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Assessing Road Infrastructure and Safety in Sango to Ewekoro on the Lagos-Abeokuta Expressway

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Abstract: *The Lagos-Abeokuta Expressway is a critical transportation artery connecting Lagos State to Ogun State and other parts of Nigeria. However, the expressway has been plagued by numerous road hazards and challenges, which pose significant risks to road users. This study assesses the road hazards and challenges along the Sango to Ewekoro section of the Lagos-Abeokuta Expressway. The study employed a mixed-methods approach, combining both qualitative and quantitative data collection and analysis methods. A total of 390 questionnaires were administered to road users, while 20 in-depth interviews were conducted with stakeholders, including road safety experts, transport operators, and law enforcement officials. Additionally, a road safety audit was conducted along the study corridor to identify and document road hazards and challenges. The findings of the study revealed that the Sango to Ewekoro section of the Lagos-Abeokuta Expressway is characterized by numerous road hazards and challenges, including poor road surface conditions, inadequate lighting, and lack of road safety furniture. Based on the findings, the study recommends the implementation of a comprehensive road safety strategy, including the rehabilitation of the road surface, installation of adequate lighting and road safety furniture, and enforcement of traffic laws and regulations. The study contributes to the existing body of knowledge on road safety and transportation planning, and provides valuable insights for policymakers, transportation planners, and road safety experts. The findings and recommendations of the study have implications for improving road safety and reducing road crashes along the Lagos-Abeokuta Expressway and other major highways in Nigeria.*

Keywords*: Hazard Peak Hours Safety Traffic Volume, Mitigation Traffic Management Volume*

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I. Introduction

Transportation is the foundation of modern society, enabling the free movement of people and goods, and fostering economic growth, social unity, and cultural exchange (Khan et al, 2020). The evolution of transport systems has been integral to human civilization, facilitating trade, communication, and the exchange of ideas across vast distances. Road transport, in particular, plays a crucial role, offering unparalleled flexibility, accessibility, and connectivity to communities worldwide (Paiva et al, 2021). Despite its many benefits, road transport also poses significant dangers and challenges that compromise travel safety and efficiency. Urban congestion, hazardous rural roads, inadequate signage, reckless driving behaviors, and ineffective traffic management systems are common issues that endanger motorists, pedestrians, and passengers. These problems highlight the complexities and risks inherent in road transportation, which are critical areas of concern for societies and organizations alike (Mustapha, 2023). In Africa, road infrastructure development and maintenance often lag behind the pace of urbanization, population growth, and economic expansion. Many African nations, including Nigeria, grapple with increasing traffic volumes and substandard road networks, exacerbating congestion and road safety issues. Nigeria, as Africa's most populous country and largest economy, faces pronounced challenges in its road transportation sector, reflecting its sprawling urban centers, burgeoning population, and diverse transportation needs (Ahijo, 2022).

The Lagos-Abeokuta Expressway, a vital link between Lagos, Nigeria's commercial capital, and Abeokuta, the historic capital of Ogun State, exemplifies these challenges (Akinyemi et al.,2016). This approximately 80-kilometer expressway is a crucial conduit for commuters, businesses, and freight transport, underpinning economic activity between two major hubs. However, it suffers from severe road hazards and challenges, such as increased travel times due to traffic congestion and deteriorating road conditions (Akinyemi et al.,2016). This study focuses on a thorough analysis and evaluation of the hazards and challenges associated with the Lagos-Abeokuta Expressway, aiming to propose solutions to enhance road safety and efficiency.

II. Statement Of The Problem

The Lagos-Abeokuta Expressway, a crucial artery for Nigeria's commercial and economic activities, faces significant challenges that hinder its efficiency and safety (Femi and Tolorunloju, 2020). The expressway is plagued by some identified conditions such as deteriorating road conditions (pot holes), insufficient signage, narrow roads, sharp bends, severe traffic congestion, and dangerous safety concerns such as over speeding, reckless overtaking, and disregard for traffic rules by some road users. These issues not only lead to increased travel times but also pose significant risks to motorists, pedestrians, and other users (Olasokan and Toki, 2021). The necessity to address these problems is underscored by its role in facilitating economic activities between Lagos and Abeokuta. Poor road conditions and inadequate signage contribute to a higher incidence of accidents, resulting in loss of lives and property, and placing additional strain on emergency services and healthcare systems (Mustapha, 2023). Dangerous driving behaviors, exacerbated by ineffective traffic management, further compound these safety risks, creating a perilous environment for all road users. Continued deterioration of the expressway will likely lead to increased accident rates, higher transportation costs, and diminished economic productivity.

This study seeks to provide solutions to the identified challenges by analyzing the factors contributing to road hazards on the Lagos-Abeokuta Expressway.

III. Aim And Objectives Of The Study

This study analyzed and evaluated the road hazards and challenges on the Lagos Abeokuta Expressway, with a view to proposing solutions for improved road safety and efficiency. The Objective of this study: analyze trends in accident statistics between 2020 and 2024 on the Lagos-Abeokuta Expressway;and assess the correlation between traffic volume during peak hours and accident occurrences on the expressway

IV. Scope Of The Study

This study focuses on analyzing and evaluating the road hazards and challenges on the Lagos Abeokuta Expressway. While the broader issue of road safety in Nigeria is acknowledged, also, the study analyzes accident statistics and traffic volume data between 2020 and 2024.

V. Literature Review

Phase I: Empirical Review

Olasokan and Toki, (2021) researched on Spatiotemporal Analysis of the incidence of Road Traffic Accidents along Lagos/Abeokuta Expressway. Their research aimed to conduct a spatiotemporal analysis of the incidence of road traffic accidents along the Lagos/Abeokuta Expressway to identify prominent accident spots and determine the prevalent times of these incidents, thereby analyzing the relationship between location, time, and accident prevalence. Statistical records were consulted, and questionnaires were designed and randomly distributed to commuters at notable bus stops. Additionally, the government and relevant institutions should prioritize road construction and maintenance, ensuring proper diversions and traffic signs are implemented during road construction activities.

Ogunkan et al (2024) also studies that on Navigating Urban Gridlock: Traffic Congestion and Sustainable Mobility Solutions in Abeokuta Metropolis, Nigeria. The study addressed the prevalent issue of traffic congestion by investigating the intensity, patterns, and characteristics of traffic within selected road corridors in the Abeokuta metropolis, Nigeria. Traffic censuses were conducted to extract traffic characteristics during morning and evening peak periods. Traffic volume and capacity were quantified in "vehicles per hour" (vph) and Passengers Car Unit per hour (PCU/hr.). The study finding concluded by recommending the enhancement of road capacities through upgrades to meet current and future transportation demands, and proposes the development of alternative traffic routes, such as rail lines, to facilitate the movement of heavy-duty trucks.

Yahaya et al, (2024) forecasted the trend of road traffic crashes and their accompanying fatalities in Nigeria (1960–2020). Their study aimed to model and anticipate the trend of road traffic collisions and fatalities in Nigeria. Employing a descriptive retrospective approach, the study examined the trend of road traffic crashes and their associated fatalities using secondary data from the Federal Road Safety Corps (FRSC) database, covering sixty years from 1960 to 2020. The results revealed that between 1960 and 2020, Nigeria averaged 19,014 road traffic collisions and 6,104 fatalities annually. The number of road traffic crashes increased from 10,963 in 1961 to 40,881 in 1976, then declined to 9,694 by 2020, although fatalities have continued to rise somewhat.

