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Regional and State Analysis of Petroleum Tanker Fire and Explosion Accidents in Nigeria

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ABSTRACT

In Nigeria, accidents related to petroleum tanker fire and explosion accidents have led to deaths and injuries of many people, destruction of properties and degradation of environment. This paper conducts regional and state analysis of petroleum tanker fire and explosion accidents in Nigeria from 2019 to 2024 in order to provide critical insight into the menace. Secondary sources of data were used and a mixed method research approach relating both qualitative and quantitative data collection was adopted. A total of 171 accident cases corresponding to 1822 deaths were obtained and the data were statistically analysed both in descriptive and inferential form. From regional perspective, South West obtained the maximum number of accidents as 75 whereas South-South recorded most number of deaths as 562. Equally, a one-way ANOVA test revealed that there is a statistically significant difference in the number of deaths reported across the different regions. On state-wise analysis, Lagos had a peak number of 40 accidents whilst Rivers State had 220 deaths as the highest. The present study thus having identified high-risk regions and states, it will guide stakeholders in prioritizing appropriate safety measures to address the challenge of petroleum tanker fire and explosion accidents in Nigeria.

Keywords: Petroleum Tanker, Fire, Explosion, Road Accidents, Nigeria.

INTRODUCTION

Nigeria is a country located on the western coast of Africa which has a diverse geography with climates ranging from arid to humid equatorial. Nigeria's most diverse feature is its people estimated to be about 230 million (Worldometer, 2025). The country has abundant natural resources, notably large deposits of petroleum and natural gas making it largest oil producer on the continent. Nigeria consists of thirty six (36) States and a Federal Capital Territory (FCT), Abuja. For ease of regional and political administration, the country is divided into six (6) geopolitical zones (regions) namely North West (NW), North-East (NE), North Central (NC), South East (SE), South West (SE) and South South (SS) as indicated in Fig. 1. Key features of the states and regions as it pertains demography, economy and energy are contained at Appendix 1. In Nigeria, movement of persons and goods including refined petroleum products from one place to another is predominantly by road as it accounts for about 90 per cent of country's transportation system (Onokala and Olajide, 2020).

Petroleum tankers account for about 80 per cent means of transporting refined petroleum products such as Premium Motor Spirit (PMS), Automotive Gas Oil (AGO) and household kerosene across Nigeria (Obasanjo *et al.,* 2014). Presently, the bulk of the refined products are loaded from depots located in Lagos State (South West) as well as in Rivers, Cross River and Delta states all in South South region (Jeremiah, 2025).

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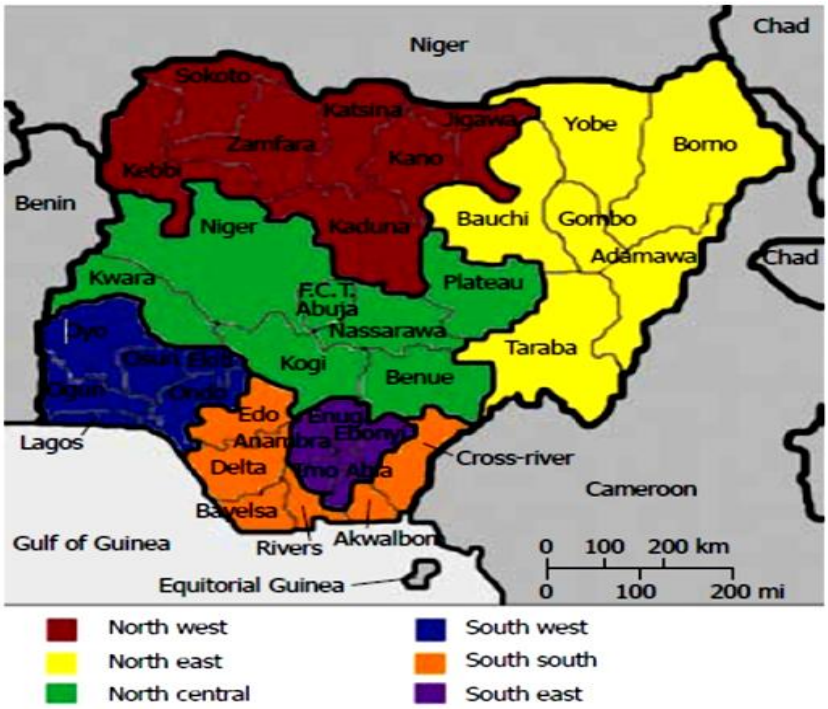

Figure 1. Map of Nigeria showing geopolitical zones with states of federation and FCT (Akinlua *et al*, 2015).

Accidents involving road tankers transporting petroleum products are often severe due to the flammability of the product which lead to fatalities, injury of persons, destruction of properties and environment in Nigeria. For instance, from January to March 2025, about 10 petroleum tanker accidents corresponding to at least 120 fatalities occurred in Nigeria. Despite the consequences of the petroleum tanker accidents which in most cases lead to fire and explosion, there was no comprehensive data prior to 2024 of such accidents for at least 10 consecutive years to understand the pattern of the menace. This is in addition to aiding relevant stakeholders in coming up with measures to curtail the menace or reduce its impact to as low as reasonably practicable. Consequently, a 16 year critical review of petroleum tanker fire and explosion accidents in Nigeria from January 2009 to October 2024 was conducted by Na'inna (2024). The study obtained a total of 169 accident cases corresponding to 1,613 deaths with year 2019 having the highest number of accidents and deaths. Until the end of December 2024, two additional petroleum tanker accidents occurred all in Jigawa State on 14 October and 13 November 2024 respectively (Premium Times 2024; Adam, 2024). While the latter accident had no casualty recorded, the former led to the deaths and injuries of 209 and 99 persons respectively thus making year 2024 with the highest number of deaths caused by petroleum tanker fire and explosion.

The present paper seeks to further the studies of Na'inna (2024) by conducting a regional and state analysis of petroleum tanker fire and explosion accidents in Nigeria from January 2009 to December 2024. This is to provide critical insights into the distribution, frequency, and severity of these accidents in each region and state in Nigeria. By interpreting the findings, high-risk regions and states could be identified which will guide stakeholders in prioritizing appropriate safety measures to address the challenge of

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petroleum tanker fire and explosion accidents in Nigeria.

