



Evaluation of Road Traffic Accident Variations in the Niger Delta

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Abstract: Drivers' behaviour is more complex when they are using the road. There are no universal guidelines for such behaviour. This research studied the variation on Road Traffic Accident (RTA) in Niger Delta region. For data collection, a cross-sectional research design was adopted. The data were collected through the use of historical/archival data of road traffic crashes from FRSC and the National Bureau of Statistics (NBS), and the use of a Driver Behaviour Questionnaire (DBQ) survey to investigate drivers' Behavioural attitude (BA), Subjective Norms (SN), the perceived Behavioural Control (PBC) in the Niger Delta. The simple random sampling technique was adopted and the selection was based on the long existence of park and registered drivers. The reason for the choice of data type is to adequately capture the spatial spread of accidents and differences in drivers' behaviour. The data include extracted accident records containing fatal, serious and minor cases yearly from 1996-2021. The reason for the choice of years includes reliability, consistency, and continuity of records and a long range of data. The data generated were analysed using multiple regression and ANOVA. The result obtained revealed that there is a decline in road traffic accidents and fatality index over the last 26 years in the Niger Delta from 24.08% road traffic accidents and 11.58 to 9.94% and 2.23 respectively. Edo state recorded the highest value of RTA, while Imo state recorded the highest fatality index in the Niger Delta. The study further revealed that there is a significant difference in drivers' behaviour within the Niger Delta. At $P < 0.05$, there is a statistically significant difference in the driver behaviour of overspeeding in the Niger Delta. The drivers in Abia, Akwa Ibom and Rivers States' overspeeding behaviour differs from the way drivers over speed in other states of the Niger Delta. Similarly, there is a significant variation in road traffic accidents within the Niger Delta. The road traffic accident in Cross Rivers State differs from other states in the Niger Delta. Driver traffic behaviour toward road safety has a significant contribution to road traffic accidents in the Niger Delta. 98% of road traffic accidents are caused by drivers' behaviour toward road safety in the Niger Delta.

Keywords: Road; Accident; Variations; Behaviour; Traffic; Niger-Delta

1. Introduction

The most serious problem facing road transportation today all over the world is the incident of road traffic accident (RTA).^[1-65] At the moment, it constitutes the most serious problem to traffic and personal safety on the highways. In Nigeria, the incident has become a very disturbing phenomenon and the country is presently ranked among the world's highest. Although road traffic accidents are completely inevitable, the fact that it is a leading cause of death and injury makes it a cause for serious concern to all countries. Road traffic accident remains a dreadful plague and a transport problem worldwide (Museru et al., 2002).^[40] Globally, accounting for an estimated 1.35 million fatalities annually, leaving a global average of 20-50 million people with temporal or permanent disabilities (Dharmarathne et al., 2015; Ngene & Anorue, 2021).^[46] An average of 3242 persons dies each day around the world from road traffic injuries (Peden et al., 2004).^[54] It is a leading cause of death from trauma (Adesunkanmi et al., 2002;^[2] Solagberu et al., 2003;^[57] Ekere

et al., 2004).^[20] A road traffic accident is a multifactorial phenomenon that affects victims to different degrees depending on the type of accident (Blakely & Salmond, 2002).^[17] The trend has been on a decline in most developed countries, while the reverse is the case in developing nations (Oladehinde et al., 2007).^[51] Africa has its fair share of this global road safety crisis and accounts for about 16% of global road fatalities, despite having only about 2% of the world's vehicles (Uzondue et al. 2013).^[59] Each year an estimated 1.2 million people are killed in road traffic crashes (Krug et al., 2000).^[38]

In Nigeria, Road Transportation accounts for about 80% of mobility needs. The non-expansive nature of the waterways and the near current low capacity of the rail system coupled with the expensiveness of air travel have led to overreliance on the road. Nigeria has the largest road network in West Africa and the second largest south of the Sahara, with a total of 193,200 km of roads comprising paved: 28,980 km and Unpaved: 164,220 km (KPMG, 2014).^[37] It has a population-road ratio of 860 persons per square kilometre, indicating intense traffic pressure on the available road

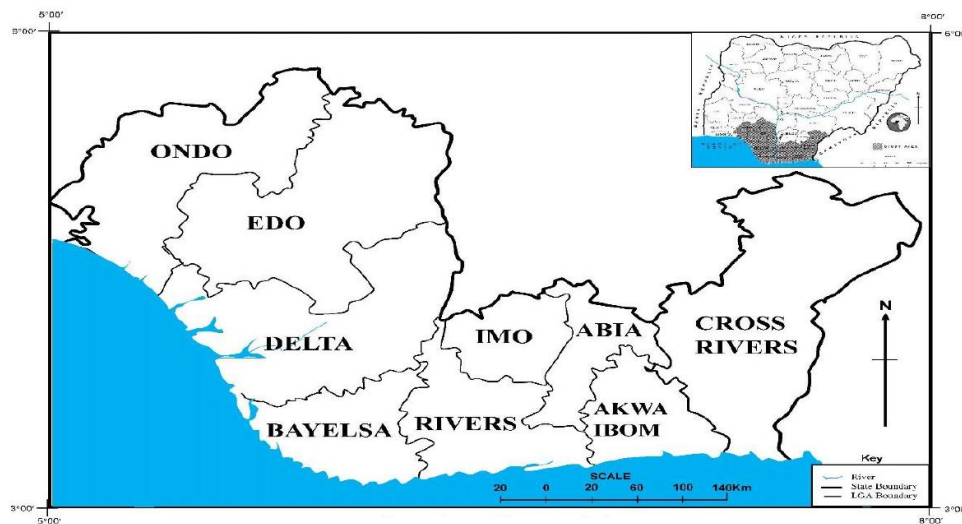


Fig. 1. Map of the Niger Delta

network (Ukoji, 2014).^[58] With a human population of about 167 million, a high level of vehicular population is estimated at over 7.6 million. There are approximately 12 million registered vehicles using Nigeria's roads, at 85 cars per 1000 people (WHO, 2013).^[60] A contributory factor to increased crashes in Nigeria is the increase in private vehicle ownership. The National Bureau of Statistics (NBS) (2018)^[42] estimates the number of officially registered vehicles in Nigeria at 11,760,871 vehicles, of which 6,785,956 (57.7%) are commercial vehicles, 4,819,251 (40.9%) are privately owned, 149,470 (1.3%) are government-owned, while 6194 (0.1%) are diplomatic vehicles.

