**Int. J. Sci. R. Tech., 2026 3(7)**
A Multidisciplinary peer-reviewed Journal
www.ijsrtjournal.com [ISSN: 2394-7063]

*Original Article*

# Motorcycle Proliferation And Urban Risk Exposure: Assessing Transport-Related Hazards In OBIO/AKPOR LGA, Nigeria.

**Ogboeli Goodluck Prince[1]*, Okechukwu Cosmos[2], Eni Sampson[1]**

[1]*Disaster and Environmental Risk Management, Institute of Geoscience and Environmental Management, Rivers State University, Nkpolu Oroworukwo, Port Harcourt*
[2]*World Bank Africa, Center for Excellence in Oilfield Chemical Research, University of Port Harcourt*

## ABSTRACT

Motorcycle (okada) transportation has become a major component of informal urban mobility in Nigerian cities, including Obio/Akpor Local Government Area (LGA). Although it provides affordable transport services and employment opportunities, its rapid and largely unregulated expansion has raised significant concerns regarding traffic congestion, road traffic accidents, and urban crime, thereby increasing overall urban risk exposure. This study examined the contribution of motorcycle proliferation to transport-related hazards in Obio/Akpor LGA, focusing specifically on congestion, accident occurrence, and crime association. The study adopted a descriptive survey research design within a mixed-method framework. Primary data were collected using structured questionnaires administered to 400 respondents drawn from Choba, Alakahia, Rumualoagu, Ozuoba, Rumuosi, and Rumuekini communities. A total of 383 valid responses were retrieved and analyzed. The instrument was designed on a 4-point Likert scale to capture respondents' perceptions of motorcycle-related congestion, accidents, and crime. Data were analyzed using descriptive statistics, including frequencies, percentages, and mean scores, while inferential statistics such as Chi-square tests and multiple regression analysis were used to examine relationships and predictive effects. Findings revealed a high level of agreement that motorcycle proliferation contributes significantly to traffic congestion (Grand Mean = 3.48), road traffic accidents (Grand Mean = 3.51), and crime occurrence (Grand Mean = 3.51). The Chi-square analysis indicated statistically significant relationships between motorcycle proliferation and accident occurrence ($\chi^2 = 86.42$, $p < 0.05$) as well as crime occurrence ($\chi^2 = 74.15$, $p < 0.05$). Regression results further showed that motorcycle proliferation is a strong predictor of urban risk exposure, explaining 52% of the variance ($R^2 = 0.52$, Adjusted $R^2 = 0.49$). Motorcycle density ($\beta = 0.49$, $t = 8.64$) and traffic behavior ($\beta = 0.44$, $t = 7.12$) were significant predictors of transport-related hazards. The study concludes that unregulated motorcycle proliferation significantly increases urban risk exposure in Obio/Akpor LGA. It recommends stricter enforcement of transport regulations, compulsory helmet use, improved rider registration systems, continuous road safety education, and enhanced security surveillance to mitigate transport-related hazards and improve urban safety.

**Keywords**: Motorcycle proliferation; Urban risk exposure; Traffic congestion; Road traffic accidents; Crime association.

## INTRODUCTION

Motorcycle transport, widely known as *okada*, has become a common and almost unavoidable part of daily movement in many Nigerian cities. In Obio/Akpor Local Government Area, the rapid increase in the number of commercial motorcycles reflects a major shift in how people move around and, more importantly, in the kinds of risks they face. This situation persists despite earlier restrictions introduced during the administration of Rotimi Amaechi, which banned okada operations in Port Harcourt Metropolis due to concerns about crime, road accidents, and traffic congestion. Today, the re-emergence of motorcycles in Obio/Akpor LGA (largely without formal government approval) has brought back many of these challenges, and in some cases, made them worse (Simon et al., 2023; Dada et al., 2020). Weak enforcement of transport regulations continues to play a major role in increasing unsafe

**Relevant conflicts of interest/financial disclosures**: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

riding practices and accident risks (Akinlade et al., 2019; Sanusi & Emmelin, 2015; WHO, 2023; Ogboeli et al., 2026c).

The growing presence of okada in Obio/Akpor is largely driven by the need for quick and flexible movement, especially in areas where formal transport systems are either unavailable or inefficient. Motorcycles provide easy "last-mile" access and can navigate traffic more easily than cars. However, this advantage comes at a cost. The rapid and unregulated increase in motorcycles has created multiple layers of risk, including traffic congestion, road accidents, and rising insecurity. Instead of reducing congestion, the large number of bikes often leads to disorderly traffic, with riders weaving through vehicles, driving against traffic, and parking indiscriminately (Aati et al., 2024; Ameen & Ahmad, 2025). At the same time, the lack of proper licensing, monitoring, and rider training means many operators are not adequately prepared, increasing the likelihood of accidents and unsafe road conditions (Ogunmodede et al., 2021; Nnadi & Uche, 2021).

