Correlates of Road Traffic Accident Parameters in Rivers State (2005-2014)

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Abstract

This study in investigated the correlations among five road traffic accident parameters of fatal cases, serious cases, minor cases, persons killed and parsons injured in Rivers State for ten years period, 2005-2014. Ten research hypotheses were posited for the study. The study made use of ex-post facto research design and used secondary data sourced from the Federal Road Safety Commission, Port Harcourt and was analyzed using descriptive statistic and Pearson Product Moment Correlations coefficient (PPMC) The result of the study revealed that road traffic accident in the state is generally on the increase with 7311 reported cases within the study period. Of this number, fatal cases were 378; serious cases 561; minor cases 719; number of persons killed 1,311; and number of persons injured 4,142. Over the ten years period

analyzed, the results showed that the years 2013 and 2006 recorded the highest and lowest cases of RTA with 1,583 and 246 respectively, other records are 2014: 1,520 cases, 2012: 836 cases; 2009: 746 cases; 2008: 682 cases; 2007: 575 cases; 2011: 387 cases; 2010: 332 cases; and 2005: 264 cases. The hypotheses results revealed that four parameters showed no relationship; three parameters showed weak relationship, and three parameters showed strong relationship. The study calls on the various stake holders in the road transport sector such as the Federal Road Safety Commission (FRSC), the Vehicle Inspection Officers (VIOs), and the Nigeria Police Force (NPF) should step up their efforts to enhance road safety management to reduce the high carnage on our roads.

Keywords: Road Traffic Accident, Rivers State, Number of Minor Cases, Number of Serious Cases, Number of Persons Injured, Number of Persons Killed.

Introduction

Road traffic accident is a well known social problem all over the world, be it developing or developed nations as it occurs on a daily basis. In the opinion of Ohakwe, Iwueze and Chikezie (2011), a road traffic accident occurs when a road vehicle collides with another vehicle, pedestrian, animal or geographical or architectural obstacle. Generally, the types of collision include head-on, road departure, rear-end, side collision and roll-over.

The term 'road traffic accident' has been defined in several ways by different scholars and authorities. For instance, Jha et al, (2004) defined it as accident which takes place on the road between two or more objects, one of which must be any kind of a moving vehicle. According to an online resource, your dictionary.com, road traffic accident occurs when a vehicle that is moving along a road collides with another vehicle or object.

The Shell Petroleum Development Company Safety Management (1987) defines road traffic accident as the injury or damage to man, animal, property (car) by chance in the course of operation or use of a motor vehicle on roads.

Road traffic accident could result to major accident, minor accident, serious accident, fatal accident, near-miss accident or reportable accident depending on the severity of the impact. Road traffic accident is a serious socio-economic problem across the globe as it can result to injury, property damage and deaths. Studies have shown that two major health effect of road traffic accident are psychological and physical effects.

Discussing on these two health effects, the Austrian Academic Staff (2004) observes that psychologically those who have been involved in a crash are afraid to drive again and in some cases, the psychological trauma may affect individual's ability to work and take on family responsibilities. On the physical effect, it observes that a number of physical injuries can result ranging from bruising and confusion to catastrophic physical injury, for example paralysis. The severity of road traffic accident cannot be overemphasized as road traffic injuries cause considerable economic losses to victims, their families and to their nations as a whole. These losses according to Asogwa (2002), arise from the cost of treatment including rehabilitation and incident investigation) as well as reduced/lost productivity (e.g. in wages) for those killed or disabled by their injuries and for family members who need to take time off work (or school) to care for the injured.

There are few global estimates of the cost of injury, but research carried out in 2010 suggests that road traffic accident cost countries approximately 3% of their gross national product (GNP). The figure rises to 5% in some low income and middle income countries according to World Health Organization (WHO, 2015). The 5% rise in some low and middle income countries as noted by WHO could be correct for the case of Nigeria.

Bolade (1990) observes that in most countries the economic consequences of RTA take about 2% of the country's GDP and when only 1% is used to calculate for any country the impact has an implicating effect on the economy. According to the Daily Champion Newspaper of February 22, 1993, quoted Chief Ernest Shonekan, then Chairman of Guinness Nigeria Plc as linking his concern to the very fact that road traffic accidents in Nigeria claims two percent (2%) of the nation's gross domestic product (GDP).

In Nigeria, several studies have shown among others that reckless and dangerous driving, alcoholism, faulty pedestrian attitude constitutes the major causes of road traffic accident (Odhero, 1998, Akpoghomeh 1998, Akpoghomeh, 2000 and Oteh, 2007). The recognition of road traffic accident as a serious social problem in Nigeria inspired the establishment of the Federal Road Safety Commission (FRSC) in 1988 by the then Federal Military Government (FMG) of Nigeria. The Commission was established with the responsibilities of policy making organization and administration of road safety management in Nigeria. During the launching of the FRSC on February 18th 1988, Vice Admiral Augustus Aikhomu (RTD) the then chief of General Staff noted that "Nigeria topped the list of thirty eight countries worldwide with highest record of deaths by road".

