International Journal of Advanced Studies in Ecology, Development and Sustainability
p-ISSN: 2354-4252| e-ISSN: 2354-4260
Volume 8, Number 1 January, 2023

IJASEDS

A Comparative Study of Year 2022 First Quarter Road Traffic Crashes Within the Geo-Political Locations in Nigeria

[1]Esuabanga, William E., [2]Osuorji, Gideon C., [3]Igbokwe Emmanuel I. & [4]Aboluwarin Tobi
[1,2,3&4]Nigerian Building and Road Research Institute (NBRRI), KM 10, Idiroko Road, Ota Ogun State.

Article DOI: 10.48028/iiprds/ijaseds.v8.i1.013

Abstract

This research paper was aimed at analyzing the year 2022 First Quarter Road Traffic crashes within the six geo-political locations in Nigeria. Objective of the study were: to determine the major causative factors responsible for road traffic crashes; to assess the influence of vehicle category on causative factors of road traffic crashes; to evaluate the degree of dependence of causative factors of road traffic crashes on the geo-political locations and to examine the level of spatial variations of road traffic crashes within the six geo-political locations. Secondary data were obtained from the Federal Road Safety Commission and National Bureau of statistics First quarter (Q1) of year 2022 Road Transport Data Report. These obtained data were subjected to both descriptive and inferential statistical analysis such as Chi-Square (X^2) and Analysis of Variance (ANOVA). The result shows that speed limit violation (59.79%), Wrongful Overtaking (6.77%) and Sign Light violation (5.67%) were the leading causative factors for road traffic crashes within the entire geo-political locations. The X^2 analysis revealed that road traffic crashes were influenced by the category of vehicle and also dependent on the geo-political locations with calculated value of 24,632 and 479.36 greater than (>) table Value of 27.59 and 107.52 respectively @ 0.05 significant level. Furthermore, the ANOVA result showed that road traffic crashes spatially varies within the geo-political locations with a calculated value of 2.48 > table value of 2.28. It was recommended that more stringent measures be put in place by concerned authorities, agencies and stake holders towards incessant speed limit violation which was the leading causative factor responsible for road crashes.

Keywords: *Crashes, Traffic, Speed limit, Road and Locations*

Corresponding Author: Esuabanga, William E.

Background to the Study

The available data of road traffic crashes across the world generated at the local, national and international levels had portrayed road transport as one of the leading cause of human disaster. This is due to the number of deaths and injuries which are associated with road traffic crashes. Road traffic has turned out to be one of the major concern for human existence since the invention of motorized vehicle and road way transport. According to world health organization (WHO,2018), road traffic crashes is eight most common means of death for all age groups. The trend for most of these traffic accident occurs in low and middle-income countries which account for over ninety percent of traffic accident fatalities (Hazaymeh, Almagbile and Alomari, 2022).

In developing countries such as Nigeria, road traffic accidents has become one of the leading course of death and fatalities, Nigeria is ranked as the second highest in terms of road crashes among 193 countries of the world (Agbokhese, et al. 2013).In order to reverse this negative trend of road traffic crashes in Nigeria, the Federal Road safety Commission (FRSC) was established in 1988 and charged with the mandate of reducing the alarming rate of regular road traffic crashes as well as generating road traffic data in collaboration with National Bureau of Statistics. Despite this effort, results has shown that the country is yet to win the war of incessant road traffic crashes on our roads. This calls for an in- depth analysis of this quarterly and yearly road traffic data which are being generated by these agencies. It is strongly believed that available data when subjected to a more in-depth analysis will likely exposed diverse variables which may be responsible for these incessant crashes and on our major highways.

Literature Review

Several studies have been conducted in relation to road traffic accident using diverse methodologies and their results published. Rahman, Jamal and Al-Ahmadi (2020) examined hotspots of traffic collisions and their spatial relationships with land users with Geographic Information System (GIS) using geographically weighted regression approach in Damman, Saudi Arabia. Their results showed that fatal and injury crashes were mostly located within residential neighborhoods and near public facilities with relatively higher speed limits.

