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Road Traffic Accident in Kano Nigeria: A Case Study of Kano Metropolitan

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Original Research Article

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Abstract: The increasing level of road traffic crash (RTC) in Kano metropolitan and the consequent of injuries and fatalities necessitate the need for its regular analysis. In the present study, data on recorded cases of RTC were collected from Federal road safety corps Kano. The data comprises of some fatal, severe and minor RTCs, the number of people involved, killed or injured with the classification of their gender and age, type of the vehicle involved and probable cause of RTC from the year 2009 to 2015. A total of 642 RTCs involving 3,019 people and 978 vehicles were recorded in Kano metropolis from 2009-2015. On average, every nine days a person is killed and 14 people are injured in road traffic accidents in Kano metropolitan. It was found that for every 7 RTCs reported, 3 people are killed while 18 people get injured. The accident rate of Kano city is 3 per 100,000 populations lower than the world average of 18 per 100,000. It was also found that male adults are four times more involved in RTC than female adults. The results of the study also showed that children account for 7% of all people involved in Road traffic accidents in Kano. It was found that 66% of the people killed in road traffic accidents are male adults while 22% are female adults and, female and male children account for 9% and 3%. About 37% of all the accidents occurred on motorcycles and 32% on passenger cars. A person on a motorcycle is 2 times and 12 times more likely to be involved in RTC than those on bus and tricycle respectively. Commercial vehicles are 253% and 710% more involved in RTC than private and official vehicles respectively. Out of the 642 RTC cases recorded within the study period. Reckless driving, vehicle condition and road environment accounts for 85%, 10% and 5% of the accidents. The safety can be enhanced by improved law enforcement and use of speed calming measures.
Keywords: Traffic Accident; Fatality; Injury; Kano Metropolis; Drivers behaviour.

INTRODUCTION

Road traffic accident is a global phenomenon posing severe social problems. According to the world health organisation, road traffic accident results in the death of over 1.2 million people, each year and 50 million more are injured. The figures are on the increase in many countries, and if proper measures are not taken, by the year 2030, road traffic accidents will be listed as the fifth cause of death in the world, resulting in the death of about 2.4 million people annually [1].

Studies showed that vulnerable road users in middle and low-income countries cover 70% of road mortality while in countries like America, 65% of the fatality were vehicle occupants. Speed was identified as the critical factor resulting in injury to vulnerable road users, but only 29% of world countries have met the criteria for speed reduction with only 10% reported effectiveness [1].

Many studies revealed that persons from low-income setting are by far more vulnerable to road accidents than those from affluent families regardless of the country's economic status. In India mortality rate from a traffic accident in poor economic setting was found to be 13.1 and 48.1 per 100,000 in urban and rural areas respectively, compared to their affluent urban and rural counterpart having a death rate of 2.8 and 26.1 [2]. Another research conducted in Australia shows a disproportionate number of children from low economic background been involved in a road accident than those from well to do families [3].

Numerous studies have concluded that the roads of African region are the worst in the world. The region has the least number of motor vehicles in the world approximately 2% of the world. Despite this low number of motor vehicles on the road, it contributes 16% of world's road deaths having a higher death rate than any other region of the world. A motor vehicle in the Africa stands a chance of being involved in a fatal

accident more than 100 times a car in the United States or the United Kingdom [2]. The probability of a vehicle killing someone in Nigeria is 47 times higher than that in Britain [4]. African region has an average death rate of 24.1 per 100,000 populations as compared to the world average of 18.0 per 100,000 populations. Nigeria has recorded the highest number of fatal accidents in the region with an average death rate of 33.7 per 100,000 populations. Studies also revealed that, out of every four fatal accidents in Africa, one occurred on Nigeria's highway [2].

Youth between the ages of 15-44 are the most vulnerable road users covering 62%. Vulnerable road users (pedestrians and 2-3 wheel riders) account for almost 52% of the overall fatalities [2]. Road accident constitutes 25% of all injury-related death in Africa (mortality in Africa). According to National Bureau of Statistics (NBS) report, 93% of the people killed in the road traffic accident are adults, and 79% are males [5].