According to Oteh (2007), Rivers State is a highly motorized state with poor road conditions involving the three classes of road and the transport system has a high rate of road traffic accident and the tendency has been on the increase. For instance, Eke, Etebu and Nwosu in Ohakwe, Iwueze and Chikezie (2011), using data collected from the University of Port Harcourt Teaching Hospital (UPTH) from January 1986 to December 1995 found out that 70% of total accidents in Port Harcourt occurred during the weekends. From the above two sets of information, it appears that Rivers State is prone to road traffic accident, hence necessitates the present study to be undertaken.

The purpose of this study is to investigate the relationships among various road traffic accident parameters (minor cases, fatal cases, serious

cases, the number of persons killed and the number of persons injured in road traffic accident in Rivers State from 2005 to 2014. The study hopes to achieve the following specific objectives:

i) examine the annual distribution of road traffic accident in Rivers State over the ten years period
ii) analyze road traffic accident parameters distribution over the state between 2005 and 2014.
iii) Investigated the relationship among the road traffic accident parameters in Rivers state.

In pursuance of the above stated objectives, ten research hypotheses are formulated to guide the study. These ten research hypotheses hinges on the policy thrust of the study! the relationship that exists among the road traffic accident parameters of the number of fatal cases, minor cases, serious cases, injured persons and person killed. These hypotheses are:

i) There is no significant relationship between the number of fatal cases and the number of serious cases in road traffic accident in Rivers State.
ii) There is no significant relationship between the number of fatal cases and the number of minor cases in road traffic accident in Rivers State.
iii) There is no significant relationship between the number of fatal cases and the number of persons killed in road traffic accident in Rivers State.
iv) Thereis no significant relationship between the number of fatal cases and the number of persons injured in road traffic accident in Rivers State.
v) There is no significant relationship between the number of serious cases and the number of minor cases in road traffic accident in Rivers State.
vi) There is no significant relationship between the number of serious cases and the number of persons killed in road traffic accident in Rivers State.

vii) There is no significant relationship between the number of serious cases and the number of persons injured in road traffic accident in Rivers State.

viii) There is no significant relationship between the number of minor cases and the number of persons killed in road traffic accident in Rivers State.

ix) There is no significant relationship between the number of minor cases and the number of persons injured in road traffic accident in Rivers State.

x) There is no significant relationship between the number of persons killed and the number of persons injured in road traffic accident in Rivers State.

Conceptual Operationalization of Parameters

There are live road traffic accident parameters under study here. For one to fully grasp the aim of the study, it becomes imperative to fully operationalized them for better understanding. The five parameters are: the number of fatal cases, the number of minor cases, the number of serious cases, the number of persons injured and the member of persons killed. The term cases here could also be referred to as accidents.

Number of Fatal Cases: The term fatality' is a death resulting from a work injury regardless of time intervening between injury and death. Fatal accident involves the loss of lives and damage to property. The number of fatal cases is records of death resulting n road traffic accident in a year.

Number of Serious Cases: Serious accident may not involve loss of lives but property might be damaged and commuters (passengers) injured. In this case, the vehicle involved in the road traffic accident is seriously damaged but does not result to loss of lives.

Number of Minor Cases: Minor accident involves little impact on the vehicle, which might result in minor dents but no loss of life is recorded.

Number of Persons Killed: This is a record of the total number of persons killed as a result of road traffic accident in a year. The number of persons

killed in a road traffic accident is usually associated with major accident which is an accident which causes death/serious injury to a person or property estimated at a high cost.

Number of Person Injured: This is a record of the total number of persons that sustained injury of various kinds and degrees resulting from road traffic accident of different types.

Materials and Methods

This study covered a period of ten years from 2005 to 2014 and involved the use of secondary data sourced from the Federal Road Safety Commission (FRSC), Rivers State sector command, Port Harcourt, The parameters of study involved five road traffic accident cases: fatal cases, serious cases, minor cases, number of persons killed and number of persons injured. The study employed ex-post facto research design which Kpolovie (2010) described as a methodological approach for eliciting possible or probable antecedents of events that have already occurred and which cannot be subjected to the direct rigorous manipulation and control of the researcher. The data were subjected to descriptive statistic, and simple correlation analysis (Pearson Product Moment Correlation = PPMC) and the results are displayed in tables and charts.

