

Evaluation Of Major Causes Of Road Accidents Along North–East Highway, Nigeria

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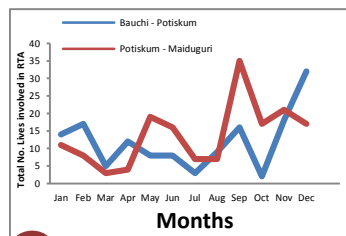
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Graphical abstract



Abstract

A major road link in the North-Eastern region of Nigeria is the Bauchi – Maiduguri highway that is a 425 km road that links a section of the north east region to other regions of Nigeria. The goods and services to the region are basically transported by road. This has increased vehicular traffic that resulted in increased road accident rates over the years. It is paramount to investigate the major causes of vehicle accidents on this highway as much has not been done to investigate accident cases on the route. The five year accident record on that route was obtained from the Federal Road Safety Corp of Nigeria, the Nigeria Police traffic unit, and the Nigeria union of road traffic workers. The study indicated that speed violation by drivers and bad road conditions contributes greatly in the rate of accidents along the route. Hence the study recommends better road maintenance culture and more sensitization of the road users and enforcement of speed limits.

Keywords: Accident, traffic, highway, vehicles and road safety.

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1.0 INTRODUCTION

The road transportation system is by far the commonest means of transportation in Nigeria compared to other modes that include air, rail and water transportation systems. Studies in past years had indicated that road transportation system provides over 90% of means of transport in Nigeria [1]. This had resulted to increased road traffic accident (RTA) occurrence on the roads. The automotive technology has made life easy compared to the hitherto means of transportation such as the use of human energy and animals. Road accidents have taken away so many lives in Nigeria today that hardly does any single disease match its mortality rate. This is only one of many adverse consequences of road accidents which also cause a lot of injures as well as economic losses in all its ramifications. Nigerian economy despite its harshness, has afforded millions of its populace the means to own cars making road traffic a major problem.

Accident is defined as anything which happens by chance, anything occurring unexpectedly and undersigned [2]. Road traffic accident is therefore an unexpected phenomenon that occurs as a result of the use or operation of vehicles including bicycles and handcarts on the public highways and roads.

Accidents may be fatal, resulting in deaths of the road users, or minor when it is not severe enough as to cause substantial hardship. The dividing line between minor and serious accident is however blurred. As it has been defined, accident would rarely give warning although reckless drivers should anticipate the consequences of their recklessness. In general, accidents do not just occur; they are basically brought about by human recklessness, carelessness or

negligence. The causes of road traffic accidents (RTA) are conventionally ramped into human, mechanical and environmental factors.

Also the human factor is considered to account for most RTAs, and also mechanical and environmental factors are subservient to human factor [3]. Also lack of knowledge of road signs and regulations, illiteracy, health problems like poor eye sight, excessive speeding, alcoholism, drug abuse, arrogance, over-confidence are some of the human factors too numerous to mention that cause RTAs.

Mechanical factors include poor vehicle maintenance, tyre blowouts, poor lights, un-roadworthy vehicles, broken down vehicles on the road without adequate warning sign etc. Rainfall, sun reflection, storm, heavy wind, spot holes, un-tarred roads are some of the environmental conditions that contribute to RTAs.

Generally, the Vehicle factors can be divided into vehicle design and vehicle maintenance. Some safety features of vehicles like seatbelts and airbags are likely to reduce the risk of death and serious injuries. A well-designed and maintained vehicle is less likely to be involved in accidents. If the brakes and tires are good and the suspension well-adjusted, the vehicle is more controllable in an emergency and thus, better equipped to avoid accidents. Road design and maintenance is also a factor that contributes to road traffic accidents. Right from the colonial days to the present, there are three major classes of roads in Nigeria, which are:

- a) Trunk Road “A”
- b) Trunk Road “B”
- c) Trunk Road “C”

Trunk Road “A” forms the skeleton of the national road grid. It cuts across regional boundaries in the country.

It even extends to the international borders of neighbouring West African countries. Notable examples are Ijebuode- Benin Expressway, Abuja-Kaduna Expressway, and the Bauchi - Maiduguri road [5].

The road safety engineering program is a set of activities designed to reduce the number and/or severity of accidents on specific road sections by exchanging or modifying some road environment characteristics. The activities generally consist of planning i.e., identification of safety problems, road locations and feasible road counter measures; implementation, i.e., installation or construction of the countermeasures; and evaluation, i.e., the determination of the degree of effectiveness [7,8].

