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# Assessment of Passenger Safety Perception in Informal Public Transportation in Lokoja-Okene Road Transport Network, Kogi State, Nigeria

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## ABSTRACT

Informal public transport, as a mode of transportation, offers flexibility to users by allowing them to access services conveniently. However, its mode of operation poses significant challenges, particularly regarding safety, thereby undermining the core objective of ensuring safe travel. This study employs a survey research design to investigate passengers' safety perceptions in informal public transport along the Lokoja-Okene transport corridor. A total of 300 questionnaires were purposefully distributed among commuters using the Lokoja-Okene transport network, with 255 valid responses analyzed using frequencies and percentages. The relationship between passenger safety and factors influencing it was analysed using multiple regression analysis. The findings identified eight key factors affecting passenger safety, including vehicle condition (37.5%), driver driving behavior (41.9%), poor road conditions (57.7%), overloading (42.6%), and driver operational behaviour (46%). Furthermore, a statistically significant relationship was established between passenger safety and factors such as driver behavior, operational practices, and vehicle condition, which were found to influence passengers' safety perceptions positively. In conclusion, informal public transport operations along the Lokoja-Okene road network are deemed highly unsafe. The study recommends, among other measures, that Kogi State Vehicle Inspection Officers (VIOs) implement mandatory periodic inspections for vehicles operating in informal public transport along this route.

**Keywords:** *informal public transport, Lokoja-Okene, passenger safety, poor road condition, vehicle condition*

## INTRODUCTION

The primary objective of any transportation system is the safe arrival of its users. Within the public transport system, the concept of safe arrival has been widely debated by scholars. Although the terms "safety" and "security" are often used interchangeably, they possess distinct meanings.<sup>1-3</sup> In the context of informal transportation, safety refers to the users' protection from operational hazards, while security pertains to protection from risks caused by deliberate human actions intended to compromise safety.<sup>2,4,5</sup> Such actions include violent crimes inflicted on

individuals within the transport network.<sup>6</sup> Consequently, there is a growing necessity to implement policies, practices, and procedures that prevent accidents, injuries, and hazards, thereby ensuring the protection and well-being of individuals across various settings.<sup>7,8</sup>

Informal transportation, also known as paratransit, is generally categorized into three types: demand-responsive transit (DRT) systems, shared taxis, and shuttle buses. According to Kerzhner (2023), informal transport serves as the predominant mode of motorized transportation in many African cities and holds significant relevance globally.<sup>9</sup> These informal transport

services go by different names across African countries: in Abidjan, they are called *Gbakas*; in Accra, *Trotros*; and in Dakar, *Cars rapides*. In Nigeria, the most prominent forms of paratransit include tricycles, motorcycles, and city shuttle buses. However, growing safety concerns have emerged, especially with the transition from conventional taxi services to these informal alternatives.<sup>10,11</sup>

Several factors contribute to the lack of safety in informal public transport systems globally, including in Nigeria and particularly within Kogi State. Dumba (2017) identifies driver behavior as a major cause of concern.<sup>12</sup> Xu et al. (2014) explain that such behaviors include difficulties in maintaining lane discipline, abrupt lane changes, and driving along road shoulders.<sup>11,13</sup> Other factors affecting safety include the condition of vehicles, their mechanical quality, and the level of passenger awareness regarding safety protocols.

Additional contributors to unsafe conditions in informal public transport include vehicle overloading, deteriorated road infrastructure, and shared road usage with larger vehicles.<sup>14–17</sup> Joewono and Kubota (2006) identified passenger awareness, vehicle condition, and driver competence as significant safety-related factors in their study on paratransit in Bandung, Indonesia.<sup>18</sup> Oliveira et al. (2022) found that infrastructure quality, regulatory mechanisms, and the type of bus systems in use significantly impact commuters' perceptions of safety in Brazil.<sup>3</sup> However, while such studies provide valuable insight, they often lack specific focus on the safety challenges unique to informal transport systems. In Addis Ababa, research has shown that issues such as overcrowded buses, personal insecurity, and irregular service schedules are major safety concerns.<sup>19</sup>