Correlation is one of the two most common techniques used to determine the relationship between two or more variables. According to Wahau (2010), correlations is a descriptive statistic which only indicates how closely associated two variables are. Thus the two variables may be merely designated as X and Y, without any element of dependency or independency. These variables are assumed to be both random variables with a joint distribution and as well as to be normal. He further stated that this assumption is very important and therefore, one is only interested in the degree of association and not in the formulation of a prediction equation.

In this study, we are only- interested in simple linear correlations analysis. The point of interest here is in estimating the degree of linear association

between two variables, merely designated as X and Y. None of these variables depends on the other. The variables of interest here are the five road traffic accident parameters mentioned above. The essence of this study is to see how closely related the five variables are in road traffic accident. Thus, a total of ten correlation analyses among these five variables are undertaken in the study.

The correlations coefficient 'r gives information on that direction and strength of the trend of the relationship while the coefficient of (CD) is to determine the extent to which the variation in one variable depends on the variation in the other. The correlations coefficient test was done through the use of student 't' test, which is a powerful test for significance.

Results and Findings

Road Traffic Accident Annual Distribution (2005-2014)

The Road Traffic Accident (RTA) Annual distribution of Rivers State under the ten years period of study is shown in table 1.

Table 1: Road traffic accident annual distribution descriptive statistic (2005-2014)

s/n	Year	No. of fatal cases	No. of serious cases	No. of persons killed	No. of persons injured	Total	mean	Percentage (%)	Range	Rank
1.	2005	28	30	30	138	264	52.8	3.71%	110	9th
2.	2006	11	35	17	153	246	49.2	3.46%	142	10th
3.	2007	58	22	109	272	515	103	7.24%	250	6th
4.	2008	68	28	133	389	682	136.4	9.59%	361	5th
5.	2009	23	81	51	557	746	149.2	10.49%	534	4th
6.	2010	10	15	37	223	332	66.8	4.67%	213	8th
7.	2011	40	37	18	245	387	77.4	5.44%	227	7th
8.	2012	34	109	57	583	836	167.2	11.76%	549	3rd
9.	2013	46	124	82	708	1,583	316.6	22.26%	662	1st
10.	2014	60	80	185	874	1,520	304	21.38%	814	2nd
11.	Total	378	56.1	719	4,142	7,111				
12.	Mean	37.8	56.1	71.9	414.2					

13.	Median	16.5	48	44	390					
14.	Percentage	5.32%	7.89%	10.11%	58.25%					
15.	Range	58	94	167	736					
16.	Variance	411.733	1525.878	3,061.656	58,399.73					
17.	S.D	20.291	39.062	55.062	241.66					
18.	S.E	6.417	12.354	17.499	107.88					
19.	C.D	0.5368	0.6963	0.7696	0.5834					
20.	C.V%	53.68%	69.63%	76.96%	58.34%					

Source: (FRSC and Authors field work, 2017)

The result from table 1 above reveals that Rivers State recorded a total of 7,111 cases of road traffic accident under the ten years period of study. The annual distribution of road traffic accident in Rivers State reveals that the year 2013 with 1,583 cases with a mean value of 316.6 accounts for 22.26% of the total cases recorded the highest road traffic accident in the state. Conversely, the year 2006, recorded the lowest case of road traffic accident with 246 with a mean of 49.2 and accounts for 3.46% of the total cases. Other years in the descending order of magnitude are 2014: 1,520.cases with a mean value of 304 represents 21.38%; 2012; 836 cases with a mean value of 167.2 represents 11.76%; 2009: 746 cases with a mean score of 149.2 represents 10.49%; 2008:682 cases with a mean score of 136.4 represents 9.59%; 2007:575 cases witha mean record of 103 represents 7.24%; 2011:387 cases with a mean record of 77.4 represent 5.44%; 2010: 332 cases with a mean value of 66.8 represents 467%; and finally 2005:264 cases with a mean value of 52.8 represents 3.71%.

Rivers State Road Traffic Accident Parameters Distribution 2005-2014

The road traffic accident parameters distribution under the ten years investigation in Rivers State is shown in table two and below.

Table 2: Road Traffic Accident Distribution Parameters (2005-2014)

s/n	RTA Parameter	Total	Mean	Percentage %	Variance	Standard Deviation	Standard Error
1	Number of fatal cases	378	37.8	5.32%	411.73	20.29	6.412
2	Number of serious cases	561	56.1	7.89%	1,525.88	30.06	12.35
3	Number of minor cases	719	71.9	10.11%	3.061.66	55.06	17.50
4	Number of persons killed	1,311	131.1	18.44%	43,345.25	208.20	65.84
5	Number of persons injured	4,142	414.2	38.25%	58,399.73	241.66	107.88
	Total	7,111	711.1	100%			

Over the ten year period of study, there were a total 7,111 cases were recorded among the five parameters. Furthermore the parameters analysis shows that there were a total of 378 fatal cases with a mean score of 37.8 and represents 5.32%; and others are 561 serious cases with a mean value of 56.1 and represents 7.89%; 719 minor cases with a mean record of 71.9 which represents 10.11%; 1311 persons killed with a mean score of 131.1 that represents 18.44% and finally 142 persons injured with a mean value of 414.2 which represents 58.25%.