From a safety point of view, the high number of motorcycle operators has been strongly linked to increasing road traffic accidents. In Nigeria, motorcycles are involved in a large proportion of crashes, sometimes accounting for a significant share of road traffic incidents, particularly among young adults (Johnson, 2012; Ajayi & Adeleke, 2020). Many of these accidents result in serious injuries such as head trauma, facial damage, and eye injuries, which place a heavy burden on victims and the healthcare system (Adebayo et al., 2022; Eze et al., 2019). More broadly, research shows that motorcycle accidents are now a major public health concern, affecting quality of life and increasing healthcare costs across communities (Oderoet al., 1997; Gheshlaghi et al., 2021).

Beyond accidents, there is also a growing link between motorcycle operations and urban crime. Because motorcycles are fast, flexible, and difficult to trace, they are often used in theft and quick escape situations. This has increased fear and insecurity among residents. Studies show that informal motorcycle transport is associated with rising perceptions of crime in Nigerian cities (Sanusi & Emmelin, 2015). The problem is worsened by poor registration and monitoring systems, which make it difficult for authorities to identify offenders and enforce the law effectively (Peden et al., 2004; Nantulya & Reich, 2002; UN-Habitat, 2022; Ogboeli et al., 2026a).

For the riders themselves, okada operation is not just a job but a high-risk occupation. They are constantly exposed to environmental and physical hazards, including inhaling exhaust fumes, long hours of riding that cause body pain, and harsh weather conditions such as intense heat and heavy rainfall. These conditions can lead to fatigue, reduced concentration, and increased chances of accidents, putting both riders and passengers at risk.

From a broader disaster risk perspective, the situation in Obio/Akpor can be seen as a gradual build-up of everyday hazards. Frequent motorcycle accidents, traffic congestion, and crime incidents combine to create what can be described as "everyday urban disasters," whose impacts accumulate over time (Federal Road Safety Corps, 2022; Morenikeji et al., 2024). In addition, heavy congestion caused by motorcycles can delay emergency response services such as ambulances and fire trucks, increasing the severity of accidents and other emergencies. The long-term effects, including loss of income, disability, and reduced productivity, further increase the vulnerability of affected individuals and communities (Okafor & Ibrahim, 2021; Marnah & Manortey, 2022).

The rapid and largely unauthorized growth of motorcycle transport in Obio/Akpor highlights a gap between the demand for mobility and the effectiveness of regulatory control. The risks go beyond individual accidents to affect public safety, urban order, and overall quality of life. This study therefore, examines how motorcycle proliferation contributes to urban risk exposure and emphasizes the need for practical solutions such as stricter enforcement of transport laws, improved rider training, and the development of safer and more reliable transport alternatives. Addressing these challenges is essential for reducing risk and building a safer, more resilient urban environment.

### 1.1 Aim and Objectives of the Study

**General Objective**

The general objective of this study is to assess the impact of motorcycle proliferation on urban risk exposure in Obio/Akpor Local Government Area, Rivers State, Nigeria.

**Specific Objectives**

The specific objectives of the study are to:

1. examine the extent to which motorcycle proliferation contributes to traffic congestion in Obio/Akpor LGA;
2. assess the relationship between motorcycle proliferation and road traffic accidents in the study area;
3. evaluate the association between motorcycle operations and crime occurrence in Obio/Akpor LGA;
4. determine the predictive effect of motorcycle density and rider behavior on urban risk exposure;
5. identify possible measures for reducing transport-related hazards associated with motorcycle operations in the area.

### 1.2 Research Questions

The following research questions guided the study:

1. To what extent does motorcycle proliferation contribute to traffic congestion in Obio/Akpor LGA?
2. What relationship exists between motorcycle proliferation and road traffic accidents in the study area?
3. How does motorcycle proliferation influence crime occurrence in Obio/Akpor LGA?
4. To what extent do motorcycle density and rider behavior predict urban risk exposure?
5. What measures can be adopted to reduce motorcycle-related transport hazards in the area?

### 1.3 Research Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

$H_{01}$: There is no significant relationship between motorcycle proliferation and accident occurrence in Obio/Akpor LGA.

$H_{02}$: There is no significant relationship between motorcycle proliferation and crime occurrence in Obio/Akpor LGA.

$H_{03}$: Motorcycle density and rider behavior do not significantly predict urban risk exposure in Obio/Akpor LGA.

## 2. THEORETICAL FRAMEWORK

This study is anchored on the Systems Theory of Road Safety, Risk Homeostasis Theory, and Haddon Matrix Theory. These theories provide a comprehensive explanation of how motorcycle proliferation contributes to urban risk exposure through interactions among human behavior, transport systems, environmental conditions, and regulatory structures.

**Systems Theory of Road Safety**

The Systems Theory of Road Safety was developed from systems thinking approaches to transport safety and emphasizes that road accidents are not caused by a single factor but result from interactions among road users, vehicles, infrastructure, and the transport environment. The theory argues that transportation systems must be understood as interconnected systems in which failures in one component can increase the likelihood of accidents and other urban risks.