The Federal Road safety corps revealed that a total of 64,394 people were involved in 9,734 road traffic accidents resulting to the death of 5,440 people and 30,478 persons sustaining various degrees of injuries [6]. In 2014, Kano state recorded a total of 404 RTC (44% higher than the national average) resulting in the death of 358 people and leaving 1,482 injured above the national average of 281, 162 and 867 respectively. Peden noted that human behaviour accounts for more than 85% of all traffic crashes [7]. Human factors were responsible for 85% of all causes of road traffic accident [8]. According to Umar, the human factor accounts for up to 90% of accidents, while the mechanical and environmental factors contribute to the other 10% [9].

The faster a vehicle is travelling, the higher the impact of a crash. As a result, speed affects not only the risk of being involved in a crash but also the severity of injuries resulting from a crash [10]. Research in Adelaide Australia shows that the risk of a vehicle to be involved in severe crash increases with the vehicle´s speed [11]. Limiting the speed of drivers on many roads in Brazil has partly contributed to the reduction of the accident by 20% [12]. In Nigeria speed is the primary cause of road traffic accident accounting for 33% of the overall traffic crashes in 2016 [5]. The number of accidents and fatalities increases even as better roads are constructed due to a violation of speed limits [13-15].

Research conducted in Mekele Ethiopia shows that 42.3% of drivers with risky behaviours were using handheld phones while driving; 12.3% for business and 29.7 does not want miss calls from friends and clients [16]. Research shows that one-third of taxi drivers in Nigeria has a poor vision [17]. The Number of roadworthy vehicles operating in developing countries is lower than those in developed countries [18, 19].

According to one report, urban roads are safer than those in rural areas due to lower average speed, lighting, and presence of traffic control devices. Males are 3times more likely to die in a road accident than females. Related research shows that drivers using cell phones show greater impairment than drunk drivers and nearly 10% of all highway fatalities were motorcyclists. A motorcyclist who travelled 15 miles every day for a year had an astonishing 1 in 860 chance of dying, 29 times the risk for automobiles and light truck [20].

MATERIALS AND DATA

Study Area

Kano metropolis is the capital city of Kano state, Nigeria. It is located at latitude 12°00′N and longitude 8°31′E to 8.517°E. It consists of six Local Government Areas namely Dala, Fage, Gwale, Municipal, Nassarawa, and Tarauni and some parts of Kumbotso, Ungogo, and Tofa Local Government Areas [21]. The population of Kano metropolis is estimated to be over 4 million people with a male-female ratio of about 1 to 1.32 and a population growth of 2.38% according to Google. Kano is the most prominent commercial and industrial centre in Northern Nigeria and the third largest city in Nigeria.

The city is well linked by roads as shown in Figure 1. It also has an International airport and a rail line connecting it with Guru and Lagos. The public transportation for intra-urban is mainly by mini-buses, taxis, tricycles (commonly referred as Adaidaita Sahu) and commercial motorcycles until their ban in 2013. Taxis and mini-buses have a definite route, only Tricycles and motorcycle offer door to door services. Every day the streets of Kano are flooded with about 9,800 registered motor vehicles, 6,500-registered tricycle and 1.9 million registered motorcycles [22].

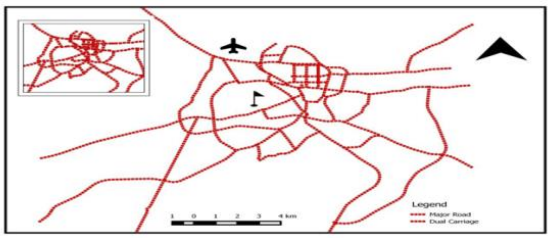

Fig-1: Road Network in Kano Metropolis [21]

Nature of Data

The data used for this research is a secondary data obtained from Federal road safety corps. The record comprises of some fatal, severe and minor RTCs, number people involved, killed or injured with the classification of their gender and age, classification and

category of the vehicle involved and probable cause of RTCs form the year 2009 to 2015.