Retallack and Ostendorf, (2020) explored on the Relationship between traffic volume and accident frequency at intersections. They designed to improve the understanding of the relationship between traffic volume and accident frequency at intersections and examines the effect of rainfall on this relationship. However, at the highest traffic volumes, accident frequency increased at a higher rate, indicated by a significant quadratic

explanatory term in Poisson and negative binomial models. They suggested that focusing management efforts on avoiding high traffic volume conditions would be most effective in reducing accident frequency.

Ogunkan and Eyitayo (2022), studies look into the volume, trends, and features of traffic in a few chosen road corridors in the Nigerian city of Abeokuta. Using a predetermined checklist, structured observations were used to gather data on land use and road kinds. To gather information on traffic characteristics, traffic censuses were carried out during morning and evening peak hours. "Vehicles per hour" (vph) and passenger car units per hour (PCU/hr.) were used to measure traffic volume and capacity,Although Ogunkan et al. (2022) and Ogunkan et al. (2024) looked into Abeokuta's traffic congestion, they didn't concentrate on the particular section of the highway between Sango and Ewekoro. Additionally, a more detailed analysis concentrating on the research region is lacking from Olasokan and Toki's (2021) investigation of accidents along the Lagos-Abeokuta Expressway. Statistics unique to the Sango-Ewekoro region are absent from Yahaya et al.'s (2024) presentation of national trends in traffic accidents. This gap will be filled by an analysis of accident statistics for this particular area from 2020 to 2024, as suggested in the research goals. Although Martin (2002) and Retallack and Ostendorf (2020) looked at the connection between traffic volume and accidents, they failed to take into account the particular circumstances of the Lagos-Abeokuta Expressway.

Vi. Research Methodology

This study employs a mixed-methods research design, integrating both quantitative and qualitative approaches. Data on traffic volume, accident frequency, and road conditions were collected from relevant authorities such as the Federal Road Safety Corps (FRSC).The data collected was analyzed to identify trends, high-risk areas, and peak times for accidents. Direct observations of traffic flow and road conditions were conducted at various points along the Lagos-Abeokuta Expressway. This method allowed for real-time data collection and verification of reported hazards and traffic patterns. A stratified random sampling method was employed to ensure representative data. The population of the study included all individuals and entities that possessed the characteristics or had knowledge of the road safety phenomena being investigated on the Lagos-Abeokuta Expressway. The unit of analysis for this study on the Lagos-Abeokuta Expressway includesa sample size of approximately 381 respondents is deemed adequate. Confidence Level and Margin of Error: A 95% confidence level and a 5% margin of error are typically used in social science research. Sample Size Formula: The sample size (n) can be calculated using the Kothari's (2004) formula with a 5% margin error for finite populations:

$$\mathbf{n} = \frac{z^2 \times P \times \mathbf{q} \times \mathbf{N}}{e^2(\mathbf{N}-1) + z^2 \times \mathbf{p} \times \mathbf{q}} \quad \text{..... Equation (1)}$$

Where;

N = Sample Population p = sample proportion (taken at 0.5) q = 1-p z = the value of the standard variate at a given confidence level (1.96 for 95% C.I) n= size of sample e= error margin at 5%

Table 1: Sample Frame and Size of the target population in the study area

	Sample Frame	Sample Size
Oke-Odu	50,000	381

Source: Author's Computation (2024)

Vii. Results and Finding

Descriptive Analysis of Demographic Information of Respondents

This analyses of the number of questionnaires distributed, returned, usable, and non-usable for the study. Also, under this section, the demographic information of the respondents wasanalyzedwith the used of Questionnaire

Descriptive Analysis of the Administered Research Instruments

Table1: Response Rate

Description	Frequency	%
Copies of the questionnaire filled	373	97.9
Copies of the questionnaire not filled	8	2.1
Total Copies of Questionnaire Administered	**381**	**100**

Source: Researcher's computation (2024).

Table 1 shows the response rate of the respondents on the distributed questionnaire. The table shows that hundred and eighty-one (381) copies of the questionnaire were targeted responses, but eight (8) were not

properly filled, and seventy-three (373) were properly filled and used for the analysis of this study. This represents a response rate of 97.9 %.

Descriptive Statistics from 2020 to 2024 Total Accidents Road Traffic Crashes within Abeokuta - Ewekoro - Sango Otta Axis

Table 2: Descriptive Statistics from 2020 to 2024 Total Accidents Road Traffic Crashes

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
TRTCs_for_2020	79	5.13	4.439	1.882	0.271	3.287	0.535
TRTCs_for_2021	88	4.76	4.880	2.996	0.257	11.090	0.508
TRTCs_for_2022	93	4.81	4.654	2.588	0.250	8.401	0.495
TRTCs_for_2023	66	5.50	4.442	1.877	0.295	3.519	0.582
TRTCs_for_2024	47	7.45	6.500	2.374	0.347	6.093	0.681
Valid N (listwise)	47						

Source: Researcher's computation (2024).

Table 2 revealed the descriptive statistics for Total Road Traffic Crashes (TRTCs) from 2020 to 2024. The table indicates notable variations in total accidents and road traffic crashes (TRTCs) within the Abeokuta-Ewekoro-Sango Otta axis from 2020 to 2024. The sample sizes (N) for each year varied, with 2024 having the lowest valid cases (47) and 2022 having the highest (93). The mean number of crashes showed a general upward trend, increasing from 5.13 in 2020 to 7.45 in 2024, indicating a potential worsening of road traffic conditions over this period.The standard deviations across years highlight the differences in the spread of TRTCs. The lowest variability was observed in 2023 (SD = 4.442), suggesting relatively consistent occurrence in that year. Conversely, 2024 showed the highest standard deviation (SD = 6.500), indicating greater inconsistency or a wider range of TRTC occurrences. This increased variability in 2024 may point to specific factors contributing to irregularities in road safety in that year.

The skewness values for all years were positive, ranging from 1.877 in 2023 to 2.996 in 2021. This positive skewness indicates that the distributions of TRTCs are right-tailed, with a concentration of lower values and occasionally higher TRTC counts. The year 2021, with the highest skewness (2.996), suggests a significantly skewed distribution with more extreme outliers than other years. The kurtosis values provide further insight into the shape of the TRTC distributions. All kurtosis values were positive, suggesting leptokurtic distributions (i.e. distributions with heavy tails). The highest kurtosis is observed in 2021 (11.090), implying a sharp peak and extreme outliers. In contrast, 2020 and 2023 showed lower kurtosis values (3.287 and 3.519, respectively), indicating fewer extreme values and relatively more normal distributions.

These statistics reveal the potential temporal and spatial dynamics of road traffic conditions within an axis. The steady increase in the mean TRTCs and higher variability in later years, especially in 2024, may reflect changes in traffic density, road infrastructure, or enforcement policies. The extreme skewness and kurtosis in 2021 could result from specific incidents or anomalies such as weather conditions or policy changes. Further investigation is necessary to understand the underlying causes and implement effective road-safety measures tailored to the observed trends.