Owusu, Eshun, Asure and Aikins (2018), Studies road traffic accident hotspots in Cape coast metropolis, Southern Ghana using Geographic Information System (GIS). Their outcome released nine major hotspots within the study area. Yunus and Abdukarim (2021), studied Traffic Accident and Emergency Response Optimization in Kano Metropolis, Nigeria. The result revealed a variation in the distribution patterns, emergency health care facilities ambulance and accident spots. Gumah (2015) in his Investigation of Spatial-Temporal Analysis of Road Traffic Accident on the Accra-Tema Motorway in Ghana, observed that accident along the route clustered at point of road intersections and areas associated with high commercial activities and concentration of human population. Odinfono, Adesina and Adeoye (2020) in their study examined the road way characteristics of road traffic crashes black spots along Akure –Owo highway between 2012-2016 using spatial model for assessing the spatial dimension for road safety management. Outcome of their studies showed that

there is a statistically significant clustered pattern in the occurrence of road traffic crashes along the route. The study also found out that most potent road factors in the incidence of road traffic crashes are within the intersections, road curvature, and slope along the route. Isa and Siyan (2016) analyzed factors responsible for road accident along Kano-Kaduna –Abuja dual carriage way using category model. It was discovered that most of the vehicles responsible for crashes on the highway lacked routine repairs, maintenance together with the existence of potholes.

In a study by Samuel and Amini (2021) in Rivers state Nigeria among commercial drivers concerning determinant of road accident using a cross –sectional survey design, it was found that age and drug use were major significant predictor of road traffic accident among commercial drivers. Furthermore, Oguagbaka (2019) carried out a statistical analysis of road accident in Anambra state, Nigeria from 2014-2017 using secondary data obtained from Anambra state statistical year book. These data which were subjected to Kruskal- wallis statistical tool showed that serious accident was the most experienced category of accident suffered within the study area.

Oyetubo, Afolabi and Ohida (2018) in their investigation of road traffic safety in Minna, Niger state, Nigeria using data obtained through questionnaire and secondary data obtained from the Nigerian police force and the Federal Road Safety Commission. It was revealed in their result that male involved more in road accident than female within the state while private cars are more prone to accident than commercial taxis. Despite all these studies by renowned researchers and scholars on road traffic accidents using diverse approaches, non is yet to focus on the comparative study of first quarter of year 2022 road accident data report which was released by Federal Road Safety Commission and the National Bureau of statistics. It is on this base that this research was embarked upon in other to carry out an in depth study in order to fill this yearning gap.

Aim and Objectives of the Study

This study was aimed at giving an in-depth and comparative analysis of the first quarter of year 2022 road traffic data within the six geo-political locations of Nigeria. In order for this aim to be achieved the following objectives were set as guides for this study viz:

1. To determine the major causative factors responsible for road traffic crashes
2. To access the influence of vehicle category on causative factors, of road traffic crashes
3. To evaluate the degree of dependence of causative factors of road traffic crashes on geo- political locations
4. To examine the level of spatial variation in road traffic crashes within the six geo-political locations.

Materials and Methods

Secondary data needed for the study were obtained from Federal Road Safety Commission and National Bureau of statistics on road traffic data (First Quarter of 2022). These data were subjected to both descriptive and inferential statistical analysis such as Chi-Square (x^2) and one-way Analysis and Variance (ANOVA). The Chi-Square Statistical tools was used to

investigate the influence of vehicle category on causative factors of road traffic crashes as well as the degree of independence of causative factors of road traffic accident on the six geo-political locations in Nigeria. One-way ANOVA was used to examine the degree of spatial variations of road traffic crashes within the six geo-political locations.