The complexities in road administration in Nigeria are responsible for the inability to attain the lofty assertion. The road traffic environment in Nigeria is characterized by the following:

- a) over-speeding;
- b) blocked drains;
- c) narrow pedestrian walkways;
- d) bushy road environment;
- e) rough and undulating surfaces black spots;
- f) unfit road/intersections;
- g) narrow bridges;
- h) defaced signs;
- i) non-functional traffic lights
- j) irregular road marking;
- k) road median not crash-worthy (concrete);
- l) poor guard railing arrangement;
- m) high disregard for traffic regulations and the law;
- n) and
- o) flooded road surfaces [9,10,11]

The causes of road traffic accidents are not just human error or driver negligence. Unfortunately, Nigerian highways are arguably in poor state, due to heavy traffic loadings and poor maintenance of the roads [12].

Nigerian roads despite the current effort of the Federal Road Maintenance Agency (FERMA) are still in very bad states especially those leading to rural areas. It is a known fact that some rural areas do not even have un-tarred roads that could link them to the nearest town making pregnant women and other patients die in the cause of animal transportation [13, 14].

Agencies such as the Nigeria Police and the Nigeria union of road transport workers (NURTW) and FERMA had being responsible for RTA records for the country over the period of years.

2.0 EXPERIMENTAL

This study involved collection of road traffic accident (RTA) records from concerned agencies like FERMA, NURTW and the Nigeria Police. The data obtained included 5 years road traffic accident (crash) records for Bauchi-Potiskum-Maiduguri highways of Nigeria.

3.0 RESULT AND DISCUSSION

The RTA records from the various Government agencies These include FERMA, NURTW and NPF where obtained and analyzed as presented in Table 1 and 2. The crash factor/ casualty records for Bauchi – Potiskum- Maiduguri section of the road is presented in Table 1.

Table 1 Accident record along Bauchi – Potiskum – Maiduguri highway

| Year | Description | Dead | Injury | Casualties |
|------|-------------|------|--------|------------|
| | BFL | | | |
| 2008 | | 0 | 1 | 1 |
| 2009 | | 0 | 2 | 2 |
| 2010 | | 0 | 1 | 1 |
| 2011 | | 0 | 5 | 6 |
| 2012 | | 0 | 2 | 2 |
| | TBT | | | |
| 2008 | | 1 | 0 | 1 |
| 2009 | | 1 | 1 | 2 |
| 2010 | | 0 | 2 | 2 |
| 2011 | | 0 | 3 | 3 |
| 2012 | | 2 | 1 | 3 |
| | FTQ | | | |
| 2008 | | 1 | 6 | 7 |
| 2009 | | 0 | 4 | 4 |
| 2010 | | 0 | 1 | 1 |
| 2011 | | 0 | 3 | 3 |
| 2012 | | 0 | 2 | 2 |
| | OBS | | | |
| 2008 | | 0 | 1 | 1 |
| 2009 | | 0 | 2 | 2 |
| 2010 | | 0 | 2 | 2 |
| 2011 | | 0 | 1 | 1 |
| 2012 | | 0 | 1 | 1 |
| | NJR | | | |
| 2008 | | 0 | 1 | 1 |
| 2009 | | 2 | 4 | 6 |
| 2010 | | 4 | 12 | 16 |
| 2011 | | 4 | 6 | 10 |
| 2012 | | 6 | 5 | 11 |
| | LOC | | | |
| 2008 | | 2 | 5 | 7 |
| 2009 | | 2 | 4 | 6 |
| 2010 | | 1 | 6 | 7 |
| 2011 | | 2 | 5 | 7 |
| 2012 | | 3 | 4 | 7 |
| | SPV | | | |
| 2008 | | 10 | 11 | 21 |
| 2009 | | 8 | 6 | 14 |
| 2010 | | 22 | 27 | 49 |
| 2011 | | 9 | 9 | 18 |
| 2012 | | 8 | 12 | 20 |
| | DGD | | | |
| 2008 | | 2 | 3 | 5 |
| 2009 | | 0 | 2 | 2 |
| 2010 | | 1 | 1 | 2 |
| 2011 | | 0 | 15 | 15 |
| 2012 | | 2 | 6 | 8 |
| | BRD | | | |
| 2008 | | 3 | 17 | 20 |
| 2009 | | 9 | 10 | 19 |
| 2010 | | 2 | 1 | 3 |
| 2011 | | 15 | 22 | 37 |
| 2012 | | 5 | 4 | 9 |
| | UPD | | | |
| 2008 | | 2 | 11 | 13 |
| 2009 | | 1 | 1 | 2 |
| 2010 | | 1 | 5 | 6 |
| 2011 | | 2 | 2 | 4 |
| 2012 | | 1 | 3 | 4 |
| | DOT | | | |
| 2008 | | 6 | 4 | 10 |
| 2009 | | 1 | 3 | 4 |
| 2010 | | 0 | 10 | 10 |
| 2011 | | 2 | 15 | 17 |
| 2012 | | 1 | 5 | 6 |

Brake failure (BFL), tire burst (TBT), fatigue (FTQ), obstruction (OBS), night journey (NUR), loss of control (LOC), speed violation (SPV), dangerous driving (DGD), bad roads (BRD), use of phone (UPD), and dangerous overtaking (DOT).

