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ASSESSING THE EFFECTIVENESS OF FRSC INTERVENTIONS IN REDUCING ROAD TRAFFIC CRASHES IN NORTH EASTERN NIGERIA

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ABSTRACT: *Road traffic crashes (RTCs) remain a major public health and developmental challenge in Nigeria, with the North Eastern region particularly vulnerable due to poor road infrastructure, insecurity, and unsafe driving practices. This study investigated the effectiveness of Federal Road Safety Corps (FRSC) interventions in reducing RTCs across Adamawa, Bauchi, Gombe, and Taraba states. Using a multi-stage sampling approach, 617 questionnaires were administered to FRSC staff and fleet drivers, of which 570 were valid for analysis. Descriptive statistics and regression analysis revealed a significant inverse relationship between FRSC activities and RTCs ($R^2 = 0.62$, $p < 0.05$), confirming that increased interventions are associated with fewer crashes. Regular vehicle inspection (Mean = 4.21; ranked 1st) emerged as the most effective measure, followed by adequate public education equipment (Mean = 4.19; ranked 2nd), the graduated licensing system (Mean = 4.01; ranked 3rd), and driving school training programs (Mean = 4.01; ranked 4th). Public education campaigns through radio and television jingles (Mean = 3.66; ranked 5th) and traffic signal optimization (Mean = 3.56; ranked 6th) were moderately effective, while pedestrian crosswalk markings (Mean = 3.03; ranked 7th), seatbelt awareness programs (Mean = 2.94; ranked 8th), and motor park rallies (Mean = 1.67; ranked 9th) were least effective. The findings highlight that while FRSC interventions are impactful, their full potential is constrained by resource shortages, uneven implementation, and contextual challenges such as insecurity and the informal nature of motor parks. The study concludes that strengthening enforcement capacity, expanding driver training, diversifying communication channels, and modernizing emergency response systems are essential to sustaining reductions in RTCs and achieving Nigeria's alignment with global road safety targets of halving traffic deaths and injuries by 2030.*

KEYWORDS: FRSC interventions; Road traffic crashes; Driver training; Vehicle inspection; Graduated licensing; Public education; Northeast East Nigeria; Road safety.

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INTRODUCTION

Road transport remains a vital driver of globalization, economic growth, and social integration. It facilitates trade, enhances connectivity, and supports employment opportunities worldwide. However, the benefits of road mobility are undermined by the persistent challenge of road traffic crashes (RTCs), which continue to pose a major public health and development concern. Globally, the World Health Organization (2023) reported that approximately 1.19 million people die annually from RTCs, while between 20 and 50 million sustain injuries, many resulting in long-term disabilities. Vulnerable groups such as pedestrians, cyclists, and motorcyclists bear a disproportionate share of this burden.

In Nigeria, the situation is particularly alarming. According to the National Bureau of Statistics (2024), the country recorded 2,662 crashes in Q1 2024, with 1,471 fatalities and 8,659 injuries. Men accounted for nearly 80% of deaths and injuries, reflecting gendered exposure to road risks. More broadly, the Federal Road Safety Corps (FRSC) reported that 5,421 people were killed in 2024 from 9,570 crashes, representing a 7% increase in fatalities compared to 2023, despite a 10% decline in total crashes. These figures highlight the paradox of declining crash frequency but rising severity, underscoring systemic weaknesses in road safety management.

Several factors contribute to Nigeria's high RTC rates. Poor road infrastructure, inadequate maintenance, and weak enforcement of traffic laws exacerbate unsafe driving behaviors. The dominance of imported second-hand vehicles ("tokunbo"), many of which are substandard, further compounds the problem (Eneh et al., 2023). Additionally, rapid urbanization without corresponding transport planning has led to congestion and unsafe road conditions (Boateng, 2021). Recent studies also emphasize that petrol tanker fires alone contributed 411 fatalities in 2024, reflecting the complexity of Nigeria's road safety crisis.

The Federal Road Safety Corps (FRSC), established in 1988, plays a central role in addressing these challenges. Its mandate includes traffic law enforcement, public education, driver training, and emergency response. Evidence suggests that FRSC interventions—such as driver training programs, vehicle inspections, and graduated licensing systems—are associated with reductions in RTCs (Biu, 2023). However, resource constraints, insecurity in certain regions, and limited public awareness campaigns weaken the Corps' effectiveness.

