



Statistical analysis of traffic accident in Nigeria

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Abstract: The research work is undertaken on Statistical Analysis of Traffic Accident in Nigeria having realized the alarming rate at which motorists and passenger involved in traffic accident. The use of Hotelling T-square revealed that there is significant difference in reported cases and casualties of traffic accident in the regions (Southern and Northern) and two way analysis of variance also showed that there is significant difference in the reported cases and casualties of traffic accident in the years and geo-political zones except for those highlighted in the conclusion.

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1. INTRODUCTION

Road accident worldwide and in particular Nigeria has become a regular phenomenon. Every day Nigerian die on the road and many injured. In such circumstances, the role of medical institutions become important as the first few minutes after the accident termed the “golden hour” are very precious and crucial. Many lives could be saved and disabilities prevented by providing immediate treatment to accident victims. Among the accidents resulting from the development of air, land, sea, river transport, road accident predominate both in respect of their frequency and seriousness and in term of human and economic cost. There is no doubt about it; there are far too many accidents on the road today. Even if you are the most careful and contentious driver on the road there is still a chance that someone will slam in your car causing you at the very least, some property damage and may something far worse. This is disheartening indeed because road accident is becoming a daily occurrence due to road traffic integration are treated as secondary issue in Nigeria. It is a known fact that transportation system is the movement of people and goods from one location to another. Transport is performed by various modes such as air, rail, road, water, cable pipeline and space, road is an identifiable route way or path

between two or more places. Road are typically smoothed, pave or otherwise prepared to allow easy travel.

The most common road vehicle is the automobile which offer high flexibility and with low capacity. It allow for more efficient travel at a reduced cost. Mr. Julius Adekoye lamented that “road accident in Nigeria claim more lives daily than any other faster because of the multiple lapses in our system contribute to such road mishap, source of which are fatal in some cases” there is nothing you can do that will guarantee you a constantly safe and totally accident free driving experience but there are several things that travelers could do to help minimize the amount of accident that occur on the road every day. first obey the traffic law that states makes prospective drivers pass a test before they get behind the wheel for a reason, automobiles can be very dangerous if they are not operated properly and according to the laws of the road. Speed limits, traffic signs and all other traffic signals should be closely adhered to every single time someone get behind the wheel. Traffic laws are put in place to produce all the travelers who are sharing space on the road. Following traffic signals is an option, those drivers that treat it as such are usually the ones you see

pulled over to the side of the road being handed a violation paper by officers.

Nigeria Government has been trying all their effort to reduce the rate of road accidents in the country. Investigation have shown that many factors contributed to road accident which are over speeding, bad roads, careless driving by the drivers and faulty vehicles e.t.c.

The Federal Road Safety commission (FRSC) is a government agent with statutory responsibility for road safety administration in Nigeria. It was established in 1988. The federal road safety corps (FRSC) operates in all Nigerian states as well as the federal capital territory (FCT). A corps marshal of the FRSC Osita Chidoka (2008) said that 18300 road accidents have claimed 51251 persons injured in Nigeria in the past three years. He further explained errant petroleum tankers drivers were responsible for most of the accident in Nigeria he said that in the first three months of the year 2007, 2119 accidents involving tankers drivers claimed 301 lives meanwhile; one analyst has said the figure of fatalities by the police is a gross under - estimation of the death resulting from accident. The increasing magnitude of fatal road traffic accident globally has been attributed to population explosion and increased level of motorization. Motor vehicle crashes are the leading cause of death in adolescent and people in the prime age (Atunbi, 2009). Vehicular crashes are the world's leading cause of death for individuals between the ages of one and twenty-nine (WHO 2015). Following current trends, about two million people could be expected to be killed in motor vehicle crashes each year by 2030 (WHO 2015). Currently, road crashes are ranked as the ninth most serious cause of death in the world, and without new initiatives to improve road safety, fatal crashes will likely rise to the third place by the year 2020 (WHO 2015).