The perception of safety in informal transport varies across countries and is largely dependent on commuters' experiences and local contexts. While Ceccato et al. (2022) reported global improvements in transit safety since the

mid-1990s, such findings may not reflect localized realities.<sup>20</sup> For example, Sam and Abane (2017) found that public transport users in Ghana often feel unsafe due to frequent accidents and reckless driving.<sup>2</sup> Conversely, Ajiboye et al. (2020) reported that commuters in Minna, Nigeria, generally perceive paratransit services as safe.<sup>21</sup>

Perceived safety significantly enhances users' perceptions of service quality and their intention to remain loyal to a particular transport mode. Su et al. (2019) in a study conducted in Vietnam, demonstrated that while safety may not directly influence loyalty, it has a considerable effect on how passengers perceive service quality.<sup>6</sup> Similarly, Friman et al. (2020) in their study of Northern European cities, found that perceived safety acts as a mediating factor between transport service quality and accessibility.<sup>22</sup>

There remains a need for more comprehensive studies on the safety of informal public transport systems in Nigeria, especially in Kogi State, where formal public transportation systems have significantly declined. This decline has led to increased reliance on informal modes such as tricycles, mini-buses, motorcycles, and shared taxis as the primary means of public transportation.<sup>23–25</sup> In Kogi State, the rising urban population, deteriorating infrastructure, growing unemployment,<sup>26</sup> and increasing poverty levels have heightened safety concerns across the transportation network. These conditions have also contributed to rising crime rates within the transport system, further undermining the safety of road travel.<sup>21</sup>

Despite various governmental efforts to improve road safety through the establishment of regulatory and enforcement agencies such as the Motor Traffic Division, the Federal Road Safety Corps (FRSC), Vehicle Inspection Officers (VIO), and highway police units, public perception of safety in informal transport remains low. Passengers continue to express concerns about crime, accidents, and the general uncertainty associated with using informal modes of transport. Therefore, the present study aims to explore the

factors influencing passenger safety in informal public transport within Kogi State, using the Lokoja–Okene transport corridor as a case study.

## METHOD

The study employed a survey research design to carry out the investigation. A needs assessment was conducted to select informal public transport options along the Lokoja–Okene transport corridor for examination. This corridor was chosen due to ongoing construction and the mixed traffic conditions, with various forms of transportation such as bikes, tricycles, shared taxis, large trucks, and articulated vehicles sharing the road, which may increase risk to informal public transport users.

Three hundred questionnaires were purposefully distributed to public transport users within the Lokoja–Okene network. The questionnaires were designed in Google Forms, and the link was shared with staff at Confluence University of Science and Technology and Kogi State Polytechnic, as they frequently use this transport route. Additionally, hard copies were distributed to travelers at Okene Motor Park who were traveling to Lokoja or Abuja via this route.

The questionnaire consisted of two sections: the first covered sociodemographic characteristics, while the second focused on factors impacting passenger safety in informal public transport. A five-point Likert scale was used to capture responses, ranging from 1 (strongly disagree) to 5 (strongly agree). To ensure validity and reliability, a T-test was conducted on 20% of the questionnaires in a pilot survey in the study area. The collected data were analyzed descriptively, and multiple regression analysis was used to test the study's hypotheses.

## Kogi state and Lokoja–Okene transport corridor

Kogi State is one of the states in North Central Nigeria, located on Latitude 7° 30' N and Longitude 6° 42' E. The state comprises twenty-one local government areas, with the majority of the population belonging to the Ebira, Igala, Okun, Gbagyi, Nupe, Igbo, and Hausa ethnic groups. The capital of Kogi State is Lokoja. According to, Igwenagu (2025) the population of Kogi State is 5,179,581 and is expected to grow at a rate of 7.7%.<sup>27</sup> The state was created on 27 August 1991 and covers a total area of 29,833 km<sup>2</sup>.

