

SPATIAL AND TEMPORAL PATTERNS OF KIDNAPPING INCIDENTS ALONG THE ABUJA–KADUNA EXPRESSWAY, NIGERIA

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Abstract

This study investigates the spatial and temporal distribution of kidnapping incidents along the Abuja–Kaduna expressway, Nigeria, from 2010 to 2021. Using primary and secondary data obtained from police records, field surveys, and GIS-based spatial analysis, the research identifies high-risk flashpoints and examines the temporal variations of kidnapping occurrences. Data were processed using ArcGIS 10.8 and SPSS 25.0 to perform spatial mapping, frequency distribution, and correlation analyses. Results revealed that kidnapping incidents have increased progressively within the decade, peaking between 2019 and 2021. Spatially, the most notorious flashpoints include Rijana, Katari, Jere, Maraban-Rido, and Goningora. Temporal analysis showed that most incidents occur between 6:00 p.m. and 10:00 p.m., mainly on Fridays and Sundays. The findings demonstrate that geography, road network design, and inadequate police patrol coverage significantly influence the crime pattern. The study concludes that integrated spatial intelligence and community-driven security frameworks are essential for effective policing and crime prevention.

Keywords: *Kidnapping, Spatial Analysis, GIS, Crime Mapping, Abuja–Kaduna Road, Temporal Pattern.*

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1. INTRODUCTION

Kidnapping as a criminal behaviour is not entirely a new social problem in the world. It is a global phenomenon with different degrees and intensity in terms of its practice. The practice of kidnapping event dates back to 17th century (Akpan, 2010). It started in Britain when, infants

(kids) of wealthy families would be ‘napped’ (caught in the sleep) for ransom (Tzannelli, 2010; Okoli & Agada, 2014). Kidnapping is a form of violent crime commonly identified with the illegal seizure of persons against their will for several criminal reasons (Chidi, 2014). Okoli and Agada (2014) perceive kidnapping as an organized crime that has its essence in the unlawful intentional deprivation of a person’s freedom from movement in an attempt to exploit the situation to extort money or other advantages. It is an old and contemporary criminal activity in both developed and developing nations. Kidnapping has evolved into one of Nigeria’s most persistent security challenges, particularly along the Abuja–Kaduna expressway. The highway, which connects the Federal Capital Territory with the northwestern geopolitical zone, has become synonymous with frequent abductions and armed attacks. The menace undermines social stability, economic activity, and public trust in state institutions. Despite the presence of multiple police checkpoints, the spate of abductions continues to rise, reflecting operational, logistical, and intelligence gaps.

This study therefore aims to spatially and temporally examine kidnapping incidents, identify high-risk flashpoints, and analyze the relationship between environmental characteristics and crime prevalence.

2. STUDY AREA

The Study Area

Location

The Abuja-Kaduna highway or Abuja–Kaduna expressway is a highway in Nigeria that connects the national capital of Abuja with the city of Kaduna. Depending on the definition used, it is between 155 kilometres (96 mi) and 200 kilometres (120 mi) in length. It is primarily part of the A2 highway but the section nearest Abuja is part of the A234 highway. Regarded as one of Nigeria’s most important highways runs from North to South. The Abuja-Kaduna Road forms a critical part of this larger highway system, enabling the movement of people and products from the North to the South and vice versa - thereby uniting the Nigerian people and economy, and connecting Nigeria to North Africa via the Lagos-Algiers Trans-African Highway. The expressway lies between the boundaries of the Abuja, Niger and Kaduna States, and falls within longitude 6° 00’ to 8° 00’ east of the Greenwich Meridian and latitude 9° 00’ to 11° 00’ north of the Equator with a total length of 123km, from Diko Junction to Kaduna (Dangana, 2021).

Weather and Climate

The Abuja – Kaduna Road experiences the tropical savanna climate or tropical wet and dry climate beginning from the tropical rainforest climate boundary in southern Nigeria to the central part of Nigeria, where it exerts enormous influence on the region. The tropical savanna climate exhibits a well-marked rainy season and a dry season with a single peak known as the summer maximum due to its distance from the equator. Temperatures are above 18°C (64°F) throughout the year. Abuja, Nigeria's capital city found in central Nigeria, has a temperature range of 18.45°C (65.21°F) to 36.9°C (98.4°F), and an annual rainfall of about 1,500mm (59.1in) with a single rainfall maximum in September (Dangana, 2021). The single dry season experienced in the tropical savanna climate in the central Nigeria beginning from December to March, is hot and dry with the Harmattan wind, a continental tropical (CT) air mass laden with dust from the Sahara Desert prevailing throughout this period.