MATERIALS AND METHODS

The research method employed in this study was a mixed approach relating both qualitative and quantitative data collection and analysis techniques in a single study in order to offer a more insights on petroleum tanker explosion accidents in Nigeria. This approach leads to an optimum and robust outcomes by integrating the advantage of each method while alleviating their shortcomings (Creswell, 2014). Quantitative data was used to ascertain extensive trends and patterns of the tanker accidents, while qualitative data offered thorough descriptions and context for those findings. Consequently, this would provide an invaluable way of helping researchers, practitioners, policy makers, and others to develop an understanding of the problem of interest (Wu *et al.,* 2016). This research work is a typical analytical research. In this case, critical thinking skills and evaluation of facts and available information on petroleum tanker fire and explosion accidents from 2009 to 2024 were conducted.

The source of data employed in this study is secondary, mainly from online sources, including a wide range of digital information such as websites, articles, journals, books, and multimedia content, all accessible through the internet. One major shortcoming of applying secondary data over the primary data is the restricted connection with relevant participants and context for the data. This was particularly true for this study as no contact was made with direct or indirect victims of petroleum tanker fire and explosion accidents in Nigeria. However, this did not reduce the quality of the research as the study was dependent upon various sources concerning similar issues in order to verify facts. Equally, to gain more confidence in each source used, attention was given to official statements made by stakeholders that were there at the scene of the accident. These included the Federal Road Safety Corps, Federal Fire Service, National Emergency Management Agency as well as government officials of the affected states amongst others. Thus, the bulk of the sources referred to in this study were identified to have employed the use of primary data in their reportage.

The information extracted from each source included parameters such as date, fuel type and location (town and state) of the petroleum tanker fire and explosion accidents from 2009 to 2024. Others include the number of deaths, injuries, properties damage as well as an aggravating factor for each accident. Consequently, a total of 169 accident cases corresponding to 1,613 deaths were obtained by Na'inna (2024) for January 2009 to October 2024. However, for the remainder of the 2024, two additional petroleum tanker accidents occurred which led to the deaths of 209 people (Premium Times 2024; Adam, 2024). Therefore, a total of 171 cases corresponding to 1822 deaths in Nigeria from January 2009 to December 2024 was used in present study to perform regional and state-wise analysis of the petroleum tanker fire and explosion accidents. Comprehensive details of each accident case is contained in form of a data set by Na'inna (2025).

Document analysis was used to collect data from secondary sources and then analysed using the archival library search method as well as statistically both in descriptive and inferential form. The inferential statistics covered one-sample t-test, Pearson correlation, ANOVA test and Tukey HSD Post-Hoc Test. Consequently, data were presented in descriptive forms using diagrams, graphs, tables, and charts to gain more insight on the menace. This served as the foundation for the findings and recommendations which were presented in narrative form.

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RESULTS AND DISCUSSION

Statistical Overview of Accidents

Table 1 gives a cumulative data obtained in the present study in terms of frequency of accident and number of fatalities associated to the petroleum tanker fire and explosion accidents in Nigeria.

Table 1. Overview of number of accidents and deaths from petroleum tanker fire and explosion in Nigeria.

Statistic	Value
Total deaths	1,822.00
Total accidents	171.00
Average deaths per accident	10.65

The descriptive statistics presented in Table 1 provides a summary of fatalities resulting from petroleum tanker accidents over the study period. A total of 1,822 deaths were recorded from 171 separate accidents, resulting in an average of approximately 10.65 deaths per accident. This high average suggests that these incidents are not only frequent but also particularly lethal, highlighting the severe impact such accidents have on human life.

To gain more insights, an inferential statistics approach, a one-sample t-test was conducted as indicated in Table 2 to determine if the mean of a sample in the present study is considerably diverse from a known or hypothesized population mean (H0: $\mu = 10$)

Table 2. T-test results showing whether the average deaths per accident are significantly different from 10.

Statistics	Value
t value	0.2917
df	170.0000
p-value	0.7710
95% CI Lower	6.2520
95% CI Upper	15.0480
Mean of Sample	10.6500

The one-sample t-test summarized in Table 2 tests whether the average number of deaths per accident significantly differs from 10. The test yielded a t-value of 0.2917 with 170 degrees of freedom and a p-value of 0.7710. This high p-value indicates that the difference between the observed mean (10.65) and the hypothesized mean (10) is not statistically significant at any conventional level (e.g., 0.05). The 95% confidence interval (6.25 to 15.05) further suggests that the true average number of deaths per accident could reasonably include the hypothesized value of 10. Therefore, we fail to reject the null hypothesis, concluding that there is no significant evidence to suggest the average deaths per accident differ from 10.

Table 3 shows the results of a Pearson correlation test, which was conducted to examine the linear relationship between the number of deaths and the number of accident occurrences.

Table 3. A Pearson correlation test on the relationship between the number of deaths frequency of accidents.

Statistic	Value
Correlation Coefficient	0.4896
p Value	4.673910e-12
Confidence Interval Lower	0.3687
Confidence Interval Upper	0.5942

From Table 3, a correlation coefficient of 0.4896 was obtained. This indicates a moderate positive relationship as frequency of accidents increase, deaths tend to increase as well. This relationship is statistically significant with a p-value of < 0.0001, suggesting strong evidence against the null hypothesis of no correlation. The 95% confidence interval for the correlation ranges from 0.3687 to 0.5942, reinforcing the reliability of this moderate positive association.

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Regional Analysis of Accidents

Figure 2 shows number of petroleum tanker fire and explosion accidents by region in Nigeria from 2009-2024.