Nigeria is ranked second-highest in the rate of road accidents among 193 countries of the world (Oladehinde et al., 2007;^[51] Agbonkhese et al., 2013;^[3] Atubi, 2020).^[12] WHO (2018),^[63] adjudged Nigeria as the most dangerous country in Africa with 33.7 deaths per 100,000 population every year. According to their report, one in every four road accident deaths in Africa occurs in Nigeria. In Nigeria alone, annual fatalities on roads reached 6,452 and the number of persons injured amounted to nearly 18,116 in 2003. In 2005, the total number of casualties rose to nearly 20,298 and was about 34,641 in 2008. The number and frequency of road accidents in Nigeria have become a growing concern and as such requires urgent attention (FRSC, 2018). According to FRSC (2015), between 2010 and 2014, more than 27000 people died and about 100000 were injured in 48841 road crashes. FRSC (2017) further shows that 5053 people were killed in 9694 road crashes in 2016, representing a decrease of 387 in comparison with the death toll of 5440 recorded in 2015 where about 9734 crashes happened.

Several approaches and efforts have been employed to make the roads in Nigeria safer. The most commonly used methods are the behavioural modification approach which includes enforcement, education and propaganda. These methods were introduced as programme options for modifying the behaviour of road users. The various institutions which are in one way or the other responsible for road safety in Nigeria include the Vehicle Inspection Unit of the Federal Ministry of Works, the Federal Ministry of Transport, and the Motor Traffic Division of the Nigeria Police, the Supply and Transport unit of the Nigerian Army, the Federal Road Safety Commission

which was specifically set up by Decree 45 of 1988 to address the problem and which was recently merged with the Nigeria Police Force. These institutions have, at one time or the other, embarked on measures aimed at inculcating road safety consciousness on road users. Other organizations include the multinational companies, especially those in the oil sector, for example, Shell Petroleum Development Company (SPDC) 'Nigeria and the Nigerian National Petroleum Company (NNPC). The Federal Road Safety Commission in particular has adopted such measures as enforcement of the traffic rules by arresting and prosecuting traffic offenders; educating the young ones to appreciate and adopt good road safety manners through taking part in the activities of Road Safety Clubs; public enlightenment and propaganda through advertisement on radio, television and newspaper; as well as rallies at motor parks, organized drama, stickers, etc. The Commission also introduced a revised Highway Code and uniform driving license. In spite of all the above, the progress so far achieved by the Federal Road Safety Commission has been attributed to public enlightenment programme. There is, however, no doubt that much still needs to be done, especially in the area of highway improvement and management as well as vehicle standard inspection and maintenance (Ogunsanya, 1991; Aikhomu, 1991).

This research studied the variation on Road Traffic Accident (RTA) in Niger Delta region. Commercial drivers, often try to recoup weekend expenses when they overload passengers; thus over-speeding to complete more trips. The repercussions of such driving result in colossal accidents. Most accidents are higher during weekends in the Niger Delta, for example, 70% of fatal accidents in Port Harcourt occur during the weekends (Eke et al., 2000). Between 2007 and 2010, 16% of road accidents occurred on Sundays, 15% on Saturdays, 15% on Fridays, 14% on Thursdays, 13% on Wednesdays, 14% on Tuesdays, and 13% on Mondays (FRSC, 2010). People who travel back on Sundays to resume official duties on Mondays increase traffic volume and fatal road accidents. Despite the happiness and change in the quality of family lives associated with owning a vehicle, its possession has left many families bereft of their breadwinners or loved ones (Ukoji, 2014). On 3 April 2013, 70 people died after a double-decker bus, a haulage truck, and a petrol tanker collided

Table 1. Study Location and Sample Sites

States	Motor parks		
	Park 1	Park 2	Park 3
Ondo	Akure Motor park	Ultra-Modern park	Iroko motor park
Delta	Effurun motor park,	Warri main garage	Coka junction park
Edo	Ring road motor park	Auchi motor park	Jetu motor park
Imo	Mbaise motor park	Okigwe motor park	Orlu motor park
Rivers	Rumuokoro motor park	Choba motor park	Waterline park
Cross Rivers	Ugep motor park	Cross central park	Ogoja motor park
Akwa Ibom	Uyo motor park	Oron motor park	Eket central motor park
Abia	Ohafia motor park	Okigwe motor park	Okputong motor park
Bayelsa	Tombia motor park	Ekeki motor park,	Mbiama motor park