Graphical Representation of Accidents Road Traffic Crashes Within Abeokuta - Ewekoro - Sango Otta Axis from Jan., 2020 To July, 2024: Graphical Representation of Accident During Peak Hours of Road Traffic Crashes Within Abeokuta - Ewekoro - Sango Otta Axis

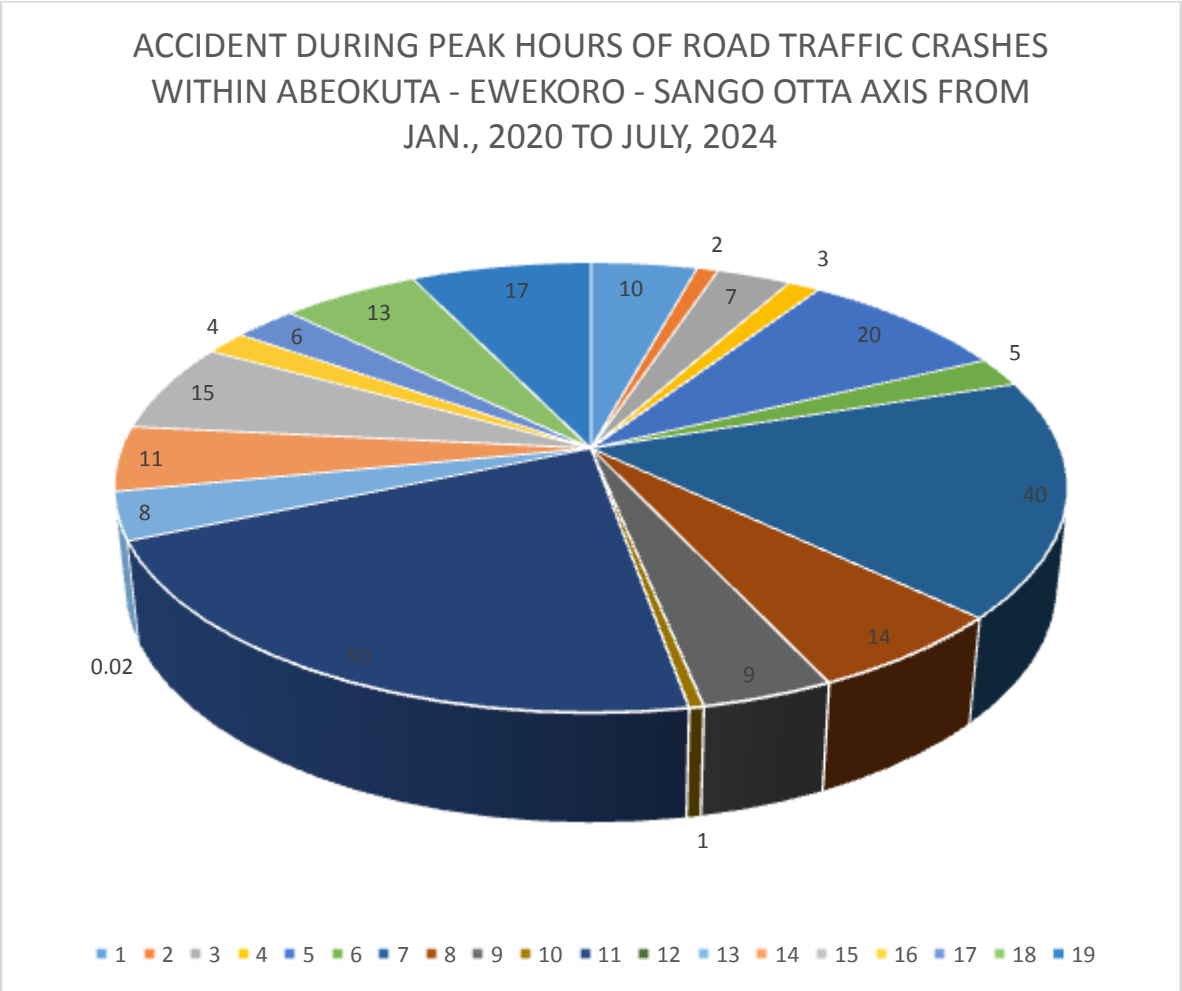

Fig 1: Pie chart of accidents during peak hours of road traffic crashes within the Abeokuta - Ewekoro–Sango Otta Axis from January 2020 to July 2024.Source: Researcher's computation (2024**).**

The pie chart in Figure1 provides a detailed representation of road traffic crashes (RTCs) occurring during peak hours within the Abeokuta-Ewekoro-Sango Otta axis from January 2020 to July 2024. Each segment of the chart corresponds to a specific time interval during which accidents occurred, with proportional sizes indicating the relative frequency of crashes during those hours. The most significant proportion, represented by the segment for time interval 1minute, accounts for the largest number of crashes (40%), highlighting this as a critical time for road safety measures.

These findings suggest variability in RTC occurrences throughout the day, possibly influenced by factors such as traffic density, commuting patterns, and road conditions during specific hours.The chart underscores the necessity of targeted interventions during high-risk periods, particularly around the dominant peak times like interval 1minute.

2020 to 2024 Graphical Representation of Vehicle Route of Road Traffic Crashes within Abeokuta - Ewekoro - Sango Otta Axis

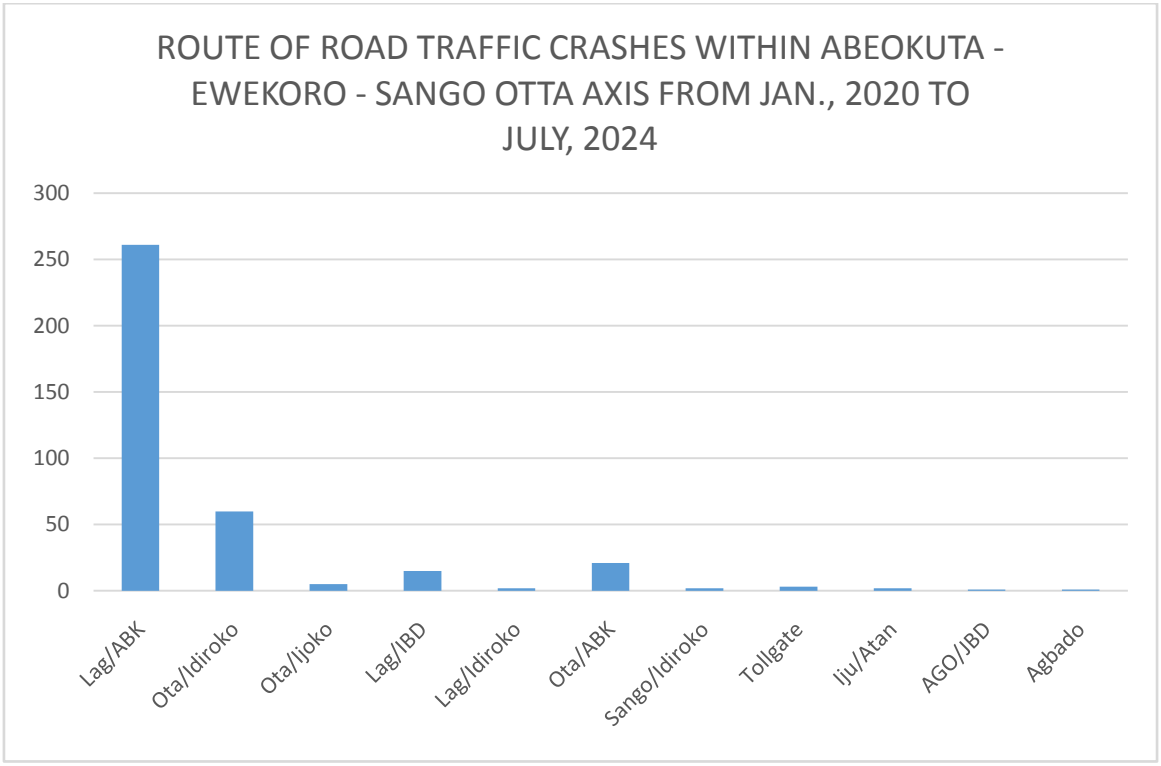

Fig 3: Bar Chart of Route of Road Traffic Crashes within Abeokuta - Ewekoro - Sango Otta Axis from January, 2020 to July, 2024