Road traffic crash data are useful tools to support the development, implementation, and assessment of highway safety programs that tend to reduce road traffic crashes. Collecting road traffic crash data aims at gaining a better understanding of road traffic operational problems, locating hazardous road sections, identifying risk factors, developing accurate diagnosis and remedial measures, and evaluating the effectiveness of road safety programs. (Abdulhafedh, 2017). The causes of road traffic accidents therefore fall under three major categories viz- Human factors, Mechanical factors and the Environmental factors. Of these three categories, the human factors are said to be responsible for over 80% of all traffic crashes because the drivers' operational ability is very critical to the causes and prevention of traffic accidents (Afolabi and

Gbadamosi, 2017). Effective interventions include design of safer infrastructure and incorporation of road safety features into land-use and transport planning; improvement of vehicle safety features; improvement of post-crash care for victims of road crashes, and improvement of driver behavior, such as setting and enforcing laws relating to key risk factors, and raising public awareness will minimized this problem to some extent as recommend by (Mohan 2002) as well.

Adegbenro (2009) studied the road accidents trends in Nigeria between the period of 1960 and 1989 his study reveal a sharp increase in fatal accident occurrence. Between 1960 and 1969 it was observed that over 18000 death occur as a result of road accidents by the third decade (1980 - 1989) this figure had increase to about five times i.e. more than 9200 death. According to Eke (2001) it has however being observed that most of the factors involving in road accidents are created and control by man. Man initiated the process that may yield a road accidents by traveling, he or she may travel as a pedestrian as a passenger in a vehicle or as the operator of the vehicle. Odero (1998) added that most vehicle operator also fail to ensure the road worthiness of their vehicle before they hit the highway which contributes majorly to road accidents in Nigeria. Occasionally, the vehicle operator fails to adhere to safety regulation for instance, fastening the seatbelt and ensuring safe condition of the vehicles. It has also been observed that during the festival periods and holidays, there are always more vehicles on the Nigeria highways and road, people tend to be rushing to meet certain commitment or to arrive at their destination earlier consequently, there are more accident during these period than other time.

(Antigba 1996 and Edom 1989) "the fewer the people that would die from road accidents the better Nigeria will begin to appreciate the federal road safety corps (FRS C) and it is believed that this is possible so talking of being able to show results with the (FRS C), being effective, delivering service reducing road accidents from 100 to 80 percent per month, it is then that service will be known to being delivered. The Federal Road Safety Corps have the responsibility of improving road safety and reducing road accident. In addition, Daily Post (2018) published from the National Bureau of Statistics (NBS) Road Transport Data (Q2 2018) on Tuesday; at least, 1,331 Nigerians died in road crashes in the second quarter of 2018. There has been an upsurge in the proportion and absolute number of traffic fatalities witnessed in a number of developing countries while the industrial nations are witnessing downward trend in the occurrence of accident by more than 20% (Emenike and Ogbole, 2008).

According to Gbadamosi (2005); to reduce and or prevent traffic accident occurrence in the country the following may be considered as part of a meaningful approach: There should be total enforcement of traffic rules and regulation to correct erring drivers and the Government and affected institutions should take the issue of road construction and maintenance more seriously. Driving schools should be made compulsory so that driving license holders will have a full knowledge of traffic rules.

Odelowo (1998) believe that the role of intoxication with drugs and alcohol is important in the cause of road accident worldwide. Odeleye (2003) in this view picture the road traffic environment in Nigeria as an environment dominated by abundant combination of largely illiterate or inexperienced or drunk or overconfident of drivers, unconcerned about the line of other road users knowing nothing more than the rudiment of money a vehicle and sounding their horn with reckless abandon, meanwhile operating poorly maintained vehicle on high quantity poorly designed ill maintained roads a society that is devoid of traffic law enforcement service and that is ill equipped with emergency Road Safety facilities where Government, Police, and Military driver flout traffic laws with immunity where paramedical personnel are sometimes called and unconcerned about the agonies of road accident victims. Mr. Osita Chidoka, the Corps Marshal of Nigeria's Federal Road Safety Corps (FRSC), said on Saturday that road accidents are the "biggest killers of Nigerians, more than any other disease. Although he did not provide statistics for a reality check and comparison with other killers, Chidoka said the frequency of accidents has become a great source of concern. "No other disease is killing people in the country like road traffic accidents and this is a source of concern for all the stakeholders," he said in Sokoto at a Special Marshals Sectoral Workshop, with the theme, "Advocacy as a tool for improved road safety activities".