The major factors responsible for road crashes in Nigeria includes brake failure (BFL) with no dead record along the Bauchi – Potiskum – Maiduguri road for the period under review, while tire burst (TBT), fatigue (FTQ), obstruction (OBS), night journey (NUR), loss of control (LOC), dangerous driving (BRD), use of phone (UPD), and dangerous overtaking (DOT) had low casualty records. The speed violation (SPV) has been attributed to be the main cause of road traffic accident (RTA) along the study route as presented in Table 1. Speed violation in the year 2010 is responsible for recording the highest number of dead's while bad roads recorded the highest casualties in 2011 as presented in Figure1.

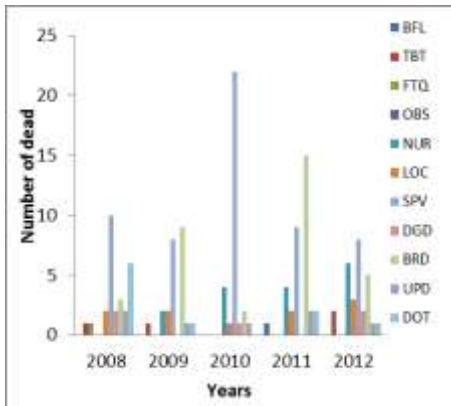


Figure 1 Dead trend per annum

The highest number of injuries was recorded in 2010 with speed violation as the major cause of RTA injuries/year while 2012 recorded the lowest injury cases as presented in Figure 2.

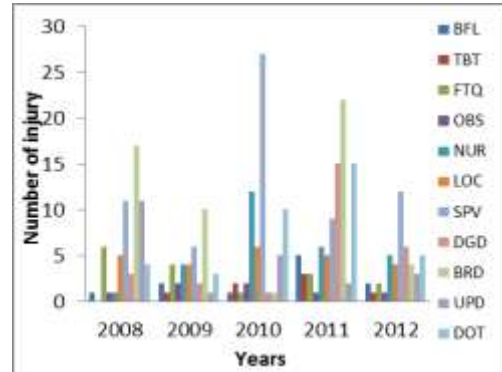


Figure 2 Injury trend per annum

The Monthly casualty records for Bauchi – Potiskum-Maiduguri section of the road is presented in Table 2;

Table 2 Bauchi- Potiskum - Maiduguri monthly road casualty records

| | Month | Jan | Feb | March | April | May | June | July | Aug | Sep | Oct | Nov | Dec | Total |
|------|------------------|-----|-----|-------|-------|-----|------|------|-----|-----|-----|-----|-----|-------|
| 2008 | No of Deaths | - | 2 | 1 | 3 | 4 | - | 3 | 4 | 7 | 14 | 1 | 11 | 50 |
| | No of injureies | 4 | 2 | 9 | 11 | 5 | 14 | 6 | 7 | 30 | 26 | 17 | 12 | 143 |
| | No of casualties | 4 | 4 | 10 | 14 | 9 | 14 | 9 | 11 | 37 | 40 | 18 | 23 | 193 |
| 2009 | No of Deaths | 1 | - | - | 12 | - | - | 4 | 19 | 5 | - | 3 | 1 | 45 |
| | No of injureies | 18 | 2 | - | 14 | 3 | 3 | 21 | 31 | 2 | 2 | 3 | 4 | 103 |
| | No of casualties | 19 | 2 | - | 26 | 3 | 3 | 25 | 50 | 7 | 2 | 6 | 5 | 148 |
| 2010 | No of Deaths | 1 | 2 | 4 | 6 | 2 | 2 | 10 | 8 | 2 | 1 | 6 | 12 | 56 |
| | No of injureies | - | 4 | 11 | 12 | 7 | 11 | 18 | 12 | 6 | 4 | 30 | 16 | 131 |
| | No of casualties | 1 | 6 | 15 | 18 | 9 | 13 | 28 | 20 | 8 | 5 | 36 | 28 | 187 |
| 2011 | No of Deaths | 2 | - | 3 | 10 | - | - | - | 2 | 1 | 5 | 1 | 1 | 26 |
| | No of injureies | 37 | 10 | 35 | 33 | 17 | 8 | 5 | 29 | 9 | 27 | 9 | 5 | 224 |
| | No of casualties | 39 | 10 | 38 | 43 | 17 | 8 | 5 | 31 | 10 | 32 | 10 | 6 | 249 |
| 2012 | No of Deaths | - | 2 | 1 | 1 | - | 5 | 1 | - | 3 | 8 | - | - | 21 |
| | No of injureies | 9 | 1 | 1 | 1 | 8 | 10 | 1 | 5 | 23 | 12 | 10 | 15 | 96 |
| | No of casualties | 9 | 3 | 2 | 2 | 25 | 15 | 2 | 5 | 26 | 20 | 10 | 15 | 137 |

The total lives involved in road accident in 2010 along Bauchi-Potiskum – Maiduguri are presented in Figure 3. The highest casualty record for Bauchi-Potiskum link was recorded in the

month of December while the lowest causality recorded in March 2010. The Potiskum – Maiduguri section of the road recorded its highest peak in December and the lowest in January 2010,

indicating lower mortality in the beginning of the year as presented in Figure 3.

