

## AN EVALUATION OF ROAD TRAFFIC CRASHES CAUSATIVE FACTORS IN OGUN STATE NIGERIA

<sup>1</sup>Adebola John Babalola, <sup>2</sup>Morakinyo Kehinde Onifade and <sup>2</sup>Oluwaseyi Joseph Afolabi

<sup>1</sup>Federal Road Safety Corps, Ota Ogun State

<sup>2</sup>Department of Management Technology, Bells University of Technology, Ota Ogun State

Corresponding Author's email: [adebolababalola19@yahoo.com](mailto:adebolababalola19@yahoo.com)



### Abstract

The aim of the study is to evaluate road traffic crash causative factors in Ogun State Nigeria. Questionnaire on road safety risk factors which involved 30 questions was administered on 240 respondents drawn from six of the 20 LGAs of Ogun State. The outcome of respondents' which were transposed into 240 x 30 data matrix was analyzed with Principal Component Analysis (PCA) model of Factor Analysis. The results showed that over speeding and use of substandard automobile spare parts has the highest communalities of 0.720 and 0.810 respectively. The scree plot and computed eigenvalues justified the adequacy of nine components extracted by Varimax rotation. The first two factors which were labeled as vehicle / environmental concern and driver's knowledge/safety concern comprised of seven (7) variables each and they were considered principal factors, because they have highest number of variables among other factors. It is therefore recommended that attitudinal change on the part of road users and government intervention on road maintenance will go a long way to reduce road traffic crashes in Ogun State, Nigeria.

**Keywords-** Crash, Factor analysis, Road, Varimax rotation

### Introduction

Roads are important to economic development and without doubt, road transport is the most utilized mode of transport in Nigeria. The Nigerian road transport system, right from inception, were poorly designed and are unable to scale up to meet greater demand.

Road traffic crash is a combination of factors related to the components of the system which comprise vehicles, road surface, and road users and the interaction between these components. Rospa (2017) identified some traffic risk factors to include but not limited to, alcohol, inexperience or lack of adequate knowledge, fatigue, poor road design and surface as well as vehicle malfunction. Anticipated traffic risk in driving activities has been identified as important factor that determines drivers' decisions and behavioral tendencies (ONeill & Mohan, 2002).

Accidents and their effects can be represented by a system of interconnected components. As the elements of the road and transport system interact, linkages appear between crash and trauma factors. For example, specific aspects of road users' action are determined by some road

furniture or vehicle characteristics, and the consequences of some vehicle defects may have been compounded by a particular road feature (Hermitte, 2012).

Survey on vehicle fleet operators have revealed that commercial vehicle owners in pursuit to increase profits, induce their drivers to speed excessively or work unduly longer hours which result to fatigue and usually leads to road crash as observed in Nigeria

The road network determines how road users perceived their environment and it provides instructions for road users through the aid of signs and traffic control (Muhlrad, 2005). However, research has revealed that, deplorable state of Nigerian roads is not only the cause of frequent road traffic crashes but can be as a result of driver's attitude to a large extent and negligence by other road users (Atubi, 2012). Bates (2004) also substantiated that certain pedestrian behaviour, such as walking along the roadway with traffic, and crossing a roadway at a point other than an intersection are significant in fatal crashes.

The rate of road crashes in Nigeria and even in Ogun state is on the increase due to several factors which needed to be addressed. The unwholesomeness and mortality in developing countries is on the increase due to a combination of factors, including rapid motorisation, poor road and traffic infrastructure as well as the behaviour of road users. Reverse is the case with technologically advanced countries where the rate is reducing (Nantulya & Reich, 2002). Soyoung et al (2009), assessed the effects of rainfall on the severity of single-vehicle crashes on Wisconsin interstate highways utilizing polychotomous response models and inverse squared distance method. The study compared two types of polychotomous response models: sequential logistic and ordinal logistic regressions. The result revealed that the backward sequential logistic regression model yielded the best results for predicting crash severities in rainy weather where rainfall intensity, driver's gender, wind speed, safety belt and roadway terrain were found to be statistically significant. The vehicle constitutes one of the major factors of road traffic crash. It is therefore necessary to make it a daily routine of care and check of all vehicle components. The main vehicle factors are defects in tyres, brakes and inputs all arising from poor maintenance of the vehicle (Uchegbu, 2001).

There are numerous cognitive, affective and behavioral factors that may influence risk perception. Previous research has demonstrated that a situation where risk is not imminent but possible, the risk perception of drivers depends on the regulatory focus orientation (Wearth & Foster, 2017).