Last year, 3,000 people, according to a contentious statistics given by the FRSC, died in Nigeria in 2,235 accidents, making Nigeria, the second country in the world with the highest fatalities on the roads. The World Health Organization and the National Union of Road Transport Workers all disputed last year's figures. In earlier figures, FRSC reported deaths of 17,000 between 2007 and 2009. In comparison, 220,000 people were estimated to have died as a result of AIDS in 2010. Recently, the corps marshal and chief executive of the federal road safety corps (FRSC) Osita Chidoka said the 54 person died in motor accidents in the northern region of the country between July and August this year. The corps

marshal made the fact known in Sokoto at a special marshal sectorial workshop with the term advocacy as a tool for improved road activities according to Chidoka; he said 15 people died during the Eld-Fitr celebration in August in Zamfara and Kebbi state. 12 of them died in Fsafe, Zamfara the diseased persons where all district head from Jigawa state who were on their way to Argungu Kebbi state, he said adding that the zone road safety 10 comes third nationwide in the ranking of accidents rate during the period "no other diseases is killing people in the country like road traffic accident and this is a sure of concern for all the stakeholders.

Mrs. Josephine AGwu cautioned that "if you do not have time to eat, change or apply your make up before you get in the car it is probably good idea to start getting up earlier. Those five extra minute of sleep won't help you replace your destroyed automobile or help with your rehabilitation following an accidents" put down the cell phone, our cell phone now are a huge survival tool, they lets us make calls, receive and send text messages and e-mails, stuff in the internet and get directions, watch videos, take pictures and listen to music among other things but one place they don't belong is in your hand while you are behind the wheel. Transport workers according to Dave Spooner of the global labor institution (UK) in 2011, he said over last 20 years the urban centers of development countries have exploded in size. Formal often state owned public transport services have not had the necessary financial or institutional capacity to meet demand and have been badly affected by deregulation and privatization, most state run bus and rail services in developing countries have in effect collapsed as a consequence the information transport section has grown rapidly unemployment and rate, of urban poverty. Notwithstanding this global trend there is a sparcity of data collection and systematic analysis of information transport services.

The sector is often ignored in policy making circle not least because compiling both quantities and qualitative information is exceedingly difficult. It is not surprising therefore, that there are little reliable and up to date data on the livelihoods of transport workers in the urban informal economy. Recently the Government tendered research into in-vehicle technology that made an evaluation of devices that can inform drivers or monitor driver behaviour, including BBR and vehicle collision avoidance systems. In 1986, the lack of systematic analysis on regional and intra-urban variation in accident rate was a significant cause for concern. This lead to a call for a " renewed attack on road safety problems with a detailed spatial examination, attention to movement and interaction, attention to neighbourhood and community and attention to age,

sex, ethnic, and class variation that will not only tell us just what progress we have or have not made but will give us hard evidence on which to base future policy through which progress can be monitored", Whitelegg 1986.

2. MATERIALS AND METHOD

Data collection: This is the first step in a statistical investigation or a research work. It is defined as an assembling of facts needed for the purpose of investigating a particular project at hand. There is various method of data collection. They are interview method (person or delegated investigation), questionnaire method (mail or personal), observation method, experimentation method, registration method and transcription from records (published or unpublished).

Source of data: The source of data for this research work is secondary collected by the investigator. Data collected from secondary source need some caution before it could be used, it must be verified to be reliable, current and free from falsification. The method employed for the purpose of this study is the method of transcription from records.

Hotelling's t-squared methods: In statistics Hotelling's T-squared distribution is important because it arises as the distribution of a set of statistics which are natural generalizations of statistics underlying student's T distribution. In particular, the distribution arises in multivariate statistics in undertaking tests of the differences between the multivariate means of different populations, where tests for univariate problems would make use of a t-test. It is proportional to the F distribution. The distribution is named for Harold Hotelling who developed it as a generalization of student's t-distribution.