The regional distribution reveals that some regions experience significantly more accidents than others due to their economic activities and role in petroleum transportation. The South West and North Central regions recorded the highest number of accidents as 75 and 35 respectively. This aligns with the presence of fuel depots, refineries and high concentration of industries requiring petroleum products as well as major highways that facilitate the movement of petroleum tankers thereby making them more prone to tanker-related accidents. For instance, South West as a key logistics hub accounts for about 36 per cent of the GDP of the entire states of Nigeria, 35 per cent of number of PMS trucks and 31 per cent of the PMS consumption in Nigeria which are the highest for all regions (Okeowo, 2023; NBS, 2019). North Central Zone with states like Kogi and Benue are considered as a meeting point between Northern and Southern Nigeria where the bulk of the nation's petroleum tanker trucks ply. In contrast, the North East Region recorded the lowest number of accidents of 8 followed by North West with just 10 accidents. This could possibly be attributed to less industrial activity and fewer petroleum transport routes. This is evident with the North East having the least percentage of GDP as 8 per cent, 6 per cent as number of PMS trucks allocated and 6 per cent of the PMS consumption in Nigeria (Okeowo, 2023; NBS, 2019). These regional differences suggest that accident prevention strategies should be tailored to the specific challenges faced in each region, with stricter regulations and enforcement in high-risk areas.

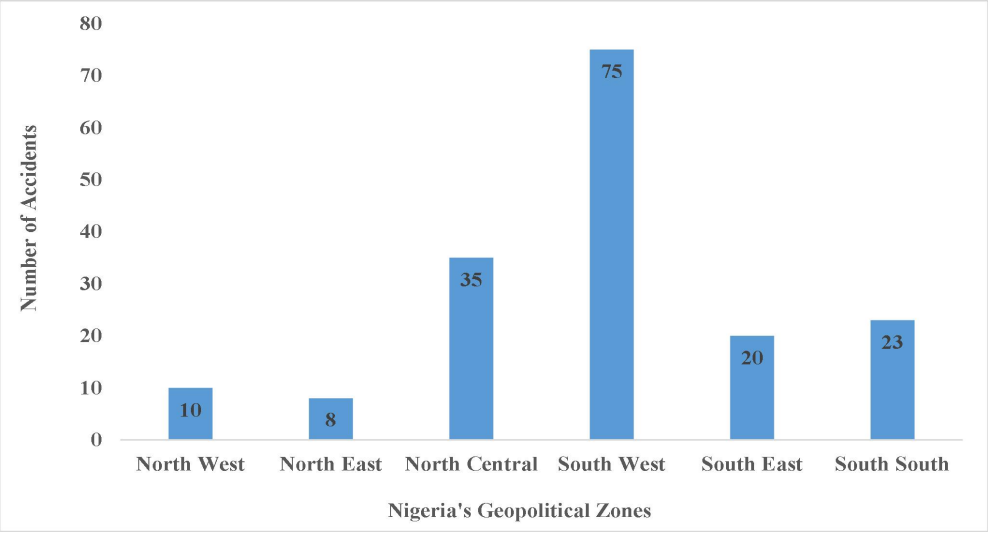

Figure 2. Number of petroleum tanker fire and explosion accidents by region in Nigeria from 2009-2024. (Data Source: Na'inna, 2025).

A corresponding number of fatalities from the petroleum tanker accidents in Nigeria for each region is indicated Figure 3.

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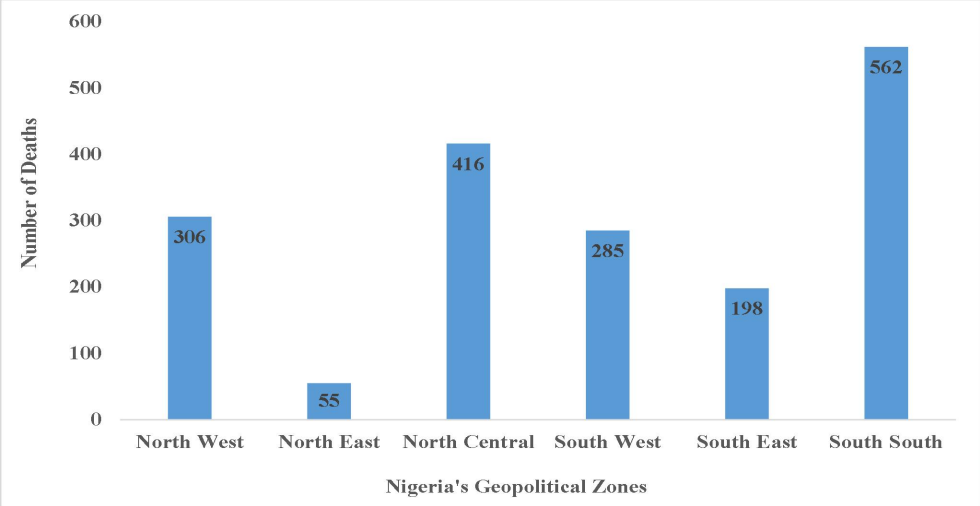

Figure 3. Number of deaths from petroleum tanker fire and explosion accidents by region in Nigeria from 2009-2024. (Data Source: Na'inna, 2025).

The regional analysis of fatalities from petroleum tanker accidents highlights the severity of these incidents. The South-South recorded the highest number of deaths of 562 persons, followed closely by the North-Central and North-West regions recording 416 and 306 fatalities respectively. This suggests that not only do these regions experience more accidents, but the accidents also tend to be more severe and deadlier. The high population density in states like, Rivers and Delta in South-South increases the likelihood of mass casualties when tanker explosions or fires occur. Interestingly, North West Zone with fewer accidents still reported high fatalities, indicating that some accidents result in large-scale disasters, possibly due to explosions in densely populated areas or delayed emergency response. Given these findings, there is a need for improved emergency preparedness, including the deployment of fire service stations and first responders along major tanker routes to reduce fatalities.

To gain further details on the menace, a total number of tanker accidents per region were examined against a 16 year period from 2009 to 2024 as indicated in Figure 4.