The graph titled "Route of Road Traffic Crashes within Abeokuta-Ewekoro-Sango Otta Axis from Jan. 2020 to July 2024" illustrates the frequency of crashes across various routes. The crash frequency of each route varies significantly, providing insights into the safety conditions of these routes. TheLagos-Abeokuta route records the highest crash frequency, with approximately 280 incidents. This overwhelming figure indicates that the route is hazardous. High traffic density, poor road conditions, and inadequate enforcement of traffic regulations might be contributing factors to these frequent accidents. Targeted measures such as road expansion and the introduction of traffic lights could help alleviate this issue.

Approximately 25 accidents were recorded on the Ota/Ijoko route. Although the frequency is not alarmingly high, it still suggests underlying safety concerns. This route may experience challenges such as intersections that complicate navigation or insufficient road markings. This can be addressed by better signage and regular inspections. TheLagos/Ibadan route has reported fewer than ten (10) crashes. Thus, it is a safer route in this region. A low frequency may indicate better road conditions or lighter traffic flow. However, continued investment in road maintenance and monitoring is necessary to preserve safety records.

Similarly, the Lagos/Idiroko route has a crash frequency of fewer than ten (10) incidents, making it a relatively safe route. The minimal accidents can reflect effective traffic control or good infrastructure. However, periodic reviews of road conditions and safety protocols are advised in order to maintain these low numbers.The Ota/Abeokuta route also recorded fewer than ten (10) crashes, highlighting its relative safety. This route's minimal accidents could be attributed to lighter traffic, fewer high-risk areas, or proactive traffic management. Consistent safety measures should be implemented to prevent uptick accidents.

The Agbado route reported a similarly low crash frequency, with fewer than ten (10) incidents. This route appears to share characteristics with the two previously safer routes. Maintaining this level of safety requires ongoing attention to the infrastructure and driver behavior.

The Tollgate route's significantly higher crash frequency compared to other routes demands urgent action. The stark contrast between this route and the Toll/Sango route underscores the need for tailored interventions. Authorities should priorities this route to improve safety. TheSango/Idiroko route’s moderate crash frequency signals that it is not as dangerous, but still poses risks to road users. Specific problem areas, such as sharp bends, narrow passages, or confusing signage, could be the culprits that require prompt rectification.

For the Iju/Atan route, the mid-range crash frequency indicates manageable safety concerns. Unlike Sango/Ajebo, this route may not require major overhauls but would benefit from localised safety measures, such as better street lighting and pedestrian crossings.Overall, the data highlights a clear disparity in road safety across the Abeokuta-Ewekoro-Sango Otta axis. While routes such as Sango-Ajebo, Tollgate, Iju/Atan, and Agbado exhibit low crash rates, those such as Lagos/Abeokuta and Ota/Idiroko face significant challenges.

Policymakers should focus on resources in high-frequency crash areas while maintaining existing safety standards for less hazardous routes.

RO1: Analyze trends in accident statistics between 2020 and 2024 on the Lagos-Abeokuta Expressway.

2020 Road Traffic Crashes Within Abeokuta - Ewekoro - Sango Otta Axis from Jan-Dec

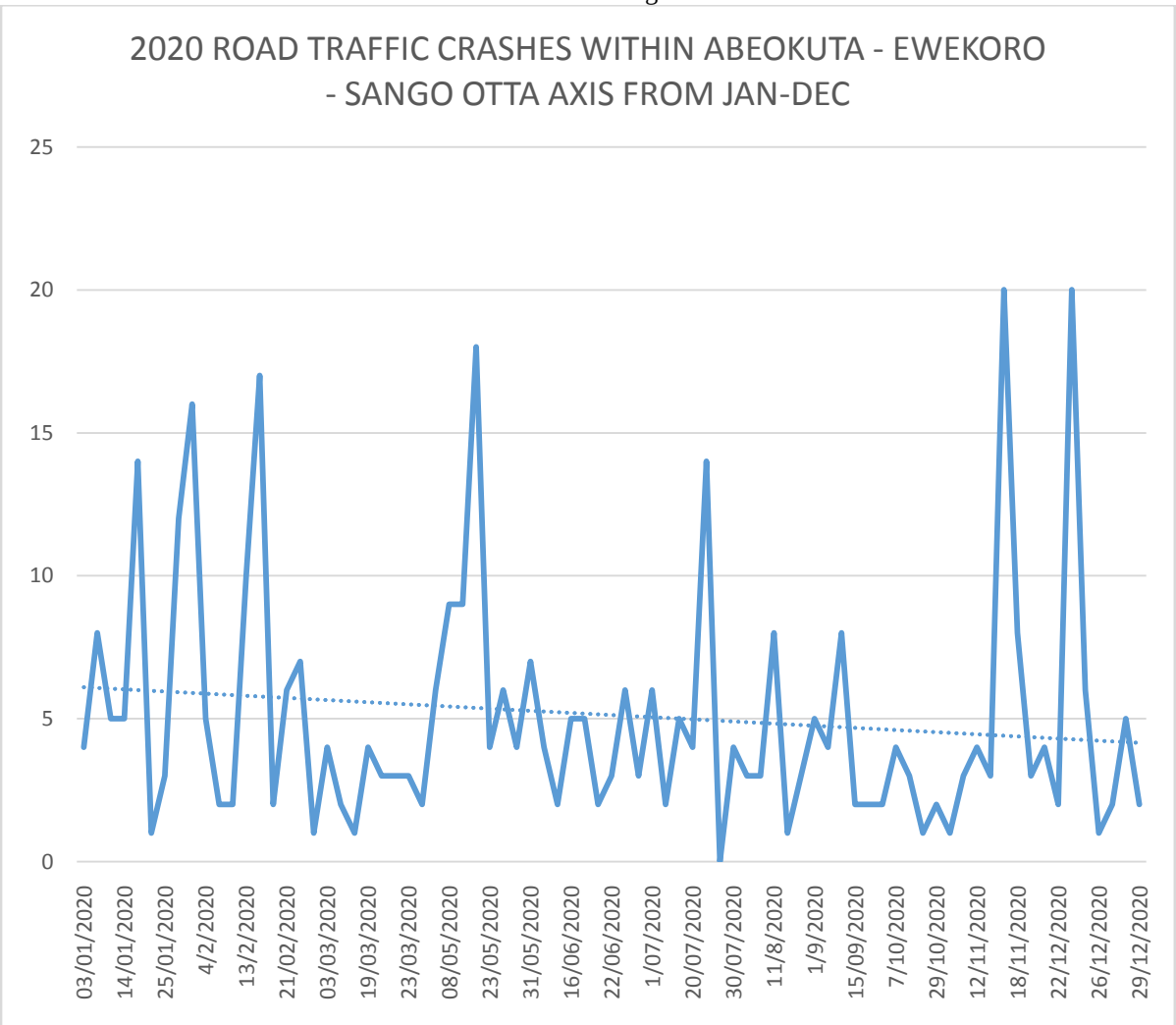

Fig4: 2020 Line Graph of Road Traffic Crashes within Abeokuta - Ewekoro - Sango Otta Axis from January-December