Two Way Anova: This is always known as two-way ANOVA. All the treatments must appear in the same block. Two-way ANOVA is of the form.

2.1 MODEL

$$Y_{ij} = \mu + \alpha_i + \beta_j + e_{ij} \quad \text{for } i = 1, 2, \dots, p; \quad j = 1, 2, \dots, q$$

Where

- Y_{ij} = is the observation at the level (i^{th} and j^{th}) of factor A and B.
- μ = overall mean effect
- α_i = effect of the factor A at i^{th} level.
- β_j = effect of the factor B at j^{th} level
- e_{ij} = random error associated with the observations.

Tukey Range Test: Tukey test, also known as the Tukey range test, Tukey method, Tukey honest significance test, Tukey HSD (honestly significant difference) test or the Tukey-Kramer method, is a single-step multiple comparison procedure and statistical test. It is used in conjunction with an ANOVA to find means that are significantly different from each other. Named after John Tukey, it compares all possible pairs of means, and is based on a studentized range distribution (q) (this distribution is similar to the distribution from the t-test). The Tukey HSD tests should not be confused with the Tukey Mean Difference tests (also known as the Bland-Altman Test).

2.2 ANALYSIS

The data below were collected on the reported cases and casualties of road accidents in Nigeria based on Regions from years 2013 to 2018.

Tests of Between-Subjects Effects

Dependent Variable: REPORTED CASUALTIES IN NIGERIAN GEO-POLITICAL ZONES

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Model	1.162E9	11	1.056E8	40.913	.000
YEARS	44471120.222	5	8894224.044	3.446	.017
ZONES	1.476E8	5	29529980.044	11.440	.000
Error	64533250.778	25	2581330.031		
Total	1.226E9	36			

a. R Squared = .947 (Adjusted R Squared = .924)

Post Hoc Tests

Year

Multiple Comparisons

REPORTED CASUALTIES IN NIGERIAN GEO-POLITICAL ZONES Tukey HSD

(I) YEARS	(J) YEARS	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
2013.00	2014.00	-2030.1667	927.60085	.278	-4888.8334	828.5001
	2015.00	-1749.6667	927.60085	.433	-4608.3334	1109.0001
	2016.00	49.1667	927.60085	1.000	-2809.5001	2907.8334
	2017.00	-1954.6667	927.60085	.316	-4813.3334	904.0001
	2018.00	-2993.0000*	927.60085	.036	-5851.6668	-134.3332
2014.00	2013.00	2030.1667	927.60085	.278	-828.5001	4888.8334
	2015.00	280.5000	927.60085	1.000	-2578.1668	3139.1668
	2016.00	2079.3333	927.60085	.255	-779.3334	4938.0001
	2017.00	75.5000	927.60085	1.000	-2783.1668	2934.1668
	2018.00	-962.8333	927.60085	.900	-3821.5001	1895.8334
2015.00	2013.00	1749.6667	927.60085	.433	-1109.0001	4608.3334
	2014.00	-280.5000	927.60085	1.000	-3139.1668	2578.1668
	2016.00	1798.8333	927.60085	.403	-1059.8334	4657.5001
	2017.00	-205.0000	927.60085	1.000	-3063.6668	2653.6668
	2018.00	-1243.3333	927.60085	.760	-4102.0001	1615.3334
2016.00	2013.00	-49.1667	927.60085	1.000	-2907.8334	2809.5001
	2014.00	-2079.3333	927.60085	.255	-4938.0001	779.3334
	2015.00	-1798.8333	927.60085	.403	-4657.5001	1059.8334
	2017.00	-2003.8333	927.60085	.291	-4862.5001	854.8334
	2018.00	-3042.1667*	927.60085	.032	-5900.8334	-183.4999
2017.00	2013.00	1954.6667	927.60085	.316	-904.0001	4813.3334
	2014.00	-75.5000	927.60085	1.000	-2934.1668	2783.1668
	2015.00	205.0000	927.60085	1.000	-2653.6668	3063.6668
	2016.00	2003.8333	927.60085	.291	-854.8334	4862.5001
	2018.00	-1038.3333	927.60085	.869	-3897.0001	1820.3334
2018.00	2013.00	2993.0000*	927.60085	.036	134.3332	5851.6668
	2014.00	962.8333	927.60085	.900	-1895.8334	3821.5001
	2015.00	1243.3333	927.60085	.760	-1615.3334	4102.0001
	2016.00	3042.1667*	927.60085	.032	183.4999	5900.8334
	2017.00	1038.3333	927.60085	.869	-1820.3334	3897.0001

*. The mean difference is significant at the 0.05 level.

