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An Assessment of Road Traffic Accident in Zaria Urban Area, Kaduna State, Nigeria

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Abstract
The study assessed road traffic accident along Pz/Samaru route Zaria Kaduna state. The study was conducted using the accident statistics from the Federal Road Safety Commission 2010 to 2013 and field observations. The data were analyzed using descriptive statistics and presented in table and percentages. The study revealed that 2013 recorded the highest number of road accidents of which 15% of the accidents across the sampled year occurred at aviation junction and 15.8% occurred in the month of October. Among the causes of the road traffic accidents in the study area are over speeding representing 23.3% been the highest, followed by loss of control 16.7%. the study indicated that the month of march recorded the highest accident fatality with 52.2% and that in most of the accidents there are no traffic management measures except few with traffic warders which despite their presence, accident has being on the increase in the study area. The study concluded by calling the attention of the stakeholders on the need to ensure safe urban travel with some recommendations which among them are channelization of roads junctions, construction of speed bumps, strict enforcement of road traffic laws and public awareness on road safety measures.
KEYWORDS: Road Traffic Accident, Fatality, Road Control Measures and Urban Zaria

INTRODUCTION

Transportation is a process that involves movement of commuters, good and services from a given point of origin to specific destination (Asiyanbola and Akinpelu, 2012). Gbadamosi (2002) observed that transportation affects every human being in the course of his daily activities and it is difficult to conceive a situation where transportation does not play significant role in the life of any individual. Transportation helps to achieve the basic objectives of living in the city which is the functional efficiency of land uses, infrastructure, services and improvement in the quality of life. The structure, size vertical and horizontal spreads of any city are dependent on the nature and function of transport system. As a result of these, the ease, the spread, the cost and quality of movement between land uses and places in the cities are inextricably bound with the transport system, and directly linked with planning system (Osoba, 2012).

The role of transport in our daily activities cannot be overemphasized and without it, the necessities of life would be difficult to achieve. As wonderful as the role of transport may be in our daily activities, it has been noted to possess myriads of negative effects. This is why in the literature transport is describes as the maker and breaker of the cities. Ogunsanya (2002) confirmed how transport has built cities over the year in some urban areas in Nigeria and how it has gradually destroyed them. Filani (2002) stated that inadequate and poorly maintained infrastructure facilities, accident; the relative immobility of the disadvantage, waiting for a long period at the bus-stop, pollution from transportation; traffic congestion and parking problems are becoming acute in the city. Road vehicular accidents have been so frequent and common to everyday life.

According to Odugbemi (2010) accident is anything which happens by chance, anything occurring unexpectedly and un-designed. Road traffic accident is a collision or similar incident involving a moving vehicle, resulting in property damage, personal injury or death (Astrom, Kent and Jovi, 2006). Road traffic accident is 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 (passengers, drivers or pedestrians), or minor when it is not severe enough as to cause substantial hardship (Sarin, 2000).

In developing countries like Nigeria, roads often carry a wide range of users from heavy goods-vehicles to bicycles and pedestrian without any separation. Road traffic accidents (RTA) have become a significant, cause of any disability, death and economic loss. Every day many people are killed and injured on our roads. Accidents frequently occur on roads in Nigerian urban centers. Urban environments are the most prone to motor traffic accidents because 75 per cent of traffic accidents take place in built-up areas or cities (Aderamo, 2002). This is due to the underlying factors of undue concentration of vehicles in urban areas, traffic mix and the resultant flow conflicts. Similarly, road accidents appear to occur regularly at some flash points such as where there are sharp bends, potholes and at bad sections of the highways. At such points over speeding drivers usually find it difficult to control their vehicles, which then result to fatal traffic accidents, especially at night (Atubi, 2009).