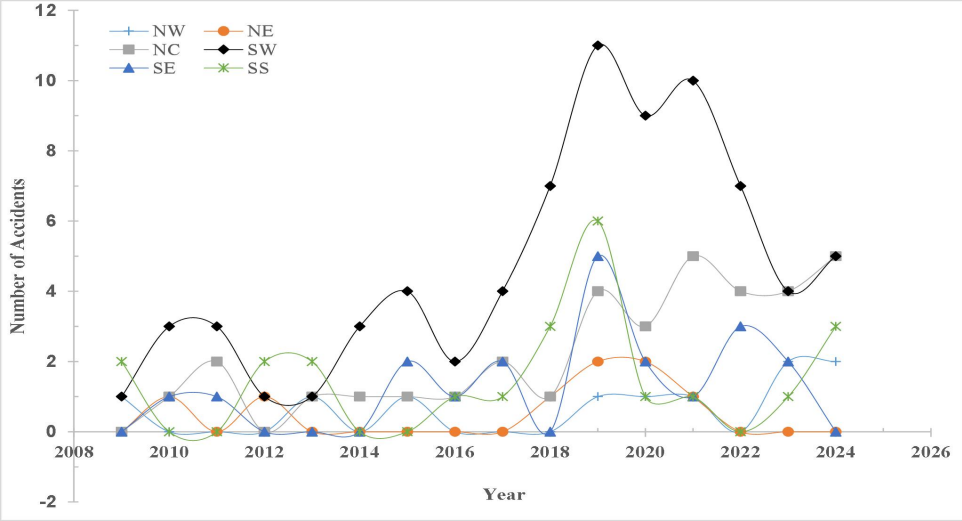

Figure 4. Yearly number of petroleum tanker fire and explosion accidents per region in Nigeria.

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For better analysis, the 16 year accident pattern are segmented into three phases. Phase one (2009 to 2013) is characterized with low number of accidents with three as the maximum in the South West. North West, North East and South East had three years of no petroleum tanker fire and explosion accidents. This was followed by North Central and South-South regions with two years of no accidents. However, South West experienced a tanker accident throughout phase one. For phase two (2014 to 2018), there was steady increase in accidents compared to phase one with South West region having a maximum number of seven. Both South West and North Central regions experienced petroleum tanker accidents throughout. Nonetheless, North West and North East regions had one accident only, whereas South East and South-South had just two accidents within this phase. The final phase (2019 to 2024) in comparison with the two phases, is characterised with the highest number of accidents of 11 which transpired in 2019 in South West region. With the exception of North West region, the remainder of the regions also had their highest petroleum tanker fire and explosion accidents in 2019.

Figure 5 shows a corresponding yearly number of deaths from petroleum tanker fire and explosion accidents per region in Nigeria for the 16 year period.

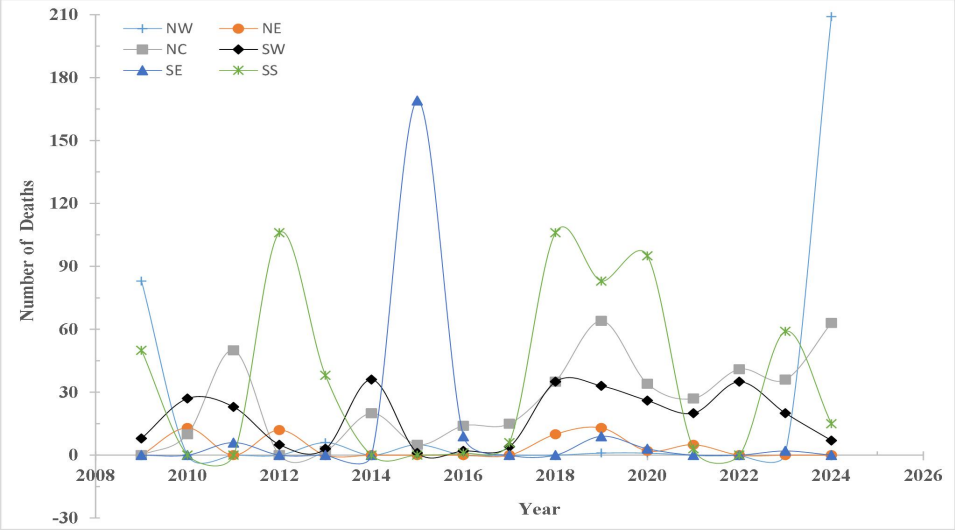

Figure 5. Yearly number of deaths from petroleum tanker fire and explosion accidents per region in Nigeria.

In phase one (2009 to 2013), the highest number of deaths, 106 occurred in the South-South region in 2012 followed by 83 deaths in North West in 2009. Phase two (2014 to 2018) witnessed a higher number of deaths compared to phase one as 169 mortalities took place in South East region in 2015 followed by South-South region with 106 deaths in 2018. Maximum number of deaths in phase three (2019 to 2024) was 209 and it occurred in 2024 in the North West and thereafter 95 deaths in South East in 2020. In both Figures 4 and 5, there was steady increase in number of accidents and deaths across the three phases respectively with phase one being the lowest and phase three the highest. However, the region with the highest number of accidents in 2019 (South West) did not correspond to the highest number of deaths which occurred in the North West in 2024.

A summary of the number of accidents and deaths across the 16 year period (2009 to 2024) is presented in Table 4. Also shown is the corresponding number of deaths and accidents across the six regions.

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Table 4. Regional summary of number of accidents and deaths from petroleum tanker fire and explosion in Nigeria from 2009 -2024. (Data Source: Na'inna, 2025).

Year	NW		NE		NC		SW		SE		SS		Total	
	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2009	1	83	0	0	0	0	1	8	0	0	2	50	**4**	**141**
2010	0	0	1	13	1	10	3	27	1	0	0	0	**6**	**50**
2011	0	0	0	0	2	50	3	23	1	6	0	0	**6**	**79**
2012	0	0	1	12	0	0	1	5	0	0	2	106	**4**	**123**
2013	1	6	0	0	1	2	1	3	0	0	2	38	**5**	**49**
2014	0	0	0	0	1	20	3	36	0	0	0	0	**4**	**56**
2015	1	5	0	0	1	5	4	1	2	169	0	0	**8**	**180**
2016	0	0	0	0	1	14	2	2	1	9	1	1	**5**	**26**
2017	0	0	0	0	2	15	4	4	2	0	1	6	**9**	**25**
2018	0	0	1	10	1	35	7	35	0	0	3	106	**12**	**186**
2019	1	1	2	13	4	64	11	33	5	9	6	83	**29**	**203**
2020	1	1	2	2	3	34	9	26	2	3	1	95	**18**	**161**
2021	1	0	1	5	5	27	10	20	1	0	1	3	**19**	**55**
2022	0	0	0	0	4	41	7	35	3	0	0	0	**14**	**76**
2023	2	1	0	0	4	36	4	20	2	2	1	59	**13**	**118**
2024	2	209	0	0	5	63	5	7	0	0	3	15	**15**	**294**
Total	**10**	**306**	**8**	**55**	**35**	**416**	**75**	**285**	**20**	**198**	**23**	**562**	**171**	**1822**