DISCUSSIONS

Accident Severity

A total of 642 RTCs involving 3,019 people and 957 vehicles occurs from 2009-2015 as shown in table 1 below. Out of the 3,019 people involved, 289 (9%) died, 1663 (55%) sustained various degrees of injury and 1,067 (36%) escaped without any injury. The fatality index of 0.44 per accident shows that in every Seven RTCs reported, three people are killed, and eighteen people are injured within Kano metropolitan. However, the severity index is slightly lower than the national fatality index of 0.48 deaths per accident [6]. The accident rate is 3 per 100,000 populations which is lower than the world average of 18 per 100,000 [2].

Table-1: Severity of RTC in Kano Metropolis

Accident summary									
Year	Population (Millions)	No. RTC	Fatality	Injury	People Involved	Vehicle Involved	Accident (Rate per 100,000) population	Fatality Index	Injury Index
2009	3.044	96	62	272	457	128	3.15	0.65	2.83
2010	3.116	157	47	331	894	209	5.04	0.30	2.11
2011	3.190	120	50	356	448	199	3.76	0.42	2.97
2012	3.266	69	5	100	417	127	2.11	0.07	1.45
2013	3.344	139	86	404	507	186	4.16	0.62	2.91
2014	3.424	25	9	101	143	56	0.73	0.36	4.04
2015	3.505	36	22	99	153	52	1.03	0.61	2.75
% change		-63	-65	-64	-67	-59	-67	-5	-3
Total		642	281	1,663	3,019	957			
Average		92	40	238	431	137	3	0.44	2.59

There was 67%, 5% and 3% decrease in accident rate, fatality index and injury index respectively from 2009 to 2015 as presented in Table 1 above. This may be related to infrastructural improvement and enforcement within the state over the years.

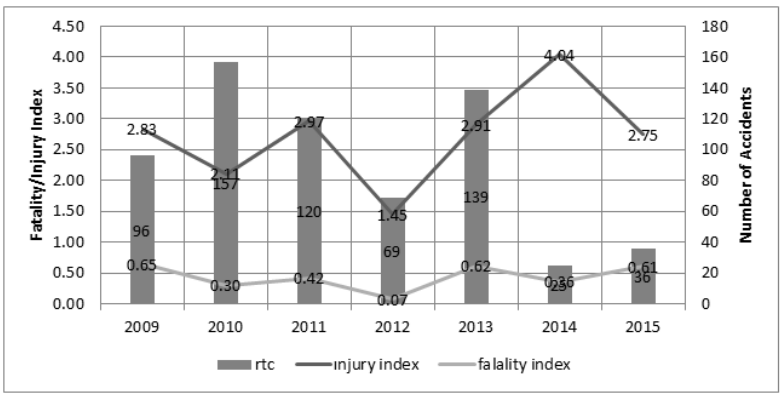

Fig-2: Accidents Severity in Kano Metropolis

From Figure-1, it is evident that the number of fatalities, injuries and vehicles involved in RTC has a direct relationship with some RTC cases, as RTC decreases all others decrease and vice-versa.

People Involved

From Table 2, it is clear that males are more involved in traffic accidents (78%) than females (22%). This is because most of the business and work in the city are run by males (the breadwinners of the family providing all basic needs for their by families) while most of the females are kept indoors to take care of the children and home. Also, the majority of the drivers and passengers are males. RTC has become a significant social problem in Kano metropolis as 88% of those killed, and 85% with severe injuries are adults as shown in table 2.

Table–2: People involved in RTC in Kano Metropolis

Percentage of Age/Sex Group (%)								
					GENDER		AGE GROUP	
	Male >18	Female >18	Male <18	Female <18	Males	Females	Over 18	Below 18
Involved	75	19	3	3	78	22	93	7
Injury	63	22	4	11	67	33	85	15
Fatality	66	21	3	9	69	31	88	12

Mode of Transport in Road Accident

A total of 978 different vehicles were involved in road traffic accident between years 2009–2015. The data for the pedestrians involved in the road traffic crashes were not available for the study period. The mode of transport characterised by the highest number of the accident is motorcycles followed by passenger car as presented in Table 3, which is due to their number on the roads.