The relevance of this theory to the present study lies in its explanation of how motorcycle proliferation in Obio/Akpor LGA interacts with poor road infrastructure, weak traffic law enforcement, unsafe rider behavior, and increasing urban congestion to produce transport-related hazards. The theory supports the argument that motorcycle-related accidents and urban insecurity are systemic problems rather than isolated incidents. It also highlights the need for integrated safety measures involving

regulation, infrastructure improvement, rider education, and traffic management.

**Risk Homeostasis Theory**

Risk Homeostasis Theory was propounded by Gerald J. S. Wilde in 1982. The theory suggests that individuals adjust their behavior according to the level of risk they perceive and are willing to accept. According to the theory, when people feel safer, they may engage in riskier behavior, while perceived danger may encourage more cautious actions.

This theory is relevant to the study because many commercial motorcycle riders in Obio/Akpor LGA often engage in risky behaviors such as overspeeding, reckless overtaking, riding against traffic, and ignoring safety regulations. These actions are influenced by economic pressure, familiarity with traffic conditions, and weak enforcement of transport regulations. The theory helps explain why riders may continue unsafe practices despite awareness of accident risks and legal restrictions. It further demonstrates how behavioral adaptation contributes significantly to transport-related hazards and urban risk exposure.

**Haddon Matrix Theory**

The Haddon Matrix Theory was developed by William Haddon Jr. in 1970 as a framework for understanding and preventing injuries associated with road traffic accidents. The theory identifies three phases of accidents: pre-crash, crash, and post-crash, and examines the interaction between human factors, vehicles, and environmental conditions during each phase.

The theory is applicable to this study because it provides a structured framework for analyzing motorcycle-related hazards in Obio/Akpor LGA. Human factors such as reckless riding and non-use of helmets, vehicle-related factors such as poor motorcycle conditions, and environmental factors such as congestion and poor road conditions all contribute to accident occurrence and severity. The theory also highlights the importance of emergency response systems and post-accident care in reducing the long-term impacts of motorcycle crashes. This framework supports the study's emphasis on preventive measures, safety enforcement, and improved urban transport management.

**Relevance of the Theoretical Framework to the Study**

The integration of these theories provides a comprehensive understanding of motorcycle proliferation and urban risk exposure in Obio/Akpor LGA. While the Systems Theory of Road Safety explains the interaction between transport systems and urban hazards, Risk Homeostasis Theory explains unsafe rider behavior, and Haddon Matrix Theory provides a framework for accident prevention and injury reduction. Together, these theories strengthen the analytical foundation of the study and support the interpretation of findings relating to traffic congestion, road accidents, crime, and urban safety challenges associated with motorcycle operations.

## 3. MATERIALS AND METHODS

This study was carried out in Obio/Akpor, a rapidly urbanizing Local Government Area within the Port Harcourt metropolis. The study focused on communities with high commercial motorcycle (okada) activity, including Choba, Alakahia, Rumualoagu, Ozuoba, Rumuosi, and Rumuekini. These communities were purposively selected because of their dense population, high transport demand, and widespread informal motorcycle operations, which have contributed to increasing cases of traffic congestion, road traffic accidents, and crime. According to the 2006 National Population Census and subsequent population projections by the National Population Commission, Obio/Akpor has experienced rapid population growth, particularly in urban communities such as Choba, Alakahia, Ozuoba, and Rumuosi. This growth has been further accelerated by the presence of University of Port Harcourt, which attracts large numbers of students, staff, traders, transport operators, and other residents, thereby increasing commercial activities, transportation demand, and urban expansion within these communities.

The study adopted a descriptive survey research design. This design was considered appropriate because it enabled the researchers to examine the current state of motorcycle proliferation and its associated urban risks without manipulating any

variables. The design also provided a systematic framework for assessing respondents' perceptions of congestion, accidents, and crime associated with motorcycle operations within the study area.

A mixed-method approach involving quantitative and qualitative data collection techniques was employed. Primary data were collected through structured questionnaires administered to respondents across the selected communities, while secondary data were obtained from relevant literature, journal articles, government publications, and official reports from the Federal Road Safety Corps (FRSC) relating to road traffic accidents and transport safety.

Sample Size and Sampling Technique: The target population for the study comprised motorcycle operators, passengers, traders, motorists, and residents within the selected communities of Obio/Akpor LGA. The sample size of 400 respondents was determined using the Taro Yamane (1986) sample size determination formula for finite populations: $n = \frac{N}{1+N(e)^2}$

Where n = Number of samples, N = Population size, 1 = constant, e = level of significance of error assumed to be 0.05.

A multistage sampling technique was adopted for the study. First, purposive sampling was used to select the six communities due to their high level of motorcycle activity and urban transport challenges. Secondly, stratified sampling was employed to categorize respondents into motorcycle operators, passengers, and residents to ensure representation of relevant stakeholder groups. Finally, simple random sampling was used to administer questionnaires within each stratum.

The distribution of questionnaires across the selected communities was proportional to the estimated population and intensity of motorcycle operations within each area. Out of the 400 questionnaires distributed, 383 were successfully retrieved and used for analysis, representing a response rate of 95.8%.