Kogi State is bordered to the north by the Federal Capital Territory, Abuja (FCTA); to the northeast by Nasarawa State; and to the northwest by Niger State. Similarly, it is bordered to the southwest by Ondo and Edo States, and to the southeast by Anambra and Enugu States (see Figure 1). Kogi State is the only state in Nigeria bordered by ten other states, while the Lokoja–Okene road plays a significant role in connecting southern Nigeria to the North via the FCT, Abuja.

Kogi State's economy is supported by agriculture (e.g., coffee, cashew, groundnut, livestock production, and palm oil), oil extraction, and limestone mining. The state's economic strength, coupled with its strategic geographical location, attracts many travellers to the state and promotes the use of the Lokoja–Okene corridor as a key link to northern Nigeria. The Lokoja–Okene road transport corridor is a Trunk A road with a total length of 79 km.<sup>28</sup> The increasing traffic volume along the Lokoja–Okene corridor, combined with the poor road condition, significantly impacts commuter safety.

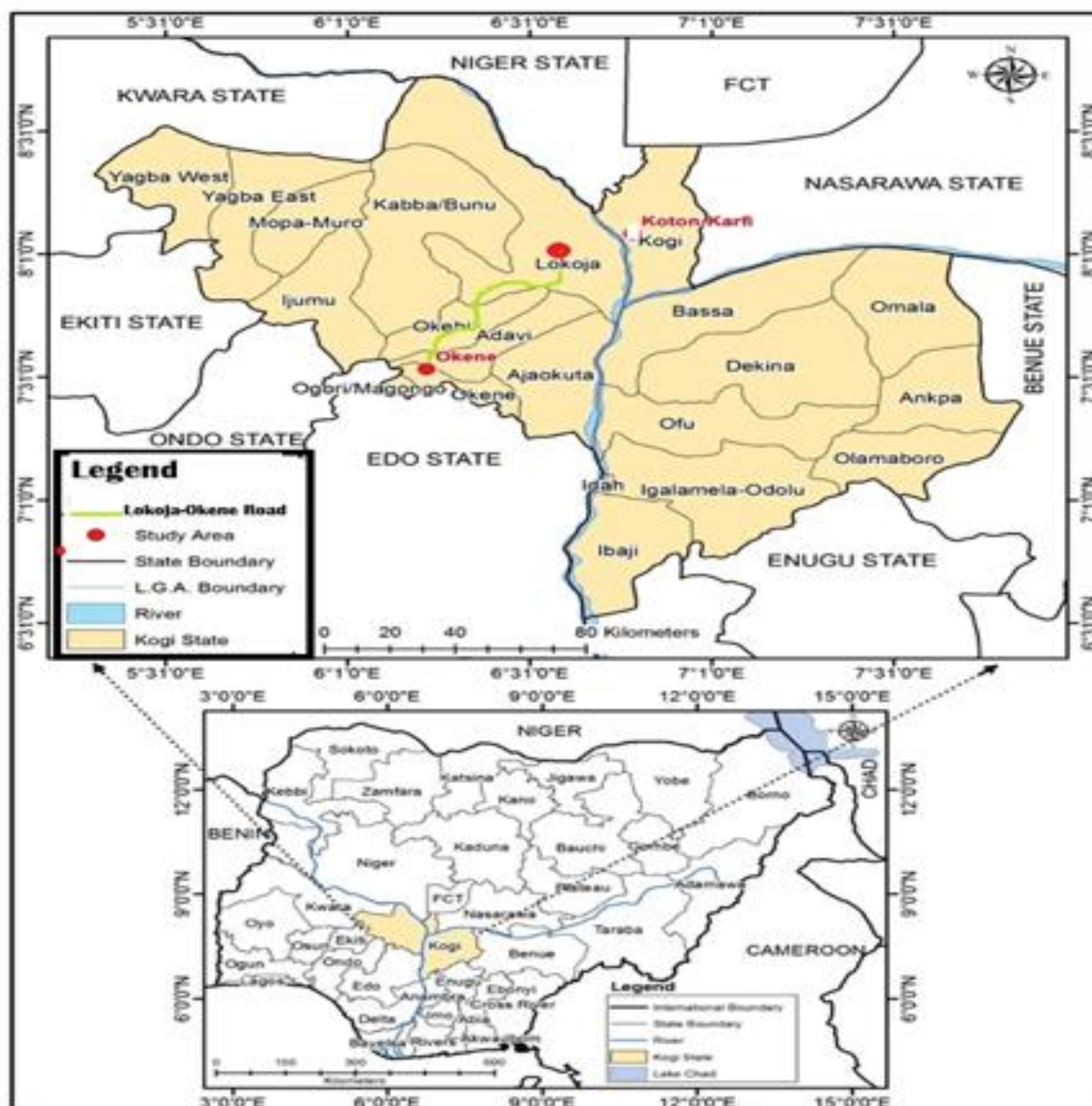


Figure 1: Map of Nigeria showing Kogi state and Lokoja-Okene Road

Sources: Adapted from Yusuf et.al (2021)<sup>29</sup>

## RESULTS

### *Sociodemographic features*

The analysis of respondents' gender in Table 1 shows that majority of the respondents are male, accounting for 67.5% of the study population. This suggests that men are more likely to use informal public transport in Okene. Another possible reason for this male dominance in the

results could be that men may have been more willing to participate in the survey.

The analysis of the age of the respondents in Table 1 indicate that larger proportion (66.3%) of the respondents are in their early age of 20 and 30 years. This finding suggests that the majority of informal public transport users in the Lokoja-Okene network are in their youthful age.

Regarding marital status, Table 1 reveals that there are more married peoples (41.6%) using informal public transport in Okene compare to those without spouse. This indicates that most informal transport users are married, which may impact their safety perceptions differently than single individuals, as married individuals are often more conscious of their safety due to family responsibilities.