Table–3: Vehicles involved in RTC in Kano Metropolis

Modes Of Transport	Years							TOTAL
	2009	2010	2011	2012	2013	2014	2015	
Pedestrians	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bicycle	0	2	2	1	0	0	4	9
Motorcycle	14	84	111	77	59	10	7	362
Motor Tricycle	0	3	3	2	0	9	15	32
Passenger Car	40	58	41	54	74	26	16	309
SUV (Jeep)	0	0	1	0	0	1	0	2
Van	0	0	0	0	4	0	0	4
Mini Bus	45	37	31	16	26	3	4	162
Medium Truck	4	0	1	0	0	3	1	9
Heavy Truck And Trailer	8	18	20	6	23	3	5	83
Others	6	0	0	0	0	0	0	6
Total	117	202	210	156	186	55	52	978

From Figure-3 it is can be seen clearly that 37% of all the vehicles involved in the road traffic crash are motorcycles more than any other form of road transportation over the years, followed by passenger cars 32%, bus 17%, 10% truck, tricycle 3%, bicycle 1%. The result shows that people on a motorcycle are 1.1 times and 12 times more likely to be involved in RTC than those on cars and tricycle respectively. The probability of person on the bus to be involved in RTC is 52% and 45% less than those on motorcycles and cars respectively. Bicycle involvement in accidents is low which is due to its little number on the road as compared to other modes of transportation in Kano city. Even though Motorcycles has the highest number of crashes, it can be seen from Table 3 that the number has continued to fall since 2011 despite an increase in the number of RTCs and number of the vehicle involved in the year 2013. Some tricycle involvement in RTC begins to rise at the rate of 67% which is due to the Achaba ban in Kano and the sudden increase in the number of tricycles in the city, which is the second most convenient public mode of transportation.

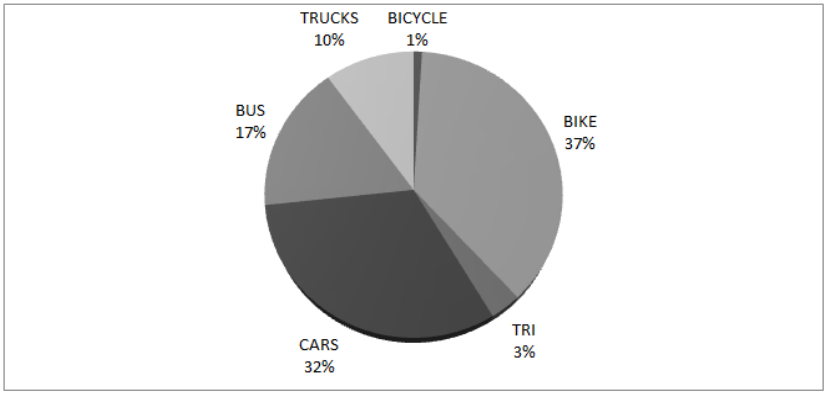

Fig-3: Vehicles involved in RTC in Kano Metropolis

It is evident from Figure-4 that commercial vehicles are 253% and 710% more involved in RTC than private and official vehicles respectively in Kano metropolitan. This indicates that people from the low economic background are more likely to be involved in RTC than the affluent about 2.5 times higher, since the affluent families mostly use private vehicles rather than the commercial vehicles. Involvement of both private, commercial and government vehicles follows the same pattern of accident, injury and fatality distribution over the years. This may be attributed to the high number of commercial vehicles compared to others.

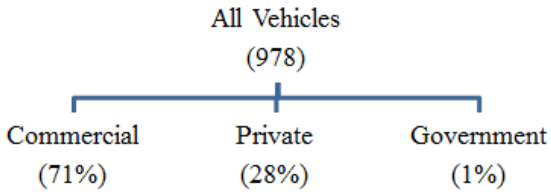

Fig-4: Category of Vehicles in Road Traffic Accident

Factors Contributing to Accident

The most common contributing factors to RTC in Nigeria and their code are summarized in Table 4. The contributing factors were classified based on driver, vehicle and the road environmental contributions. RTV, SPV, and UPD are the leading causes of all the RTC within the study period as shown in Figure-5 with average values of 30 (32 %), 24 (26 %), 17 (19%) respectively. BFL recorded 8 cases contributing to 8% followed by OBS 5%, and then WOT and ROV 4% each. LOC represent 2% of the leading causes, and TBT, MDV, DOT, DGD, each represents 1%. No case of accident was reported to have been caused by SOS, SLV, PWR, OVL, OTH, FTQ, DAD and BRD within the study period. The high percentage of accidents due to RTV is linked to the is less enforcement with regards to a one-way traffic violation and high rate of one-way movement along divided roads by drivers and cyclist especially at peak hour so as to avoid delays in many of the intersections while trying to make U-turns and left turns. It is clear from Table 4 that 85% of the accidents were due to driver's behaviour. This value corroborates with the values from the research conducted by Peden [7] and Odero [8], which states that driver behaviours contribute about 85% of accidents in the world. The remaining 10% were due to defects from the vehicle, and 5% was due to the road environment.