Table 2. States of Niger Delta and their creation date

State	Creation date
Ondo	3 rd February 1976
Edo	27 th August 1991
Delta	27 th August 1991
Bayelsa	1 st October 1996
Rivers	27 th May 1967
Cross Rivers	27 th May 1967
Akwa Ibom	27 th September 1987
Imo	3 rd February 1976
Abia	27 th August 1991

along the Benin–Ore expressway. The tanker exploded and killed most people on board the bus (Ukoji, 2014). Two days later, multiple accidents involving a Dangote cement-laden trailer, a tanker, and a luxury bus led to the death of 60 persons in Edo. The bus lost control and rammed into the trailer and the trailer into the tanker. The victims were burnt beyond recognition. About 10 motorcycles and 15 shops were destroyed by the fire (Ukoji, 2014). On the same day in Anambra, other multiple accidents involving a trailer, two minibuses belonging to the Rivers State Transport Company (RSTC), and two other vehicles claimed 25 lives (Ukoji, 2014). Within a space of two days, 155 lives were lost on the road. On 4 October 2013, for instance, four finance clerks of a Local Government Area were killed in an auto crash while they were returning from the headquarters of the council during a heavy downpour (Ukoji, 2014). This study type can be used to aid decision-making processes involving safety assessment of various road users as well as infrastructure improvements which could potentially reduce the number of future crash events. Studies of driver behaviour are of great help for different tasks in transport safety as unsafe driving behaviour can cause crashes and injuries (Özkan & Lajunen, 2005; Taubman-Ben-Ari and Yehiel, 2012).^[52]

2. Materials and Methods

2.1. Study Area

The Niger Delta is a vast coastal plain in the southernmost part of Nigeria where the River Niger drains into the Atlantic Ocean in the Gulf of Guinea (see Fig. 1). The Niger Delta lies between latitude 3°N and 6°N, and longitude 5°E and 8°E (Ndubuisi & Asia, 2007).^[45] About 2,370 square kilometres of the Niger Delta area consist of rivers, creeks and estuaries while stagnant swamp covers about 8,600 square kilometres (Odoemene, 2011).^[47] Considered the largest wetland in Africa and among the world's largest, it covers 70000 square kilometres and makes up 7.5% of Nigeria's land mass

(Akpabio & Akpan, 2010).^[4] Stretching over 20,000 km² of swamp land in the littoral fringes of the country covered by mangrove forests, swamps, coastal ridges, and forests; it embraces one of the world's largest wetlands, over 60% of Africa's largest mangrove forests, and one of the world's most extensive (Eyinla & Ukpo, 2006;^[21] Anthony, 2011). Comprising mainly of a distinct aquatic environment which is very fertile, providing habitat for vast biodiversity and supporting a high population density of people who derive their livelihoods from its rich resource base.

2.2. Sampling Design

The study adopted a cross-sectional survey design of both qualitative and quantitative (empirical evidence). The design involves the use of historical/archival data on road traffic crashes from the Federal Road Safety Corp (FRSC) and the National Bureau of Statistics (NBS), and the administration of questionnaires. The research design for this study was adopted by Wimmer and Dominick (2014),^[64] Ojiakor et al. (2019),^[50] and Odufuwa et al. (2019).^[49] The data used for this research was based on both primary and secondary sources. The primary data were acquired from field-generated data through the administration of questionnaires. The secondary data includes numbers and types of crashes, and numbers of road safety violators and types of violations from the various Federal Road Safety Corps (FRSC) offices in the Niger Delta for a period of twenty-six (26) years.

2.3. Sampling Framework

Stratified and systematic random sampling techniques were adopted for this study. Here, motor parks in Niger Delta were selected based on long existence, travel direction and destination (major parks). To achieve this study, twenty-seven (27) existing motor parks with a minimum of ten (10) years long term duration of existence in the nine (9) states within the Niger Delta were selected (Table 1). The choice of sampled parks was based on the influx of commuters and travel trip frequency.

2.4. Method of data collection

Data on traffic crashes and the number of injured and death cases were obtained from each state road safety office respectively. The accident record contained the number of total casualties for the period of 1996-2021 (26 years). The data were extracted from accident records which contained fatal, Serious and Minor cases every year from 1996-2021. The reasons for the choice of years include the choice of 1996 as a base year is because the most recent state created in the Niger Delta was Bayelsa, which was created in

Table 3. Registered drivers in the Niger Delta

States	Registered drivers
Ondo	515
Delta	3421
Edo	3858
Imo	1337
Rivers	2815
Cross Rivers	487
Akwa Ibom	592
Abia	1034
Bayelsa	538
Total	14597

Source: National Bureau of Statistics / Federal Road Safety Corps (FRSC) (2021)

1996 (Table 2), reliability, consistency, continuity of records and a long range of data. Similar reasons for the choice of data have been used by various researchers on drivers' behaviour and road crashes (Iversen & Rundmo, 2004;^[36] Bener & Crundall, 2008;^[16] Delhomme et al., 2013;^[18] Abayomi, 2016).

Accident data within the Niger Delta were characterized by historical records obtained from archives of the National Bureau of Statistics from 1996-2021 and were provided by the Federal Road Safety Corps (FRSC). The data retrieved contained the fatal, serious and minor case reports of traffic accidents. The reason for the choice of years of an accident is to determine the demi-decadal trend of road traffic accidents (Adesunikanmi et al., 2002;^[2] Agbonkheshe et al., 2013;^[3] Razzaghi et al., 2013;^[55] Arthur, 2015;^[6] Atubi, 2015;^[7] Abayomi, 2016; Balantine, 2019;^[14] Atubi, 2020).^[12] Also as part of the study, copies of questionnaires were administered. The questionnaire approach was adopted over an observational study due to the costs associated with observational studies and also due to how wide the roads are in the Niger Delta, which makes the manual observation of drivers and other road users quite impossible from a distance. The questionnaires were administered with participant information leaflets and consent forms with the liberty to withdraw from the study at any time, even without reasons. The survey ethical clearances were obtained from the motor park union leaders and participants who were registered drivers in the Niger Delta (Table 3).

Furthermore, to get an adequate sample size for questionnaire distribution the population for each State were subjected to the Taro Yamane sample size formula as stated below:

$$n = \frac{N}{1 + N * (e)^2}$$

Where;

n = the sample size,

N = the population size,

e = the acceptance sampling error

* 95% confidence level and p = 0.5 are assumed.

Where N is 14597, e is 0.05.