Statistical Correlations Analysis of Road Traffic Accident in Rivers State

This study aims to examine the relationship that exists among the five parameters of road traffic accident in the state over these ten years period. To realize this aim, the study posited ten research hypotheses which are analyzed independently below as the data were subjected to the pearson moment correlations coefficient (PPMC) analysis. The null and alternate hypotheses are stated for each case to be analyzed.

Hypothesis 1: Relationship Between the Number of Fatal Cases and the Number of Serious Cases of Road Traffic Accident

Null hypothesis (Ho): There is no significant relationship between the number of fatal cases and the number of serious in road traffic accident.

Alternate hypothesis (Ha): There is significant relationship between the number of fatal cases and the number of serious cases in road traffic accident.

The result of the analysis is presented in table 3 below:

Table 3: Relationship between the number of fatal cases and the number of serious cases.

Calculated correlation coefficient r	Degree of freedom	Expected r value	Coefficient of determination	Coefficient correlation Interpretation	Calculated t value	Critical t value	Alpha level	Result	Decision
0.126	3	0.632	1.59%	Weak positive relationship	0.289	2.306	0.05	Not significant	Rejected

From the analysis in table 3, the result shows that the calculated t value of 0.289 is less than the table value of 2.306 hence, we reject the alternate hypothesis and accept the null hypothesis which states that there is no significant relationship between the number of fatal cases and the number of serious cases in road traffic accident of Rivers state.

Further analysis of the result shows the calculated r value to be 0.126 and the critical r value to be 0.632. This result shows a weak positive relationship. Thus as the number of fatal cases increase likewise the number of serious cases increase as well. The co-efficient of determination of 1.59% which is very low indeed. Based on the result on the dataset, it appears that no significant relationship exist between these two variables of interest over these ten period of study.

Hypothesis 2: Relationship between the number of fatal cases and the number of minor cases in road traffic accident.

Null hypothesis (Ho): There is no significant relationship between the number of fatal cases and the number of minor cases in road traffic accident.

Alternate hypothesis (Ha): There is significant relationship between the number of fatal cases and the number of minor cases in road traffic accident.

The result of the analysis is presented in table 4 below:

Table 4: Relationship between the number of fatal cases and the number of minor cases

Calculated correlation coefficient r	Degree of freedom	Expected r value	Coefficient of determination	Coefficient correlation Interpretation	Calculated t value	Critical t value	Alpha level	Result	Decision
0.820	8	0.632	67.24%	Strong positive correlations	4.052	2.306	0.05	Significant	Accepted

The table shows a correlations coefficient (r-value) of 0.820 and the table value of 0.632. This result is interpreted to mean that there is a strong positive relationship between the number of fatal cases and the number of minor cases of road traffic accident in Rivers state. The table further reveals a coefficient determination of 67.24% which is high.

The result also shows that the calculated t value to be 4.052 while the critical t value to be 2.306 at 0.05 level of significance. Thus since the calculated t-value of 4.052 is greater than the critical t value of 2.306, the null hypothesis is rejected and the alternate hypothesis is accepted. We therefore conclude that there is a significant relationship between the number of fatal cases and the number of minor cases of road from road traffic accident in Rivers State over the ten years period of study.

Hypothesis 3:Relationship between the number of fatal cases and the number of persons killed in road traffic accident.

Null Hypothesis (Ho): There is no significant relationship between the number of fatal cases and the number of minor cases in road traffic accident.

Alternate hypothesis (Ha): There is significant relationship between the number of fatal cases and the number of minor cases in road traffic accident.

The result of the analysis is presented in table 5 below

Table 5: Relationship between the Number of Fatal Cases and the Number of Minor Cases.

Calculated correlation coefficient r	Degree of freedom	Expected r value	Coefficient of determination	Coefficient correlation Interpretation	Calculated t value	Critical t value	Alpha level	Result	Decision
0.344	8	0.632	11.83%	Weak positive relationship	1.036	2.306	0.05	Not Significant	Rejected

The table above indicates a calculated correlation (r-value) of 0.344 and expected (r-value of 0.632. The result is that there is a positive relationship between the number of fatal cases and the number of persons killed though a weak positive relationship. Since the calculated r value is positive it implies that as the number of fatal cases increases, so also the number of persons killed increases. On the coefficient of determination which is 11.83%, this implies that as the number of the two variables increases, this association exists at 11.83% of the time.