ZONES

Multiple Comparisons

REPORTED CASUALITIES IN NIGERIAN GEO-POLITICAL ZONES

Tukey HSD

(I) ZONES	(J) ZONES	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
SOUTH WEST	SOUTH EAST	3977.0000*	927.60085	.003	1118.3332	6835.6668
	SOUTH SOUTH	3015.0000*	927.60085	.034	156.3332	5873.6668
	NORTH WEST	1259.5000	927.60085	.751	-1599.1668	4118.1668
	NORTH EAST	3424.6667*	927.60085	.012	565.9999	6283.3334
	NORTH CENTRAL	-1712.5000	927.60085	.456	-4571.1668	1146.1668
SOUTH EAST	SOUTH WEST	-3977.0000*	927.60085	.003	-6835.6668	-1118.3332
	SOUTH SOUTH	-962.0000	927.60085	.901	-3820.6668	1896.6668
	NORTH WEST	-2717.5000	927.60085	.069	-5576.1668	141.1668
	NORTH EAST	-552.3333	927.60085	.990	-3411.0001	2306.3334
	NORTH CENTRAL	-5689.5000*	927.60085	.000	-8548.1668	-2830.8332
SOUTH SOUTH	SOUTH WEST	-3015.0000*	927.60085	.034	-5873.6668	-156.3332
	SOUTH EAST	962.0000	927.60085	.901	-1896.6668	3820.6668
	NORTH WEST	-1755.5000	927.60085	.430	-4614.1668	1103.1668
	NORTH EAST	409.6667	927.60085	.998	-2449.0001	3268.3334
	NORTH CENTRAL	-4727.5000*	927.60085	.000	-7586.1668	-1868.8332
NORTH WEST	SOUTH WEST	-1259.5000	927.60085	.751	-4118.1668	1599.1668
	SOUTH EAST	2717.5000	927.60085	.069	-141.1668	5576.1668
	SOUTH SOUTH	1755.5000	927.60085	.430	-1103.1668	4614.1668
	NORTH EAST	2165.1667	927.60085	.218	-693.5001	5023.8334
	NORTH CENTRAL	-2972.0000*	927.60085	.038	-5830.6668	-113.3332
NORTH EAST	SOUTH WEST	-3424.6667*	927.60085	.012	-6283.3334	-565.9999
	SOUTH EAST	552.3333	927.60085	.990	-2306.3334	3411.0001
	SOUTH SOUTH	-409.6667	927.60085	.998	-3268.3334	2449.0001
	NORTH WEST	-2165.1667	927.60085	.218	-5023.8334	693.5001
	NORTH CENTRAL	-5137.1667*	927.60085	.000	-7995.8334	-2278.4999
NORTH CENTRAL	SOUTH WEST	1712.5000	927.60085	.456	-1146.1668	4571.1668
	SOUTH EAST	5689.5000*	927.60085	.000	2830.8332	8548.1668
	SOUTH SOUTH	4727.5000*	927.60085	.000	1868.8332	7586.1668
	NORTH WEST	2972.0000*	927.60085	.038	113.3332	5830.6668
	NORTH EAST	5137.1667*	927.60085	.000	2278.4999	7995.8334

*. The mean difference is significant at the 0.05 level.