With the Inter Tropical Convergence Zone (ITCZ) swinging northward over West Africa from the Southern Hemisphere in April, heavy showers coming from pre-monsoonal convective clouds mainly in the form of squall lines also known as the north easterlies formed mainly as a result of the interactions of the two dominant air masses in Nigeria known as the Maritime tropical (south westerlies) and the Continental tropical (north easterlies), begins in central Nigeria while the Monsoons from the South Atlantic ocean arrives in central Nigeria in July bringing with it high humidity, heavy cloud cover and heavy rainfall which can be daily occurrence lasting till September when the monsoons gradually begin retreating southward to the southern part of Nigeria. Rainfall totals in central Nigeria varies from 1,100 mm (43.3 in) in the lowlands of the river Niger Benue trough to over 2,000 mm (78.7 in) along the south western escarpment of the Jos Plateau (Olayemi *et al.*, 2014; Dangana, 2021). While climate change may not be a direct root cause of kidnapping it is recognized as a predominant destabilizing force that fosters an enabling environment for violent organisations and gangs such as kidnappers. The raining season in the study area in most times is strong and heavy. More so the dry season/Harmattan bring with thick fog, and strong windy cold air. All of these restrict movement for residents and commuters along the area, and strongly undermines the capacity of security operators in the area to carryout patrol and respond to distress call, thus making fostering an enabling condition for kidnappers to abduct residents and commuters in the area.

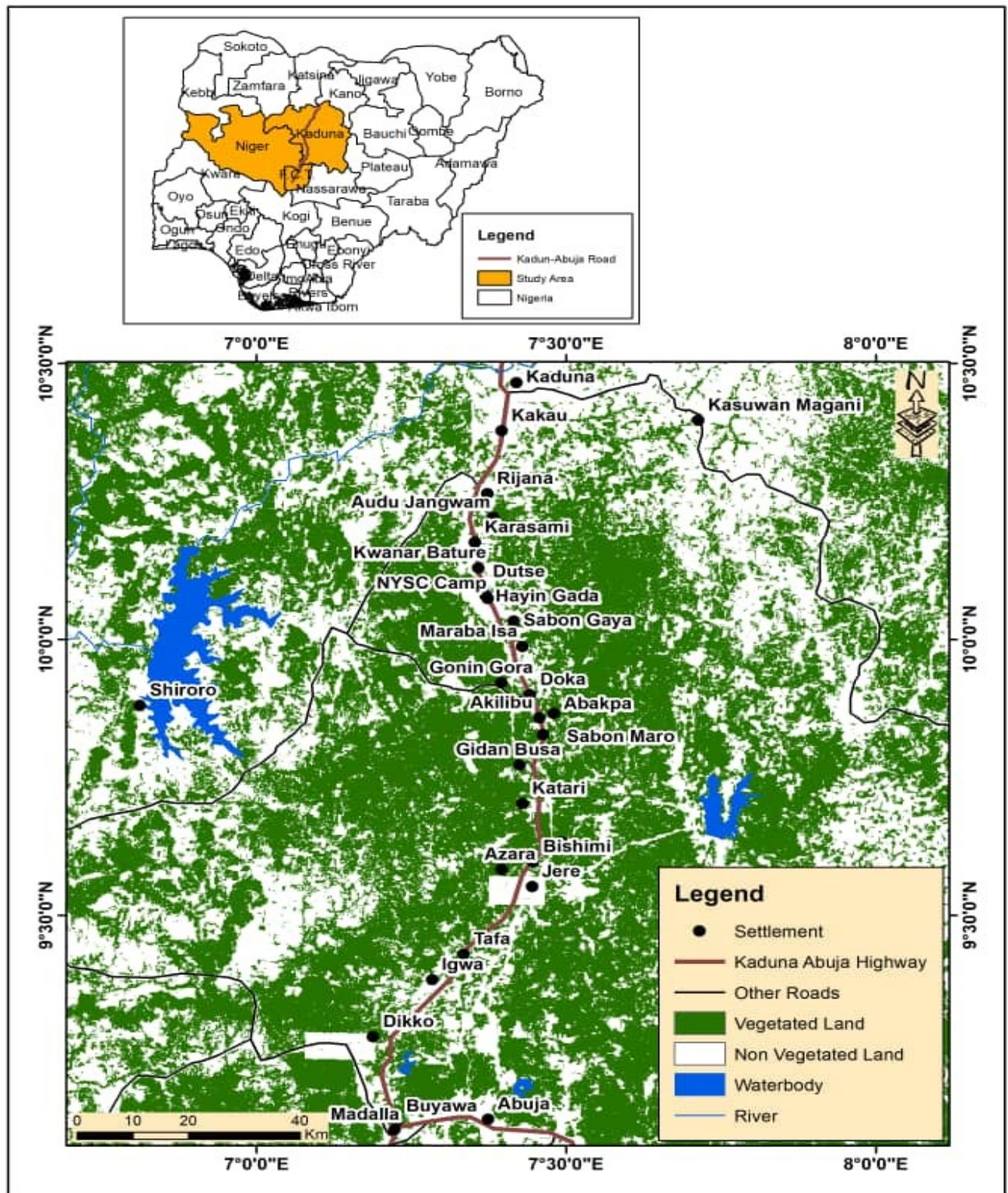


Figure 3.1: The Abuja-Kaduna express road, Nigeria

Source: NIGIS, 2022.