There were 29 petroleum tanker fire and explosion accidents in 2019 which were the highest for the 16 years whilst the maximum number of deaths recorded as 294 occurred in 2024. Consequently, it could be viewed that higher number of accidents do not necessarily correspond to the higher number of deaths. This could be attributed to aggravating factors such as human factor, mechanical, densely populated areas and scooping of spilled petroleum products.

A one-way ANOVA (Analysis of Variance) test is performed as indicated in Table 5 to ascertain the possibility of a statistically substantial variance between the means of three or more autonomous groups, in this context, the 6 Nigerian regions.

Table 5: An ANOVA test conducted to check if there is a significant difference in the number of deaths across 6 Nigerian regions.

Statistic	Value
Df	5.0000
Sum Sq	11925.6600
Mean Sq	2385.1320
F value	4.2687
Pr(>F)	0.0011

The analysis from Table 5 shows an F-value of 4.2687 with 5 degrees of freedom and a corresponding p-value of 0.0011. Since the p-value is less than the commonly used significance level of 0.05, we reject the null hypothesis. This indicates that there is a statistically significant difference in the number of deaths reported across the different regions.

To further substantiate on the Analysis of Variance (ANOVA Test), a Tukey Honest Significant Difference (HSD) post-hoc test was performed as indicated in Table 6.

This test in Table 6 identifies specific regional pairs where the number of deaths significantly differ. Most pairwise comparisons yielded non-significant p-values ($p > 0.05$), indicating no substantial difference between those regions. However, two comparisons stood out as statistically significant: South West vs. North West ($p = 0.0123$) and South West vs. South South ($p = 0.0047$). These results suggest that the South West region had significantly different

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(lower) death counts compared to North West and South-South regions.

State by State Analysis of Accidents

Figure 6 shows 10 states with most petroleum tanker fire and explosion accidents in Nigeria from 2009 to 2024.

Table 6. Post-hoc test (Tukey HSD) performed to determine how regions differ.

Comparison	diff	lwr	upr	p adj
North East-North Central	-4.6806	-31.3220	21.9609	0.9959
North West-North Central	19.0444	-5.3199	43.4088	0.2193
South East-North Central	-1.6556	-20.6644	17.3533	0.9999
SouthSouth-North Central	12.8792	-5.3152	31.0736	0.3238
South West-North Central	-7.7042	-21.5544	6.1460	0.5971
North West-North East	23.7250	-8.6060	56.0560	0.2842
South East-North East	3.0250	-25.4882	31.5382	0.9996
South South-North East	17.5598	-10.4171	45.5367	0.4623
South West-North East	-3.0236	-28.3909	22.3436	0.9994
South East-North West	-20.7000	-47.0981	5.6981	0.2162
South South-North West	-6.1652	-31.9831	19.6527	0.9830
South West-North West	-26.7486	-49.7128	-3.7845	**0.0123**
South South-South East	14.5348	-6.3045	35.3741	0.3405
South West-South East	-6.0486	-23.2262	11.1289	0.9123
South West-South South	-20.5834	-36.8552	-4.3117	**0.0047**

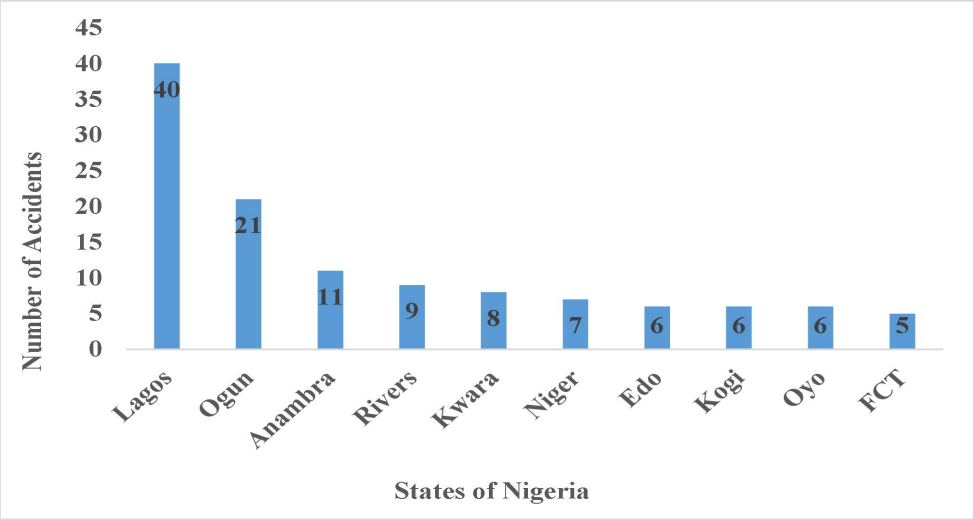

Figure 6. Ten (10) states with most petroleum tanker fire and explosion accidents in Nigeria from 2009 -2024. (Data Source: Na'inna, 2025).

The composition involves 4 states from North Central (Kogi, Kwara, Niger and FCT), three from South West (Lagos, Ogun and Oyo), two from South-South (Rivers and Edo) and one from South East (Anambra). Lagos is the State with the highest number of accidents of 40 accounting for about 23 per cent of the total tanker accidents. This number is about double, 4 folds and 8 times higher than accidents which occurred in Ogun, Anambra and FCT respectively. The high number of accidents could be attributed to the presence of critical economic centres, major fuel depots, ports and industrial zones especially in the South West and South-South regions. This is in addition to increasing the frequency of tanker movement due to strategic locations along national fuel

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transport routes in the North Central region. Consequently, priority by stakeholders should be given to these top 10 states with highest accidents when coming up with measures to prevent or mitigate petroleum tanker fire and explosion.