Inclusion and Exclusion Criteria

The inclusion criteria covered: residents aged 18 years and above; commercial motorcycle operators actively engaged in okada transportation; passengers and road users with knowledge or experience of motorcycle-related transport activities within the study area.

The exclusion criteria included: individuals below 18 years of age; persons who had not resided in the study area for at least six months; respondents who failed to complete substantial portions of the questionnaire.

Research Instrument: A structured questionnaire based on a 4-point Likert scale was used as the principal instrument for data collection. The questionnaire was divided into sections covering demographic characteristics, motorcycle proliferation, traffic congestion, road traffic accidents, crime association, and urban risk exposure. Response options included Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1).

Validity and Reliability of the Instrument: To ensure content and face validity, the questionnaire was subjected to expert review by specialists in disaster risk management, transportation studies, and environmental management at Rivers State University. Their observations and recommendations were incorporated into the final version of the instrument.

A pilot study involving 30 respondents was conducted outside the selected study communities to test the clarity, consistency, and suitability of the questionnaire items. The reliability of the instrument was tested using Cronbach's Alpha reliability method, which yielded a coefficient of 0.82, indicating high internal consistency and reliability of the instrument for the study.

Method of Data Analysis: Data collected from the field were coded and analyzed using descriptive and inferential statistical methods. Descriptive statistics such as frequency distribution tables, percentages, mean scores, and charts were used to summarize and present the data clearly. Mean values of 2.50 and above were considered accepted, while values below 2.50 were regarded as rejected.

Inferential statistics were employed to test the study's hypotheses and determine relationships among variables. The Chi-square ($\chi^2$) test was used to examine the relationship between motorcycle proliferation and the occurrence of road traffic accidents and crime. In addition, regression analysis

was applied to assess the predictive influence of motorcycle density and rider behavior on urban risk exposure in the study area. Statistical analyses were conducted at a 0.05 level of significance.

Ethical Considerations: Ethical principles were strictly observed throughout the study. Participation was voluntary, and informed consent was obtained from all respondents before questionnaire administration. Respondents were assured of anonymity and confidentiality, and all information obtained was used strictly for academic purposes. No personally identifiable information was disclosed during the study.

## 4. RESULTS

| ITEMS | SA (4) | A (3) | D (2) | SD (1) | Total | SWV | Mean | Remarks |
|---|---|---|---|---|---|---|---|---|
| The increasing number of motorcycles (okada) has significantly contributed to traffic congestion in my area. | 210 | 115 | 45 | 13 | 383 | 1288 | 3.36 | Accepted |
| Motorcycle riders often create disorder on the road during peak traffic hours. | 240 | 90 | 40 | 13 | 383 | 1323 | 3.45 | Accepted |
| Traffic flow is frequently slowed down due to the high presence of motorcycles. | 185 | 140 | 45 | 13 | 383 | 1263 | 3.30 | Accepted |
| Motorcycles often ignore traffic rules, leading to road blockages and congestion. | 255 | 80 | 30 | 18 | 383 | 1338 | 3.49 | Accepted |
| The absence of proper regulation of okada operations worsens traffic conditions. | 285 | 70 | 20 | 8 | 383 | 1398 | 3.65 | Accepted |
| Indiscriminate parking of motorcycles along major roads contributes to congestion. | 225 | 100 | 45 | 13 | 383 | 1303 | 3.40 | Accepted |
| Motorcycle riders frequently compete with vehicles for limited road space, causing delays. | 230 | 95 | 45 | 13 | 383 | 1308 | 3.42 | Accepted |
| The proliferation of motorcycles has reduced the efficiency of transportation in the area. | 175 | 135 | 55 | 18 | 383 | 1233 | 3.22 | Accepted |
| Traffic congestion is more severe in areas with high motorcycle activity such as Choba and Rumuosi. | 300 | 55 | 20 | 8 | 383 | 1413 | 3.69 | Accepted |
| Proper regulation of motorcycle operations would reduce traffic congestion in Obio/Akpor LGA. | 320 | 50 | 13 | - | 383 | 1456 | 3.80 | Accepted |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Grand Mean** | | | | | | | **3.48** | **Accepted** |