Road Traffic Accidents are having a worsening effect on our society and economy. Among all accidents, road traffic accidents claim the largest toll of human life and tend to be the most serious problem world over (Kual *et*

al., 2005). Worldwide, the number of people killed in Road Traffic Accidents (RTA) each year is estimated at almost 1.2 million while the number of people injured could be as high as 50 million (WHO, 2004). The Americans bear 11 per cent of the burden of road traffic injury mortality (WHO, 2002). Currently, motor vehicle accidents rank 9th in order of disease burden and are projected to be ranked 3rd in the year 2020. In Africa, it has been estimated that 59,000 people lost their lives in road crashes in 1990 and this figure will be 144,000 people by 2020, a 144 per cent increase (Kopits, 2005). Nearly three-quarters of deaths resulting from motor vehicle crashes occur in developing countries (Odero, 1998) and this problem appears to be increasing rapidly in these countries (Jacobs, Aeron-Thomas and Astrop, 2000). Apart from humanitarian aspect of the problem, traffic accidents and injuries in these countries incur an annual loss of $65 billion to $100 billion annually. These costs include both loss of income and the burden placed on families to care for their injured relatives.

The major concern is on the Samaru/Sokoto route which is among the six identified accident routes (IAR) as identified by the Federal Road Safety Corps (FRSC) Zaria command (Musa, I and Moses A. 2014). This road drew the attention of the researcher because of the high average number of death recorded which constituted 75% and it was rank third of the total number of road accidents occurrences in the entire city (Musa and Moses 2014). The six major roads as identified by the FRSC in Zaria urban area are, PZ, Bank road, Gaskiya/Poly road, Ahmed Makarfi dual road, Lagos street/Aminu road, Sokoto/Samaru road and Shehu Idris road, Zaria-City. This road plays additional role in linking the Zaria unbans center and educational centers. It has also linked the two campuses of Ahmadu Bello University Zaria.
Zaria is one of the major cities in Kaduna State with high traffic volume as a result increased road traffic accidents. This situation has become more worrisome and a source of concern to everyone especially its negative effects on the socio-economic activities hence the need for efficient movement of people and goods is for sustainable economic development of a growing urban area like Zaria.

STUDY AREA

Zaria is located on a plateau at a height of about 2200 feet above sea level in the centre of northern Nigeria. It lies at latitude 11^0 13'N and $11^0 9^1$N and longitude $7^0 39^1$E and 7^0 68'E . Zaria local government area is located in the northern part of Kaduna state, bordered by Makarfi on the northeast, to the east by Soba, to the west Giwa and to the south by Igabi local government areas. Zaria is about 75km to Kaduna the capital of Kaduna state. Figure 1.