Road traffic crashes and injuries have greatly affected Nigeria's socio-economic aspirations and development due to loss of qualified professionals and young men and women in the labour force (Aderamo, 2012).

As part of effort to reduce road traffic crashes globally, the United Nations added two specific targets in the 2030 agenda for sustainable development in order to ensure safety of all road users. SDG target 3.6 seeks to reduce road traffic injuries and death by 50% by 2020 and SDG target 11.2 with the objective to provide access to safe, accessible, affordable and sustainable transport by 2030 (Afolabi et al, 2018)

The goal of this study is to evaluate road traffic crash causative factors in Ogun State, Nigeria (figure1) and to examine how these factors do individually and collectively interact to cause crashes on roads in Ogun State. The study would help the government and other relevant stakeholders in transport sector in Nigeria to identify the areas that needed urgent attention as well provide a policy framework to reduce road traffic crashes and fatalities to the barest minimum in Ogun State.

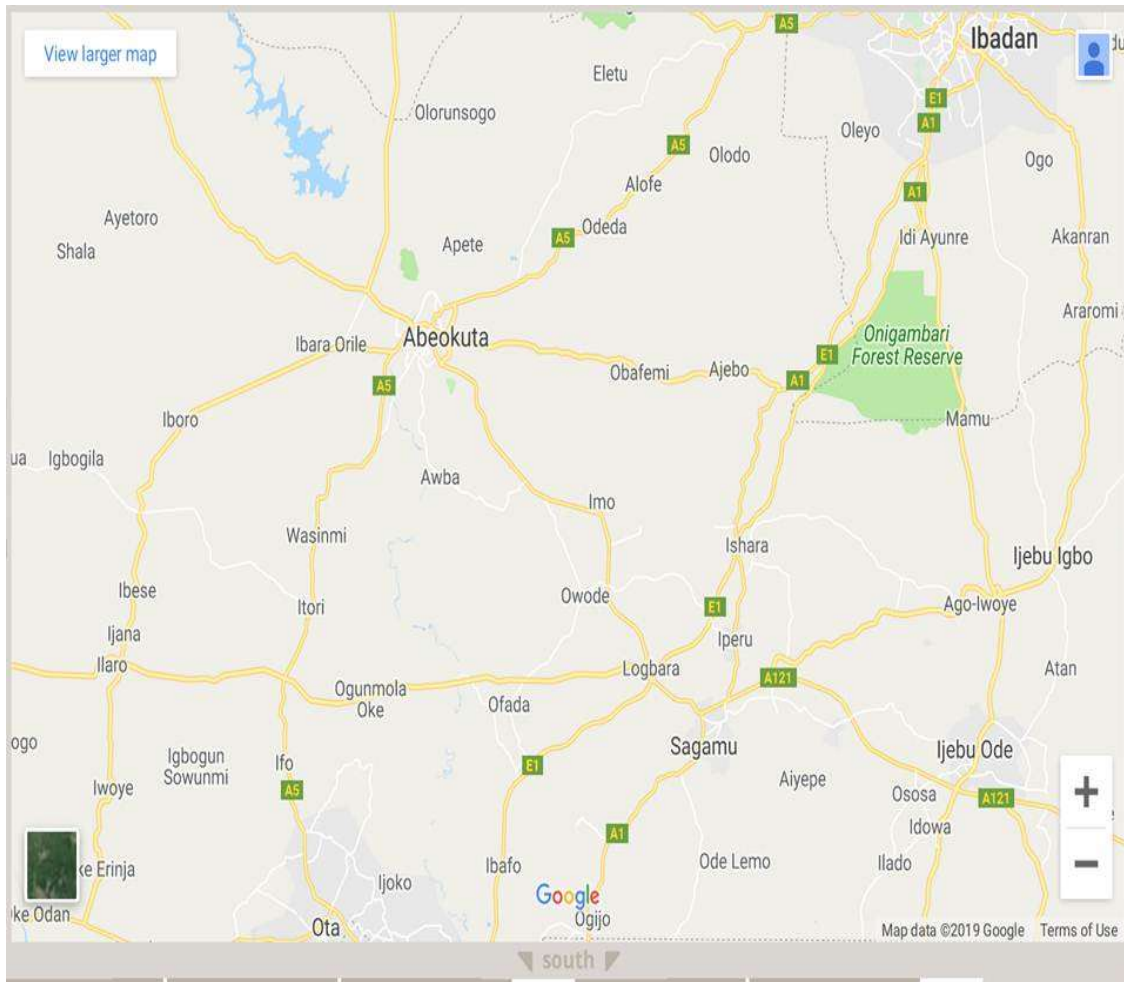


Figure 1: A map of Ogun State showing major road networks in Ogun State.