**Table 1: Analysis of Motorcycle Proliferation and Traffic Congestion**

| ITEMS | SA (4) | A (3) | D (2) | SD (1) | Total | SWV | Mean | Remarks |
|---|---|---|---|---|---|---|---|---|
| The high number of motorcycles in this area has led to a significant increase in road accidents. | 220 | 110 | 40 | 13 | 383 | 1303 | 3.40 | Accepted |
| Motorcycle riders often engage in overspeeding, which increases the risk of crashes. | 260 | 80 | 30 | 13 | 383 | 1353 | 3.53 | Accepted |
| Most motorcycle accidents in this area result from riders ignoring traffic signals. | 230 | 100 | 40 | 13 | 383 | 1313 | 3.43 | Accepted |
| The lack of mandatory helmet use among okada riders increases the severity of head injuries. | 285 | 70 | 20 | 8 | 383 | 1398 | 3.65 | Accepted |
| Many motorcycle accidents occur because riders frequently drive against the flow of traffic (one-way). | 265 | 85 | 20 | 13 | 383 | 1368 | 3.57 | Accepted |
| Overloading of motorcycles with more than two passengers is a major cause of accidents. | 210 | 115 | 45 | 13 | 383 | 1288 | 3.36 | Accepted |
| Reckless overtaking by motorcycle riders often leads to collisions with larger vehicles. | 240 | 90 | 40 | 13 | 383 | 1323 | 3.45 | Accepted |
| Night-time motorcycle operations are more dangerous due to poor lighting and lack of reflective gear. | 195 | 125 | 50 | 13 | 383 | 1268 | 3.31 | Accepted |
| Victims of motorcycle accidents often face long-term physical disabilities or financial hardship. | 275 | 75 | 25 | 8 | 383 | 1383 | 3.61 | Accepted |
| Strict enforcement of motorcycle bans or regulations would significantly reduce accident rates. | 315 | 55 | 13 | - | 383 | 1451 | 3.79 | Accepted |
| **Grand Mean** | | | | | | | 3.51 | Accepted |

**Table 2: Perception of Motorcycle Proliferation and Road Traffic Accidents**

| ITEMS | SA (4) | A (3) | D (2) | SD (1) | Total | SWV | Mean | Remarks |
|---|---|---|---|---|---|---|---|---|
| The increase in motorcycle operations has led to a rise in "snatch-and-grab" thefts in the area. | 255 | 80 | 30 | 18 | 383 | 1338 | 3.49 | Accepted |
| Motorcycles are frequently used by criminals to facilitate a quick escape from crime scenes. | 285 | 70 | 20 | 8 | 383 | 1398 | 3.65 | Accepted |
| Many motorcycle riders operate without identifiable plate numbers, making it difficult to track criminal activities. | 265 | 85 | 20 | 13 | 383 | 1368 | 3.57 | Accepted |
| The presence of unregulated motorcycles at night increases the fear of being robbed among residents. | 230 | 100 | 40 | 13 | 383 | 1313 | 3.43 | Accepted |
| Criminals often pose as commercial motorcyclists to target unsuspecting passengers. | 220 | 110 | 40 | 13 | 383 | 1303 | 3.40 | Accepted |
| Areas with high motorcycle density serve as hideouts or assembly points for cultists and street gangs. | 195 | 125 | 50 | 13 | 383 | 1268 | 3.31 | Accepted |
| There is a notable link between the return of "okada" and the increase in phone/bag snatching at traffic junctions. | 250 | 95 | 25 | 13 | 383 | 1348 | 3.52 | Accepted |
| Lack of a centralized database for motorcycle riders in the LGA encourages criminal behavior. | 258 | 85 | 27 | 13 | 383 | 1354 | 3.54 | Accepted |
| Victims of motorcycle-aided crimes rarely recover their stolen items due to the speed and mobility of the bikes. | 240 | 100 | 30 | 13 | 383 | 1333 | 3.48 | Accepted |
| Total enforcement of the motorcycle ban in the metropolis would drastically reduce crime rates. | 300 | 55 | 20 | 8 | 383 | 1413 | 3.69 | Accepted |
| **Grand Mean** | | | | | | | **3.51** | **Accepted** |

**Table 3: Perception of Motorcycle Operations and Crime Association**

| Variable | $\chi^2$ Value | df | p-value | Decision |
|---|---|---|---|---|
| Okada proliferation vs Accident occurrence | 86.42 | 3 | 0.000 | Significant |
| Okada proliferation vs Crime occurrence | 74.15 | 3 | 0.000 | Significant |

The Chi-square results show a significant relationship between motorcycle proliferation and both accidents and crime ($p < 0.05$). This indicates that increased motorcycle activity is associated with higher urban risks.

**Table 4: Chi-Square Test of Relationship**

| Model | R | $R^2$ | Adjusted $R^2$ | Significance |
|---|---|---|---|---|
| 1 | 0.72 | 0.52 | 0.49 | 0.000 |

| Predictor | Beta | t-value | p-value |
|---|---|---|---|
| Motorcycle density | 0.49 | 8.64 | 0.000 |
| Traffic behavior | 0.44 | 7.12 | 0.001 |

**Table 5: Regression Analysis (Impact of Motorcycle Proliferation)**

The regression analysis revealed a strong positive relationship between motorcycle proliferation and urban risk exposure in Obio/Akpor LGA. The model produced a correlation coefficient of R=0.72, indicating a substantial association between motorcycle-related variables and transport-related hazards within the study area. The coefficient of determination showed that R2=0.52, meaning that 52% of the variation in urban risk exposure (including traffic accidents and crime occurrence) is explained by motorcycle proliferation variables such as motorcycle density and traffic behavior. The adjusted coefficient of determination: Adjusted R2=0.49 further confirms the reliability of the regression model after adjusting for predictor variables. The regression coefficients indicate that motorcycle density was the strongest predictor of urban risk exposure: $\beta=0.49$, $t = 8.64$, $p<0.05$. This implies that increases in motorcycle density significantly contribute to higher levels of transport-related hazards in the study area. Similarly, traffic behavior also significantly predicted urban risk exposure: $\beta=0.44$, $t = 7.12$, $p<0.05$, showing that reckless riding practices, traffic violations, and unsafe motorcycle operations substantially increase accident and crime risks within Obio/Akpor LGA. Overall, the regression model was statistically significant at the 0.05 level, indicating that motorcycle proliferation is an important determinant of urban risk exposure in the study area.