The 10 states with peak number of fatalities from petroleum tanker fire and explosion accidents is indicated in Figure 7.

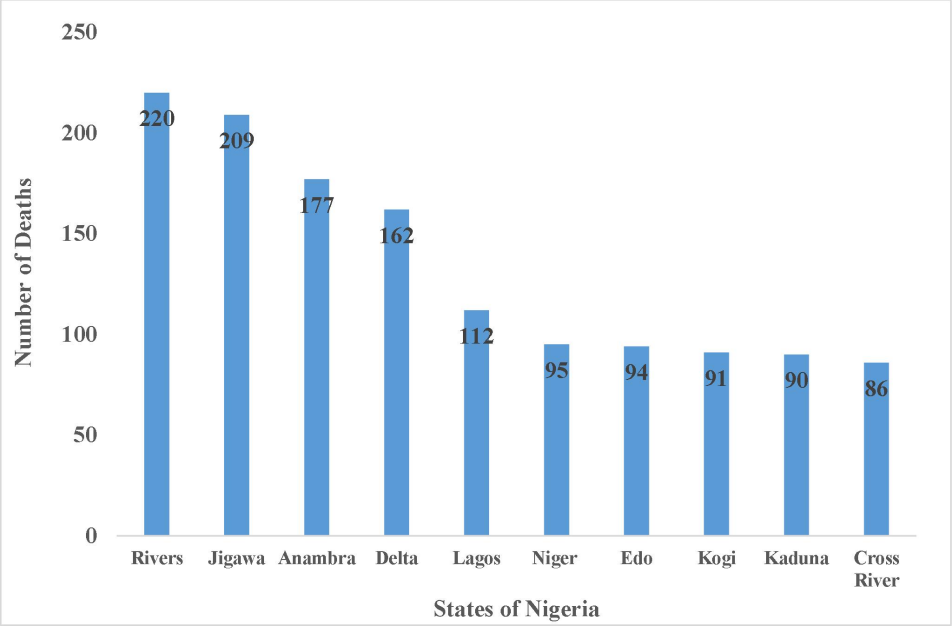

Figure 7. Ten (10) states with most number of deaths from petroleum tanker fire and explosion accidents in Nigeria from 2009 -2024. (Data Source: Na'inna, 2025)

The top five states total 880 deaths and account for nearly 50 per cent of the entire fatalities from the 36 states and FCT. Rivers State had 220 deaths as the highest and this doubles the deaths occurred in Lagos and 2.5 folds deaths for Cross River. With the exception of Jigawa, Delta, Kaduna and Cross River states, the remainder are among the top 10 states with highest number of accidents as shown in Figure 6. This further reaffirms that higher number of accidents do not equate to number of fatalities and vice versa. For instance, Jigawa recorded fewer accidents but still had the second highest fatality rates, suggesting that petroleum tanker fire and explosion accidents are often more catastrophic. Therefore, reducing the severity of accidents is just as important as reducing their frequency. Better accident response measures, such as quick deployment of emergency services and public awareness campaigns on the dangers of fuel scooping, could be implemented in these high-fatality states.

The state-wise breakdown of petroleum tanker accidents provides a clearer understanding of how different states are affected as shown in Figure 8.

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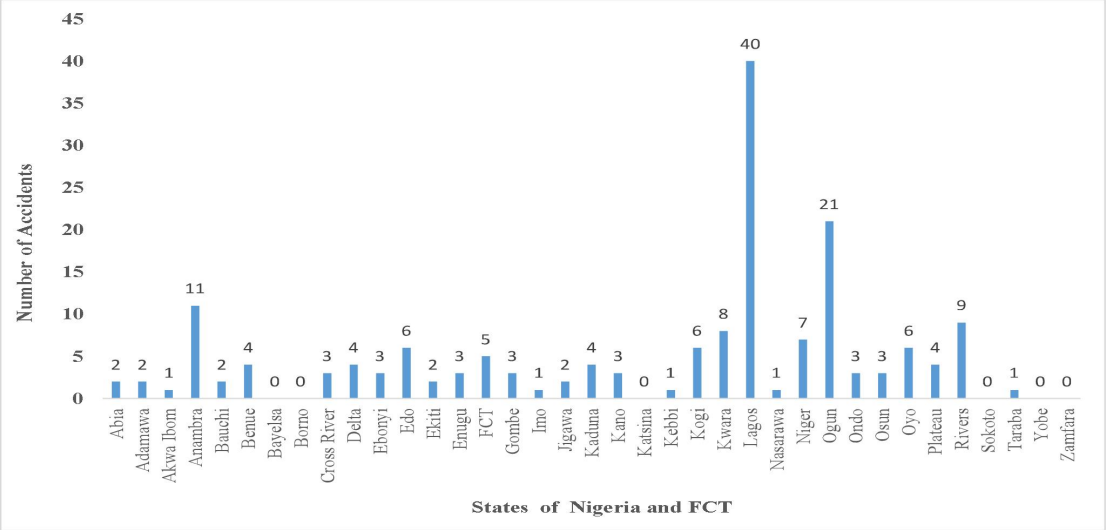

Figure 8. State-wise frequency of petroleum tanker fire and explosion accidents in Nigeria from 2009-2024. (Data Source: Na'inna, 2025)

Whilst the 10 states with highest number of accidents are discussed in Figure 6, the 10 ten states with least number of accidents are Akwa Ibom, Imo, Kebbi, Nasarawa and Taraba with one case each. Others are Abia, Adamawa, Bauchi, Ekiti and Jigawa with two accident cases each. Additionally, six states namely Bayelsa, Borno, Katsina, Sokoto, Yobe and Zamfara had no cases of any petroleum tanker and explosion accidents for the 16 year review. With the exception of Bayelsa in South-South region, the other states are from North West and North East regions which are characterised with minimum GDP, small industrial activities, low volume of petroleum product consumption and fewer major fuel transport routes. For instance, Yobe and Zamfara states are ranked 36 and 32 in terms of GDP out of 36 states respectively (Okeowo, 2023). Also, Yobe, Jigawa and Taraba states have the least consumption of PMS of 0.13, 0.22 and 0.29 per cent in that order (NBS, 2019).

