Using Victimisation Survey to understand Spatial Crime hotspot at sub-urban context: An insight from Nigeria.

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Summary

Previous studies have identified clusters of crime in sub-urban areas in Europe and North America. There is limited evidence of whether similar patterns exist in Sub-Saharan Africa. This paper explores the spatial patterns of crime in a typical suburban area in Abuja-Nigeria. To date, the challenge is georeferenced datasets are unavailable at small scale. This study, therefore, utilises fieldworkers to carry out a door-to-door survey to capture incidents of crime at property level (N>3000). Preliminary analysis demonstrated that, as observed in Europe-American studies, crime clusters at sub-urban context in Nigeria. Future work will explore explanatory variables for the identified patterns.

KEYWORDS: Suburban; Property crime; Hotspot analysis

1. Introduction

To date, there are paucity of studies that examine the spatial patterns of crime in developing countries. Indeed, most studies have emerged in Europe and North America. Spatial criminologists and geographers in developing countries who wish to better understand the spatial manifestations of crime are hindered by the challenges of obtaining micro-level datasets. In one study, Umar, (2017) utilised victim survey in studying the first empirical spatial patterns of urban crime in the city of Kaduna - a contextualised traditional urban area. However, this study represents one of the first studies of spatial patterns of crime at suburban context in Sub-Saharan Africa. This paper presents an insight on using georeferenced victimisation survey to understand spatial crime hotspots in areas where official crime data is unknown. Furthermore, this is supplemented by individual-level property data on socio-demographic and built-environment that can be used to explain patterns of crime and their relationship with physical and social environment at micro (point) and meso (neighbourhood) levels. A further advantage of this study is that the survey data can be used to test spatial theories of criminology at micro level (household or street) – which is not feasible with aggregated census data in Europe and North America beyond the Census Output Areas. This paper, therefore, examines the identifying crime hotspots evident in the study area – and follow up work will begin to explore some of the potential explanatory variables for these spatial patterns. A key question is whether spatial concentrations of crime (hotspots) identified across Europe and North America in suburban places (Wagner, 2020; Gill et al., 2017) are mirrored in Sub-Saharan Africa? The research question is unique one; it has never been asked in Lugbe suburban district of the Federal Capital Territory (FCT) of Nigeria, Abuja.

2. Background

Unlike the typical pre-colonial cities in Nigeria that were often developed by conservative traditional patterns, Abuja is a non-traditional city that was planned and developed according to the Abuja Master Plan (AMP)**.** Since December 12, 1992, when Abuja was designated as Nigeria's Federal Capital City

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(FCC), sub-urban communities have seen rapid population influx. Phase V (mainly suburbs) was developed and included into the development phases of the AMP by the Federal Capital Development Authority (FCDA) in 1999 to reduce the effects of haphazard urbanisation from outside FCC districts entering the central business districts (JICA, 2019). However, the FCDA had little impact on the development of phase V since its creation. Therefore, it is argued that the vision of planners to have a functional city have not been actualised due to non-strict implementation of the AMP. FCC Abuja has a population of 3.6 million with a total land area of 735km^2. Phase V is made-up of 12 rapid suburban districts designed for low-income employees.