In term of the respondent's occupation, it can be observed that majority of the users of informal transport around Lokoja-Okene transport

corridor are civil servants, accounting for 30.5% of the study population. These results suggest that civil servants make up a significant portion of informal transport users. This is likely due to the transport network passing near major educational institutions in Kogi State, making the routes popular among staff and students. Finally, Table 1 shows the majority of the respondents (41.8%) frequently use the Lokoja-Okene transport route for their trips. This indicates a high reliance on informal transport among respondents for their regular travel.

**Table 1: Sociodemographic Features**

Sociodemographic variables	Criterion	Frequency	Percentage
Gender	Male	172	67.5
	Female	83	32.5
	Total	255	100.0
Age	<20 years	14	5.5
	20-30 years	169	66.3
	31-40 years	64	25.1
	41-50 years	6	2.3
	>51	2	.8
	Total	255	100.0
Marital status	Married	106	41.6
	Single	71	27.8
	Divorced	13	5.1
	Separated	65	25.5
	Total	255	100.0
Occupation	Civil servant	81	31.8
	Farmers	10	3.9
	Artisan	5	2.0
	Student	54	21.2
	Not employed	27	10.6
	Self employed	78	30.5
	Total	255	100.0
Frequency of use of informal public transport	Rarely	19	7.6
	Occasionally	38	14.9
	Frequently	91	35.7
	Very frequent	107	41.8
	Total	255	100.0

Sources: Authors' survey (2025)

### ***Analysis of the respondent perception of their safety of informal public transport***

The analysis of the respondent safety perception of the use of informal transport along the Lokoja-Okene transport network in Table 2. From the analysis, it was observed that informal

public transport usage within Lokoja-Okene transport corridor is very unsafe. This outcome is an indication that there may be high risk of accidents, injuries, or fatalities within the transport corridor. If passengers feel unsafe, there might

be significant public health and safety concerns, especially in the absence of regulatory oversight.