The formula for Chi-Square(x^2) is presented as follows

$$X^2=\Sigma(O-E)^2 / E$$

Where O= the observed value or distribution
E= the expected value or Distribution

While the formula for the one-way ANOVA is presented as

$$F=MSB \div MSW$$

Where F (F-statistics or f-ratio) =Coefficient of ANOVA
MSB=Mean Sum of square between the groups
MSW=Mean sum of square within group

Result and Discussion

Table 1: Causative Factors for road traffic crashes within the geo-political locations

Causative Factors	Geo-political locations							
	South-South	South-West	South-East	North-West	North-East	North-Central	Total	Percentage(%)
Dangerous Driving	6	59	3	31	44	86	229	5.35
Break Failure	27	67	39	4	0	51	188	4.39
Sleeping on Steering	0	1	0	0	0	13	14	0.33
Bad Road	0	1	0	2	8	3	14	0.33
Dangerous Overtaking	0	1	0	2	2	0	5	0.12
Sign Light Violation	28	8	33	15	40	119	243	5.67
Use of phone while Driving	1	0	0	1	0	4	6	0.14
Driving Under Alcohol	0	5	1	0	0	3	9	0.21
Road Obstruction Violation	3	1	5	4	6	14	33	0.77
Fatigue	0	10	1	5	3	23	42	0.98
Route Violation	10	64	5	22	21	61	183	4.27
Wrongful Overtaking	24	58	28	39	58	83	290	6.77
Speed Violation	205	661	87	464	275	869	2561	59.79
Poor Weather	0	0	0	0	0	0	0	0.00
Over loading	2	8	1	17	6	8	42	0.98
Tyre Burst	22	59	12	36	28	66	223	5.21
Mechanically Deficient Vehicle	8	29	1	3	8	23	72	1.68
Others	3	38	1	20	2	65	129	3.01

Source: Authors computational Analysis 2022 from NBS/FRSC (First Quarter of 2022 Road Traffic Data)

The data presented on table 1 showed different causative factors responsible for traffic crashes within the geo-political locations. Among these factors, speed violation was leading causative factor responsible for road traffic crashes within the entire geo-political locations with 59.79%. Other major causative factors responsible for traffic crashes were wrongful overtaking and sign light violation with 6.77% and 5.67% respectively.

Table 2: Summary of X^2 showing influence of vehicle category on causative factors of road traffic crashes

Cal.X^2	df	Crit. X^2	Sign. Level
24.632.52*	17	27.59*	0.05

Source: Authors Computational Analysis, 2022

The Table 2 above, which is the summary of Chi-square showing the influence of vehicle category on causative factors of road accident. The result showed that the calculated value of 24.63 was greater than the table value of 27.59. This means the category of vehicles such as car, motor cycle, tanker, bicycle etc, indeed influence the causes of road traffic crashes experience on road within the geo-political locations. It therefore calls on those concern agencies to put more safely measures on some category of vehicles that have the highest tendency for road crashes. Moreover, this agrees with Oyetubo, Afolabi Ohida (2018) in their investigation of road traffic safety which revealed that private vehicles are more prone to road crashes than commercial vehicles.

Table 3: Summary of X^2 showing the degree of dependent of causative factors on traffic crashes on geo-political locations.

Cal.X^2	df	Crit.X^2	Sign. Level
479.36*	85	107.52*	0.05

Source: Authors statistical Analysis, 2022

The above Table 3 showed that causative factors of road traffic crashes are dependent on different geo-political locations. This point to the fact that some geo-political location may be more prone to road crashes than others as a result of some inherent factors such as the terrain, cultural, religious background etc. This may of course influence some geo-political locations to be more prone to road traffic crashes. It therefore calls for a more critical look at these inherent factors within the six geo-political locations that may specifically trigger more traffic crashes than other locations.

Table 4: Summary of ANOVA showing the level of spatial Variations in road traffic crashes.

	Difference or Sum of Squares	Degree of freedom	Variance estimate	F- Value	Cal. Value	Sign. Level
Between Sample	64,770.48	5	129544.09			
Within Sample	533,016.46	102	5225.65		2.48	0.05
Total	597,786.94	107	18,179.747			

Source: Authors computational Analysis, 2022

Table 4 above showed the summary of the level of spatial variations in road traffic crashes within the six geo-political locations. The result revealed that traffic crashes indeed varies significantly within the geo-political locations in Nigeria. The reason being that, the calculated value of 2.48 was greater than that of the table of value of 2.28, at 0.05 level of significance. This means that causative factors responsible for road crashes vary within the existing political location. In this case, in tackling the menace of road crashes, there is needed to consider the peculiar attributes associated with each geo-political location of the country. This may be attributed to the fact that causative factors of road traffic crashes might have been influenced by the terrain and other socioeconomic characteristics of each geo-political location within the country.