Figure 9 illustrates number of deaths caused by petroleum tanker accidents in Nigeria between 2009 and 2024.

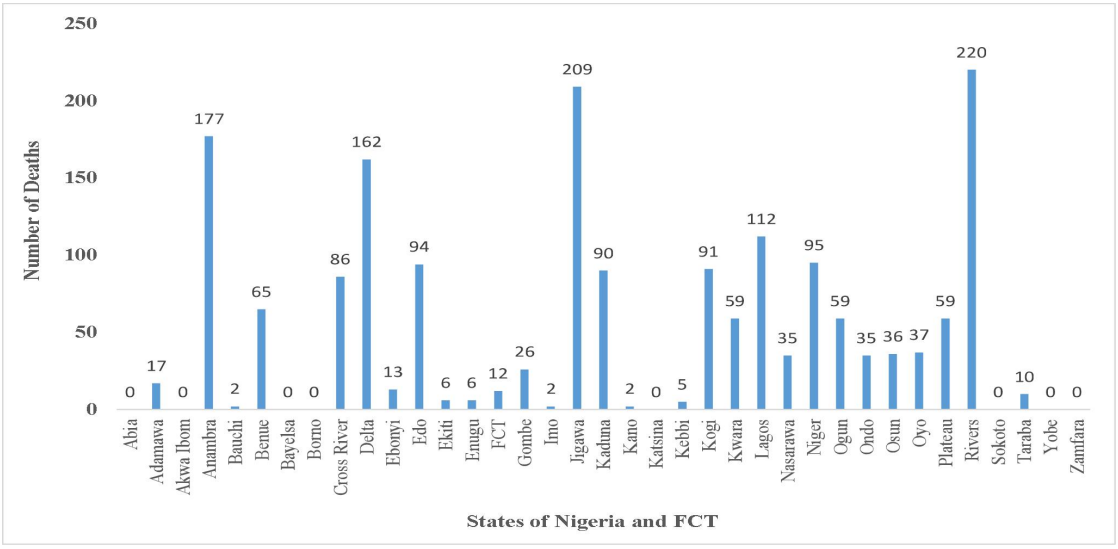

Figure 9. State-wise number of deaths from petroleum tanker fire and explosion accidents in Nigeria from 2009-2024. (Data Source: Na'inna, 2025).

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The top 10 states which account for 73 per cent of the entire fatalities across Nigeria is discussed in Figure 7. On the contrary the bottom 10 states account for just 4 per cent of the total number of deaths. These states include Bauchi, Imo and Kano with two deaths each whilst Ekiti and Enugu had 6 deaths each. Kebbi, Taraba, FCT, Ebonyi and Adamawa states recorded 5, 10, 12, 13 and 17 losses respectively. The least number of fatalities cuts across the entire six regions except South-South region. This could be attributed to little or no presence of aggravating factors related to petroleum tanker fire and explosion accidents in Nigeria. These include scooping of spilled fuel, human error, head on collision and impact in densely populated areas amongst others.

Table 7 gives a summary of number of accidents and fatalities from petroleum tanker fire and explosion across 36 states and FCT in Nigeria from 2009-2024. A sub-total for each geopolitical zone is also presented. A total of 171 accidents corresponding to 1,822 fatalities transpired for a 16 year period. This amounts to an average of nearly 11 and 114 accidents and deaths per annum respectively.

Table 7. Number of accidents and deaths from petroleum tanker fire and explosion across 36 states and FCT in Nigeria from 2009-2024. (Data Source: Na'inna, 2025).

Serial	State	Number of Accidents	Number of Deaths	Geopolitical Zone
1.	Jigawa	2	209	
2.	Kaduna	4	90	
3.	Kano	3	2	
4.	Katsina	0	0	**North West**
5.	Kebbi	1	5	
6.	Sokoto	0	0	
7.	Zamfara	0	0	
	Sub-total	**10**	**306**	
1.	Adamawa	2	17	
2.	Bauchi	2	2	
3.	Borno	0	0	**North East**
4.	Gombe	3	26	
5.	Taraba	1	10	
6.	Yobe	0	0	
	Sub-total	**8**	**55**	
1.	Benue	4	65	
2.	FCT	5	12	
3.	Kogi	6	91	
4.	Kwara	8	59	**North Central**
5.	Nasarawa	1	35	
6.	Niger	7	95	
7.	Plateau	4	59	
	Sub-total	**35**	**416**	
1.	Ekiti	2	6	
2.	Lagos	40	112	
3.	Ogun	21	59	**South West**

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4.	Ondo	3	35	
5.	Osun	3	36	
6.	Oyo	6	37	
	Sub-total	**75**	**285**	
1.	Abia	2	0	
2.	Anambra	11	177	
3.	Ebonyi	3	13	**South East**
4.	Enugu	3	6	
5.	Imo	1	2	
	Sub-total	**20**	**198**	
1.	Akwa Ibom	1	0	
2.	Bayelsa	0	0	
3.	Edo	6	94	**South-South**
4.	Cross River	3	86	
5.	Delta	4	162	
6.	Rivers	9	220	
	Sub-total	**23**	**562**	
	GRAND TOTAL	**171**	**1,822**	

CONCLUSION

A regional and state analysis of petroleum tanker fire and explosion accidents in Nigeria from January 2009 to December 2024 was conducted in the present study using a total of 171 accident cases corresponding to 1822 deaths. The South West and North Central regions recorded the highest number of accidents as 75 and 35 respectively. This aligns with the presence of fuel depots, refineries and high concentration of industries requiring petroleum products in South West as well as major highways that facilitate the movement of petroleum tankers in the North Central thereby making them ng 416 and 306 fatalities respectively. This suggests that not only do these regions experience more accidents, but when they occur, they tend to be more severe and deadlier. South West region though having the highest number of accidents have recorded fatalities nearly half the ones recorded in South South. However, the North East region least number of accidents more prone to tanker-related accidents. In contrast, the North East Region recorded the lowest number of accidents of 8 followed by North West with just 10 accidents. This could possibly be attributed to less industrial activity and fewer petroleum transport routes. The South East and South South regions recorded number of accidents which are nearly 3.5 times lower than those obtained in the South West.