Furthermore, the table shows that the calculated (t) value to be 1.036 and the critical t value of 2.306 at 0.05 level of significance for a two tailed test. Since the calculated t value (1.036) is less than the t critical (2.036), the null hypothesis accepted implying that there is no significant relationship between the number of fatal cases and the number of persons killed in road traffic accident in Rivers state over these ten years period or study.

Hypothesis 4: Relationship between the number of fatal cases and the number of persons injured in road traffic accident.

Null hypothesis (Ho): There is no significant relationship between the number of fatal cases and the number of persons injured in road traffic accident

Alternate hypothesis (Ha): There is significant relationship between the number of fatal cases and the number of persons injured in road traffic accident.

The result of the analysis is presented in table 6

Table 6: Relationship between the number of fatal cases and the number of persons injured

Calculated correlation coefficient r	Degree of freedom	Expected r value	Coefficient of determination	Coefficient correlation Interpretation	Calculated t value	Critical t value	Alpha level	Result	Decision
0.000	8	0.632 %	0%	No relationship	0.000	2.306	0.05	Not Significant	Rejected

Table 6 above shows a correlation coefficient (r) value of 0.000. This means no relationship exists between the number of fatal cases and the number of persons injured. The coefficient of determination record 0%. Also, the calculated t value of 0.00 is less than the critical t value of 2.306 at 0.05 level of significance; hence the null hypothesis is accepted. This implies that there is no significant relationship between the number of fatal cases and the number of persons injured in road traffic accident in Rivers state over the ten years period of investigation.

Hypothesis 5: Relationship between the number of serious cases and the number of minor cases in road traffic accident.

Null hypothesis (Ho): There is no significant relationship between the number of serious cases and the number of minor cases in road traffic accident.

Alternate hypothesis (ha): There is no significant relationship between the number of serious cases and the number of minor cases in road traffic accident.

The result of the analysis is presented on table 7.

Table 7: Relationship between the number of serious cases and the number of minor cases

Calculated correlation coefficient r	Degree of freedom	Expected r value	Coefficient of determination	Coefficient correlation Interpretation	Calculated t value	Critical t value	Alpha level	Result	Decision
0.196	8	0.632 %	3.842%	Weak positive relationship	0.577	2.306	0.05	Not Significant	Rejected

From table 7 above, the calculated correlations coefficient (r) show a low positive value of 0.196. This means that there is a positive relationship between the number of serious cases and the number of minor cases. Thus as the number of serious cases increases like wise the number of minor cases increases. The result has a low coefficient of 3.842%. This implies that as the number of the two variables increases, this association exist at 3.842% at the same time.

On the test of significance, the table shows that the calculated t value of 0.577 at 0.05 level of significance is less than the critical t value of 2.306, hence the null hypothesis is accepted. This implies that there is no significant relationship between the number of serious cases and the

number of minor cases in road traffic accident in Rivers state over this period of time.

Hypothesis 6: Relationship between the number of serious cases and the number of persons killed in road traffic accident.

Null hypothesis (Ho): There is no significant relationship between the number of serious cases and the number of persons killed in road traffic accident.

Alternate hypothesis (ha): There is no significant relationship between the number of serious cases and the number of persons killed in road traffic accident.

The result is presented in table 8

Table 8: Relationship between the number of serious cases and number of persons killed

Calculated correlation coefficient r	Degree of freedom	Expected r value	Coefficient of determination	Coefficient correlation Interpretation	Calculated t value	Critical t value	Alpha level	Result	Decision
0.669	8	0.632 %	44.76%	Strong positive relationship	2.513	2.306	0.05	Not Significant	Accepted

It can be seen table 8 that the calculated correlations coefficient (r-value) of 0.669 shows a strong linear relationship between the number of serious cases and the number of persons killed in road traffic accident. Since the r value of 0.669 is positive; it implies that as the number of serious cases increases, likewise the number of persons killed increases. The association that exists between these two variables is at 44.76% according to the coefficient of determination.

The test of significance shows that the t-calculated value of 2.513 is greater than the t-critical value of 2.306 at 0.05 level of significance. Hence the null

hypothesis is rejected. The result shows that there exists a significant linear relationship between the number of serious cases and the number of persons killed in road traffic accident over the ten years period of study.

Hypothesis 7: Relationship between the number of serious cases and the number of persons injured in road traffic accident.

Null hypothesis (Ho): There is no significant between the number of serious cases and the number of persons injured in road traffic.