The chart in Fig. 4 depicts the number of road traffic crashes within the Abeokuta-Ewekoro-Sango Otta axis from January to December 2020. The graph shows a fluctuating pattern with peaks and troughs throughout the year.The highest number of crashes occurred in March 2020, followed by a significant decrease in April. The second peak was observed in May, with a subsequent decline in June. The remaining months showed a relatively stable number of crashes, with minor fluctuations. This pattern suggests that certain factors such as seasonal changes, holidays, or specific events might influence the occurrence of road accidents in this region.

2021 Road Traffic Crashes Within Abeokuta - Ewekoro - Sango Otta Axis from Jan-Dec

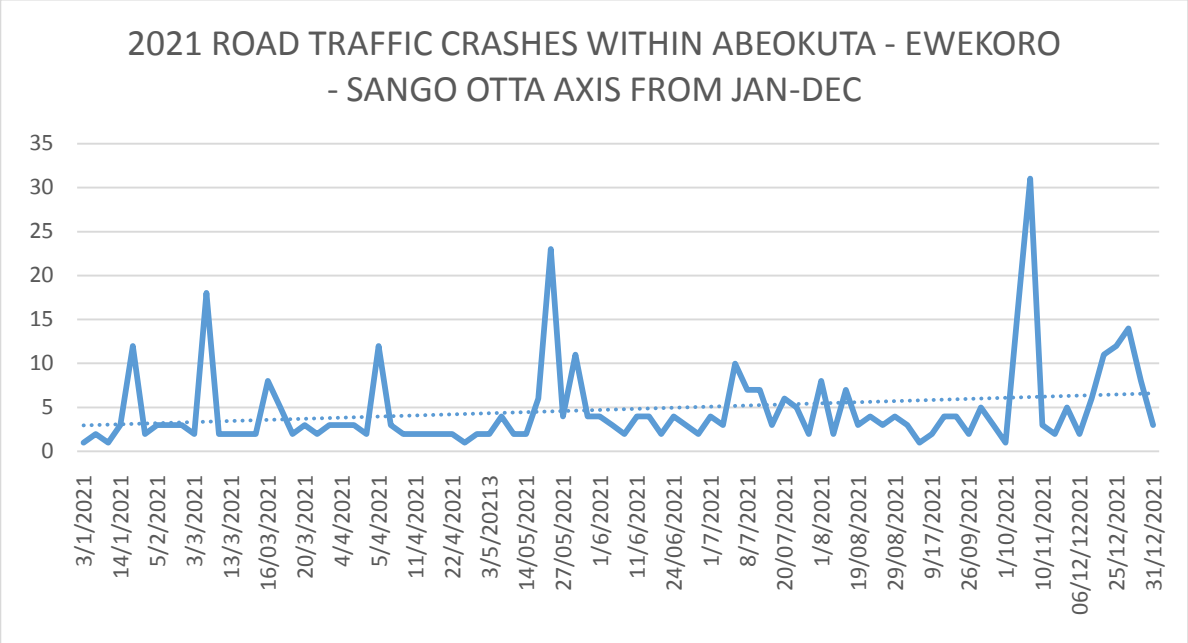

Fig 5:2021 Line Graph of Road Traffic Crashes within Abeokuta - Ewekoro–Sango Otta Axis from January to December.

Fig. 5 shows a line graph of the number of road traffic crashes within the Abeokuta-Ewekoro-Sango Otta axis from January to December 2021. The graph shows a fluctuating pattern, with periods of high crash occurrence interspersed with relatively calmer periods.The chart reveals a notable peak in road accidents in March 2021, followed by a significant decline in April. Another noticeable spike was observed in May with subsequent fluctuations throughout the year. The data suggest that certain factors such as seasonal changes, holidays, or specific events might influence the occurrence of road accidents in this region.

2022 Road Traffic Crashes Within Abeokuta - Ewekoro - Sango Otta Axis from Jan-Dec

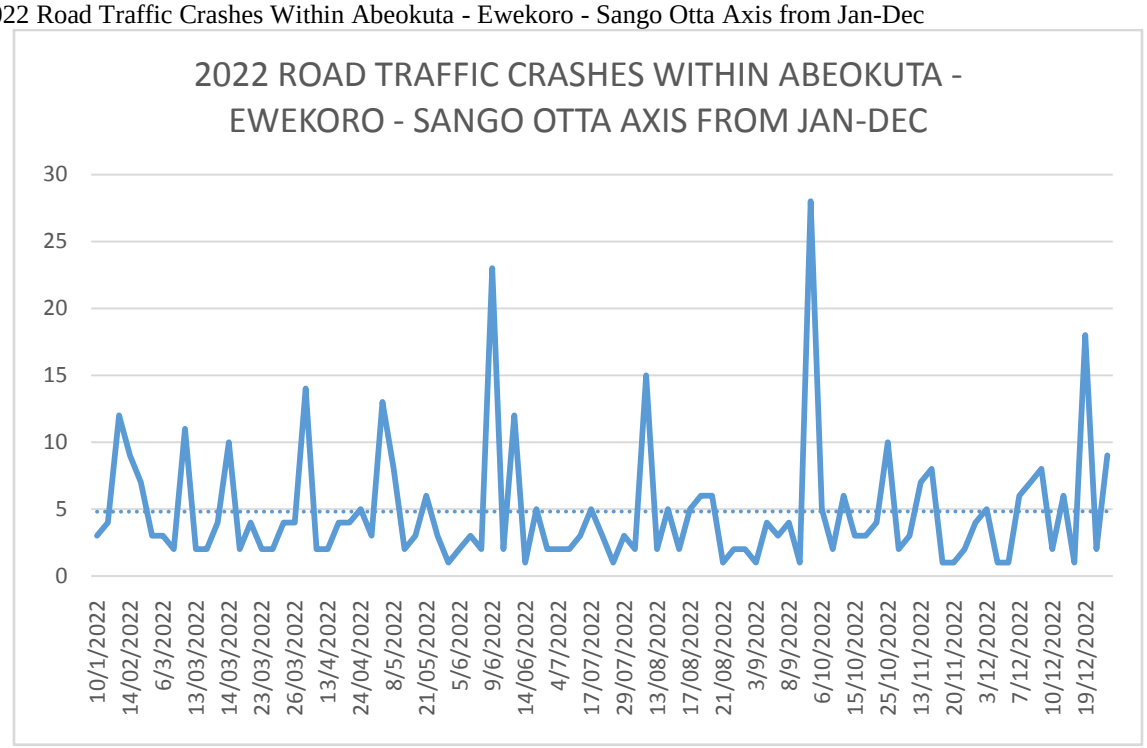

Fig 6: Trend Line of 2022 Road Traffic Crashes within Abeokuta - Ewekoro–Sango Otta axis from January to December.