**Table 2: Safety Perception of Informal Transport**

Criterion	Frequency	Percentages
Very unsafe	112	41.2
Safe	59	21.7
Very safe	30	11.0
Unsafe	52	19.1
Neutral	19	7.0
Total	255	100.0

Sources: Authors' survey (2025)

### ***Analysis of the factors affecting passenger safety during the use of informal transport***

The analysis of the factors influencing passenger safety in an informal transport is shown in Table 3. From the analysis, the findings indicate that the condition of vehicles plays a significant role in influencing passenger safety in informal public transport systems. With a majority (70.9%) of respondents either strongly agreeing or agreeing, it highlights the critical need for stringent vehicle maintenance standards and regular inspections to ensure passenger safety (see Figure 2). Also, the analysis of driver driving behaviour in Table 3 reveal that driver behaviour is a significant factor influencing passenger safety in informal transport systems, as evidenced by the majority (79.8%) of respondents who strongly agree or agree with this assertion. This highlights the critical need for driver training and strict enforcement of driving standards to enhance passenger safety.

In addition to the study outcome in Table 3 show that poor road conditions significantly influence passenger safety in informal transport systems, with 87.5% of respondents either strongly agreeing or agreeing with this assertion

(see Figure 2). This emphasizes the urgent need for infrastructure improvements and regular maintenance of roads to enhance safety. The study findings in Table 3 point that overloading significantly affects passenger safety in informal transport systems, with 76.8% of respondents either strongly agreeing or agreeing. This underscores the need for stricter enforcement of vehicle capacity regulations to ensure safety.

The study outcome in Table 3 further reveals that drivers' operational behaviour significantly impacts passenger safety in informal transport systems, with 64.4% of respondents agreeing or strongly agreeing. This highlights the need for initiatives such as driver training programs, adherence to operational guidelines, and stricter monitoring to enhance safety.

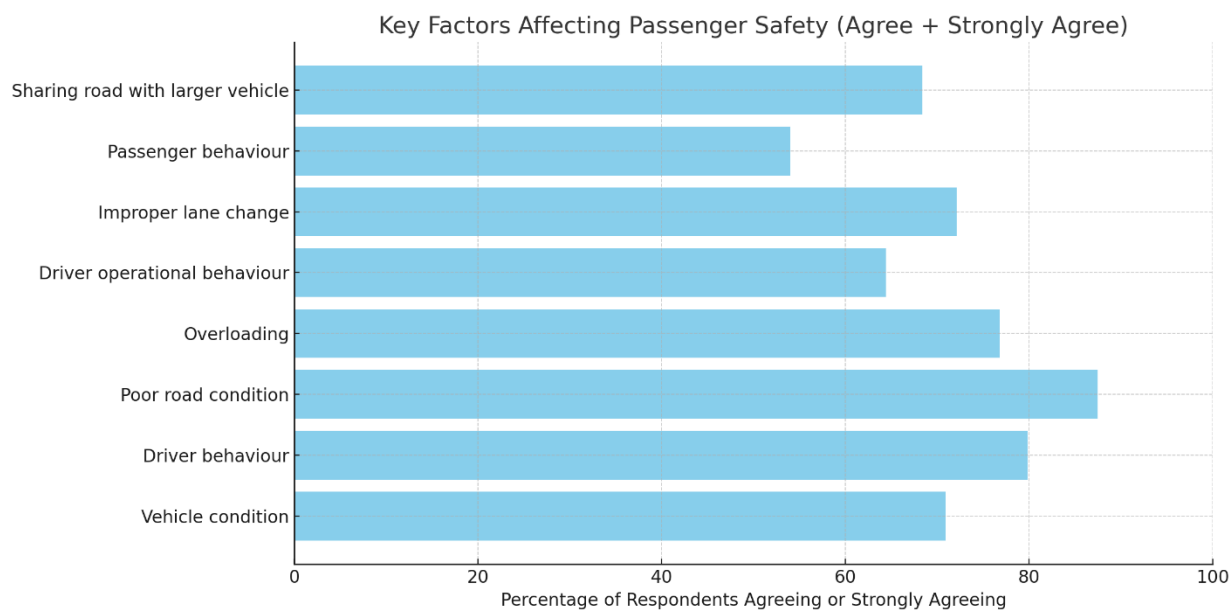
The analysis in Table 3 shows that 40.1% of respondents strongly agree and 32% agree that improper lane changes by drivers affect passenger safety in informal transport systems. The significant agreement (72.1%) on improper lane changes underscores the need for driver education and stricter enforcement of lane discipline to improve safety. Moreover, 36.4% of respondents agree and 17.6% strongly agree that passenger behavior influences safety.