Alternate hypothesis (Ha): There is significant relationship between the number of serious cases and the number of persons injured in road traffic accident.

The result is presented in table 8

Table 9: Relationship between the number of serious cases and the number of persons injured

Calculated correlation coefficient r	Degree of freedom	Expected r value	Coefficient of determination	Coefficient correlation Interpretation	Calculated t value	Critical t value	Alpha level	Result	Decision
0.960	8	0.632	92.16%	Strong positive relationship	9.697	2.306	0.05	Significant	Accepted

Table 9 presents the calculated correlations coefficient r value of 0.960 which indicates a very strong linear relationship exists between the number of serious cases and the number of person injured in road traffic accident. The relationship that exists between these two variables is a 92.16%. Since this relationship is positive, it reveals that as the number of serious cases increases, the number of persons injures increases also.

The test of significance reveals that the t-calculated value of 9.697 for the number of serious cases and the number of persons injures and t-critical value of 2.306. Since the t-cal is greater than the t-critical, the null

hypothesis is rejected and the alternate hypothesis accepted. This result shows that there is a significant relationship between the number of serious cases and the number of persons injured in road traffic accident.

Hypothesis 8: Relationship between numbers of minor cases and numbers of persons killed in road traffic accident

Null hypothesis (Ho): There is no significant relationship between the number of minor cases and the number of persons injured in road traffic.

Alternate hypothesis (Ha): There is significant relationship between the number of serious cases and the number of persons killed in road traffic accident.

The result is presented in table 10

Table 10: Relationship between the number of minor cases and the number of persons killed

Calculated correlation coefficient r	Degree of freedom	Expected r value	Coefficient of determination	Coefficient correlation Interpretation	Calculated t value	Critical t value	Alpha level	Result	Decision
0.013	8	0.632	0.016%	No relationship	0.037	2.306	0.05	Not Significant	Rejected

On table 10, the r-calculated value of 0.013 is less than the expected r-value of 0.632 and this indicates that no relationship exists between the number of minor cases and the number of persons killed in road traffic accident. The coefficient of determination is 0.016% which implies that the association between the two variables of numbers of minor cases and persons killed exists at that number.

Subjecting the calculated r-value of 0.013 to test of significance, the result reveals the calculated t-value to be 0.037 and critical t-value to be 2.306. Since the t-cal is less than that t-critical, the null hypothesis is retained.

This result shows that there is no significant relationship between the number of minor cases and the number of persons killed in road traffic accident in Rivers state during the ten years period of investigation.

Hypothesis 9: The relationship between the number of minor cases and the number of persons injured in road traffic accident.

Null Hypothesis (Ho): There is no significant relationship between the number of minor cases and the number of persons injured in road traffic accident.

Alternate Hypothesis (Ha): There is significant relationship between the number of minor cases and the number of persons injured in road traffic accident

The result is presented in table 11

Table 11: Relationship between the number of minor cases and the number of persons injured in road traffic accident

Calculated correlation coefficient r	Degree of freedom	Expected r value	Coefficient of determination	Coefficient correlation Interpretation	Calculated t value	Critical t value	Alpha level	Result	Decision
0.000	8	0.632	0%	No relationship	0.000	2.306	0.05	Not Significant	Rejected

Result in table11 shows a correlation coefficient (r-value) of 0.000 and expected r-value of 0.632. This means that there exists no linear relationship between the number of minor cases and the number of persons injured road traffic accident. The coefficient of determination also reveals zero (0% percentage which equally implies that the relationship between the two variables exist and at zero level.

Moreso, the test of significance shows that the calculated t-value of 0.000 at 0.05 level of significance is less than the critical t-value of 2.306, therefore, null hypothesis is accepted, implying that there is no significant

relationship between the number of minor cases and the number of persons injures in road traffic accident.

Hypothesis 10: The relationship between the number of persons killed and the number of persons injured in road traffic accident.

Null hypothesis (Ho): There is no significant relationship between the number of persons killed and the number of persons injured in road traffic accident.

Alternate hypothesis (Ha): There is significant relationship between the number of persons killed and the number of persons injured in road traffic accident.

The result is presented in table 12

Table 12: Relationship between the number of persons killed and the number of persons injured road traffic accident

Calculated correlation coefficient r	Degree of freedom	Expected r value	Coefficient of determination	Coefficient correlation Interpretation	Calculated t value	Critical t value	Alpha level	Result	Decision
0.000	8	0.632	0%	No relationship	0.000	2.306	0.05	Not Significant	Accepted

In table 12, it is observed the calculated correlations coefficient (r-value) is 0.000 while the critical r value is 0.632. This result reveals that there exist no relationship between the number of persons killed and the number of persons injured in road traffic accident.