( [www.google.com/ogunroadnetwork](http://www.google.com/ogunroadnetwork))

### Methodology

The population of this study consists of all traffic officials and commercial drivers in six local government areas in Ogun State with major carriages. These are Ado- Odo Ota, Abeokuta north and south, Ijebu-Ode, Sagamu, and Obafemi Owode. The total number of one hundred and eighty registered commercial drivers and sixty traffic officials were investigated.

The methodology adopted was presented with the use of research design, population, sample and sampling technique. Primary data was used in the study. The structured questionnaire which consists of 30 traffic risk factors variables was administered on 240 respondents which consist of 60 traffic officials and 180 commercial drivers in six selected Local Government with crash prone area in Ogun State. The items of measurement were rated on a 5-point Likert type scale which ranks responses on a scale of (1) strongly agree to (5) strongly disagree. The ranking of the Likert scale for each item is given as we have it below:

Strongly Agree SA = 1, Agree A= 2, Undecided UD = 3, Disagree SD = 4, Strongly Disagree SA = 5

The data collected through the instruments were analyzed using descriptive and inferential statistics. Factor analysis was deployed to carry out the systematic reduction of the extracted variables using Statistical Package for Social Sciences (SPSS). The factor loadings of the variables were obtained and factor clustering was carried out with emphasis on their similarities. The rotation model selected was varimax rotation which was developed by Kaiser (1959). In this rotation, a simple solution indicates that each factor has a small number of large loadings and variable was associated with one of the factors, while each factor contains small number of variables. Equation 1 shows the sample variance of standardized loadings for each factor summed over the number of factors.

$$V = \frac{1}{p} \sum_{j=1}^k \left\{ \sum_{i=1}^p (\mathfrak{R}_{ij})^4 - \frac{1}{p} \left( \sum_{i=1}^p (\mathfrak{R}_{ij})^2 \right)^2 \right\} \quad (1)$$

30 road safety risk factors were evaluated (table1)

**Table 1: Road safety risk factors with their correspondent variable**

| VARIABLE CODE | ROAD SAFETY RISK FACTORS                     |
|---------------|----------------------------------------------|
| VAR1          | Over speeding                                |
| VAR2          | Use of phone while driving                   |
| VAR3          | Distraction                                  |
| VAR4          | Fatigue                                      |
| VAR5          | Ineffective traffic personnel                |
| VAR6          | Driving under the influence of Alcohol/drugs |
| VAR7          | Dangerous overtaking                         |
| VAR8          | Overloading                                  |
| VAR9          | Underage driving                             |
| VAR10         | Lack of drivers training                     |
| VAR11         | Tyre burst                                   |
| VAR12         | Brake failure                                |
| VAR13         | Power failure                                |
| VAR14         | Steering & suspension problem                |
| VAR15         | Exhaust problem                              |
| VAR16         | Use of fake spare parts                      |
| VAR17         | Unworthy vehicle                             |
| VAR18         | Poorly maintain vehicle                      |
| VAR19         | Defective lighting system                    |
| VAR20         | Leaking fuel                                 |
| VAR21         | Bad road/ portholes                          |
| VAR22         | Poor weather                                 |
| VAR23         | Ineffective traffic light                    |
| VAR24         | Inadequate road signs                        |
| VAR25         | Indiscriminate bumps/road diversion          |
| VAR26         | Dangerous bends                              |
| VAR27         | Narrow bridge                                |
| VAR28         | Fallen trees/Obstruction                     |
| VAR29         | Slippery road surface                        |
| VAR30         | Rainfall                                     |

## Results

The communalities obtained for the variables based on the Principal Component Analysis (PCA) carried out are shown in table 2.