The Abuja–Kaduna expressway extends approximately 165 km, traversing the Federal Capital Territory, Niger, and Kaduna States. The route passes through semi-arid and guinea savanna vegetation, with undulating topography and several forested areas providing cover for criminal operations. Settlements such as Goningora, Rijana, Katari, and Jere form critical socio-economic nodes but have become hotspots of insecurity. The area lies between latitude 9°00' N to 10°45' N and longitude 6°30' E to 7°30' E.

3. METHODOLOGY

3.1 Data Collection

Data were derived from:

- **Primary sources:** field observations, questionnaires administered to residents, drivers, and police officers; key informant interviews with security officials and traditional leaders.
- **Secondary sources:** police crime records (2010–2021), satellite imagery, and relevant literature.

3.2 Data Analysis

- Spatial and temporal data were analyzed using **ArcGIS 10.8** for hotspot mapping and **SPSS 25** for statistical frequency analysis.
- Descriptive and inferential statistics were used to identify spatial clusters, temporal trends, and relationships among socio-demographic factors and kidnapping prevalence.
- The GIS layers included coordinates of reported incidents, settlement boundaries, and road network features.

4. RESULTS AND DISCUSSION

4.1 Spatial Distribution of Kidnapping Incidents

Table 1. Flashpoints of Kidnapping along the Abuja–Kaduna Road (2010–2021)

Flashpoint Location	Coordinates (Lat/Long)	Frequency of Reported Incidents	Percentage (%)
Rijana	10.038° N, 7.166° E	58	23.2
Katari	10.101° N, 7.104° E	47	18.8
Jere	9.970° N, 7.200° E	39	15.6
Goningora	10.385° N, 7.416° E	31	12.4
Maraban-Rido	10.468° N, 7.462° E	29	11.6
Others (misc. sites)	—	45	18.4
Total	—	249	100.0

The results show a pronounced concentration of kidnapping activities at **Rijana** and **Katari**, accounting for over 40% of all incidents. These locations are characterized by thick vegetation, poor lighting, and sparse security patrols—factors that provide tactical advantage for kidnappers.

4.2 Temporal Pattern of Kidnapping Incidents

Table 2. Reported Kidnapping Incidents (2010–2021)

Year	Number of Cases	Percentage (%)
2010	5	2.0
2011	9	3.6
2012	11	4.4
2013	14	5.6

Year	Number of Cases	Percentage (%)
2014	17	6.8
2015	23	9.2
2016	31	12.4
2017	36	14.4
2018	42	16.8
2019	38	15.2
2020	18	7.2
2021	5	2.0
Total 249		100.0

A steady escalation is observed between 2010 and 2019, followed by a slight decline in 2020–2021, attributed to increased military-police joint patrols. Temporal concentration analyses reveal that most incidents occurred in **evening hours (6 p.m.–10 p.m.)** and on **Fridays and Sundays**, suggesting offenders exploit reduced visibility and weekend mobility patterns.

4.3 Correlation between Environmental Features and Crime Incidence

The Pearson correlation coefficient ($r = 0.78$, $p < 0.01$) indicates a strong positive relationship between proximity to forested areas and kidnapping frequency. Locations within 3 km of dense vegetation or uninhabited zones exhibited higher incident rates.

5. RECOMMENDATIONS

1. **Enhanced Surveillance:** Establish permanent, well-lit checkpoints at Rijana, Katari, and Jere, complemented by CCTV and drone-assisted monitoring.

2. **Community Policing Integration:** Strengthen collaboration between police and local vigilante groups using the SARA (Scanning, Analysis, Response, Assessment) framework.
3. **Intelligence-Led Patrols:** Deploy mobile patrol units using real-time GIS data to predict and intercept criminal activity.
4. **Infrastructure Improvement:** Clear roadside vegetation, improve lighting, and repair sections of the road that facilitate ambushes.
5. **Public Awareness:** Launch campaigns to sensitize road users about preventive measures and emergency contact protocols.

6. CONCLUSION

The study reveals that kidnapping incidents along the Abuja–Kaduna expressway are not random but spatially and temporally patterned. The clustering of crimes at Rijana, Katari, and Jere underscores the influence of environmental and operational factors. By integrating GIS-based crime mapping with proactive policing strategies, authorities can better allocate resources and reduce response time. Addressing the underlying socioeconomic and infrastructural vulnerabilities will be crucial to sustainable security in the corridor.

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