The significance result shows the calculated "t" value of 0.00 while the critical t value of 2.306 at 0.05 level of significance for a two tailed test. This result shows that the null hypothesis is accepted. This implies that there is no significant relationship between the number of persons killed and the number of persons injured in road traffic accident in Rivers state over the ten years period of investigation.

Summary of Hypotheses Result

The ten hypotheses findings on the relationship among the RTA parameters are presented on table 14 and summarized below:

Table 14: Summary of Hypotheses Results

S/N	Hypothesis number and type	Correlations coefficient interpretation	Result interpretation	Decision
1.	HYP 1: Relationship between fatal cases and serious cases	Weak positive relationship	Not significant	Rejected
2.	HYP 2: Relationship between fatal cases and minor cases	Strong positive relationship	Significant	Accepted
3.	HYP 3: Relationship between fatal cases and number of persons killed	Weak positive relationship	Not significant	Rejected
4.	HYP 4: Relationship between fatal cases and number of persons injured.	No relationship	Not significant	Rejected
5.	HYP 5: Relationship between serious cases and minor cases	Weak positive relationship	Not significant	Rejected
6.	HYP 6: Relationship between serious cases and number of persons killed.	Strong positive relationship	Significant	Accepted
7.	HYP 7: Relationship between serious cases and number of persons injured.	Strong positive relationship	Significant	Accepted
8.	HYP 8: Relations between minor cases and number of persons killed	No relationship	Not significant	Rejected
9.	HYP 9: Relationship between minor cases and number of persons injured	No relationship	Not significant	Rejected
10.	HYP 10: Relationship between the number of persons killed and number of persons injured.	No relationship	Not significant	Rejected

Source: Authors Field Work (2017)

The correlation results reveal that all had positive correlation value which shows that as one parameter increases, the other parameter also increases. From table 12, it can be observed that three cases (hypotheses 1, 3 and 5) show weak positive relationship. Their results are not significant at the Alpha level 0.05 and hence are all rejected. Furthermore, three cases: (Hypotheses 2, 6 and 7) showed strong positive relationship and their results are all accepted. Finally, four cases (hypotheses: 4, 8, 9 and 10) show no relationship among the variables correlated. Their results are not

significant at 95% probability level of confidence and hence rejected. On the other hand six cases (hypotheses 1, 2, 3, 5, 6 and 7) show that there exist linear relationship among the variables correlated.

Since the concept of correlations deals with the relationship between two or more variables or the same group of individuals (Igho, 2000) from the table above we deduce that:

1. There is a weak relationship between the number of fatal cases and the number of serious cases in RTA in Rivers state.
2. There is a weak relationship between the number of fatal cases and the number of persons killed in RTA in Rivers state.
3. There is a weak relationship between the number of serious cases and the number of minor cases in RTA in Rivers State.
4. There is strong relationship between the number of fatal cases and the number of minor cases in RTA in Rivers State.
5. There is a strong relationship between the number of serious cases and the number of persons killed in RTA in Rivers State.
6. There is a strong relationship between the number of serious cases and number of person injured in RTA in Rivers state.
7. There is no relationship between the number of fatal cases and the number of persons injured in RTA in Rivers State.
8. There is no relationship between the number of minor cases and the number of persons killed in RTA in Rivers State.
9. There is no relationship between the number of minor cases and the number of persons injured in RTA in Rivers State.
10. There is no relationship between the number of persons killed and the number of persons injured in RTA in Rivers State.

Discussion and Contribution

This study successfully investigated the linear relationship among the five road traffic accident parameters of number of fatal cases, number of serious cases, the number of minor cases, the number of person injured

and the number of persons killed in road traffic accident in Rivers state, over ten year period.

From the results of this study, it is clear that the incidences of road traffic accident are on the increase as can be seen on the number of total cases reported annually in table 1. By observing the values for the years of 2005, 2007, 2009, 2012, 2013 and 2014. These years have shown steady rise in the number of road traffic accident recorded in Rivers state. This rise in road traffic accident is in line with the World Health Organization (WHO) predication. According to WHO (2015), "road traffic crashed are predicted to rise to become the 7th leading cause of death by 2030" in the world. In our opinion, we suspect that the deaths rising from road traffic accident may also be a serious Public Health issue or concern just like epidemics and natural disasters (HIV/AIDS), TB, Polio, Earthquakes, Volcanic Activity, and Floods etc). The World Health Organization observes that road traffic injures have been neglected from the global health agenda for many years, despite being predictable and largely preventable. As a result of the increasing carnage on the world's highways as a result of RTA in 2010, a United Nations General Assembly Resolution proclaimed a decade of Action for Road Safety (2011 in over 110 countries with the aim of saving millions of lives and the Word Health Organization is the lead agency in this respect.