Based on the results of the study, the safety of roads in Kano metropolitan can be improved by increased law enforcement to tackle the problem of route traffic violation and use of the phone while driving. Modern speed calming measures and traffic radars in dense areas should be installed to reduce accidents caused by speeding. Public education and extensive modification of people behaviour that targets motorist may help improve safety. Driver's licenses should only be issued to qualified drivers.

Table-4: Causes of Accidents in Kano Metropolis

Contributing factor	Probable cause	Code	Percentage
	Speed violation	SPV	26
	Loss of control	LOC	2
	Dangerous Driving	DGD	1
	Wrongful overtaking	WOT	4

Driver behaviour	Route violation	RTV	32
	Dangerous overtaking	DOT	1
	Overloading	OVL	0
	Sleeping on steering	SOS	0
	Driver under Alcohol/Drug	DAD	0
	Use of phone while driving	UPD	19
	Fatigue	FTQ	0
Road environment	Bad road	BRD	0
	Road obstruction violation	OBS	5
	Poor weather	PWR	0
	Sign light violation	SLV	0
Vehicle	Tyre burst	TBT	1
	Brake failure	BFL	8
	Mechanically defective vehicle	MDV	1

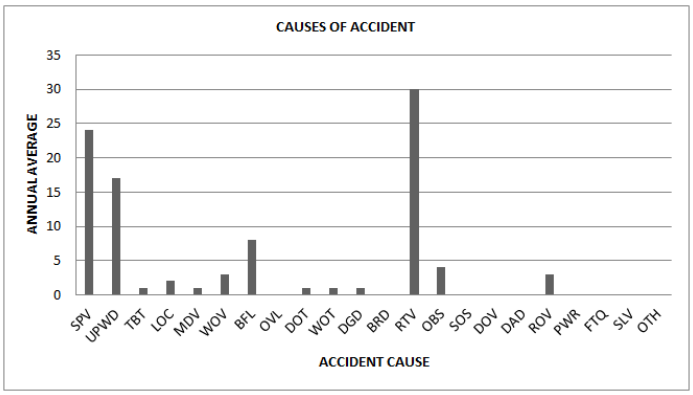

Fig-5: Causes of RTC in Kano Metropolis

CONCLUSIONS

The following conclusions were drawn based on the results of data analysis and evaluation conducted in this study:

- Out of the 3019 people involved in accidents in Kano city within the study period, 9% were killed, 55% sustained a various degree of injuries leaving only 36% escaping without any injury. On average, every nine days a person is killed and 14 people are injured in a road traffic accident. For every 7 RTC reported, three people are killed, and eighteen people are injured within Kano metropolitan. The accident rate per 100,000 populations is 3, which is lower than the world average of 18 per 100,000.
- The male adults account for 75% of all accidents in Kano city, which is four times higher than that of female adults. Also, 66% of the people killed in road traffic accidents are male adults while female adults are 22% of all fatalities. The males are almost four times more likely to be involved in RTC than female.
- The data for pedestrians involved in RTC is not available making the accident data less complete. About 37% of all the accidents occurred on a motorcycle and 32% on a passenger car. A person on a motorcycle is two times and twelve times more likely to be involved in RTC than those on bus and tricycle respectively. Commercial vehicles are 253% and 710% more involved in RTC than private and official vehicles respectively in Kano metropolitan.
- Reckless driving, vehicle condition and road environment accounts for 85%, 10% and 5% of the accidents.
- The ban on Achaba has undoubtedly helped in decreasing the number of accident from 149 cases in 2013 to about 36 cases in 2015.

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