Fig 6 depicts the trend line of the number of road traffic crashes within theAbeokuta-Ewekoro-Sango Otta axis from January to December 2022. The graph shows a fluctuating pattern, with periods of high crash occurrence interspersed with relatively calmer periods.

The chart reveals a notable peak in road accidents in March 2022, followed by a significant decline in April. Another noticeable spike was observed in May with subsequent fluctuations throughout the year. The data suggest that certain factors such as seasonal changes, holidays, or specific events might influence the occurrence of road accidents in this region.

To implement targeted interventions to reduce the number of road traffic crashes, it is crucial to analyse the underlying causes of these fluctuations. Possible factors contributing to these variations could include changes in traffic volume, road conditions, weather patterns, and human factors, such as driver behaviour and fatigue.

2023 Road Traffic Crashes Within Abeokuta - Ewekoro - Sango Otta Axis from Jan-Dec

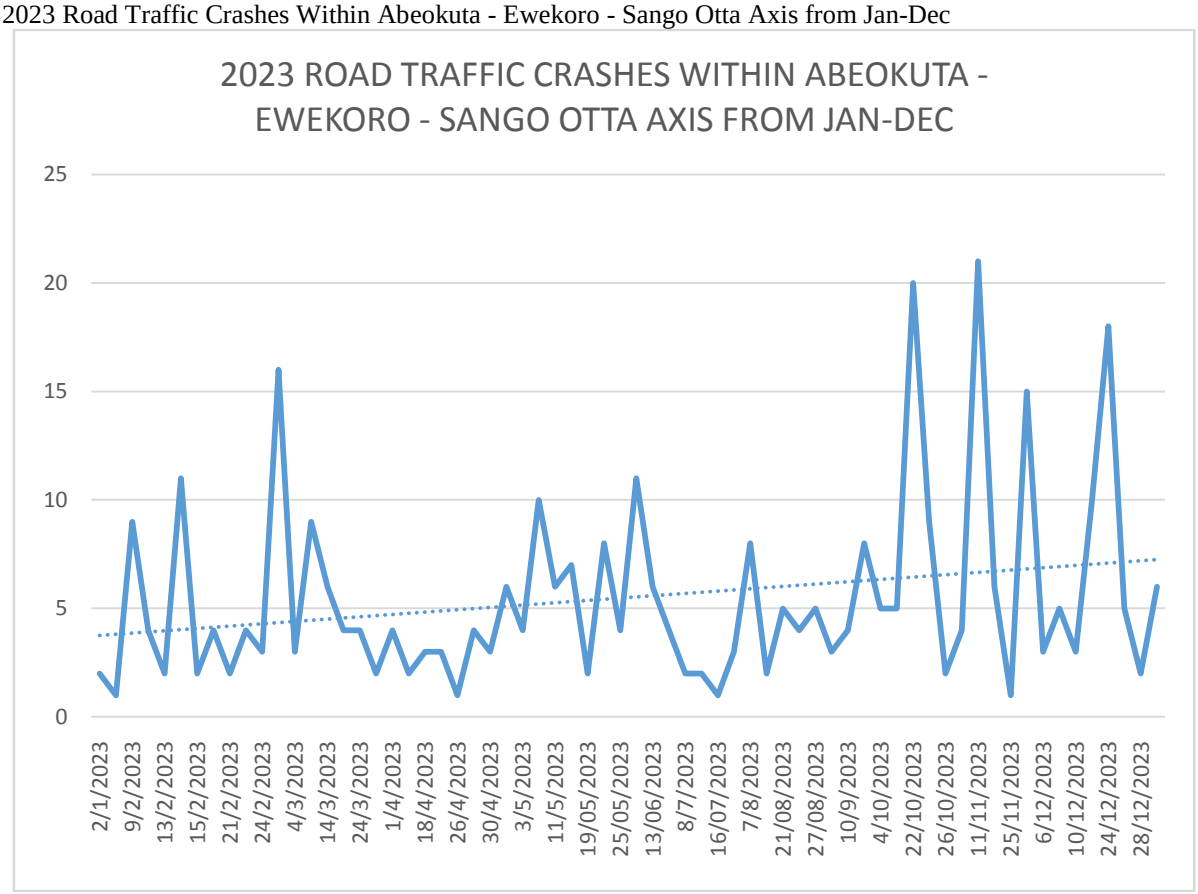

Fig 7:2023 Trend Line of Road Traffic Crashes within Abeokuta - Ewekoro–Sango Otta Axis from January to December.

The Fig.7 reveals the number of road traffic crashes within the Abeokuta-Ewekoro-Sango Otta axis from January to December 2023. The graph shows a fluctuating pattern, with periods of high crash occurrence interspersed with relatively calmer periods.The chart reveals a notable peak in road accidents in March 2023, followed by a significant decline in April. Another noticeable spike was observed in May with subsequent fluctuations throughout the year. The data suggest that certain factors such as seasonal changes, holidays, or specific events might influence the occurrence of road accidents in this region.

To implement targeted interventions to reduce the number of road traffic crashes, it is crucial to analyse the underlying causes of these fluctuations. Possible factors contributing to these variations could include changes in traffic volume, road conditions, weather patterns, and human factors, such as driver behaviour and fatigue. By identifying these factors, authorities can develop and implement effective strategies for improving road safety and preventing accidents.