The population comprised 14,597 registered drivers and a sample size of approximately 405 persons was obtained through the application of Taro Yamane's sample size selection formula for a finite population (Yamane, 1978).^[65] A total of four hundred and five

Table 4. Ages of Drivers

Ages	Respondent	Percentage (%)
<18	14	3.46
18-25	60	14.81
26-40	224	55.31
41-50	79	19.51
51 & Above	28	6.91
Total	405	100

Source: Fieldwork, 2022

(405) questionnaires were administered to the twenty-seven (27) motor parks. Fifteen questionnaires were administered to drivers in each Motor park. A simple random sampling technique was used in selecting subjects of 405 (15 participants from each park) commercial drivers from which samples drawn are from the nine (9) states of the Niger Delta. The selected drivers are registered in their respective motor parks and have affiliations with the National Union of Road Transport Workers (NURTW). The theory of planned behaviour was used for the item questions including Behavioural attitude (BA), Subjective Norms (SN), the perceived Behavioural Control (PBC). The survey questionnaire consisted of cognitive variables which could be divided into four sections. Section A featured the respondents' demographic characteristics with 4 items, section B deals with the driving background history and traffic violations investigated with 7 items, section C deals with drivers' behaviour investigated with items, while the last section D contains the drivers' cognitive variable of 7 items. It is a direct-self reported questionnaire model for data collection as the primary source with these drivers' behaviour and cognitive questions answered with a 5-point Likert scale (0 = Never; 1 = Rarely; 2 = Some of the time; 3 = Most of the time; 4 = All the time).

2.5. Statistical Analysis

The analysis of data involved the use of means and percentages. The results were presented in tables and graphs in statistical diagrams and analysed with the aid of percentages, multiple regression and Analysis of Variance (ANOVA). Simple descriptive analyses of the distributions and cross-tabulation of variables were carried out. The first, second and fifth hypotheses that state "there is no significant difference in drivers' behaviour within the Niger Delta", there is no significant variation in road traffic accidents within the Niger Delta and "there is no significant difference in drivers training and awareness of road safety culture in the Niger Delta" were analysed using Analysis of Variance (ANOVA). The third and fourth hypotheses that state "driver traffic behaviour does not significantly result in accidents within the Niger Delta", and "there is no significant relationship between drivers' demographic characteristics were analysed using multiple regression. Multiple regressions are a useful tool to analyse cause and effect. Multiple regressions have been used in road traffic accidents and safety cultures studies by scholars such as Agbeboh and Osabuohien-Irabor (2016) and they obtained significant results. ANOVA is used to examine differences and identify the points where the difference occurs. This tool has been used in similar studies of Road Traffic Car Accidents by Hunde and Aged (2015)^[35] and they obtained significant results. The data were entered in Statistical Package for Social Sciences (SPSS) version 22 and double-checked before analysis.

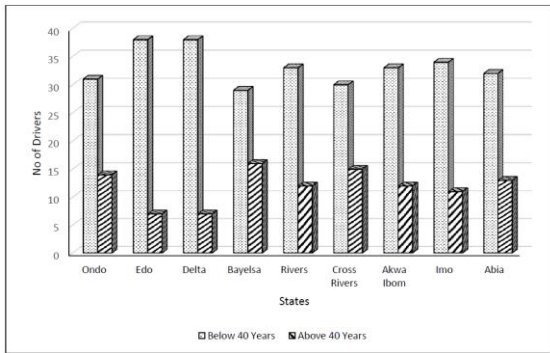


Fig. 2. Drivers in the Niger Delta region that falls between the ages of 26-40 years.

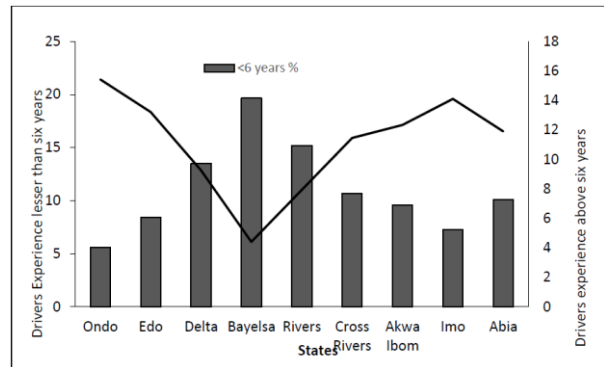


Fig 4. Years of Drivers Experience in the Niger Delta

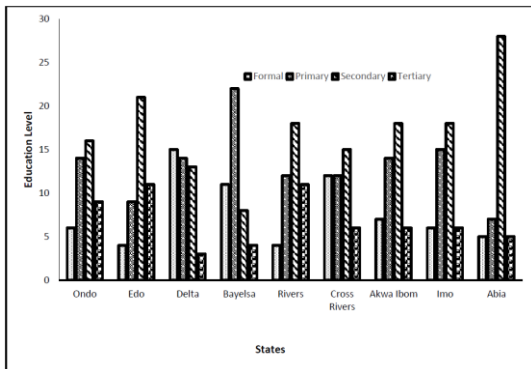


Fig. 3. Educational status of Drivers in the Niger Delta region

Table 5. Education levels of the Driver

Education	Respondent	Percentage
Formal	70	17.29
Primary	119	29.38
Secondary	155	38.27
Tertiary	61	15.06
Total	405	100

Source: Fieldwork, 2022

Table 6. Drivers' Experience

Drivers Experience	Respondent	Percentage
< 2 Years	60	14.81
2-5 years	118	29.14
6-10 years	162	40.00
> 11 years	65	16.05
Total	405	100