**Table 2: Communalities**

| <b>Variables</b>              | <b>Extraction</b> | <b>Variables</b>          | <b>Extraction</b> |
|-------------------------------|-------------------|---------------------------|-------------------|
| Over speeding                 | <b>0.720</b>      | Fake spare parts          | <b>0.810</b>      |
| Cell phone                    | <b>0.556</b>      | Unworthy RV               | <b>0.571</b>      |
| Distraction                   | <b>0.586</b>      | Poor vehicle maintenance  | <b>0.665</b>      |
| Fatigue                       | <b>0.567</b>      | Defective light           | <b>0.646</b>      |
| Ineffective Traffic personnel | <b>0.500</b>      | Fuel Leakage              | <b>0.662</b>      |
| Drug/Alcohol                  | <b>0.555</b>      | Bad roads                 | <b>0.535</b>      |
| Dangerous Overtaking          | <b>0.501</b>      | poor weather              | <b>0.682</b>      |
| Overloading                   | <b>0.448</b>      | traffic light             | <b>0.696</b>      |
| Underage                      | <b>0.405</b>      | Road signs                | <b>0.451</b>      |
| Lack of training              | <b>0.530</b>      | Illegal bumps& RD         | <b>0.502</b>      |
| Tyre Burst                    | <b>0.509</b>      | Dangerous Bends           | <b>0.625</b>      |
| Brake failure                 | <b>0.583</b>      | Narrow Bridge             | <b>0.623</b>      |
| power failure                 | <b>0.608</b>      | Fallen trees/obstructions | <b>0.615</b>      |
| steering suspension           | <b>0.494</b>      | slippery &eroded road     | <b>0.627</b>      |
| Exhaust/ smoke                | <b>0.470</b>      | Rainfall                  | <b>0.664</b>      |

### **Extraction Method: Principal Component Analysis.**

The values indicated the proportion of variance of the variables that can be explained by the factors extracted. The values have direct impact on the P-value and cronbach alpha associated with the analysis. The communalities revealed that over speeding, bad road, poor vehicle maintenance and sub-standard spare parts have been mainly responsible for road mishaps in the corridors investigated in Ogun State.