2024 Road Traffic Crashes Within Abeokuta - Ewekoro - Sango Otta Axis from Jan-July

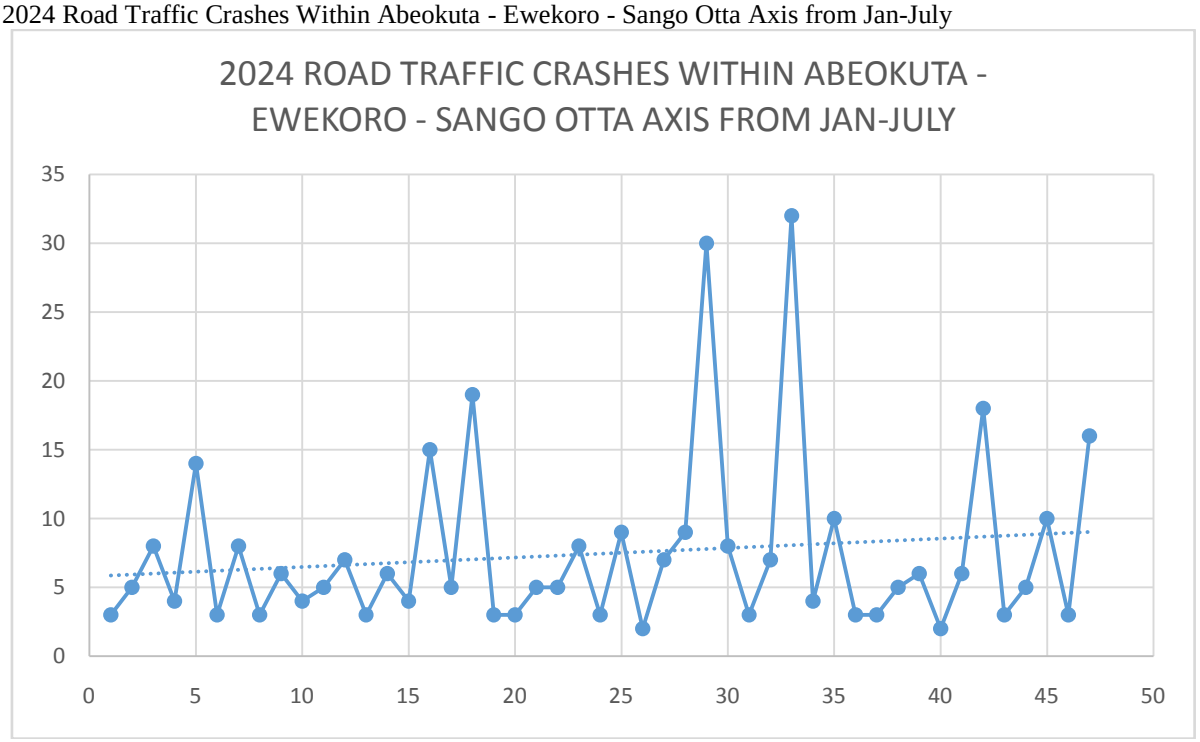

Fig 8:2024Trend Line forRoad Traffic Crashes within Abeokuta - Ewekoro - Sango Otta Axis from January-July

Fig.8 indicates the number of road traffic crashes within the Abeokuta-Ewekoro-Sango Otta axis from January to July 2024. The graph shows a fluctuating pattern, with periods of high crash occurrence interspersed with relatively calmer periods.

The chart reveals a notable peak in road accidents in March 2024, followed by a significant decline in April. Another noticeable spike was observed in May, with subsequent fluctuations throughout this period. The data suggest that certain factors such as seasonal changes, holidays, or specific events might influence the occurrence of road accidents in this region.

2020 -2024 Total Road Traffic Crashes Within Abeokuta - Ewekoro - Sango Otta Axis from January-July

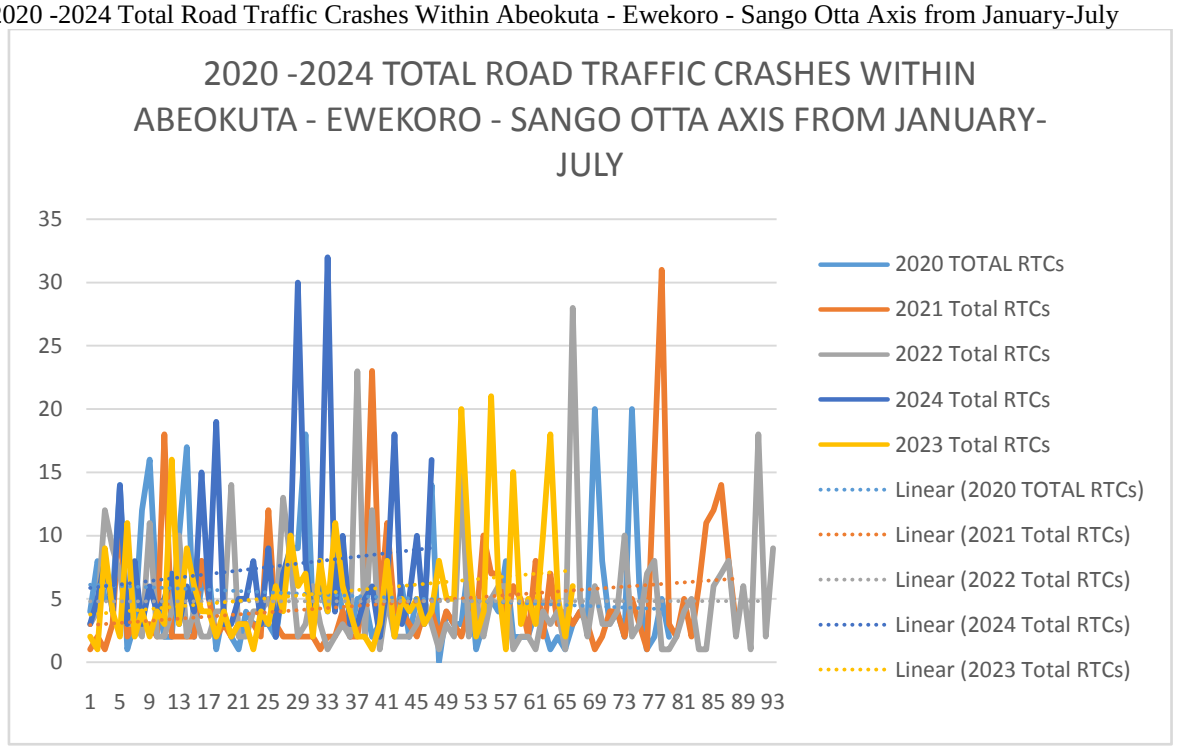

Fig 9: 2020 -2024 Total Road Traffic Crashes within Abeokuta - Ewekoro - Sango Otta Axis from January-July

The Fig.9 presents a comprehensive overview of road traffic crashes within the Abeokuta-Ewekoro-Sango Otta axis from January to July for the years 2020 to 2024. The graph illustrates a fluctuating pattern, with periods of high crash occurrence interspersed with relatively calmer periods.A notable trend is the presence of peaks in the number of road accidents during specific months across all years. March consistently emerged as a month with a higher frequency of crashes. This pattern might be attributed to various factors, such as seasonal changes, increased traffic volume during holidays, or specific events occurring during these months.Furthermore, the chart highlights the interannual variations in the overall number of road traffic crashes. While 2020 and 2021 exhibited relatively similar patterns, with peaks and troughs occurring in comparable months, 2022 and 2023 displayed distinct trends. For instance, 2022 shows a higher number of crashes in the initial months, whereas 2023 experiences a more gradual increase. These differences can be attributed to factors such as changes in road infrastructure, enforcement measures, and socioeconomic conditions.

To implement targeted interventions to reduce the number of road traffic crashes, it is crucial to analyse the underlying causes of these fluctuations. Possible factors contributing to these variations could include changes in traffic volume, road conditions, weather patterns, and human factors, such as driver behaviour and fatigue. By identifying these factors, authorities can develop and implement effective strategies for improving road safety and preventing accidents.

A deeper analysis of the data, potentially using statistical techniques, could provide further insights into the factors influencing these trends and help to identify specific areas for intervention. This could involve examining the impact of factors, such as road infrastructure, traffic management, and public awareness campaigns on road safety. By understanding these factors, policymakers and stakeholders can develop evidence-based strategies to effectively address road traffic accidents.

