident

$LPC_S =$ Loss of Productivity Cost for Fatal Accident

$LPC_M =$ Loss of Productivity Cost for Minor Injury Accident

$MC_S =$ Medical Cost for Serious Injury

$MC_M =$ Medical Cost for Minor Injury

$S_{PGS(S)}$ = Sum assign for Pain, Grief and Suffering for the family of Serious Injury Victims

S_{PGSM} = Sum Assign for Pain Grief and Suffering for the family of minor Injury Victims

Ni = number of Injuries (Serious and minor injury)

Total General Cost

Total General Cost can therefore be obtained from the follow equation:

$GC_T = (PAC_F * N_F) + (PAC_S * N_S) + (PAC_M * N_M) + (PAC_D * N_D)$

Where GC_T = Total General Cost

PAC_F = Police Administrative Cost for Fatal Accident

PAC_S = Police Administrative Cost for Serious Accident

PAC_M = Police Administrative Cost for Minor Accident

PAC_D = Police Administrative Cost for Damage-Only Accident

Total Properties Damage Cost

The formula bellow can be used to obtained Total Cost for Property Damage

$PDC_T = (PDC_F * N_F) + (PDC_S * N_S) + (PDC_M * N_M) + (PDC_D * N_D) + (PDC_{NON} * N_{NON})$

Where PDC_T = TotalProperty Damage Cost

PDC_F = Property Damage Cost Fatal Accident

PDC_S = Property Damage Cost for Serious Accident

PDC_M = Property damage Cost for Minor Accident

PDC_D = Property Damage Cost for Damage-Only Accident

PDC_{NON} = Property Damage Cost for Non Vehicular Damage

Total Human Capital (Gross Output) Cost

The Total Human Capital Cost or Gross Output Cost can then obtained as follows:

GOP (HCA) = HC_T + GC_T + PDC_T

Where GOP = Gross Output

HC_T = Total Human Cost

GC_T = Total General Cost

PDC_T = Property Damage Cost.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1CONCLUSION

This study estimates the cost of road traffic accidents on a major highway in Nigeria, the Abuja-Lokoja Road for the period of 2000-2010. The computation process was carried out using Gross-output approach. The estimated cost of road traffic accident on Abuja-Lokoja road as₦56, 669,844,234, while cost per kilometre was₦318, 369,911.43Km^{-1} and cost per vehicle was ₦10,823,117.692, then cost per vehicle per kilometre was ₦60,804.03Km^{-1}

The magnitudesof accident cost established by this study are much higher than those found in Benson (1996) but, measured correctly with the research work conducted in Thailand (2004). The disparities occur because Benson (1996) used Net Gross Output method which differs from the Gross output method use in Thailand (2004) and in this research work. In Net Gross-Output method the discounted value of the victims' future consumption is subtracted from the Gross Output figure.

In summary, the estimated cost per fatal accident in this researchis₦ 24,853,524, against₦ 453,187.69 and₦ 23,290,000 (B 4,658,004) of Benson (1996) and Thailand (2004) respectively. For the same reason, the cost of serious injury accident is ₦ 633, 520 while that of Benson (1996) and Thailand (2004) are ₦ 279, 258.41 and ₦ 644, 180 (B 128,836) respectively(note:₦1=B0.20THB) . Minor injuries accident cost is much lower (₦10, 575.36) compared to Benson (1996) ₦ 99, 999.39 and Thailand (2004), ₦152, 305 (B30, 461), because of consideration of 4 days spent at home as out-patient and 8% sum assigned to reflect pain, grief and suffering of the minor accident victims and their family.

5.2Recommendation

Finally, Gross-Output or Human Capital model is recommended to be used in highway cost-benefit analysis under-taking in the country and in ranking of any highway project be it construction or maintenance work in Nigeria.

This study can be improved to capture other parameters that are not included in this research work, such as travel delay cost, long term care cost, and insurance administrative cost so as to achieve detail and comprehensive result.