On the corresponding fatalities on each region, the South-South recorded the highest number of deaths of 562 persons, followed closely by the North-Central and North-West regions recordi
still recorded the lowest number of death as 55. The high population density in states like, Rivers and Delta in South South increases the likelihood of mass casualties when tanker explosions or fires occur. Interestingly, North West Zone with fewer accidents still reported high fatalities, indicating that some accidents result in large-scale disasters, possibly due to

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explosions in densely populated areas or delayed emergency response.

Furthermore, a total number of tanker accidents per region were examined against a 16 year period from 2009 to 2024 and it was discovered that a maximum of 11 accidents occurred in South West in 2019. With the exception of North West region, the rest of the regions also had their highest petroleum tanker fire and explosion accidents in 2019. On the contrary, North West region had maximum number of deaths of 209 in 2024 followed by 95 deaths in South East in 2020 for the 16 year review. Unlike the number of accident cases, the peak number of deaths occurred at various years from 2009 to 2024. The entire state analysis on the number of accidents revealed that the top 10 states account for about 70 per cent of the of the entire 171 petroleum tanker fire and explosion accident in Nigeria. Lagos State recorded the highest number of accidents of 40 which is followed by Ogun and Anambra states which are nearly half and a quarter of accidents in Lagos respectively. Akwa Ibom, Imo, Kebbi, Nasarawa and Taraba states had one accident case each which are considered the least. Interestingly, six states namely Bayelsa, Borno, Katsina, Sokoto, Yobe and Zamfara had no cases of any petroleum tanker and explosion accidents for the 16 year review. The uppermost 10 states in terms of number of fatalities constitute 73 per cent of the entire 1822 deaths across Nigeria with Rivers, Jigawa and Anambra states experiencing peak loss of lives as 220, 209 and 177 in that order. The least number of deaths of two each occurred in Bauchi, Imo and Kano states.

The present study reveals that regional difference in terms of frequency of accidents and number of fatalities suggest that accident prevention strategies be tailored to the specific challenges faced in each region, with stricter regulations and enforcement in high-risk areas. Hence, there is a need for improved emergency preparedness, including the deployment of fire service stations and first responders along major tanker routes to reduce fatalities. Whilst industrial activities, depots, refineries, petroleum products consumption and major transport routes of petroleum tanker products could increase the likelihood of accidents; however, this do not necessarily correspond to higher number of fatalities and vice versa. This could be attributed to accident occurring in high population density, head on collision, scooping of spilled petroleum products and poor human judgement. Therefore, reducing the severity of accidents is just as important as reducing their frequency. Better accident response measures, such as quick deployment of emergency services and public awareness campaigns on the dangers of fuel scooping, could be implemented in these high-fatality states.

REFERENCES

Adam, U. (2024). *Petrol Tanker Fire Sparks Panic at Jigawa-Kano Border*. https://dailyrealityng.com/2024/11/14/petrol-tanker-fire-sparks-panic-at-jigawa-kano-border/

Akinlua, J.T., Meakin, R., Umar, A.M., & Freemantle, N. (2015). Current Prevalence Pattern of Hypertension in Nigeria: a Systematic Review. *Plus One*. 10(10):e0140021. 10.1371/journal.pone.0140021.

Creswell, J.W. (2014). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches (4th ed.)*. SAGE Publications Inc. Los Angeles

Jeremiah, O. (2025). *Depots: the Lifeline of Nigeria's Oil and Gas Industry*. https://sweetcrudereports.com/depots-the-lifeline-of-nigerias-oil-and-gas-industry/

Na'inna, A.M. (2024). Overview of Petroleum Tanker Fire and Explosion Accidents in Nigeria from 2009 to 2024. *Nigerian Research Journal of Engineering and Environmental*

DOI: 10.64290/bimagombe.v9i2A.1084

Sciences, 9 (2024) 552–575. https://doi.org/10.5281/zenodo.14565617

Na'inna, A.M. (2025). Overview of Petroleum Tanker Fire and Explosion Accidents in Nigeria from 2009 to 2024 [Data set]. *Zenodo*. https://doi.org/10.5281/zenodo.15032760

NBS (2019). Petroleum Products Imports and Consumption (Truck Out) Statistics Q2 2019. https://www.nigerianstat.gov.ng/pdfuploads/Petroleum_Products_Importation_and_Con umption_ (Truck_Out) _-_Q2_2019.pdf.

Obasanjo, T.O., Francis, M., & Williams, J.J. (2014). Road Haulage Constraints in the Transportation of Petroleum Products in Northern Nigeria. *IOSR Journal of Environmental Science, Toxicology and Food Technology*. 8(2014) 1-8. 10.9790/2402-08310108

Okeowo, G. (2023). *State of States 2023 Edition*. https://budgit.org/wp-content/uploads/2023/10/2023-State-of-States-1.pdf

Onokala, P.C., & Olajide, C.J. (2020). Problems and Challenges Facing the Nigerian Transportation System which affect their Contribution to the Economic Development of the Country in the 21st Century. *Transportation Research Procedia*, 48, 2945-2962. https://doi.org/10.1016/j.trpro.2020.08.189

Premium Times (2024). *Nigeria: Jigawa Tanker Explosion Killed 209, Injured 99 – Report*. https://allafrica.com/stories/202411210087.html

Worldometer (2025). *Nigeria Population (live).* https://www.worldometers.info/world-population/nigeriapopulation/#:~:text=The%20current%20population%20of%20Nigeria,of%20the%20total%20world%20population

Wu, S., Wyant, D., Fraser, M. (2016). Author Guidelines for Manuscripts Reporting on Qualitative Research. *Journal of the Society for Social Work and Research*, 7(2016) 405-425. https://doi.org/10.1086/685816.