$RO2_2$: Traffic volume during peak hours do not correlate with the occurrence of accidents on the Lagos-Abeokuta Expressway

Table 3: Correlations Traffic volume during peak hours and Traffic Volume

		ARDPHs	Traffic volume
ARDPHs	Pearson Correlation	1	0.904**
	Sig. (2-tailed)		0.000
	N	373	373
Traffic volume	Pearson Correlation	0.904**	1
	Sig. (2-tailed)	0.000	
	N	373	373

**. Correlation is significant at the 0.01 level (2-tailed).

The table3 provides a statistical analysis of the relationship between traffic volume during peak hours and the occurrence of accidents on the Lagos-Abeokuta Expressway. The Pearson's correlation coefficient was 0.904, indicating a strong positive correlation between the two variables. This means that as traffic volume increases during peak hours, the occurrence of accidents also increases significantly. The significance values (Sig. (2-tailed)) are0.000, which is less than the threshold of 0.01. This result confirms that the observed relationship is statistically significant and not due to random chance. With a sample size of 373, the data are robust and support the rejection of the null hypothesis (R02) that there is no correlation between the traffic volume during peak hours and accidents. This strong positive correlation suggests that higher traffic volumes during peak hours are a major contributing factor to the occurrence of accidents on the Lagos-Abeokuta Expressway. This insight highlights the need for effective traffic management strategies, particularly during peak hours, to reduce the risk of accidents along this route.

Vii. Discussion of Findings

Research objective one reveals the analysis of crash trends along the Abeokuta-Ewekoro-Sango Otta axis from 2020 to 2024 reveals consistent fluctuations, with March emerging as a peak month for accidents across all years. This indicates a recurring seasonal or situational pattern that requires further examination. Factors such as increased vehicular activity during holidays, weather-related conditions, and regional socioeconomic activities may contribute to this trend (World Health Organization, 2021). Furthermore, the decline observed in April in all years may correspond to reduced travel or the implementation of safety measures after high crash periods.Inter-annual variations, such as the higher crash rates in early 2022 compared with other years, may reflect changes in road conditions, enforcement of safety laws, or variations in traffic volumes. These findings underscore the importance of continuous monitoring of road conditions and adaptive

traffic safety interventions. To address these fluctuations, road safety campaigns and infrastructure upgrades should be timed to coincide with the historically high-risk months.

Viii. Conclusion

The findings of this study highlight consistent patterns of road traffic crashes from 2020 to 2024 along the Abeokuta-Ewekoro-Sango Otta axis. A recurring observation was the higher incidence of crashes in March, followed by fluctuating occurrences throughout the year. This trend underscores the need for targeted interventions during periods of high crash frequencies. The descriptive statistics revealed an increasing trend in the mean number of road traffic crashes over the five years, with 2024 recording the highest mean (7.45) and standard deviation (6.500). This indicates growing volatility in crash occurrences, which might be linked to worsening road conditions, increased traffic volume, or other underlying factors.

The analysis suggests that factors such as seasonal changes, holidays, or specific regional events may significantly influence the frequency of road traffic crashes. March consistently emerged as the month with the most crashes, indicating potential traffic surges or adverse conditions during this period. A comparative analysis of the years 2020 to 2024 shows interannual variations in crash trends. While 2020 and 2021 exhibit relatively consistent patterns, 2022 and 2023 show distinct changes, potentially reflecting shifts in socioeconomic conditions, infrastructure development, and enforcement measures.

Recommendations

i. Road infrastructure should be regularly assessed and upgraded along the Abeokuta-Ewekoro-Sango Otta axis. This should include repaving deteriorated road sections, adding or enhancing road signage, and ensuring the availability of appropriate lighting in high-risk areas. Establishing well-maintained pedestrian crossings and dedicated lanes for commercial vehicles can further enhance the safety of road users.

ii. There is a need for launch-targeted campaigns to educate drivers on safe driving practices, focusing on speed management, dangers of fatigue, and adherence to traffic rules. Partnering with transportation unions and stakeholders to promote defensive driving and implementing mandatory refresher training programs for commercial drivers can significantly reduce human error as a leading cause of crashes.

iii. The government should develop and enforce policies that address the root causes of RTCs, such as overloading, reckless driving, and noncompliance with traffic laws. This should include increasing the number of road safety personnel during peak traffic periods, conducting random breathalyzer tests to deter driving under the influence, and imposing stricter penalties for violations. Collaboration between local governments, road safety authorities, and the community is essential for sustained impact.

References

[1]. Ahijo, T. M. (2022). Assessing social sustainability in urban road transportation of Abuja, Nigeria(Doctoral dissertation, University of Central Lancashire).

[2]. Ahmad, S., Wasim, S., Irfan, S., Gogoi, S., Srivastava, A., & Farheen, Z. (2019). Qualitative v/s. quantitative research-a summarized review. Population, 1(2), 2828-2832.

[3]. Akinyemi, O. O., Adeyemi, H. O., & Jinadu, O. (2016). Road transport accidents in Nigeria and the role of automotive active safety system.

[4]. Femi, O. J., & Tolorunloju, E. R. (2020). Assessment of road transport infrastructure in Lagos state, Nigeria. Indian Journal of Engineering, 17(47), 182-192.

[5]. Khan, N., Hassan, A. U., Fahad, S., & Naushad, M. (2020). Factors affecting tourism industry and its impacts on global economy of the world. Available at SSRN 3559353.

[6]. Mustapha, A. M. (2023). Analysis of Road Traffic Violations on Passengers and Freights Transport in Minna Metropolis. Lapai International Journal of Management and Social Sciences, 15(1), 62-71.

[7]. Ogunkan, D. V., & Eyitayo, O. O. (2022). Pattern and Characteristics of Traffic Congestion in Nigerian Metropolitan Centres: An Example of Abeokuta Metropolis.

[8]. Ogunkan, D. V., Olaleye, E. O., Akinpelu, O. P., & Oyeleye, I. O. (2024). Navigating Urban Gridlock: Traffic Congestion and Sustainable Mobility Solutions in Abeokuta Metropolis, Nigeria.

[9]. Olasokan, O. O., & Toki, E. O. (2021). A Spatiotemporal Analysis of the incidence of Road Traffic Accidents along Lagos/Abeokuta Expressway. International Journal of Research and Scientific Innovation, 8(9), 81-91.

[10]. Paiva, S., Ahad, M. A., Tripathi, G., Feroz, N., & Casalino, G. (2021). Enabling technologies for urban smart mobility: Recent trends, opportunities and challenges. Sensors, 21(6), 2143.

[11]. Rahi, S., Alnaser, F. M., & Abd Ghani, M. (2019). Designing survey research: recommendation for questionnaire development, calculating sample size and selecting research paradigms.

[12]. Rendleman, M. C., Smith, B. J., Canahuate, G., Braun, T. A., Buatti, J. M., & Casavant, T. L. (2022). Representative random sampling: an empirical evaluation of a novel bin stratification method for model performance estimation. Statistics and computing, 32(6), 101.

[13]. Retallack, A. E., & Ostendorf, B. (2020). Relationship between traffic volume and accident frequency at intersections. International journal of environmental research and public health, 17(4), 1393.

[14]. Venkatesh, V., Brown, S. A., & Bala, H. (2013). Bridging the qualitative-quantitative divide: Guidelines for conducting mixed methods research in information systems. MIS quarterly, 21-54.

[15]. Yahaya, H. U., Tanimu, M., & Obi, O. (2024). Forecasting the trend of road traffic crashes and their accompanying fatalities in Nigeria (1960–2020). International Journal of Epidemiology and Health Sciences.