The impact of passenger behavior, with 54% of respondents agreeing or strongly agreeing in Table 3, suggests the importance of promoting awareness and responsible conduct among passengers. Regarding sharing roads with larger vehicles, 34.2% of respondents strongly agree and 34.2% agree that it impacts passenger safety. The responses regarding road sharing with larger vehicles, with 68.4% in agreement, emphasize the necessity for better road infrastructure, dedicated lanes, and policies to mitigate the risks posed by mixed traffic.

**Table 3: Factors Affecting Passenger Safety in Informal Transport**

	Criterion (%)				
	SA	A	N	D	SD
1. Vehicle condition	37.5	33.4	18.0	5.5	5.6
2. Driver driving behaviour	41.9	37.9	10.7	7.4	2.1
3. Poor road condition	57.7	29.8	2.9	5.6	4.0
4. Overloading	42.6	34.2	9.9	3.7	9.6
5. Driver operational behaviour	18.4	46.0	24.2	9.6	1.8
6. Improper lane change by drivers	40.1	32.0	10.7	9.7	7.5
7. Passenger behaviour	17.6	36.4	27.9	10.3	7.8
8. Sharing roads with larger vehicle	34.2	34.2	16.2	7.7	7.7

Sources: Authors' survey (2025)



**Figure 2: Key factors affecting passenger safety**

Sources: Authors survey (2025)

### ***Analysis of the relationship between passenger safety and factors influencing safety in informal public transport system***

The regression model summary in Table 4 provides insights into the relationship between various independent variables (e.g., vehicle condition, driver driving behavior, road conditions, overloading, and others) and the dependent variable (passenger safety). From the Table 4, the correlation coefficient  $R=0.903$  indicates a very

strong positive relationship between the predictors and the dependent variable. While the coefficient of determination in Table 4  $R^2=0.815$  shows that 81.5% of the variation in respondents' safety perceptions is explained by the independent variables. This demonstrates the model's high explanatory power.

The adjusted  $R^2$  (0.808) accounts for the number of predictors and confirms that the model remains robust even when adjusted for



potential overfitting. Also, the standard error of 0.30588 indicates the average distance that the observed values fall from the predicted values. This relatively low value suggests good predictive accuracy of the model. However, the Durbin-Watson value in Table 4 is 0.720 which is

lower than the ideal range of 1.5–2.5, indicating potential positive autocorrelation in the residuals. This suggests that further diagnostics are needed to confirm whether this might impact the reliability of the regression results.

**Table 4: Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.903 <sup>a</sup>	.815	.808	.30588	.720

a. Predictors: (Constant), Vehicle condition, Driver driving behaviour, poor road condition, Overloading, Drivers operational behaviour, Improper lane change by drivers, Passenger behaviour, Sharing roads with larger vehicle

b. Dependent Variable: Respondent safety perception

Sources: Authors' survey (2025).