Furthermore, this study is still in agreement with the World Health Organization, (WHO) key statement in 2015 that "90% of the world's fatalities on the roads occur on low and middle-income countries, even though these countries have approximately half of the world's vehicles; and that half of those dying on the world's road are vulnerable road users: Pedestrians' cyclists and motorcyclists'. Well, it is a known fact that Nigeria is a developing country and those actually being involved in road traffic accident are truly the vulnerable road users in different categories. According to World Health Organization, "every year, the lives of approximately 1.25 million people are cut short as a result of a road traffic crash. Between 20 and 50 million people suffer non-fatal injured, with

many incurring a disability as a result of their injury". The above statement by WHO is in tandem with findings of this study with respect to the numbers of persons killed and injured in RTA. The study shows a steady rise in these two RTA parameters as seen in Table 1. Thus over the ten years period these two parameters accounted for 76.69% of total RTA in the Rivers State while the rest three parameters (numbers of fatal, serious and minor cases) accounted for just 23.31%. similarly a World Bank report on the State of Nigerian highways reveals that Nigeria is worse than most countries in terms of road crash, as the proportion of fatality to injury is higher above 1-4 as against the normal 1-10 or more in most developing countries of the world.

This study is also in consonance with the work of Ohakwe, Iwueze and Chikwzie (2011) in Imo state, Nigeria and as well as that of Oteh (2007) and Ggberegbe (2016), in Rivers state which observed that road traffic accident has been on the increase on Nigerian roads due to heavy road traffics, poor conditions on the roads, and the fault of drivers. The findings of the study are in line with previous studies in developing countries which suggest that road traffic accident has been on the increase (Odero, 1998 and Nantulya and Reich, 2002). According to them, the mobility and mortality burden in developing countries is rising due to a combination of factors, including rapid motorization poor road and traffic infrastructure, reckless and dangerous driving, alcoholism and faulty pedestrian attitude.

On correlations which are the thrust of this study, the results reveal positive correlations coefficient in all the RTA parameters investigated. What this implies is that as one parameter (variable) increasing the other parameters (variable) equally increases. Further analysis of the results show that there exists linear relationship between six parameters (relationship between fatal cases and serious cases, relationship between fatal cases and minor cases, relationship between serous cases and persons killed and relationship between serious cases and persons injured) while there exists no linear relationship between four parameters (relationship

between fatal cases and persons injured, relationship between minor cases and persons killed, relationship between minor cases and persons injured and relationship between persons killed and persons injured).

Since all the results have positive correlations this indicates that RTA is on the increase in the state and this is in agreements with other works discussed above that RTA is on the increase in the world especially among the developing countries. The same is also true according to the World Health Organization key facts on RTA.

Road traffic accident in any society is inevitable. The basic findings of these ten years of study reveal that road transport accident in Rivers State is the increase. The five variables which were correlated among them showed positive correlations which connote the increase of RTA in Rivers State. Since road transport is a critical sector of the Nigeria's economy, therefore, both conscious and concerted efforts should be made to reduce the carnage on our highways. Despite that the data used in the study were collected only on Rivers state, however, the findings provide an insight into the trend and characteristics of road traffic accident in the entire country. In view of the above opinion, the following recommendations are made on the basis of the findings of this study:

- There should be adequate check and effective monitoring of drivers, especially commercial drivers by the appropriate bodies concerned such as the Federal Road Safety Commission (FRSC), the Vehicle Inspection Offices (VIOs) and the Nigeria Police Force.
- The various state governments in the country should complement the federal agencies such as the FRCS, NPF by setting up their only qualifies persons are increased to operate motor vehicles whether commercial or private.
- The training and re-training of all classes of drivers should be taken seriously and must be properly supervises by the qualifies personnel and road traffic control agents.
- Road traffic accident data should be made available online for easy accessibility to research by the custodians of such data.

- There should be rigorous enlightenment campaigns through mass and social media to educate all road users in order to reduce road traffic accident in our highways by the various stakeholders in the transport sector at the federal, state and local levels.
- Corporate bodies, especially multi-nationals corporations and as well as civil society groups should endeavor to complement government efforts in reducing the carnage on our highways through enlightenment campaigns and other measures towards reducing RTA on our roads.
- Since the public is also a critical stakeholder in the transport sector, members of the public should endeavor as a matter of agency and necessity send RTA reports online on FRSC OR Police Data Base through cell phone SMS or Social media for archival and retrieval.
- Similarity, the health sector (both private and public hospitals) should interface with the FRSC and NPF on RTAs, data so as to create accurate, reliable and dependable RTA records.

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