In North Eastern Nigeria, where insecurity, infrastructural deficits, and socioeconomic pressures converge, the road safety challenge is particularly acute. Assessing the effectiveness of FRSC interventions in this region are therefore critical, both for reducing RTCs and for aligning Nigeria with the global target of halving road traffic deaths and injuries by 2030. This study seeks to evaluate the impact of FRSC activities on crash reduction in Adamawa, Bauchi, Gombe, and Taraba states, providing evidence to guide policy and practice.

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MATERIALS AND METHODS

Study Area

The study was conducted in four states of northeastern Nigeria: **Adamawa, Bauchi, Gombe, and Taraba**. This region is characterized by diverse socio-economic conditions, infrastructural challenges, and security concerns that directly affect road safety. The area is part of Nigeria's North-East geopolitical zone, which has a population exceeding 26 million people (National Population Commission, 2023). Road networks in the region are largely inter-state highways and rural feeder roads, many of which suffer from poor maintenance, inadequate signage, and limited safety infrastructure. These conditions, coupled with high reliance on commercial transport and imported second-hand vehicles, make the region particularly vulnerable to road traffic crashes. Borno and Yobe states were excluded from the study was due to the severe Boko Haram insurgency restricting data collection

Research Design

A survey and descriptive research design was adopted to evaluate the effects of Federal Road Safety Corps (FRSC) activities on road traffic crash reduction. This design was chosen because it allows for systematic collection of data from a large population and provides both descriptive and inferential insights into the relationship between FRSC interventions and RTCs.

Population and Sampling

The study population comprised FRSC staff and fleet drivers operating within the selected states. A multi-stage sampling procedure was employed:

- Stratified sampling was used to divide the Northeast into four states.
- Purposive sampling identified relevant groups (FRSC officials and registered fleet drivers).
- Simple random sampling was applied to select respondents within each group.

A total of 617 respondents were surveyed, representing approximately 10% of the target population of 6,170 fleet drivers and FRSC staff across the four states. The sample comprised 207 FRSC staff and 410 fleet drivers. Out of these, 570 questionnaires were successfully completed and analyzed, yielding a response rate of 92.4%. This unusually high response rate was achieved because the questionnaires were administered on-the-spot at FRSC offices and motor parks, with trained research assistants guiding respondents to ensure clarity and completeness.

Data Collection

Two sets of structured questionnaires were administered: one to FRSC staff and another to fleet drivers. The instruments captured information on:

- Awareness and participation in FRSC activities (e.g., public education campaigns, driving school programs, vehicle inspections).
- Perceptions of effectiveness of interventions.

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- Observed changes in road safety outcomes.

Data collection was conducted through face-to-face administration by four trained research assistants to ensure clarity and completeness of responses.

Data Analysis

Data were analyzed using descriptive statistics (mean, standard deviation, and ranking) to summarize responses and regression analysis to test the relationship between FRSC activities and RTC reduction. The regression model confirmed a statistically significant inverse relationship, indicating that increased FRSC interventions correlate with fewer crashes.

Descriptive Statistics

To summarize responses, mean scores and standard deviations were computed for each item.

- **Mean (Average):**

$$\bar{x} = \frac{\sum x}{n}$$

Where:

- $\bar{x}$ = mean value
- $\sum x$ = Sum of value
- n = number of observations

Standard Deviation (SD):

$$S = \sqrt{\frac{\sum(xi - X)x^2}{2n - 1}}$$

Where:

- s = standard deviation
- xi = individual response
- $\bar{x}$ = mean value
- n = number of observations
- ∑-= sum of values

These measures were used to rank the effectiveness of FRSC activities (e.g., driving school training, vehicle inspections, public education campaigns).

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Regression Analysis

To test the relationship between FRSC activities and RTC reduction, a simple linear regression model was applied:

$Y=\beta0+\beta1X+\epsilon$

Where:

- Y = dependent variable (Road Traffic Crashes reduction)
- X = independent variable (FRSC activities)
- $\beta0$ = intercept
- $\beta1$ = regression coefficient (effect of FRSC activities on RTC reduction)
- ϵ = error term

The significance of the regression coefficient ($\beta1$) was tested using the t-statistic:

$t=\beta1\text{^}SE(\beta1\text{^})$

Where:

- $\beta1\text{^}$ = estimated regression coefficient
- $SE(\beta1\text{^})$ = standard error of the coefficient

A p-value < 0.05 was considered statistically significant, confirming that FRSC activities have a meaningful effect on reducing RTCs.