The screen plot shows that nine factors are having eigenvalue of  $\geq 1$

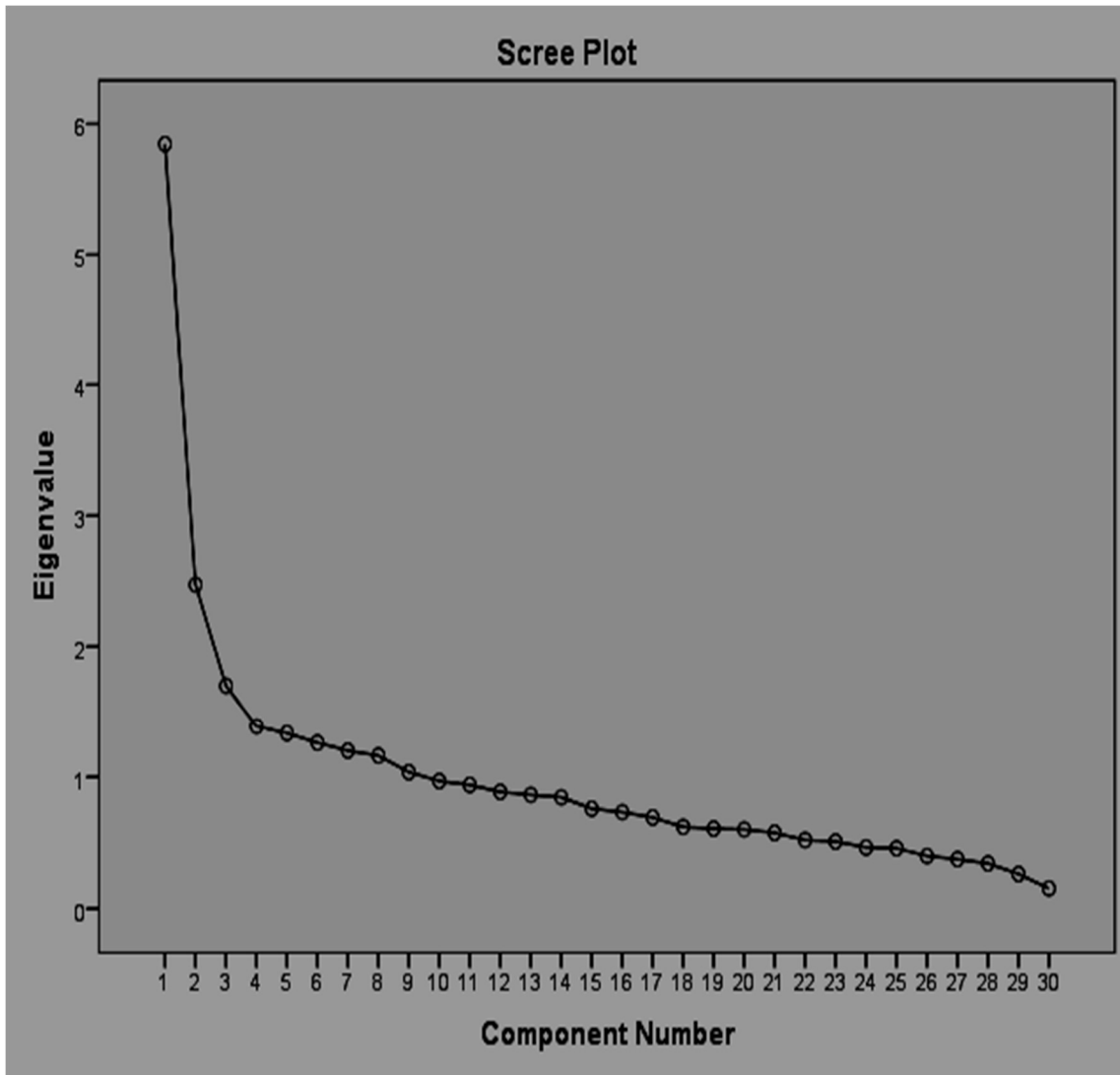


**Figure 2: screen plot**

The other components with values less than 1 were subsumed in the nine factors extracted.

The factor clustering is shown in Table 3. Table 4 shown a creative labeling of the nine factors extracted from the thirty variables based on varimax rotation with Kaiser normalization method in factor analysis.

**Table 3: Varimax Rotated Factor Loadings matrix of 30 variables**

| Variables<br>code | Component    |              |              |              |              |               |               |              |              |
|-------------------|--------------|--------------|--------------|--------------|--------------|---------------|---------------|--------------|--------------|
|                   | 1            | 2            | 3            | 4            | 5            | 6             | 7             | 8            | 9            |
| VAR16             | <b>0.841</b> | 0.097        | 0.15         | 0.192        | 0.064        | -0.144        | -0.022        | 0.069        | -0.07        |
| VAR18             | <b>0.738</b> | -0.053       | -0.179       | 0.073        | 0.188        | -0.108        | -0.17         | -0.031       | -0.047       |
| VAR23             | <b>0.693</b> | 0.216        | -0.079       | 0.183        | 0.161        | -0.236        | 0.112         | 0.187        | 0.003        |
| VAR27             | <b>0.645</b> | 0.242        | 0.337        | -0.006       | -0.164       | 0.039         | 0.033         | 0.04         | -0.061       |
| VAR29             | <b>0.603</b> | 0.202        | 0.375        | 0.191        | 0.107        | 0.034         | 0.037         | -0.144       | 0.104        |
| VAR24             | <b>0.574</b> | 0.142        | 0.073        | -0.11        | -0.063       | 0.196         | -0.025        | -0.11        | 0.17         |
| VAR21             | <b>0.515</b> | 0.164        | 0.11         | -0.085       | -0.144       | 0.035         | 0.417         | 0.153        | -0.059       |
| VAR10             | 0.167        | <b>0.682</b> | -0.092       | -0.051       | -0.091       | -0.042        | -0.092        | 0.01         | 0.088        |
| VAR4              | 0.046        | <b>0.638</b> | 0.118        | 0.119        | 0.014        | 0.131         | 0.258         | 0.188        | 0.105        |
| VAR12             | 0.17         | <b>0.632</b> | 0.061        | 0.184        | 0.104        | 0.224         | -0.016        | 0.065        | 0.228        |
| VAR7              | 0.065        | <b>0.63</b>  | 0.063        | 0.153        | 0.224        | -0.046        | -0.01         | 0.011        | 0.141        |
| VAR14             | 0.125        | <b>0.541</b> | 0.242        | 0.04         | 0.03         | 0.087         | -0.006        | 0.047        | -0.339       |