Conclusion /Recommendation

This study focused on comparative analysis of year 2022 first quarter road traffic crashes with the six geo-political locations in Nigeria. The findings of this study revealed that speed violation was the leading causative factor responsible for road traffic crashes within the geo-political locations. The study also showed the causative factors of road traffic crashes were highly influenced by vehicle category based on the X^2 analysis. Furthermore, X^2 analysis showed that causative factors of road crashes are highly dependent on the geo-political location. Moreover, the ANOVA result revealed that causative factors of road traffic crashes spatially varies with the geo-political locations. The paper recommended that more stringent measures be adopted by concerned authority, agency and stake holders in reversing the negative narrative associated with speed limit violation which was the leading cause of road crashes. Moreover, based on the fact that causative factors responsible for road traffic crashes varies with geo-political locations, there is need to look beyond just the causative factors and critically evaluate other variables that are peculiar to a particular geo-political location when it comes to road traffic crashes.

References

Agbonkhese, O., Yisa, G. L., Agbonkhese, E. G., Akabi, D., Aka, E. & Mondigba, E. (2013). Road traffic accident in Nigeria causes and preventive measures*, Civil and Environmental Research* 3 (13), 90-100

FRSC Federal Road Safety Commission and NBS (National Bureau of Statistics. (2022). *First quarter of road traffic data; Federal Road safety commission,* Abuja, Nigeria

Gumah, G. (2015). *Spatio - Temporal analysis of road traffic accident on Accra Tema motorway causes and Risk Factors*, Unpublished .M.Phil Thesis in the department of Geography and Resources Development, University of Ghana.

Hazaymeh, K., Almagbile, A., & Alomari, E. (2022). Spatio- temporal analysis of traffic accidents hotspot based on geo-spatial techniques, *International Journal of geo-information 2*(011-260)

Isa, M. N. & Siyan, P. (2016*).* Analyzing factors responsible for road traffic accident along Kano-Kaduna –Abuja Dual carriage way, Nigeria, *Journal of Economics and Sustainable Development 7.* 12(2222-2855)

Odinfono, J. U. Adesina, F. A. & Adeoye, N. O. (2020). Road characteristics and road traffic crashes Along Akure- Owo highway, Ondo state Nigeria, *Nigeria Journal of Logistics and Transport.*

Oguagbaka, S. K. (2019). Statistical analysis of road accident in Anambra State, *Chukwuemeka Odumegwu Ojukwu University Journal of Physical Sciences,2 (*8)

Owusu, E. A. & Aikins, U. (2018). Identic identification of road traffic accident hotspots in Cape Coast metropolis, South Southern Ghana using Geographic Information System (GIS) Inter *International Journal of Scientific & Engineering Research. 9*(10),2229-5518.9

Oyetubo, A. O. Afolabi, O. J. & Ohida, M. E. (2018). Analysis of road traffic safety in Minna Niger State, Niger*ia, Logistics and Sustainable Transport*. 9 (1) (23-38)

Samuel., G. K. & Amini, L. (2021*).* Development of road traffic accident among commercial drivers in Rivers State Nige Nigeri*a*, *International Journal of Public Health and Pharmacology*.

Rahman, M. T., Jamal, A., Al-Amad, H. (2003). Examining hotspot of traffic collisions and spatial relationships with Land Use. A GIS bated geographic regression approach for Damman, Saudi Arabia, *International Journal of Geo-information , 9*(540)

Yenus, S. & Abdukarim, I. (2021). *Geospa geospatial analysis of road traffic crashes and emergency*

response optimization in Kano metropolis, Niger Nigeria. Research Square.
WHO (World Health Organisation) (2018). *Global status report on road safety*, World Health Organisation: Geneva, Switzerland.