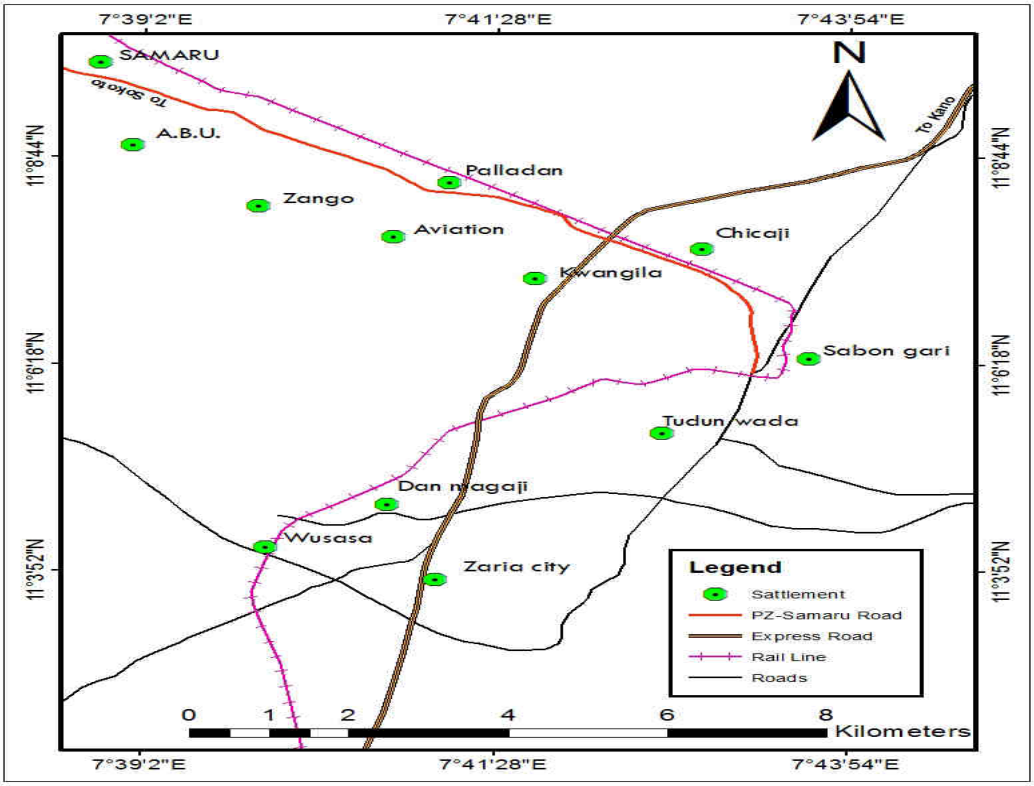

Figure 1: Map of the Study Area
Source: Adapted From Map of Kaduna State

The plains on which Zaria is situated are part of the vast undulating plains scenery which extends almost unbroken from Sokoto to Lake Chad and beyond, and from the south of Kaduna to the Tigueddi scarp near Agades. Such plains are characteristics of Africa as a whole. The plains are surmounted by hill features of rock inselbergs and lateritic ironstone-capped mesas. The inselbergs vary considerably in dimension and shape, from prominent landmark of Kufena to inconspicuous whalebacks (King, 1948).Zaria possesses a tropical continental climate. This is more pronounced during the dry season, especially December to January. The mean daily maximum temperature shows a major peak in April and a minor in October. The daily maximum temperature rises gradually from 15.3^0 C in January and attains its highest of 36.3^0 C in April. It drops rapidly to its lowest value in August 26^0 C and rises again to its secondary peak 34.1^0 C in October. The mean minimum temperature rises from its lowest in December-January to its highest in July-August. Zaria lies within a region which has a tropical savannah climate with distinct wet and dry seasons. While the wet season occurs from May-October, which is the high-sun period; the dry season which is practically rainless occurs during November to April. Rainfall in Zaria ranges from 0.0mm from January-April, and then it reaches 180mm in May to the peak of 816mm in august. It then decreases to 150mm in October and back to 0.0mm from November to December (Abubakar, 2012). The natural region in which Zaria lies is termed by plant geographers the Northern Guinea Savannah zone. A designation which implies a woodland vegetation type characterized by the presence of Isoberlinia doka, Isoberlinia tomentosa and Upaca togonensis, with well developed grass layer of tufted and low ground cover of Andropogoneae. There are also specific tree species which are mainly found in the northern part of the country such as Tamarindus indica, Shea butter, Mango, Cashew, Baobabs, Locust bean, Neem and Eucalyptus to mention a few.

Zaria Local Government Area has a population of 408,198 of which 210,900 are male and 196,090 females. It has the second largest population among the twenty three Local Government Areas of Kaduna State. There is also a large young population (age 0-14 years) which is 47.4% of the population; this signifies an in built momentum for population growth (NPC, 2009). Zaria is predominantly made up of the Hausa/Fulani- a major ethnic group in northern Nigeria. The indigenous people are generally referred to as ‘zazzagawa’ or ‘zage zagi’, and they constitute ‘Hausawa’ and Filani’. They speak Hausa and Fulfulde- the major languages across northern Nigeria and some sub-Saharan African countries. There are also other ethnic groups like the Yoruba, Igbo, and Idoma who migrated to the place. Road transport is the dominant mode of transport in Zaria. With increased economic activities and presence of several institutions investments in roads transport infrastructures have resulted into increased levels of motorization in the urban center. This increased motorization has also been accompanied by an unprecedented increase in road traffic accidents.

MATERIAL AND METHODS

Data types used for this study included the number of road traffic accidents, locations of road traffic accidents, time of road traffic accidents, causes of accidents, road safety and regulatory measures put in place. Both primary and secondary methods of data collection were used to obtained information for the study. The primary data involved field observation to identify the physical road safety measures put in place to minimize road traffic accidents at the various accident locations. The secondary data on the other hand were obtained from road traffic accidents records from the Federal Road Safety Commission Zaria command. Also the review of literature on road traffic accidents from relevant books, journals, published and unpublished texts, documents, magazines, and newspapers was carried out. The data collected for this study were analyzed by descriptive statistics and presented with frequency distribution tables, percentages, charts and using the Microsoft Excel.