Source: Fieldwork, 2022

3. Data Presentation and Discussion of Results

3.1. Unsafe Driver Behaviours in Niger Delta

Table 4 shows the ages of drivers within the Niger Delta. It is revealed that 55.31% of the drivers in the Niger Delta are aged 26 to 40 years, while 3.46% of the drivers in the Niger Delta are of ages below 18 years. Thus, most of the drivers in the Niger Delta are of younger ages (see Fig. 4). The ages of the drivers will influence their likelihood to be involved in accidents as opined by Bener and Crundall (2008) noting that young drivers show a tendency towards risks compared with older drivers. Young drivers are often considered novices with a lack of experience and are likely to commit driving offences and get into crashes (De Craen, 2010). However, Fig. 2 shows the age distribution of younger and older drivers in the Niger Delta. Edo and Delta States are the states with the younger drivers, while Bayelsa, Ondo and Cross Rivers are states with the older drivers. This is an indication that Edo and Delta State drivers are less experienced and are likely to be involved in road traffic accidents owing to youthful exuberance. Similarly, Bayelsa, Ondo and Cross Rivers drivers are older drivers who tend to be more careful while driving.

Table 5 shows the educational levels of drivers in the Niger Delta. It is revealed that 38.27% of the drivers in the Niger Delta have acquired secondary education, while 15.06% of the drivers in the Niger Delta have acquired Tertiary education. This implies that most of the drivers have acquired secondary education, thus they can read and write. Despite their educational status in the Niger Delta, they still don't keep to safety traffic rules. Education is fundamental to traffic safety (Garba, 2009; Akinmusere & Oladunmoye, 2011).

However, Fig. 3 shows the educational levels of drivers in the Niger Delta. Rivers and Edo States are the states with the most drivers who have attained tertiary education, while Bayelsa and Cross Rivers are the states with the most drivers who have attained formal Education. This is an indication that Edo and Rivers States drivers are more educated and are likely to be well-learned on Road traffic safety, while Bayelsa and Cross Rivers States drivers are the least educated states with drivers who could hardly understand road traffic safety.

Table 6 shows drivers' experience years in the Niger Delta. It is revealed that 40% of the drivers in the Niger Delta have 6-10 years of driving experience, while 14.81% of the drivers in the Niger Delta have below 2 years of experience. In the same vein, 56% of the drivers have had over six years of experience in driving, while 44% of the drivers had below six years of driving experience. Thus, the drivers in the Niger Delta had more driving experience years. This is an indication that they are more cautious and hopefully more conversant with traffic laws. Mayhew et al. (2003),^[39] opined that the crash risk of novice drivers decreases with increased driving experience.

However, Fig. 4 shows the years of drivers' experience in the Niger Delta. Bayelsa and Rivers States are the states with the most drivers who have attained less than three years of experience, while Ondo and Imo are the states with the most drivers who have attained over six years of experience. This implies that drivers in Ondo and Imo states are very cautious and experienced driving.

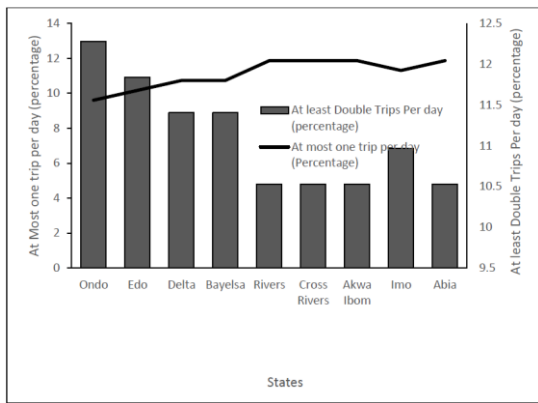


Fig. 5. Drivers' Trip frequency by States in the Niger Delta

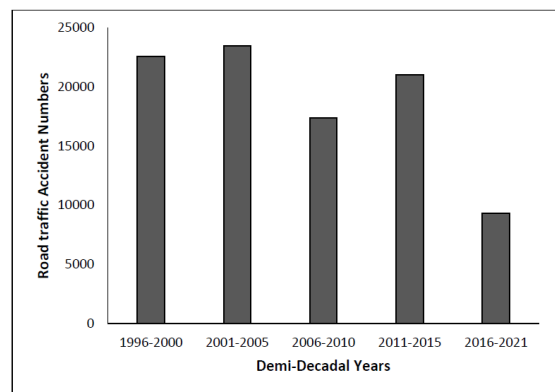


Fig. 7. Demi-decadal Road Traffic Accidents in the Niger Delta

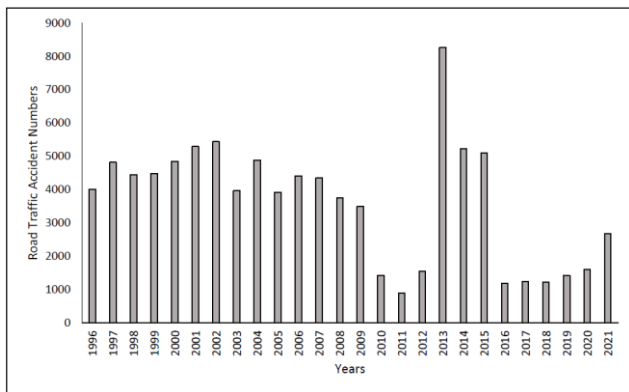


Fig. 6. Road Traffic Accident in the Niger Delta from 1996-2021

Table 7. Drivers' trip frequency

Drivers Trip Frequency	Respondent	Percentage
Many times/day	72	17.78
Twice/day	156	38.52
Daily	123	30.37
Weekly	54	13.33
Total	405	100

Source: Fieldwork, 2022

Table 7 shows the drivers' trip frequency in the Niger Delta. It is revealed that 38.52% of the drivers make double trips per day, while 13.33% of drivers cover a trip per week in the Niger Delta. However, the number of drivers that make at least double trips per day is more than that of drivers that make at most a single trip per day in the Niger Delta (see Fig. 7). This is an indication that drivers in the Niger Delta tend to make more trips, thus; over-speeding to complete more trips. The consequences of such driving result in enormous accidents.