| VAR17             | 0.345        | <b>0.521</b> | 0.189        | -0.23        | -0.195       | 0.119         | -0.096        | -0.063       | -0.167       |
| VAR11             | -0.008       | <b>0.515</b> | 0.003        | 0.042        | 0.103        | -0.396        | 0.092         | -0.257       | 0.017        |
| VAR9              | 0.294        | 0.466        | -0.011       | 0.079        | -0.097       | -0.059        | 0.283         | 0.029        | 0.038        |
| VAR5              | 0.026        | 0.355        | 0.202        | -0.021       | 0.281        | 0.227         | -0.305        | 0.25         | -0.215       |
| VAR28             | 0.049        | 0.031        | <b>0.754</b> | 0.096        | -0.002       | -0.167        | 0.041         | 0.058        | 0.01         |
| VAR26             | 0.438        | 0.124        | <b>0.634</b> | 0.018        | -0.038       | 0.039         | -0.103        | -0.005       | -0.041       |
| VAR25             | -0.032       | 0.005        | 0.461        | -0.308       | 0.305        | 0.102         | 0.086         | 0.093        | 0.271        |
| VAR30             | 0.123        | 0.036        | 0.06         | <b>0.685</b> | -0.197       | -0.062        | 0.061         | 0.254        | -0.253       |
| VAR3              | 0.126        | 0.461        | 0.023        | <b>0.571</b> | -0.043       | -0.075        | 0.058         | -0.098       | 0.101        |
| VAR19             | 0.147        | 0.007        | -0.027       | -0.111       | <b>0.777</b> | -0.026        | 0.053         | 0.047        | 0.044        |
| VAR6              | -0.126       | 0.337        | 0.167        | -0.041       | 0.477        | 0.291         | 0.014         | -0.272       | -0.098       |
| VAR15             | 0.272        | 0.021        | 0.152        | 0.185        | -0.017       | <b>-0.581</b> | 0.011         | 0            | -0.013       |
| VAR13             | 0.154        | 0.104        | 0.006        | 0.427        | 0.215        | <b>0.579</b>  | 0.026         | -0.088       | 0.01         |
| VAR20             | 0.083        | 0.009        | 0.011        | -0.096       | -0.168       | 0.03          | <b>-0.782</b> | 0.035        | 0.064        |
| VAR8              | 0.047        | 0.209        | 0.019        | -0.125       | -0.249       | 0.379         | 0.405         | 0.026        | 0.126        |
| VAR22             | 0.049        | 0.145        | 0.12         | 0.113        | -0.011       | 0.002         | -0.02         | <b>0.788</b> | 0.101        |
| VAR2              | 0.107        | 0.252        | 0.304        | 0.347        | -0.073       | 0.051         | -0.107        | -0.433       | 0.248        |
| VAR1              | 0.014        | 0.219        | 0.076        | -0.083       | 0.015        | 0.036         | -0.026        | 0.061        | <b>0.808</b> |