The ANOVA table shown in Table 5 provides insights into the overall significance of the regression model by comparing the variance explained by the predictors to the unexplained variance. From the Table 5, The regression sum of squares (SSRegression=100.841 represents the variation in the dependent variable (*passenger safety perception*) explained by the predictors. While the residual sum of square (SSResidual=22.830) indicates the variation not explained by the model. The total sum of squares (SSTotal=123.671) is the combined variance and shows the total variation in the dependent variable. The Table 5 recorded that F-statistic (F=107.77) represents the ratio of variance explained by the model to the unexplained variance. The p-value (Sig.=0.000) indicates that the

overall regression model is highly significant, meaning the predictors collectively explain a significant portion of the variance in passengers' safety perception. The findings on the Table 5 implies that there is statistical significance of the regression model, suggesting that the predictors such as vehicle condition, driver behavior, and road conditions have a meaningful impact on passenger safety. The high F-statistic reflects a robust relationship between the independent variables and the dependent variable. This underscores the importance of addressing these factors to enhance safety in informal transport systems. The low residual variance further supports the model's efficiency in explaining the variation in safety perceptions.

**Table 5: ANOVA<sup>a</sup>**

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	100.841	10	10.084	107.778	.000 <sup>b</sup>
Residual	22.830	244	.094		
Total	123.671	254			

a. Dependent Variable: respondent safety perception

b. Predictors: (Constant), Vehicle condition, Driver driving behaviour, poor Road condition, Overloading, Drivers operational behaviour, Improper lane change by drivers, Passenger behaviour, Sharing roads with larger vehicle

Sources: Authors' survey (2025)

The analysis of the coefficient of regression is show in Table 6, from the analysis, the constant (B= 0.455) represents the baseline value of passengers' safety when all predictor variables

are zero. The constant is statistically significant (t=2.609, p=0.010), indicating a meaningful baseline perception.

The analysis of the relationship between passenger safety and vehicle condition, driver driving behaviour, driver operational behaviour and sharing roads with larger vehicles shows that their statistically significant at P-value (0.011, 0.000, 0.003 & 0.000) since the p-value is less than the confidence level of 0.05. therefore, the result implies that an increase in 1 unit of vehicle condition, driver driving behaviour, and driver operational behaviour will result to 0.027, 0.648, & 0.208 increase in passenger safety in informal public transport system while 1 unit increase in

the sharing roads with larger vehicles will result to -0.213 decrease in passengers' safety in informal public transport system.

Similarly, the Table 6 shows that poor road condition ( $p = 0.183$ ), overloading ( $p=0.070$ ), improper lane change by drivers ( $p=0.676$ ) and Passenger behaviour ( $p=0.586$ ) are not statistically significant at a confidence level of 0.05. This outcome indicate that the variables are minimal but have no significant effect on passenger safety in informal public transport system in Lokoja-Okene transport corridor.

**Table 6: Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Correlations		
	B	Std. Error	Beta			Zero-order	Partial	Part
(Constant)	.455	.174		2.609	.010			
Vehicle condition	.027	.011	.078	2.574	.011	.278	.163	.071
Driver driving behaviour	.648	.072	.594	9.036	.000	.854	.501	.249
Poor road condition	.141	.106	.137	1.335	.183	.294	.085	.037
Overloading	-.144	.079	-.130	-1.822	.070	.287	-.116	-.050
Driver operational behaviour	.208	.070	.203	2.963	.003	.782	.186	.081
Improper lane change by drivers	.031	.073	.030	.419	.676	.287	.027	.012
Passenger behaviour	-.046	.085	-.041	-.546	.586	.589	-.035	-.015
Sharing roads with larger vehicle	-.213	.038	-.246	-5.616	.000	-.164	-.338	-.154

a. Dependent Variable: Respondent safety perception

## DISCUSSION OF FINDINGS

This study investigated factors influencing passenger safety in informal public transport along the Lokoja-Okene corridor. Among the eight factors examined, regression analysis revealed that four had statistically significant effects on safety perception: vehicle condition, driver driving behaviour, driver operational behaviour, and sharing roads with larger vehicles.