ANALYSIS AND DISCUSSION OF FINDINGS

This data road traffic accident data collected from the federal road safety commission (FRSC) on PZ-Samaru road between years 2010 to 2013 were analyzed according as follows.

The Rate of Road Traffic Accidents along PZ – Samaru

Table 1 Locations of Road Traffic Accidents

Location	2010	2011	2012	2013	Total	Percentage
Flyover	1	-	1	-	2	1.7
Palladan	1	1	2	-	4	3.3
Aviation	4	3	4	7	18	15.0
Police gate	1	-	-	1	2	1.7
Railway	2	-	4	-	6	5.0
Unity Bank	1	-	-	-	1	0.8
MTD	3	4	3	7	17	14.2
PZ	1	1	3	6	11	9.2
Randa Kano	-	2	3	2	7	5.8
Emanto	-	2	3	1	6	5.0
Samaru	-	1	2	2	5	4.2
FRSC gate	-	1	2	1	4	3.3
NUGA gate	-	1	-	-	1	0.8
CERT gate	-	1	-	-	1	0.8
Union Bank	-	-	1	-	1	0.8
Polo club	-	-	1	5	6	5.0
Post office	-	-	1	-	1	0.8
PHCN	-	-	-	3	3	2.5
Zango	-	-	-	3	3	2.5
ABU gate	-	-	-	3	3	2.5
Zaria Hotel	-	-	-	1	1	0.8
Others	4	3	5	5	17	14.2
Total	18	20	35	47	120	100

Source: FRSC, 2014.

Table 1 revealed the various road traffic accident locations along Samaru-PZ route in the study area. The table shows that year 2013 recorded highest the number of road traffic accidents among the sampled years having about 39.17% of the total number of accidents recorded. Similarly, 15.0% of the road accidents occurred at Aviation junction, followed by 14.2%, and 9.2% representing MTD, Others (those measured in Km) and PZ respectively.

Table 2 Distribution of Road Traffic Accidents

Month	Year				Total	Percentage
	2010	2011	2012	2013		
January	1	4	5	5	15	12.5
February	0	2	2	3	7	5.8
March	2	1	0	4	7	5.8
April	2	0	6	1	9	7.5
May	1	1	1	6	9	7.5
June	0	2	2	6	10	8.3
July	2	2	0	4	6	5.0
August	0	2	2	6	10	8.3
September	1	1	6	5	13	10.8
October	4	2	6	5	19	15.8
November	5	0	3	0	8	6.6
December	0	3	2	2	7	5.8
Total	18	20	35	47	120	100

Source: FRSC, 2014.

Table 2, shows the monthly distribution of road traffic accidents, reveal that the month of October was highly associated with road traffic accidents representing 15.8%. This followed by 12.5% for January, 10.8% for September, 8.3% for each of the month June and August.

The Causes of Road Traffic Accidents in the Study Area

Table 3 Yearly Distributions of Causes of Road Traffic Accidents

Cause	2010	2011	2012	2013	Total	Percentage
Over Speeding	7	5	6	10	28	23.3
Dangerous Driving	4	-	8	7	19	15.8
Tyre Burst	-	-	-	6	6	5.0
Brake Failure	2	-	2	5	9	7.5
Fatigue	-	-	-	2	2	1.7
Dangerous Overtaking	-	3	-	7	10	8.3
Loss Of Control	2	5	9	4	20	16.7
Stationary Vehicle/obstruction	1	-	1	-	2	1.7
Sleeping On Steering	-	-	-	-	-	-
Route Violation	-	1	-	-	1	0.8
Light Sign Violation	-	-	-	-	-	-
Night Journey	-	-	-	-	-	-
Driving Under Alcohol	-	1	2	1	4	3.3
Poor Weather	-	-	-	-	-	-
Mechanical Deficient Vehicle	1	-	1	3	5	4.2
Bad Road	-	-	2	-	2	1.7
Overloading	1	3	4	2	10	8.3
Traffic Light Disobedience	-	-	-	-	-	-
Use Of GSM While Driving	-	2	-	-	2	1.7
Total	18	20	35	47	120	100

Source: FRSC, 2014.