Tests of Between-Subjects Effects

Dependent Variable: REPORTED CASES OF ACCIDENTS IN NIGERIAN GEO-POLITICAL ZONES

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	3356360.333 ^a	10	335636.033	16.585	.000
Intercept	16630084.000	1	16630084.000	821.755	.000
YEARS	444327.333	5	88865.467	4.391	.005
ZONES	2912033.000	5	582406.600	28.779	.000
Error	505931.667	25	20237.267		
Total	20492376.000	36			
Corrected Total	3862292.000	35			

a. R Squared = .869 (Adjusted R Squared = .817)

Post Hoc Tests

YEARS

Multiple Comparisons

REPORTED CASES OF ACCIDENTS IN NIGERIAN GEO-POLITICAL ZONES

Tukey HSD

(I) YEARS	(J) YEARS	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
2013.00	2014.00	-76.8333	82.13255	.933	-329.9482	176.2816
	2015.00	-131.3333	82.13255	.607	-384.4482	121.7816
	2016.00	9.6667	82.13255	1.000	-243.4482	262.7816
	2017.00	-130.8333	82.13255	.610	-383.9482	122.2816
	2018.00	-323.6667*	82.13255	.007	-576.7816	-70.5518
2014.00	2013.00	76.8333	82.13255	.933	-176.2816	329.9482
	2015.00	-54.5000	82.13255	.984	-307.6149	198.6149
	2016.00	86.5000	82.13255	.895	-166.6149	339.6149
	2017.00	-54.0000	82.13255	.985	-307.1149	199.1149
	2018.00	-246.8333	82.13255	.059	-499.9482	6.2816
2015.00	2013.00	131.3333	82.13255	.607	-121.7816	384.4482
	2014.00	54.5000	82.13255	.984	-198.6149	307.6149
	2016.00	141.0000	82.13255	.534	-112.1149	394.1149
	2017.00	.5000	82.13255	1.000	-252.6149	253.6149
	2018.00	-192.3333	82.13255	.215	-445.4482	60.7816
2016.00	2013.00	-9.6667	82.13255	1.000	-262.7816	243.4482
	2014.00	-86.5000	82.13255	.895	-339.6149	166.6149
	2015.00	-141.0000	82.13255	.534	-394.1149	112.1149
	2017.00	-140.5000	82.13255	.538	-393.6149	112.6149
	2018.00	-333.3333*	82.13255	.005	-586.4482	-80.2184
2017.00	2013.00	130.8333	82.13255	.610	-122.2816	383.9482
	2014.00	54.0000	82.13255	.985	-199.1149	307.1149
	2015.00	-.5000	82.13255	1.000	-253.6149	252.6149
	2016.00	140.5000	82.13255	.538	-112.6149	393.6149
	2018.00	-192.8333	82.13255	.213	-445.9482	60.2816
2018.00	2013.00	323.6667*	82.13255	.007	70.5518	576.7816
	2014.00	246.8333	82.13255	.059	-6.2816	499.9482
	2015.00	192.3333	82.13255	.215	-60.7816	445.4482
	2016.00	333.3333*	82.13255	.005	80.2184	586.4482
	2017.00	192.8333	82.13255	.213	-60.2816	445.9482

*. The mean difference is significant at the 0.05 level.