The most influential factor was driver driving behaviour ( $p < 0.000$ ), indicating that how drivers steer, brake, accelerate, and respond to traffic significantly impacts passengers' feelings of safety. This underscores the urgent need for driver education and certification programs that promote responsible driving practices. In addition, licensing and certification processes should

be thorough, transparent, and free from corruption to ensure only qualified drivers are allowed to operate. This is consistent with the findings of Taiwo and Mahmud (2024) who observed that risky driving behaviours such as over speeding, fatigue, and aggressive maneuvers contribute to traffic accidents.<sup>30</sup>

Vehicle condition also significantly affected safety perception ( $p = 0.011$ ). Poor vehicle maintenance such as faulty brakes or worn tires can increase accident risks. These findings support the need for mandatory vehicle inspections, especially for vehicles used in informal transport. Driver operational behaviour, such as stopping in unsafe locations or speeding, was also found to significantly influence safety ( $p =$

0.003). Interventions such as stricter enforcement of transport regulations and operational guidelines can help reduce these risks.

Interestingly, sharing roads with larger vehicles negatively impacted safety perception ( $p < 0.000$ ), suggesting that the presence of heavy trucks and buses increases anxiety and potential risk for informal transport users. This highlights the need for better road design, including dedicated lanes or speed controls. While descriptive statistics showed that factors such as poor road conditions, overloading, and passenger behaviour were perceived as important by respondents, these did not demonstrate statistical significance in the regression analysis. This may indicate their effects are indirect or context-dependent.

## CONCLUSION AND POLICY RECOMMENDATION

This study examined passenger safety perception in informal public transportation along the Lokoja-Okene road transport network in Kogi State, Nigeria. The research aimed to identify the factors influencing passenger safety in informal public transport within this corridor and to determine the relationship between these factors and passenger safety perceptions. The analysis identified eight contributing factors, but only vehicle condition, driver driving behaviour, driver operational behaviour, and sharing roads with larger vehicles were statistically significant. The study further established a statistically significant relationship between passenger safety and factors such as driver behavior, operational behavior, and vehicle condition, which notably enhanced passenger safety perceptions. Addressing these factors could lead to improved safety outcomes in informal transport systems.

The study ultimately concluded that informal public transport operations along the Lokoja-Okene road network are highly unsafe. These findings align with Oliveira et al. (2022), who concluded that passengers exposed to unsafe practices on roads are more likely to perceive public transport as unsafe.<sup>3</sup> However, the results contrast with Ajiboye et al. (2020), who

argued that para-transit systems in Minna are generally safe.<sup>21</sup> The discrepancy may be attributed to differences in the study contexts, as this study focused on safety concerns along highways, whereas Ajiboye et al. (2020) primarily examined urban roads.<sup>21</sup>

To improve passenger safety, the following measures are recommended:

- I. Kogi state Vehicle Inspection Officers (VIO) should establish mandatory periodic inspections for vehicles used in informal public transportation along the Lokoja-Okene road network. The agency should ensure that vehicles meet roadworthiness standards to minimize risks associated with poor vehicle conditions.
- II. The government agencies should implement driver training and certification initiatives to promote safe driving behaviors. Programs should focus on defensive driving techniques, adherence to traffic laws, and handling passenger safety.
- III. State government should collaborate with the federal government to create safer roadways, including separate lanes for smaller vehicles.
- IV. The government at various level should establish a formal regulatory framework for informal transport operators, including registration, licensing, and adherence to operational safety standards. Collaborate with transport unions and stakeholders to monitor compliance and improve service delivery.
- V. Federal Road Safety Corp (FRSC) should enforce penalties for reckless driving and overloading along the corridor while increasing public awareness of transport safety risks.

## Study Limitation

This study has a few limitations. Firstly, the sample was predominantly male (67.5%), which may introduce gender bias in safety perceptions. Secondly, the regression model's Durbin-Watson value (0.720) suggests possible autocorrelation, meaning some variables may be related over time or location, potentially affecting model reliability. Lastly, the use of self-reported data may be subject to response bias. Future research should consider using longitudinal data, balanced gender representation, and more advanced statistical techniques to validate these findings.

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