Table 3 reflects the various causes of road traffic accidents in the study area. Among the causes, Over speeding (23.3%) recorded the highest, followed by Loss of Control (16.7%), Dangerous Driving (15.8%), and 8.3% each for Dangerous Overtaking and Overloading while 27.6% accounts for other causes. This based on the reconnaissance survey carried out may be attributed to the level of impatience of the motorists within Zaria and their level of diving literacy.

The Fatality Rate in the Study Area

Table 4 Sex Distribution of Number of Persons injured in Year 2010

Month	Male		Female		Total	
	No	%	No	%	No	%
January	2	3.6	-	-	2	3.2
February	7	12.5	3	50.0	10	16.1
March	5	8.9	1	16.7	6	9.7
April	6	10.7	-	-	6	9.7
May	6	10.7	1	16.7	7	11.3
June	-	-	-	-	-	-
July	5	8.9	-	-	5	8.1
August	-	-	-	-	-	-
September	2	3.6	-	-	2	3.2
October	10	17.9	1	16.7	11	17.7
November	9	16.1	-	-	9	14.5
December	4	7.1	-	-	4	6.5
Total	56	100	6	100	62	100

Source: FRSC, 2014.

The Table 4 shows the sex distribution of number of persons injured by road traffic accident in year 2010. It indicated that the month of October has the highest number of persons injured with 17.7%, 16.1% for February, 14.5% for November, and 11.3% for May. Also the number of male injured which amount to about 90.32% exceeds that of the female which is about 9.68% in all the months of the year.

Table 5 Sex Distribution of Number of Persons Injured in Year 2011

Month	Male		Female		Total	
	No	%	No	%	No	%
January	10	25	2	33.3	12	26.1
February	9	22.5	1	16.7	10	21.7
March	1	2.5	-	-	1	2.2
April	-	-	-	-	-	-
May	4	10.0	1	16.7	5	10.9
June	3	7.5	-	-	3	6.5
July	4	10.0	-	-	4	8.7
August	2	5.0	-	-	2	4.3
September	2	5.0	-	-	2	4.3
October	2	5.0	1	16.7	3	6.5
November	-	-	-	-	-	-
December	3	7.5	1	16.7	4	8.7
Total	40	100	6	100	46	100

Source: FRSC, 2014.

From the Table 5 26.1% of the number of persons injured was recorded in the month of January, 21.7% in February, 10.9% in May, 8.7% each for the month of July and December in the year 2011.

Table 6 Sex Distribution of Number of Persons Injured in Year 2012

Month	Male		Female		Total	
	No	%	No	%	No	%
January	8	12.9	5	26.3	13	16.0
February	2	3.2	1	5.3	3	3.7
March	-	-	-	-	-	-
April	10	16.1	3	15.8	13	16.0
May	7	11.3	-	-	7	8.6
June	4	6.5	1	5.3	5	6.2
July	-	-	-	-	-	-
August	3	4.8	1	5.3	4	4.9
September	6	9.7	1	5.3	7	8.6
October	12	19.4	4	21.1	16	19.8
November	9	14.5	2	10.5	11	13.6
December	1	1.6	1	5.3	2	2.5
Total	62	100	19	100	81	100

Source: FRSC, 2014.

As shown in Table 6 most of the persons injured was in the month of October. Others are January, April, November, May and September representing 16.0%, 16.0%, 13.6%, 8.6% and 8.6% respectively.

Table 7 Sex Distribution of Number of Persons Injured in Year 2013

Month	Male		Female		Total	
	No	%	No	%	No	%
January	5	5.6	-	-	5	4.5
February	8	8.9	3	14.3	11	9.9
March	3	3.3	4	19.0	7	6.3
April	-	-	-	-	-	-
May	13	14.4	3	14.3	16	14.4
June	21	23.3	6	28.6	27	24.3
July	12	13.3	-	-	12	10.8
August	9	10.0	1	4.8	10	9.0
September	5	5.6	1	4.8	6	5.4
October	13	14.4	3	14.3	16	14.4
November	-	-	-	-	-	-
December	1	1.1	-	-	1	0.9
Total	90	100	21	100	111	100

Source: FRSC, 2014.