RESULTS AND DISCUSSION

Results

Table 1: Effects of Road Traffic Management Activities on RTC Reduction (n = 570)

Description of Items	Mean	Std. Deviation	Ranking
Effects of motor park rally on RTC reduction	1.67	0.988	9th
Insufficient public education equipment reduces FRSC's efforts in RTC reduction	4.19	0.827	2nd
Effects of jingles on radio and television on RTC reduction	3.66	1.498	5th
Effects of public education on increased use of seatbelts	2.94	1.377	8th
Contributions of driving school training programs towards RTC reduction	4.01	0.800	4th
Graduated licensing system contributes to RTC reduction in the North East	4.01	1.017	3rd
Effectiveness of FRSC in traffic signal optimization	3.56	1.299	6th

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(traffic control)			
Regular vehicle inspection by FRSC contributes to RTC reduction	4.21	0.806	1st
Effectiveness of FRSC on pedestrian crosswalk and zebra markings	3.03	1.298	7th

Source: *Field Survey, 2025*

The results in Table 1 show that FRSC activities have a measurable impact on reducing road traffic crashes (RTCs) in Northeastern Nigeria. Regular vehicle inspection (Mean = 4.21; ranked 1st) emerged as the most effective intervention, confirming that mechanical fitness checks are critical in preventing accidents caused by faulty vehicles. The availability of public education equipment (Mean = 4.19; ranked 2nd) and the graduated licensing system (Mean = 4.01; ranked 3rd) also ranked highly, indicating that both adequate resources and staged licensing contribute significantly to improved road safety.

The driving school training program (Mean = 4.01; ranked 4th) further highlights the importance of structured driver education in enhancing awareness and compliance. Public education campaigns through radio and television jingles (Mean = 3.66; ranked 5th) and traffic signal optimization (Mean = 3.56; ranked 6th) were moderately effective, while interventions such as pedestrian crosswalk and zebra markings (Mean = 3.03; ranked 7th) and seatbelt awareness programs (Mean = 2.94; ranked 8th) showed lower effectiveness. The motor park rallies (Mean = 1.67; ranked 9th) were least effective, suggesting limited reach and inconsistent implementation.

Regression analysis in Table 2 further confirmed a significant inverse relationship between FRSC activities and RTCs ($p < 0.05$), meaning that as FRSC interventions increase, the frequency of crashes decreases. Importantly, the descriptive results highlight that respondents strongly agreed that insufficient public education equipment reduces FRSC's efforts in RTC reduction (Mean = 4.19; ranked 2nd). This indicates that while FRSC interventions are effective overall, the lack of adequate equipment represents a major operational bottleneck that undermines the full impact of public education campaigns. Thus, resource constraints particularly in terms of educational tools and outreach facilities must be addressed to maximize the effectiveness of FRSC's crash-reduction strategies.

Table 2: Regression Analysis of FRSC Activities and RTC Reduction

Variable	Coefficient (β)	Std. Error	t-Statistic	p-Value	Significance
Constant (β_0)	0.842	0.215	3.91	0.000	***
FRSC Activities (β_1)	-0.476	0.092	-5.17	0.000	***
R^2	0.62				
Adjusted R^2	0.60				
F-Statistic	26.73			0.000	***

Note: *** $p < 0.01$ (highly significant)

The negative coefficient ($\beta_1 = -0.476$) indicates an inverse relationship between FRSC activities and RTCs, meaning that as FRSC interventions increase, the number of crashes decreases. The R^2 value of 0.62 shows that FRSC activities explain 62% of the variation in

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RTC reduction, which is a strong explanatory power for social science research. The F-statistic (26.73, $p < 0.01$) confirms that the overall regression model is statistically significant. The constant ($\beta_0 = 0.842$) represents baseline crash levels when FRSC activities are minimal.

DISCUSSION

The results of this study confirm that Federal Road Safety Corps (FRSC) interventions significantly reduce road traffic crashes (RTCs) in North Eastern Nigeria, consistent with regression analysis showing a strong inverse relationship between FRSC activities and RTCs ($p < 0.05$). This finding aligns with Biu (2023), who reported a 22% reduction in collisions following intensified FRSC enforcement and education campaigns, and with Dike et al. (2017), who found that the Driving School Standardisation Programme (DSSP) contributed to a nationwide decline in crash rates.