**Table 4: Total Variance Explained**

| Component | Initial Eigenvalues |          |         | Extraction Sums of Squared |          |        | Rotation Sums of Squared |          |        |
|-----------|---------------------|----------|---------|----------------------------|----------|--------|--------------------------|----------|--------|
|           | Loadings            |          |         | Loadings                   |          |        | Loadings                 |          |        |
|           | % of                | Cumulati |         | % of                       | Cumulati |        | % of                     | Cumulati |        |
|           | Total               | Variance | ve %    | Total                      | Variance | ve %   | Total                    | Variance | ve %   |
| 1         | 5.846               | 19.488   | 19.488  | 5.846                      | 19.488   | 19.488 | 3.776                    | 12.587   | 12.587 |
| 2         | 2.473               | 8.244    | 27.732  | 2.473                      | 8.244    | 27.732 | 3.576                    | 11.918   | 24.506 |
| 3         | 1.700               | 5.667    | 33.399  | 1.700                      | 5.667    | 33.399 | 1.852                    | 6.172    | 30.678 |
| 4         | 1.388               | 4.627    | 38.026  | 1.388                      | 4.627    | 38.026 | 1.563                    | 5.209    | 35.887 |
| 5         | 1.335               | 4.450    | 42.476  | 1.335                      | 4.450    | 42.476 | 1.445                    | 4.816    | 40.703 |
| 6         | 1.261               | 4.205    | 46.681  | 1.261                      | 4.205    | 46.681 | 1.391                    | 4.636    | 45.339 |
| 7         | 1.201               | 4.004    | 50.685  | 1.201                      | 4.004    | 50.685 | 1.304                    | 4.348    | 49.688 |
| 8         | 1.163               | 3.877    | 54.562  | 1.163                      | 3.877    | 54.562 | 1.258                    | 4.192    | 53.880 |
| 9         | 1.037               | 3.457    | 58.019  | 1.037                      | 3.457    | 58.019 | 1.242                    | 4.139    | 58.019 |
| 10        | .970                | 3.232    | 61.251  |                            |          |        |                          |          |        |
| 11        | .940                | 3.134    | 64.385  |                            |          |        |                          |          |        |
| 12        | .887                | 2.957    | 67.342  |                            |          |        |                          |          |        |
| 13        | .865                | 2.883    | 70.225  |                            |          |        |                          |          |        |
| 14        | .847                | 2.822    | 73.047  |                            |          |        |                          |          |        |
| 15        | .760                | 2.533    | 75.580  |                            |          |        |                          |          |        |
| 16        | .733                | 2.442    | 78.022  |                            |          |        |                          |          |        |
| 17        | .693                | 2.311    | 80.333  |                            |          |        |                          |          |        |
| 18        | .621                | 2.069    | 82.402  |                            |          |        |                          |          |        |
| 19        | .608                | 2.026    | 84.428  |                            |          |        |                          |          |        |
| 20        | .602                | 2.006    | 86.434  |                            |          |        |                          |          |        |
| 21        | .576                | 1.921    | 88.355  |                            |          |        |                          |          |        |
| 22        | .521                | 1.736    | 90.091  |                            |          |        |                          |          |        |
| 23        | .510                | 1.701    | 91.792  |                            |          |        |                          |          |        |
| 24        | .465                | 1.551    | 93.343  |                            |          |        |                          |          |        |
| 25        | .459                | 1.529    | 94.872  |                            |          |        |                          |          |        |
| 26        | .401                | 1.336    | 96.207  |                            |          |        |                          |          |        |
| 27        | .376                | 1.252    | 97.460  |                            |          |        |                          |          |        |
| 28        | .344                | 1.145    | 98.605  |                            |          |        |                          |          |        |
| 29        | .264                | .880     | 99.485  |                            |          |        |                          |          |        |
| 30        | .154                | .515     | 100.000 |                            |          |        |                          |          |        |

Extraction Method: Principal Component Analysis.

**Table 5. Summary of results with the clusters**

| <b>Creative label</b>         | <b>Factor code</b> | <b>Variable</b>                | <b>Factor loading</b> |
|-------------------------------|--------------------|--------------------------------|-----------------------|
| Vehicle/environmental concern | Factor 1           | Use of fake spare parts        | 0.841                 |
|                               |                    | Poorly maintain vehicle        | 0.738                 |
|                               |                    | Ineffective traffic light      | 0.693                 |
|                               |                    | Narrow bridge                  | 0.645                 |
|                               |                    | Slippery road surface          | 0.603                 |
|                               |                    | Inadequate road signs          | 0.574                 |
|                               |                    | Bad road/ portholes            | 0.515                 |
| Knowledge/ safety concern     | Factor 2           | Lack of drivers training       | 0.682                 |
|                               |                    | Fatigue                        | 0.638                 |
|                               |                    | Brake failure                  | 0.632                 |
|                               |                    | Dangerous overtaking           | 0.630                 |
|                               |                    | Steering & suspension problem. | 0.541                 |
|                               |                    | Unworthy vehicle               | 0.521                 |
|                               |                    | Tyre burst                     | 0.515                 |
| Thoroughgoing concern         | Factor 3           | Fallen trees                   | 0.754                 |
|                               |                    | Dangerous bends                | 0.634                 |
| Veering tendency              | Factor 4           | Rainfall                       | 0.685                 |
|                               |                    | Distraction                    | 0.571                 |
| Lightning system defect       | Factor 5           | Defective lightning system     | 0.777                 |
| Emission /electrical concern  | Factor 6           | Exhaust problem/smoke          | -0.581                |
|                               |                    | Power failure in vehicle       | 0.579                 |
| Injection system              | Factor 7           | Fuel leakage                   | -0.782                |
| Weather condition             | Factor 8           | Poor weather                   | 0.788                 |
| Driver's act                  | Factor 9           | Over speeding                  | 0.808                 |

## **Discussion**

The study was centred on the road safety risk factors and crash analysis in Ogun State. The result discovered how these factors do individually and collectively interact to cause road crashes in Ogun State.

The communalities, component matrix and rotated component matrix were sort for through the software which justified 9 components and they were discussed and interpreted accordingly. The principal component analysis of the variables came up with 9 components. Variables above 0.500 factor loading were extracted from the rotated component matrix. Cluster 1 and 2 with high number of variables indicated high influence of those variables in RTC causation in Ogun State. The higher the factor loading of the variables the higher it risks.