However, Fig. 5 shows the drivers' trip frequencies by State in the Niger Delta. Ondo and Edo States are the states where drivers make at least double trips per day, while Abia and Akwa Ibom states are states where drivers make at most one trip per day. This implies that drivers in Ondo and Edo states are making more trips than any other state in the Niger Delta. The drivers become prone to fatigue, thereby increasing the rate of accident crashes.

3.2. Road Traffic Accident (RTA) variations in the Niger Delta

Table 8 indicates that the number of road traffic accidents for the period under review was 93,781 accident cases. The highest number of road traffic accident cases from 1996 to 2021 was recorded in the

Table 8. Road Traffic Accident Distribution in the Niger Delta from 1996-2021.

Years	Road Traffic Accidents
1996	4011
1997	4818
1998	4435
1999	4479
2000	4841
2001	5287
2002	5434
2003	3960
2004	4875
2005	3918
2006	4403
2007	4339
2008	3743
2009	3486
2010	1416
2011	893
2012	1539
2013	8259
2014	5224
2015	5099
2016	1178
2017	1237
2018	1213
2019	1413
2020	1604
2021	2677
Total	93781

Source: FRSC (2021)

year 2013 with a total of 8259 cases while the lowest number of cases which is 893 was recorded in the year 2011 in the Niger Delta (see Fig. 6).

The demi decadal road traffic accident record for the year 1996 to the year 2000 has annual total RTA cases of 22,584; from 2001 to 2005 has annual total RTA cases of 23,474; from 2006 to 2010 has annual total RTA cases of 17,387; from 2011 to 2015 have annual total RTA cases of 21,014, and from 2016 to 2021 have annual total RTA cases of 9,322 (see Fig. 7). These first five years of the period under review accounted for 24.08% of the road traffic accident cases within the period, the second, third, fourth and fifth periods accounted for 25.03%, 18.54%, 22.41% and 9.94% respectively. This implies that road traffic accident cases during the period have decreased over the years.

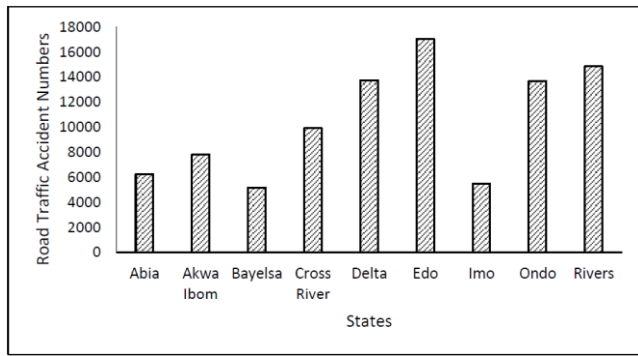


Fig. 8. State Records of Road Traffic Accidents in the Niger Delta from 1996-2021.

Table 9. State Summation of RTA

STATE	RTA from 1996-2021
Abia	6246
Akwa Ibom	7796
Bayelsa	5131
Cross River	9892
Delta	13725
Edo	17012
Imo	5487
Ondo	13650
Rivers	14842
Total	93781

Source: FRSC (2021)

Table 10. Annual Records of Fatality Index

Years	Average
1996	4.44
1997	3.25
1998	3.08
1999	5.84
2000	41.37
2001	2.63
2002	4.40
2003	2.84
2004	3.02
2005	3.05
2006	2.83
2007	3.00
2008	2.69
2009	3.32
2010	2.27
2011	1.50
2012	1.76
2013	13.54
2014	7.54
2015	7.55
2016	1.99
2017	1.83
2018	2.39
2019	2.51
2020	2.47
2021	2.19
Average	5.13

Source: FRSC (2021)

Table 9 shows the total number of road traffic accidents by states in the Niger Delta from 1996 to 2021. The highest number of road traffic accident cases from 1996 to 2021 was recorded in Edo State with a total of 17,012 cases while the lowest number of cases which is 5131 was recorded in Bayelsa State in the Niger Delta (see Fig. 8).

Table 10 indicates that the average road traffic accident fatality for the period under review was 5.13. This is an indication that the

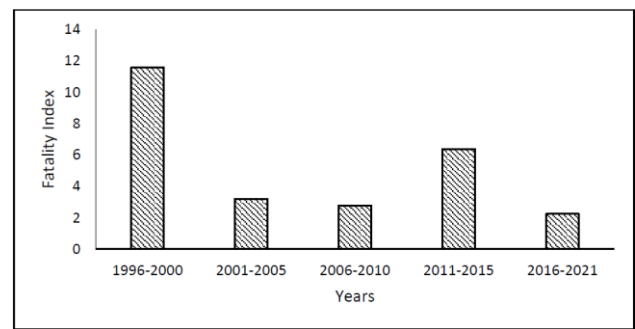


Fig. 9. Demi-decadal of RTA fatality index in the Niger Delta from 1996-2021.

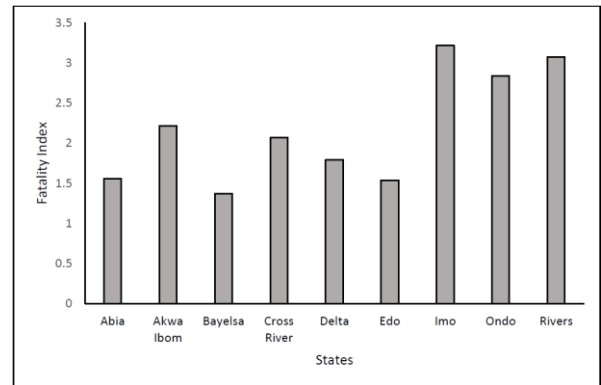


Fig. 10. Road Traffic Accident fatality index in the Niger Delta

Table 11. RTA Fatality index by States in 2021

STATE	2021
Abia	1.56
Akwa Ibom	2.21
Bayelsa	1.37
Cross River	2.07
Delta	1.79
Edo	1.54
Imo	3.22
Ondo	2.84
Rivers	3.07

Source: FRSC (2021)

fatality index in the Niger Delta is medium (see Appendix III). The highest road traffic accident fatality from 1996 to 2021 was recorded in the year 2013 with a value of 13.54 while the lowest road traffic accident fatality of 1.50 was recorded in the year 2011 in the Niger Delta.