ZONES

Multiple Comparisons

REPORTED CASES OF ACCIDENTS IN NIGERIAN GEO-POLITICAL ZONES

Tukey HSD

(I) ZONES	(J) ZONES	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
SOUTH WEST	SOUTH EAST	567.0000*	82.13255	.000	313.8851	820.
	SOUTH SOTH	478.6667*	82.13255	.000	225.5518	731.
	NORTH WEST	383.5000*	82.13255	.001	130.3851	636.
	NORTH EAST	472.1667*	82.13255	.000	219.0518	725.
	NORTH CENTRAL	-207.3333	82.13255	.155	-460.4482	45.
SOUTH EAST	SOUTH WEST	-567.0000*	82.13255	.000	-820.1149	-313.
	SOUTH SOTH	-88.3333	82.13255	.886	-341.4482	164.
	NORTH WEST	-183.5000	82.13255	.258	-436.6149	69.
	NORTH EAST	-94.8333	82.13255	.854	-347.9482	158.
	NORTH CENTRAL	-774.3333*	82.13255	.000	-1027.4482	-521.
SOUTH SOTH	SOUTH WEST	-478.6667*	82.13255	.000	-731.7816	-225.
	SOUTH EAST	88.3333	82.13255	.886	-164.7816	341.
	NORTH WEST	-95.1667	82.13255	.852	-348.2816	157.
	NORTH EAST	-6.5000	82.13255	1.000	-259.6149	246.
	NORTH CENTRAL	-686.0000*	82.13255	.000	-939.1149	-432.
NORTH WEST	SOUTH WEST	-383.5000*	82.13255	.001	-636.6149	-130.
	SOUTH EAST	183.5000	82.13255	.258	-69.6149	436.
	SOUTH SOTH	95.1667	82.13255	.852	-157.9482	348.
	NORTH EAST	88.6667	82.13255	.885	-164.4482	341.
	NORTH CENTRAL	-590.8333*	82.13255	.000	-843.9482	-337.
NORTH EAST	SOUTH WEST	-472.1667*	82.13255	.000	-725.2816	-219.
	SOUTH EAST	94.8333	82.13255	.854	-158.2816	347.
	SOUTH SOTH	6.5000	82.13255	1.000	-246.6149	259.
	NORTH WEST	-88.6667	82.13255	.885	-341.7816	164.
	NORTH CENTRAL	-679.5000*	82.13255	.000	-932.6149	-426.
NORTH CENTRAL	SOUTH WEST	207.3333	82.13255	.155	-45.7816	460.
	SOUTH EAST	774.3333*	82.13255	.000	521.2184	1027.
	SOUTH SOTH	686.0000*	82.13255	.000	432.8851	939.
	NORTH WEST	590.8333*	82.13255	.000	337.7184	843.
	NORTH EAST	679.5000*	82.13255	.000	426.3851	932.

*. The mean difference is significant at the 0.05 level.

Table 1: A table of reported cases of accident in Nigerian Geo-political zones

REGION					
Southern			Northern		
South West	South East	South South	North West	North East	North Centre
857	362	391	488	501	826
703	487	580	596	496	1024
914	398	576	608	582	1135
836	374	304	551	340	962
1053	294	392	590	454	1427
1409	455	657	638	566	1642

Source: Federal Road Safety Headquarters, Abuja.

Table 2: A table of reported casualties in southern and Northern regions of Nigeria

REGION					
Southern			Northern		
South West	South East	South South	North West	North East	North Centre
5,547	3,329	1568	5001	3012	4003
4,854	4,513	5304	6791	4767	8412
5,805	1921	5236	6181	4522	9293
4,432	1353	2521	4850	2335	6674
9,203	2531	2950	5013	3270	11,221
11,261	3593	5433	5709	2648	11,774

Source: Federal Road Safety Headquarters, Abuja.

General Linear Model

Multivariate Tests

Effect		Value	F	Hypothesis df	Error df	Sig.
REGION	Pillai's Trace	1.533	9.842	6.000	18.000	.000
	Wilks' Lambda	.020	16.358	6.000	16.000	.000
	Hotelling's Trace	21.780	25.411	6.000	14.000	.000
	Roy's Largest Root	20.402	61.207	3.000	9.000	.000

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Model	REPORTED CASUALTIES IN THE WEST	4.691E8	2	2.346E8	57.704	.000
	REPORTED CASUALTIES IN THE EAST	1.199E8	2	59973709.667	51.083	.000
	REPORTED CASUALTIES IN THE SOUTH	5.282E8	2	2.641E8	46.646	.000
REGION	REPORTED CASUALTIES IN THE WEST	4.691E8	2	2.346E8	57.704	.000
	REPORTED CASUALTIES IN THE EAST	1.199E8	2	59973709.667	51.083	.000
	REPORTED CASUALTIES IN THE SOUTH	5.282E8	2	2.641E8	46.646	.000
Error	REPORTED CASUALTIES IN THE WEST	40647392.167	10	4064739.217		
	REPORTED CASUALTIES IN THE EAST	11740396.667	10	1174039.667		
	REPORTED CASUALTIES IN THE SOUTH	56616582.167	10	5661658.217		
Total	REPORTED CASUALTIES IN THE WEST	5.098E8	12			
	REPORTED CASUALTIES IN THE EAST	1.317E8	12			
	REPORTED CASUALTIES IN THE SOUTH	5.848E8	12			