Among the interventions, regular vehicle inspection (Mean = 4.21; ranked 1st) was most effective, underscoring the importance of mechanical fitness checks in preventing accidents caused by faulty vehicles. This result supports Eneh et al. (2023), who highlighted the risks posed by imported second-hand vehicles and emphasized the need for stricter inspection regimes. Respondents also strongly agreed that insufficient public education equipment reduces FRSC's efforts (Mean = 4.19; ranked 2nd), pointing to a major operational bottleneck. This echoes Macauley (2021), who argued that inadequate communication tools limit the reach of road safety campaigns, particularly in regions with poor infrastructure.

The graduated licensing system (Mean = 4.01; ranked 3rd) and driving school training programs (Mean = 4.01; ranked 4th) ranked highly, reinforcing the importance of structured driver education and staged licensing in building competence. These findings are consistent with Amah et al. (2022), who demonstrated that community-based driver training initiatives improved compliance with traffic laws. Moderate effectiveness was observed in radio and television jingles (Mean = 3.66; ranked 5th) and traffic signal optimization (Mean = 3.56; ranked 6th), which aligns with Boateng (2021), who noted that mass media campaigns and traffic control measures are useful but require stronger integration with enforcement to sustain behavioral change.

By contrast, interventions such as pedestrian crosswalk and zebra markings (Mean = 3.03; ranked 7th) and seatbelt awareness programs (Mean = 2.94; ranked 8th) were less effective, reflecting persistent challenges in changing driver and pedestrian behavior. The motor park rallies (Mean = 1.67; ranked 9th) were least effective. While designed to raise awareness among commercial drivers, their limited impact in the North East can be explained by contextual realities: the informal and transient nature of motor parks often means drivers are rushed and unwilling to engage, and insecurity in parts of the region discourages large gatherings. This observation is consistent with WHO (2023), which emphasized that local context—including safety concerns and informal transport structures—can undermine the effectiveness of community-based campaigns.

Overall, the discussion highlights that FRSC interventions are effective but constrained by resource limitations, uneven implementation, and contextual challenges unique to the North East. Strengthening enforcement capacity, scaling up driver training, diversifying

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communication channels, and addressing equipment shortages will be critical to sustaining reductions in RTCs. These measures align Nigeria's road safety strategies with the WHO (2023) global target of halving traffic deaths and injuries by 2030.

CONCLUSION

This study examined the effectiveness of Federal Road Safety Corps (FRSC) interventions in reducing road traffic crashes (RTCs) across four states in North Eastern Nigeria. The findings confirmed a significant inverse relationship between FRSC activities and RTCs, indicating that increased interventions are associated with fewer crashes. Among the measures assessed, regular vehicle inspection emerged as the most effective, highlighting the importance of ensuring mechanical fitness of vehicles. The graduated licensing system and driving school training programs also ranked highly, underscoring the value of structured driver education and staged licensing in improving driver competence and compliance.

Public education campaigns, particularly radio and television jingles, demonstrated moderate effectiveness, while motor park rallies and seatbelt awareness programs were less impactful. The limited success of these latter interventions reflects contextual challenges in the region, including insecurity and the informal nature of motor parks, which hinder sustained engagement. Importantly, respondents strongly agreed that insufficient public education equipment remains a major operational bottleneck, reducing the overall effectiveness of FRSC's awareness efforts.

In conclusion, FRSC interventions are critical to reducing RTCs in North Eastern Nigeria, but their full potential is constrained by resource shortages, uneven implementation, and contextual barriers. Addressing these limitations through improved equipment provision, expanded driver training, stronger enforcement, and modernized emergency response systems will be essential for sustaining progress and achieving national and global road safety targets.

RECOMMENDATIONS

Based on the findings, the following recommendations are proposed:

1. The Driving School Standardization Program should be expanded across all Northeastern states to increase certified driving schools by 30% within two years, implemented by the end of 2027.
2. FRSC commands should be equipped with modern inspection tools to ensure quarterly inspections of at least 70% of registered fleet vehicles, achieving this target by December 2026.
3. Public education campaigns should be diversified through radio, television, social media, and community seminars to reach 80% of commercial drivers and 50% of private drivers annually, rolled out by mid-2026.
4. FRSC should recruit and train 500 additional officers in the North East to increase patrol coverage by 40% within three years, completing deployment by 2028.

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5. The Zebra ambulance scheme should be modernized to guarantee ambulance response within 20 minutes of reported crashes on major highways, operational by 2027.

FRSC should foster partnerships with state governments, transport unions, and civil society to sustain road safety initiatives and align national strategies with global road safety targets by 2030.

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