The demi-decadal road traffic accidents fatality record for the year 1996 to the year 2000 has an average road traffic accidents fatality index of 11.58; from 2001 to 2005 have an average road traffic accidents fatality index of 3.19; from 2006 to 2010 have an average road traffic accidents fatality index of 2.77; from 2011 to 2015 has an average road traffic accidents fatality index of 6.38, and from 2016 to 2021 has an average road traffic accidents fatality index of 2.23 (see Fig. 9). The road traffic accidents fatality index range between 1996 to 2021 is 11.58 – 2.23. This implies that the average road traffic accident fatality during the period has decreased.

Table 11 shows the RTA fatality index by States in 2021 in the Niger Delta. The highest RTA fatality index is recorded in Imo State with a value of 3.22, while the lowest RTA fatality index is 1.37 which was recorded in Bayelsa State in the Niger Delta (see Fig. 10).

Table 12. ANOVA on the variation in road traffic accident within the Niger Delta

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	6202266.111a	8	775283.264	6.432	.000
Intercept	37584940.004	1	37584940.004	311.821	.000
Location	6202266.111	8	775283.264	6.432	.000
Error	27120116.885	225	120533.853		
Total	70907323.000	234			
Corrected Total	33322382.996	233			

a. R Squared = .186 (Adjusted R Squared = .157)

Table 13. Turkey HSD Post Hoc Test

(I) Niger Delta	(J) Niger Delta	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1 Abia	2 Akwa Ibom	-59.6154	96.29037	.999	-361.2216	241.9909
	3 Bayelsa	42.8846	96.29037	1.000	-258.7216	344.4909
	4 Cross Rivers	-140.2308	96.29037	.874	-441.8370	161.3755
	5 Delta	-287.6538	96.29037	.075	-589.2601	13.9524
	6 Edo	-414.0769*	96.29037	.001	-715.6832	-112.4707
	7 Imo	29.1923	96.29037	1.000	-272.4140	330.7986
	8 Ondo	-284.7692	96.29037	.081	-586.3755	16.8370
	9 Rivers	-330.6154*	96.29037	.020	-632.2216	-29.0091
	2 Akwa Ibom	1 Abia	59.6154	96.29037	.999	-241.9909
3 Bayelsa		102.5000	96.29037	.979	-199.1063	404.1063
4 Cross Rivers		-80.6154	96.29037	.996	-382.2216	220.9909
5 Delta		-228.0385	96.29037	.307	-529.6447	73.5678
6 Edo		-354.4615*	96.29037	.009	-656.0678	-52.8553
7 Imo		88.8077	96.29037	.992	-212.7986	390.4140
8 Ondo		-225.1538	96.29037	.324	-526.7601	76.4524
9 Rivers		-271.0000	96.29037	.117	-572.6063	30.6063
3 Bayelsa		1 Abia	-42.8846	96.29037	1.000	-344.4909
	2 Akwa Ibom	-102.5000	96.29037	.979	-404.1063	199.1063
	4 Cross Rivers	-183.1154	96.29037	.613	-484.7216	118.4909
	5 Delta	-330.5385*	96.29037	.020	-632.1447	-28.9322
	6 Edo	-456.9615*	96.29037	.000	-758.5678	-155.3553
	7 Imo	-13.6923	96.29037	1.000	-315.2986	287.9140
	8 Ondo	-327.6538*	96.29037	.022	-629.2601	-26.0476
	9 Rivers	-373.5000*	96.29037	.004	-675.1063	-71.8937
	4 Cross Rivers	1 Abia	140.2308	96.29037	.874	-161.3755
2 Akwa Ibom		80.6154	96.29037	.996	-220.9909	382.2216
3 Bayelsa		183.1154	96.29037	.613	-118.4909	484.7216
5 Delta		-147.4231	96.29037	.840	-449.0293	154.1832
6 Edo		-273.8462	96.29037	.109	-575.4524	27.7601
7 Imo		169.4231	96.29037	.709	-132.1832	471.0293
8 Ondo		-144.5385	96.29037	.854	-446.1447	157.0678
9 Rivers		-190.3846	96.29037	.561	-491.9909	111.2216
5 Delta		1 Abia	287.6538	96.29037	.075	-13.9524
	2 Akwa Ibom	228.0385	96.29037	.307	-73.5678	529.6447
	3 Bayelsa	330.5385*	96.29037	.020	28.9322	632.1447
	4 Cross Rivers	147.4231	96.29037	.840	-154.1832	449.0293
	6 Edo	-126.4231	96.29037	.927	-428.0293	175.1832
	7 Imo	316.8462*	96.29037	.031	15.2399	618.4524
	8 Ondo	2.8846	96.29037	1.000	-298.7216	304.4909
	9 Rivers	-42.9615	96.29037	1.000	-344.5678	258.6447
	6 Edo	1 Abia	414.0769*	96.29037	.001	112.4707
2 Akwa Ibom		354.4615*	96.29037	.009	52.8553	656.0678
3 Bayelsa		456.9615*	96.29037	.000	155.3553	758.5678
4 Cross Rivers		273.8462	96.29037	.109	-27.7601	575.4524
5 Delta		126.4231	96.29037	.927	-175.1832	428.0293
7 Imo		443.2692*	96.29037	.000	141.6630	744.8755
8 Ondo		129.3077	96.29037	.917	-172.2986	430.9140
9 Rivers		83.4615	96.29037	.994	-218.1447	385.0678
7 Imo		1 Abia	-29.1923	96.29037	1.000	-330.7986
	2 Akwa Ibom	-88.8077	96.29037	.992	-390.4140	212.7986
	3 Bayelsa	13.6923	96.29037	1.000	-287.9140	315.2986
	4 Cross Rivers	-169.4231	96.29037	.709	-471.0293	132.1832
	5 Delta	-316.8462*	96.29037	.031	-618.4524	-15.2399
	6 Edo	-443.2692*	96.29037	.000	-744.8755	-141.6630