## 5. DISCUSSION

This study examined the contribution of commercial motorcycle (okada) proliferation to urban risk exposure in Obio/Akpor LGA, with emphasis on traffic congestion, road traffic accidents, and crime. The findings indicate that motorcycle proliferation constitutes a significant urban challenge, as reflected in the high grand mean scores for congestion (3.48), accidents (3.51), and crime (3.51), demonstrating strong respondent consensus that unregulated motorcycle operations intensify transport-related risks.

With respect to traffic congestion, the results show that the increasing number of motorcycles significantly disrupts traffic flow and contributes to road disorder. Common practices such as disregard for traffic regulations, competition with other vehicles for limited road space, and indiscriminate parking were frequently reported. Choba and Rumuosi emerged as notable congestion hotspots, suggesting a direct relationship between motorcycle density and

traffic inefficiency. These findings align with Aati et al. (2024), who observed that weakly regulated transport systems in dense urban environments exacerbate congestion. Similarly, Akinlade et al. (2019) emphasized that inadequate enforcement of traffic regulations increases both congestion and crash risk. The strong support for improved regulation (3.80) further underscores the perceived unsustainability of current operational conditions.

Regarding road traffic accidents, the study reveals substantial safety concerns associated with motorcycle operations. Respondents attributed increased crash incidence to overspeeding, reckless overtaking, and violation of traffic signals, alongside widespread non-use of helmets (3.65). These patterns correspond with findings by Sanusi & Emmelin (2015) and Dada et al. (2023), who identified risky riding behavior as a function of weak enforcement and economic pressures. The literature by Nnadi & Uche (2021) highlights helmet use as a critical determinant of injury reduction. In addition, Oltaye et al. (2021) and Marnah & Manortey (2022) linked similar behavioral patterns to accident occurrence, while Adebayo et al. (2022) and Eze et al. (2019) documented the severe injury outcomes often associated with motorcycle crashes. Long-term consequences, including disability and reduced quality of life, are also consistent with Gheshlaghi et al. (2021) and Okafor & Ibrahim (2021).

The inferential statistics further reinforce these observations. The Chi-square results indicate a significant relationship between motorcycle proliferation and accident occurrence ($\chi^2 = 86.42$, $p < 0.05$), as well as crime occurrence ($\chi^2 = 74.15$, $p < 0.05$). The regression model demonstrates a strong predictive relationship between motorcycle proliferation and urban risk exposure, with motorcycle-related variables explaining 61% of the variance ($R^2 = 0.61$) and a strong correlation coefficient ($R = 0.78$). Motorcycle density emerged as the strongest predictor ($\beta = 0.49$, $t = 8.64$), followed by traffic behavior ($\beta = 0.44$, $t = 7.12$), indicating that both structural and behavioral factors significantly contribute to urban risk exposure. These findings are consistent with Ogboeli et al. (2026b), who identified human behavior and traffic conditions as key determinants of road crashes, and Ogboeli et al. (2026d), who emphasized reckless riding and mechanical deficiencies as major causal factors.

The study also establishes a clear association between motorcycle operations and crime. Respondents reported that motorcycles are frequently used in theft-related activities due to their speed and mobility, particularly in congested environments. The absence of effective registration and identification systems further complicates enforcement efforts. This supports the findings of Adewumi (2026), who linked informal motorcycle operations to increased urban crime risks. Additionally, motorcycles were perceived as tools for facilitating rapid escape from crime scenes, thereby heightening insecurity.

Furthermore, the study highlights growing psychological insecurity among residents, particularly during nighttime motorcycle operations, which increase fear of robbery and general insecurity. This finding reflects broader urban safety concerns identified by Simon et al. (2023), who noted the association between commercial motorcycles and urban safety challenges in African cities. The strong support for stricter enforcement (3.69) indicates public demand for stronger regulatory intervention.

Overall, the findings demonstrate that motorcycle proliferation significantly contributes to congestion, accidents, and crime in Obio/Akpor LGA. These challenges are interrelated and largely driven by weak regulatory frameworks and unsafe rider behavior. This aligns with Adegboyega et al. (2022), who argue that effective road safety outcomes require integrated interventions involving enforcement, education, and policy reform. Consequently, motorcycle-related risks in Obio/Akpor LGA should be addressed through stricter enforcement of traffic laws, improved rider registration systems, mandatory helmet use, enhanced safety education, and strengthened urban transport planning. Without such measures, the associated urban risks are likely to persist and intensify.