General Linear Model

Multivariate Tests

Effect		Value	F	Hypothesis df	Error df	Sig.
REGION	Pillai's Trace	1.833	32.828	6.000	18.000	.000
	Wilks' Lambda	.003	49.584	6.000	16.000	.000
	Hotelling's Trace	62.295	72.677	6.000	14.000	.000
	Roy's Largest Root	56.633	169.899	3.000	9.000	.000

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Model	REPORTED CASES IN THE WEST	7549084.167	2	3774542.083	118.732	.000
	REPORTECASES IN THE EAST	2375770.167	2	1187885.083	191.604	.000
	REPORTED CASES IN THE SOUTH	9605709.333	2	4802854.667	84.247	.000
REGION	REPORTED CASES IN THE WEST	7549084.167	2	3774542.083	118.732	.000
	REPORTECASES IN THE EAST	2375770.167	2	1187885.083	191.604	.000
	REPORTED CASES IN THE SOUTH	9605709.333	2	4802854.667	84.247	.000
Error	REPORTED CASES IN THE WEST	317904.833	10	31790.483		
	REPORTECASES IN THE EAST	61996.833	10	6199.683		
	REPORTED CASES IN THE SOUTH	570090.667	10	57009.067		
Total	REPORTED CASES IN THE WEST	7866989.000	12			
	REPORTECASES IN THE EAST	2437767.000	12			
	REPORTED CASES IN THE SOUTH	10175800.000	12			

3. RESULTS AND DISCUSSION

From the results of analysis, the p-values for test of subject-effects that is zone, year, and region are less than 2-value for both reported casualties (zone casualties = 0.000, year = 0.017, Zone (cases) = 0.000; year = 0.047, region (casualties) = 0.47, cases = 0.0001). Thus, the null hypothesis is rejected in

favour of the alternative hypothesis. We therefore obtain that;

- The reported casualties of accident in the zones are significantly different.
- The reported cases of accident in the zones are equally significantly different.

- The reported casualties of accident in the years are not the same.
- The reported cases of accident in the years are not the same.
- The reported casualties of accident in the region are significantly different.

The multiple comparisons further tells us that the p-values for all the paired zones of the casualties recorded are less than α -value except for the following;

South West Vs North West (0.751)
 South West Vs North central (0.456)
 South East Vs South South (0.901)
 South East Vs South West (0.069)
 South East Vs North East (0.99)
 South South Vs North West (0.43)
 South South Vs North East (0.998)
 North West Vs North East (0.218)
 In case of the paired zones for reported cases of accident. All the p-values are less than α -values except for;
 South West Vs North Central (0.732)
 South East Vs South South (0.858)
 South East Vs North West (0.202)
 South East Vs North East (0.819)
 South South Vs North West (0.817)
 South South Vs North East (1.000)
 North West Vs North East (0.856)

For the years, in both casualties and cases reported, the p-values are greater than α -values except 2013 Vs 2018 (0.036) and 2016 Vs 2018 (0.032). The implication of p-values greater than α -value is that the null hypothesis is accepted and vice versa.

Based on the analysis carried out, the following were found;

- (i) There is significant difference in the reported cases and casualties of accident in the geo-political zones.
- (ii) There is significant difference in the reported cases and casualties of accident in the years under study.
- (iii) There exists significant difference in the reported cases and casualties of accident in the southern and northern regions.
- (iv) The multiple comparison revealed that the reported casualties are not the same except for;
 - South West and North West
 - South West and North Central
 - South East and South South
 - South East and South West
 - South East and North East
 - South South and North West

- South South and North East
- North West and North East

(v) The reported cases of accident are not different in the following zones:

- South West and North Central
- South East and South South
- South East and North West
- South East and North East
- South South and North West

Finally, the results showed that there is significant difference in the reported cases and casualties of traffic accident in years 2013 and 2018, 2016 and 2018.

4. CONCLUSION

From the findings of this research work, it can be concluded that there is significant difference in the reported cases and casualties of road accident in the zones, years and regions except for the paired zones and years highlighted in the findings.

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