Table 7 shows that 24.3% of the number of persons injured by road accident in year 2013 was recorded in the month of June, while 14.4%, 14.4%, 10.8%, 9.9% and 9.0% accounted for the month of May, October, July, February and August.

Table 8 Yearly Distribution of Number of Persons Killed in Road Traffic Accidents

Month	2010	2011	2012	2013	Total	Percentage
January	-	1	1	-	2	8.7
February	-	-	-	-	-	-
March	1	-	-	11	12	52.2
April	-	-	2	-	2	8.7
May	-	-	-	-	-	-
June	-	-	-	1	1	4.3
July	-	1	-	-	1	4.3
August	-	-	-	1	1	4.3
September	-	-	2	1	3	13.0
October	-	-	1	-	1	4.3
November	-	-	-	-	-	-
December	-	-	-	-	-	-
Total	1	2	6	14	23	100

Source: FRSC, 2014.

In Table 8, it is shown that year 2013 recorded the highest number of road traffic accidents fatality in the study area followed by year 2012. The table also revealed that 52.2% of the number of persons killed took place in the month of March, 13.0% in September, 8.7% each in January and April, while 4.3% each for June, July, August, and October.

The Road Safety Measures to Prevent Accidents along PZ – Samaru Zaria

Table 9 Road Traffic Measures at Accidents Locations

Location	Traffic Control Measure
Flyover	Traffic Warders
Palladan	None
Aviation	Traffic Warders
Police Gate	None
Railway	None
Unity Bank	None
MTD	Traffic Warders
PZ	None
Randa Kano	Traffic Warders
Emanto	None
Samaru	Military Check Point
FRSC	FRSC Officers
NUGA Gate	None
CERT Gate	None
Union Bank	None
Polo Club	None
Post Office	None
PHCN	None
Zango	None
ABU Gate	FRSC Officers
Zaria Hotel	Military Check Point

Source: Field Survey, 2014.

Table 9 explains the road traffic measures identified at the various accidents locations in the study area. Observed is that traffic warder, Military check points and FRSC Officers are the only measures used at the various accident locations. This might be the reason why road traffic accidents and fatality rates has being on the increase yearly in the study area.

CONCLUSION AND RECOMMENDATIONS

Summary of Findings

The study discovered that along Samaru-PZ road, road traffic prone accident locations are Aviation Junction, MTD and PZ. As revealed in the study, the month of October across the sampled years recorded the highest number of road traffic accidents. The major causes of road traffic accidents as identified by the study are over speeding, loss of control, dangerous driving, dangerous overtaking, and overloading. The study revealed that males were injured more in road traffic accidents when compared with the females across the sampled years. Finally, that year 2013 recorded the highest number of road traffic accident fatality in the study area.

Conclusion

The provision of roads in an urban area is important for the efficient and effective movement of people and goods and services within and outside the urban area. Based on the findings the point on the route with most recorded number of accidents is the Aviation Junction and this is because of the sharp bend at this junction also because it is an intersection. There also is no available measure to reduce accidents at this spot. However, given the increasing number of road traffic accidents on urban roads and cost associated with it, calls for concern of stakeholders in the sector, hence the need to maintain safe urban travel. This study was concluded by advocating the need for government to carry out researches and evolve a sustainable strategy to curtail carnages on our roads involving transport operations and introduce the use of safety transport systems in the enforcement of traffic rules and regulation.

Recommendations

The following recommendations were made;

i. The government should provide other speed limiting road traffic accident measures like channelization of junctions, speed bumps at junctions and road traffic speed limit signs in the study area
ii. Public awareness should be carried out by the FRSC educating the drivers and the public on personal measures used in limiting the impact of road traffic accidents like wearing of seat belt, interpretation of road signs, regular vehicle check, etc
iii. The FRSC should improve on the enforcement of road traffic signs without fear or favor and be proactive in the approach
iv. Finally, any individual who must be on the road should be licensed as well as vehicles must pass road worthiness test to be allowed on the road.

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