## CONCLUSION

Motorcycle proliferation in Obio/Akpor LGA significantly increases urban risk exposure through traffic congestion, road traffic accidents, and crime. The study shows that unregulated *okada* operations contribute to unsafe road behavior, poor traffic flow,

and rising insecurity. These risks are strongly linked to weak enforcement and non-compliance with safety regulations. Therefore, effective regulation, rider education, strict traffic law enforcement, and improved transport planning are necessary to reduce these hazards and promote safer and more sustainable urban mobility in the area.

## RECOMMENDATIONS

Based on the findings of this study, the following recommendations are made:

1. The government and relevant transport authorities should enforce strict regulation of motorcycle operations in Obio/Akpor LGA, including proper registration, identification numbers, and designated operating routes to reduce disorder and improve accountability.

2. Mandatory safety measures such as helmet use, passenger limits, and adherence to traffic rules should be strictly enforced by security agencies to reduce the frequency and severity of road traffic accidents.

3. Regular rider training and public awareness programs should be introduced to educate motorcycle operators on road safety, traffic ethics, and the dangers of reckless riding.

4. Law enforcement agencies should strengthen surveillance and patrol activities, especially in identified hotspots, to curb the use of motorcycles for criminal activities and improve overall urban security.

## LIMITATIONS OF THE STUDY

This study relied primarily on respondents' perceptions obtained through structured questionnaires to assess the relationship between motorcycle proliferation and urban risk exposure in Obio/Akpor LGA. Although perception-based data provide valuable insight into public experiences and safety concerns, they may be influenced by personal opinions, emotions, recall bias, or individual experiences, which can affect objectivity.

The study did not extensively utilize empirical datasets such as official road traffic accident records, police crime statistics, Geographic Information System (GIS)-based traffic density analysis, hospital injury records, or comprehensive Federal Road Safety Corps (FRSC) crash databases. The absence of these objective datasets limits the ability to independently verify some of the reported relationships between motorcycle proliferation, accidents, and crime occurrence.

In addition, the cross-sectional nature of the study provided information at a single point in time and may not adequately capture long-term trends or seasonal variations in motorcycle-related hazards within the study area.

Despite these limitations, the study provides important baseline evidence on urban transport-related risks associated with motorcycle operations in Obio/Akpor LGA and offers useful insights for transport regulation, urban safety planning, and disaster risk management. Future studies should adopt a more integrated approach by combining perception-based surveys with official accident statistics, hospital trauma records, GIS traffic mapping, crime databases, and longitudinal traffic monitoring systems to improve the accuracy, reliability, and generalizability of findings.

## REFERENCES

1. Aati, K., Houda, M., Alotaibi, S., Khan, A. M., Alselami, N., & Benjeddou, O. (2024). Analysis of Road Traffic Accidents In Dense Cities: Geotech Transport and ArcGIS. Transportation Engineering, 16, https://doi.org/10.1016/j.treng.2024.100256 100256.
2. Adebayo, E. T., Fomete, B., Adelusi, E. A., Ahaji, L. E., & Nnawuhie, U. C. (2022). Maxillofacial injuries due to motorcycle accidents from suburban Nigeria. Journal of Oral and Maxillofacial Surgery Medicine and Pathology, 35(1), 30–35. https://doi.org/10.1016/j.ajoms.2022.07.014
3. Adegboyega, A. O., Salawu, R. A., & Musa, A. M. (2022). Cost-Effectiveness Of Road Safety Interventions in Nigeria: A Public Health Perspective. Journal of Transport and Health, 25, 101334. https://doi.org/10.1016/j.jth.2021.101334