Table 13. continues

(I) Niger Delta	(J) Niger Delta	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
	8 Ondo	-313.9615*	96.29037	.034	-615.5678	-12.3553
	9 Rivers	-359.8077*	96.29037	.007	-661.4140	-58.2014
8 Ondo	1 Abia	284.7692	96.29037	.081	-16.8370	586.3755
	2 Akwa Ibom	225.1538	96.29037	.324	-76.4524	526.7601
	3 Bayelsa	327.6538*	96.29037	.022	26.0476	629.2601
	4 Cross Rivers	144.5385	96.29037	.854	-157.0678	446.1447
	5 Delta	-2.8846	96.29037	1.000	-304.4909	298.7216
	6 Edo	-129.3077	96.29037	.917	-430.9140	172.2986
	7 Imo	313.9615*	96.29037	.034	12.3553	615.5678
	9 Rivers	-45.8462	96.29037	1.000	-347.4524	255.7601
9 Rivers	1 Abia	330.6154*	96.29037	.020	29.0091	632.2216
	2 Akwa Ibom	271.0000	96.29037	.117	-30.6063	572.6063
	3 Bayelsa	373.5000*	96.29037	.004	71.8937	675.1063
	4 Cross Rivers	190.3846	96.29037	.561	-111.2216	491.9909
	5 Delta	42.9615	96.29037	1.000	-258.6447	344.5678
	6 Edo	-83.4615	96.29037	.994	-385.0678	218.1447
	7 Imo	359.8077*	96.29037	.007	58.2014	661.4140
	8 Ondo	45.8462	96.29037	1.000	-255.7601	347.4524

Based on observed means.
The error term is Mean Square (Error) = 120533.853.
*. The mean difference is significant at the .05 level.

Abia, Akwa Ibom, Bayelsa, Cross Rivers, Edo and Ondo states ranked low (0.00–2.99%) in the fatality index of fatal road accidents that occurred in 2021. Abia has a fatality index of 1.56 from 68 deaths in 106 crashes, Akwa Ibom has a fatality index of 2.21 from 33 deaths in 73 crashes, Bayelsa a fatality index of 1.37 from 35 deaths in 48 crashes, Cross Rivers a fatality index of 2.07 from 70 deaths in 145 crashes, Edo a fatality index of 1.54 from 158 deaths in 243 crashes, and Ondo a fatality index of 2.84 from 430 deaths in 1221 crashes. States that are ranked medium (3.00–5.99%) include Delta, Imo and Rivers.

Table 12 shows the statistical analysis of the variation in road traffic accidents within the Niger Delta. At $P < 0.05$, the model is significant. Therefore, there is significant variation in road traffic accidents within the Niger Delta. In the Turkey HSD post hoc test, there are values lesser than 0.05 (see table 13).

These values are 0.01, 0.02, 0.02 and 0.004; 0.001, 0.000 and 0.00; 0.020 and 0.000 (see Table 13). These values correspond with the comparison between the variation in road traffic accidents between Bayelsa and Imo and other States (Edo, Delta, Ondo and Rivers); between Edo and Rivers and other areas (Abia, Bayelsa and Imo); and between Delta and Ondo and other areas (Bayelsa and Imo). This implies that the variation in road traffic accidents between cross rivers and other states in the Niger Delta are not significantly different.

4. Conclusions and Policy Implication

The total number of road traffic accidents from 1996 to 2021 was 93,781 accident cases. However, there is a decline in road traffic accidents from 24.08% in the first five years to 9.94% in the last five years. Similarly, Edo state recorded the highest number of road traffic accident cases from 1996 to 2021 with a total of 17,012 accident cases. It was observed that the Niger Delta region has a medium-scale of fatality index of 5.13 on average. In the same vein, the road fatality index has dropped from 11.58 in the first five years

to 2.23 in the last five years. Furthermore, Imo state has the highest RTA fatality index of 3.22 in the year 2021. The result of the hypothesis shows that there is a statistically significant difference in road traffic accidents in the Niger Delta. The road traffic accident in Cross Rives State differs from other States in the Niger Delta. The tested hypothesis revealed that drivers' behaviour significantly results in road traffic accidents in the Niger Delta as evident in the model showing that 98% of road traffic accidents are caused by drivers' traffic behaviour in the Niger Delta. Furthermore, 41.98% of the drivers rarely understand traffic codes, with only 29.14% of drivers knowing narrow bridge warning signs, 41.97% of drivers' knowing no right turn regulatory signs, and 50.12% of drivers knowing hospital information signs. Drivers in Akwa Ibom, Delta, Ondo, Imo, and Rivers states do not have an understanding of traffic codes in the Niger Delta. The tested hypothesis revealed that drivers' demographic characteristics have a significant effect on the level of safety awareness as evident in the model showing that only 38.3% of levels of safety awareness are influenced caused by drivers' demographic characteristics in the Niger Delta.

Conflicts of Interest

The authors declare no conflict of interest.

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