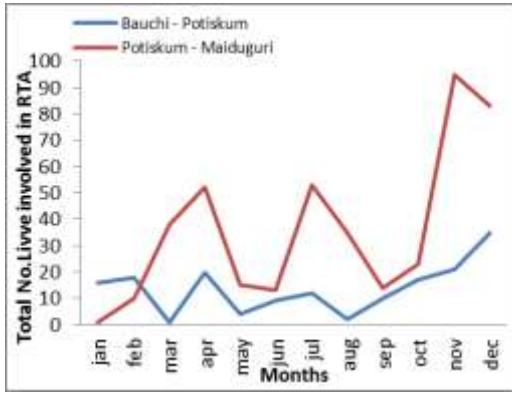


Figure 3 Graph of total lives involved in road crashes in 2010.

Figure 1 Dead trend per annum

The highest total lives involved in road accident in 2011 along Bauchi-Potiskum road was in the month of May, while the Potiskum – Maiduguri road has its highest peak in the month of August as presented in Figure 4.

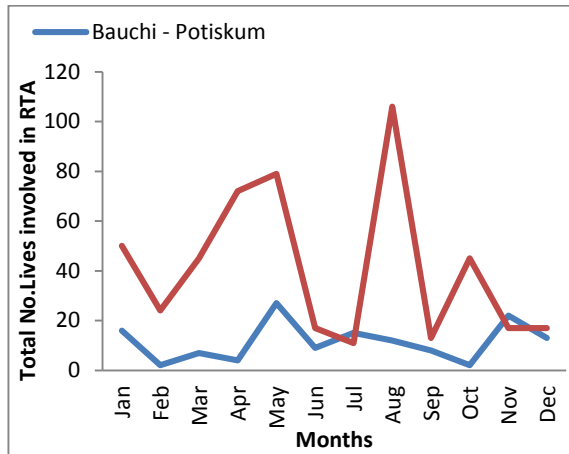


Figure 4 Graph of total lives involved in road crashes in 2011.

The results from the study indicated that the highest road accident casualties recorded in 2012 along Bauchi - Potiskum was in the month of December while the Potiskum – Maiduguri road section generated its highest peak RTA dead’s in the month of September as presented in Figure 5.

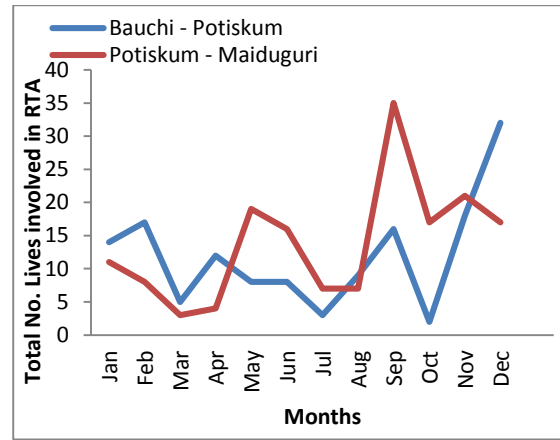


Figure 5 Graph of total lives involved in road crashes in 2012.

4.0 CONCLUSION

The driver’s perception, response, judgment, and operation are the main factors that cause road accidents. Results from the study indicates that speed violation and bad condition of roads are the major causes of RTA on the Bauchi – Potiskum – Maiduguri road of the north-east highway. Moreover, drivers’ perception and judgment mistakes are important factors for cause of traffic accidents; therefore, to prevent traffic accidents, more attentions on the management of drivers should be paid. This study also considered some of the preventive measures needed to reduce the present unacceptable high accidents causalities on the Nigerian highways. Generally RTAs in Nigeria are attributed to human errors and poor road conditions, as the case may be. The vehicle, the driver, the road and its environment are among the factors that increasingly cause road accidents in Nigeria. Results from the study indicate need to sensitize drivers on speed violation and enforcement by regulatory agencies on road users to observe highway design speed as measure to reduce road accident occurrence is paramount. The proper road maintenance is also of utmost importance, the agency FERMA should ensure adequate and routine maintenance of all the federal highways within their jurisdiction.

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