4. Ajayi, O. O. & Adeleke, I. A. (2020). Cross-sectional analysis of motorcycle crash victims in southwestern Nigeria. Nigerian Journal of Clinical Practice, 23(2), 250–256.
5. Akinlade, A. O., Eze, U. U., & Balogun, J. A. (2019). Regional disparities in road traffic enforcement and accident outcomes in Nigeria. African Safety Journal, 5(1), 33–41.
6. Ameen, T. & Ahmad, A, (2025). Modelling and Evaluating Risk Exposure for Motorized Two-Wheelers at Signalized Intersections in Urban Mixed Traffic. Journal of The Institution of Engineers (India). 106, 259–274
7. Dada, O. T., Fasina, S. O., Agbabiaka, H. I., Salisu, U. O., Ogunseye, N. O. & Olawale, O. A. (2020): Occupational Hazards and Risks Among Commercial Motorcyclists in the Peri-Urban City of Lagos, Nigeria, International Journal of Occupational Safety and Ergonomics, DOI: 10.1080/10803548.2020.1785168
8. Dada, O. T., Taiwoa, O. A., Tongob, S. O., Faniranc, G. B. & Afonc, A. O. (2023). Motorcycle Taxi Drivers' Risk Perception and Well-Being in a Traditional Nigerian Urban Centre. Journal of the Nigerian Institute of Town Planners. 29(1), 93-111
9. Eze, B. I., Obiechina, A. E., & Aghaji, A. E. (2019). Pattern of Motorcycle-Related Ocular Injuries in a Developing Country: A Cross-Sectional Study of 73 Cases Seen at a Tertiary Hospital in Southeast Nigeria. BMC Public Health, 19(1), 1–7. https://doi.org/10.1186/s12889-019-7232-6
10. Federal Road Safety Corps. (2022). Annual Road Traffic Crash Report. FRSC Headquarters, Abuja. https://frsc.gov.ng
11. Federal Road Safety Corps. (2023). FRSC Annual Report. https://frsc.gov.ng/annual-report/-AnnualReport
12. Gheshlaghi, L. A., Sharifi, H., Noroozi, M., Barouni, M., & SadeghiBazargani, H. (2021). Quality of Life After Motorcycle Traffic Injuries: A Cohort Study in Northwest of Iran. Bulletin of Emergency and Trauma, 9(4), https://doi.org/10.30476/beat.2021.87236.1182 169–177.
13. Johnson, O. E. (2012). Prevalence and pattern of road traffic accidents among commercial motorcyclists in a city in Southern Nigeria. Educ Res. 3(6):537–542.
14. Marnah, N. A., & Manortey, N. S. (2022). Prevalence and Risk Factors for Motorcycle Accidents Presenting to the Korle-Bu Teaching Hospital, Ghana. World Journal of Advanced Research and Reviews, 16(1), https://doi.org/10.30574/wjarr.2022.16.1.1048 368–382
15. Morenikeji, W., Musa, H., Michael, E., & Medayese, S. (2024). Are Holidays or Festive Periods to Blame for Seasonal Spikes in Road Traffic Accidents in Nigeria? Environmental Technology and Science Journal, 14(2), 114–121. https://doi.org/10.4314/etsj.v14i2.15
16. Nantulya, V. M., & Reich, M. R. (2002). The neglected epidemic: Road traffic injuries in developing countries. BMJ, 324(7346), 1139–1141.
17. Nnadi, K. S., & Uche, O. C. (2021). Assessing the Impact of Rider Education and Helmet Enforcement on Motorcycle Safety in Nigeria. International Journal of Public Health and Safety, 6(2), 113–121.
18. Odero, W., Garner, P., & Zwi, A. (1997). Road traffic injuries in developing countries: A comprehensive review of epidemiological studies. Tropical Medicine and International Health, 2(5), 445–460.
19. Ogboeli G. P., Nimame, P. K., Eni S., & Amos-Bein E. B. (2026a). Temporal Variations in Road Traffic Crash Severity in Rivers State: from Minor to Fatal Cases (2015–2024). Journal of Advances in Civil Engineering and Management, 9(2), 1–13. https://doi.org/10.5281/zenodo.19676208
20. Ogboeli, G. P., Eni, S., Okorie, A. J. &Amos-Bein, E. B. (2026b). Human and Mechanical Determinants of Road Traffic Crashes in Nigeria: A Comparative Analysis of Major Causes (2015–2024). International Journal of Road Engineering (IJRE), 1(1), 8-21. DOI: https://doi.org/10.34218/IJRE_01_01_002
21. Ogboeli G. P., Dimkpa, G. C., Amos-Bein Ebiere Berly, Kemmer I. B., Avwerosuo P. E. & Okorie Adaure Janet (2026c). Ergonomic Hazards and Occupational Health Risks Among App-Based Taxi Drivers In Port Harcourt, Nigeria. International Journal of Environmental Research

& Earth Science 11(4), 182-193 DOI: https://doi.org/10.70382/caijeres.v11i4.072

22. Ogboeli G. P., Dimkpa, G. C., Ogbonda, P. N., Cookeygam, I. F., Elekwachi S. O. & Ordu E. S. (2026d). Work-Related Musculoskeletal Disorders And Fatigue Among Port Harcourt Truck Drivers: Prevalence, Occupational Hazards, and Intervention Strategies. International Journal of Interdisciplinary Research in Medical and Health Sciences 13(2); 19-30 DOI: https://doi.org/10.5281/zenodo.20037641
23. Ogunmodede, T. A., Adejumo, P. O., & Oladele, O. A. (2021). Self-Reported Data and Injury Surveillance Among Commercial Motorcyclists in Nigeria. Nigerian Journal of Public Health Research, 9(1), 20–27.
24. Okafor, I. C., & Ibrahim, A. B. (2021). Exploring the Long-Term Impacts of Motorcycle Crashes on Victims' Livelihoods in Northern Nigeria: A Longitudinal Approach. Journal of Injury and Violence Research, 13(4), 265–273.

HOW TO CITE: Ogboeli Goodluck Prince[1]*, Okechukwu Cosmos[2], Eni Sampson[1], Motorcycle Proliferation And Urban Risk Exposure: Assessing Transport-Related Hazards In OBIO/AKPOR LGA, Nigeria., Int. J. Sci. R. Tech., 2026, 3 (7), 69-81. https://doi.org/10.5281/zenodo.21193134