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DAF


FRSC Rescue

QUESTIONNAIRE

Department of Civil Engineering

Faculty of Engineering

Ahmadu Bello University, Zaria

Dear Respondents,

I am a final year master degree student of the above named University. I am carrying out carrying out a research on Cost Evaluation of the cost of road traffic accident in Nigeria- Case study of Abuja-Lokoja road. This research work is in partial fulfilment of the award of Master of Science (M.Sc.) degree in civil engineering. All information provided will be kept secret and your anonymity is ensured.

INSTRUCTION

Please tick as appropriate and provide answer where necessary.

SECTION A: CURRENT AVERAGE WAGE IN NIGERIA

1 Sex (A) Male [ ] (B) Female [ ]

2. Age (A) 15-24 [ ] (B) 25-34 [ ] (C) 35-44[ ] (D) 45-54 (E) 55 and above [ ]

3 Educational Attainments (A) Primary Education [ ] (B) Secondary Education [ ] (C) Tertiary Education [ ] (D) Others Specify……..

4 Occupation (A)Civil Servants [ ] Business or self-Employ (C) Student [ ] (D) Others Specify …….

5 What is the Current Average Monthly wage in Nigeria?

(A) N18, 000 (B) 25, 000 (C) N30,000 (D) 40,000 (E) N50, 000 (F) 60,000 and above.

SECTION B: COST OF VEHICULAR REPAIR (i.e. taxi) IN NIGERIA

NOTE: This section is strictly for road side mechanic, panel beater, and automobile worker etc.

1 Cost of Vehicular Repaired for Fatal Road Accident or total lost

(A) N400, 000 (B) N200, 000 (C) 100, 000 (D) 50, 000 (E) 30, 000

2 Cost of Vehicular Repaired for Serious Road Accident Badly Damage but with Salvage Value

(A) N200, 000 (B) N100, 000 (C) N50, 000 (D) N30, 000 (E) N20, 000

3 Cost of Vehicular Repaired for Minor Accident or Minor Damage

(A) N100, 000 (B) N50,000 (C) N30, 000 (D)20,000 (E) N10, 000

4 Cost of Vehicular Repaired for Damage-Only Accident

(A) N50, 000 (B) N30, 000 (C) N20, 000 (D) N10, 000 (E) N5, 000

SECTION D: CAUSES OF TRAFFIC CRASHES ON ABUJA-LOKOJA ROAD

1 Have you ever travel along Abuja-Lokoja road?

(A) Yes [ ] (B) No [ ]

2 Have you ever witness/seen an accident on the Gwagwalada-Lokoja road?

(A) Yes [ ] (B) No [ ]

3 What would you say are the major causes of road traffic crash on the Gwagwalada-Lokoja road?

(A) Bad road [ ] (B) Poor traffic signs [ ] (C) Mechanical faults [ ] (D) Recklessness of drivers/road users [ ] (E) others specify ……

SECTION E: COST OF MEDICAL TREATMENT FOR ROAD TRAFFIC ACCIDENT VICTIME

NOTE: This section is strictly for medical doctor and senior nurses.

SUMMARY OF ATTENDANCES FOR THE VARIOUS CLINICS, AND DEPARTMENTS FOR THE MONTH OF ……..20…….

	ATTENDANCES				
	PRIMARY		SUBSEQUENT		
	MALE	FEMALE	MALE	FEMALE	TOTAL
Accident and Emergency					
General out-patient					
Injections/Drugs					
dressing					

PHSIOTHERAPY DEPT				
ATTENDANCES				
PRIMARY		SUBSEQUENT		TOTAL P&S
MALE	FEMALE	MALE	FEMALE	

SURGERY DEPT (THEATRE)

OPERATIONS	MALE	FEMALY	TOTAL
Major Operations			
Intermediate Operation			
Minor Operations			
Grand Total			

SPECIAL X-RAYS

	MALE	FEMALE	TOTAL
OUT-PATIENTS			
IN-PATIENT			

SUMMARY STATISTICS ON CASES OF ROAD ACCIDENT FROM 2000-2010									
PERIOD	**TOTAL CASUALITY**	**NO OF DEATH**	**SERIOUS INJURIES**	**MINOR INJURIES**	**1-4**	**5-14**	**15-44**	**45-64**	**ABOVE 65YRS**
2000									
2001									
2002									
2003									
2004									
2005									
2006									
2007									
2008									
2009									
2010									
TOTAL									