The first cluster which is labelled vehicle/environmental impact concern includes variable (use of fake spare parts, poor vehicle maintenance, ineffective traffic light, narrow bridge, slippery road surface, inadequate road signs and bad road/potholes with loading of 0.841, 0.738, 0.693, 0.645, 0.603, 0.574 and 0.515 respectively. Use of fake spare parts with a high factor loading of 0.841

contributes greatly to road traffic crashes in Ogun State. This is common in Ogun State and even Nigeria at large. SON (2016) reported, that 95 percent of auto spare parts imported into the country, does not meet minimum standard. More recent figures estimated that about 75percent of auto spare parts in the country were substandard.

The second cluster labelled as knowledge and safety concern consist of lack of drivers' training, fatigue, brake failure, dangerous overtaking, steering/ suspension problem, unworthy vehicle and tyre burst with factor loading 0.682, 0.638, 0.632, 0.541, 0.521 and 0.515 respectively. According to Mcphee (2007) of all the system that make vehicle, the brake might just be the most important. If not properly service and maintain, it will contribute greatly to the cause of road traffic crashes. However, the outcome of this survey shows brake failure with factor loading of 0.632 which indicates that it's one of the key determinants of road traffic crashes in Ogun State as supported by Oduro (2012).

The third cluster (thorough going concern) includes obstruction and dangerous bends with factor loading as high as 0.754 and 0.634 respectively. The two variables in the cluster are key factors contributing to road traffic crashes in Ogun State. It further supported by the research of Jesper (2008). A common pattern in each of the two risk situations in these factors, showed that drivers not seen the vehicle due to obstruction or bends on highway thereby resulting to carnages on the road.

While the fourth cluster (veering concern) includes rainfall and distraction with 0.685 and 0.571 respectively. The cluster accommodates two risky variables that can cause vehicle to veer off road. Rainfall is climatically induced and it's considered as RTC risky factors (Washington and Mannering, 2000). Distraction is driver's behavior. This factor is supported by (Abdul-Azeez& Olabode , 2010).

The fifth cluster is defective lightning system with high factor loading of 0.777. This indicates high contributing factor to RTC in Ogun State. The PCA trumps it as one of the most influencing factors as analysed in this study. The most effective mode of communication to other road user is functional and correctly use of lightning system in the vehicle. Obviously, it is difficult for a vehicle to function effectively with defect lightning system. It poses serious threat to both the occupant of the vehicle and other road users.

The sixth cluster consists of exhaust problem/smoke and power failure in vehicle with loading of -0.581 and 0.579 respectively. The effect of Var15 is opposed to that of Var13 because of the opposite signs -0581 and 0.579 respectively.

The seventh factor is fuel leakage which is injection problem with a negative loading of -0.788. The factor contributes substantially to road traffic crashes in Ogun State. It explains barely 50% of the observed variance. The effect of this factor can result to fire outbreak thereby leading to serious injuries and even death. (Uchegbu, 2001).

Factor eight is poor weather with a factor loading of 0.788. Driving under a poor weather condition is very dangerous as this can affect the visibility of the drivers thereby resulting to loss of control. Adverse weather condition is generally accepted as RTA risky factor (Soyoung et al 2009: Igboanugo & Onifade, 2013).

The ninth cluster is over speeding with high factor loading of 0.808. There is a strong correlation between the speed of a vehicle and the risk of crash involvement together with injuries sustained. Excessive speed is responsible for a high proportion of the mortality and morbidity that result from road traffic crash (Fleeter et al., 2016)

## **Conclusion**

Based on the findings, analysis and interpretation of result, the study showed the reduction of 30-variable structure into 9 specific dimensions due to principal components analysis applied. Crash analyses and prevention measures can now revolve around these nine (9) areas instead of dealing with variables individually. The 30 traffic risk factors in the PCA cut across factors related to human error, vehicle failure, climatic problem and infrastructural defect which were administered on 240 respondents.

The study also revealed that use of fake spare parts and over speeding contributed highly to RTC causation in Ogun state. From the result, the potential road traffic risk factors were identified based on the factors and their loadings. The first two clusters labelled as vehicle/environmental concern and drives knowledge/safety concern have the highest variables and they are considered principal factors among other factors.

It is therefore recommended that attitudinal change on the part of road users and government intervention on road maintenance will have a positive impact in reducing road traffic crash in Ogun State.

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