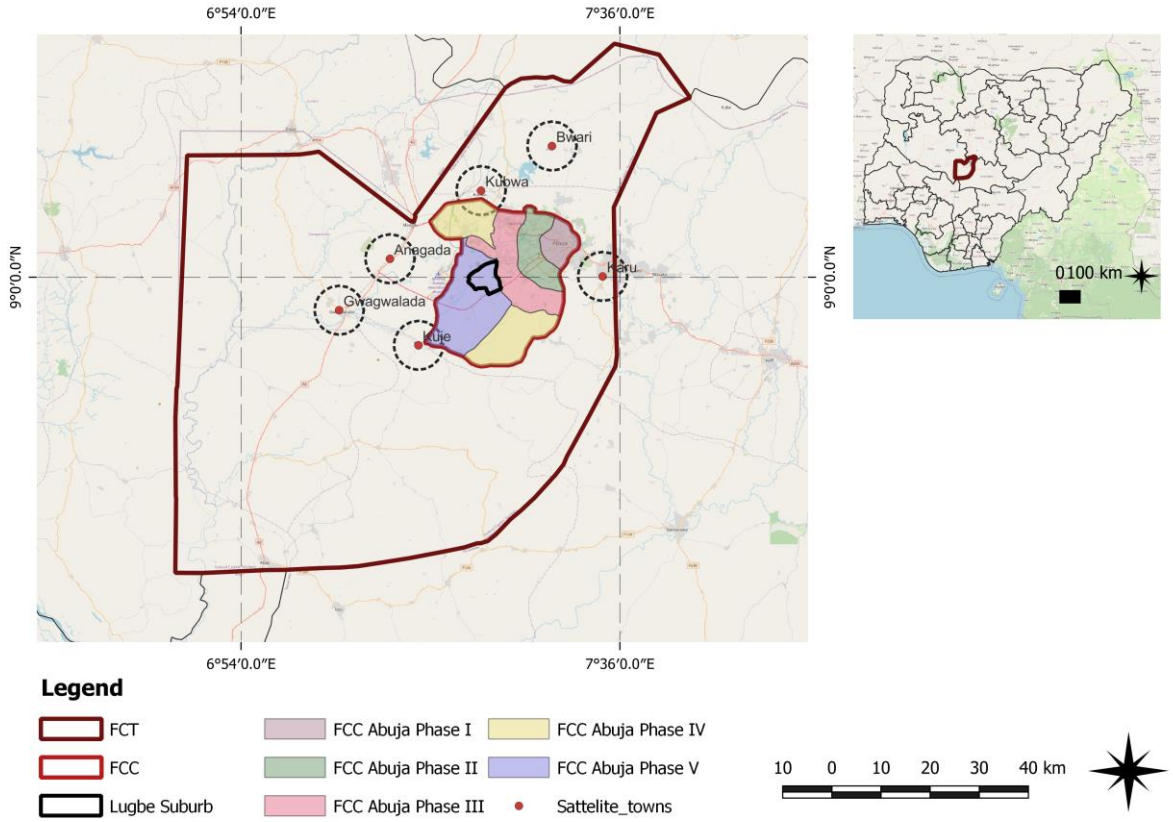


Figure 1: Location map of the Federal Capital Territory (FCT) showing the Federal Capital City (FCC) – Abuja and the study area – Lugbe Suburb.

2.1 The study area - Lugbe

Lugbe, one of the suburban districts of phase V has a total land area of 27km^2. This represents 3.7% of the total land of FCC. The study area has a built-up area of 12km^2 (see figure 2) with an estimated population of 74,343 and average household size of 5.7 persons per household (Fieldwork, 2022). The physical environment is diverse with planned community and squatter settlement coexisting; the social environment is distinct between middle-class and under-privilege people. This variation and uniqueness of the district makes it interesting to study the spatial patterns of crime.

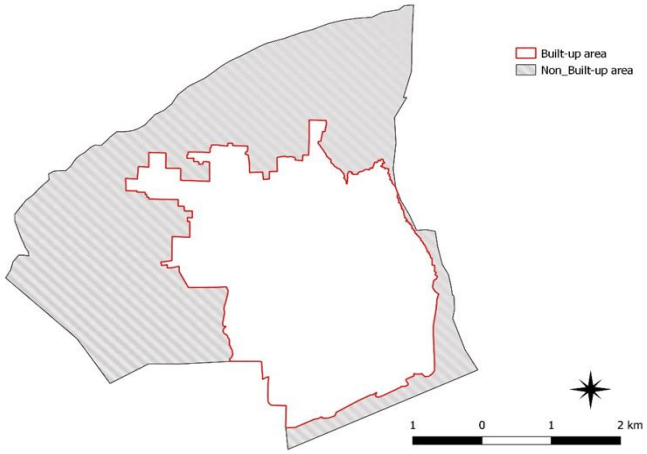


Figure 2: Map showing the spatial extent of the study area.

3. Data and Method

In this study, primary datasets were obtained using three methods.

i) Mapping of properties: field mapping exercise was employed to map all the properties in the study area using high resolution satellite image in QGIS platform. The process involves identifying and assigning property identified number (PIN) to every property. The PIN was used as a georeferenced point to integrate the door-to-door survey data in a geodatabase. The study area is divided into 89 map sections (See figure 3 a-b).

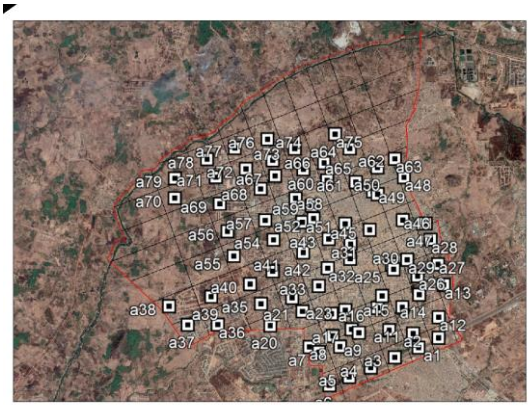


Figure 3a: Satellite image of the study area.

Figure 3b: A map section with PIN.

i) Land use assessment of properties: physical observation method was used to assess the activities of every property. The process involves selecting a target property and record its landuse activity on a structured paper. The data collected were transferred to an excel sheet and processed. The purpose of this assessment was to validate the mapped properties and to design samples needed for the door-to-door survey. Figure 4 is a land use map of the study area.

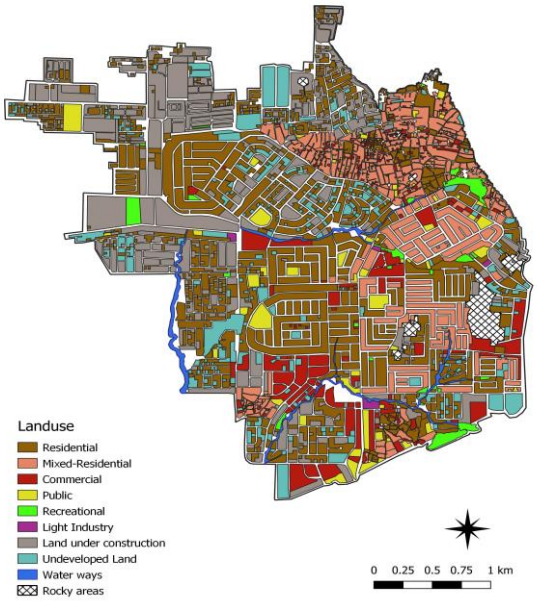
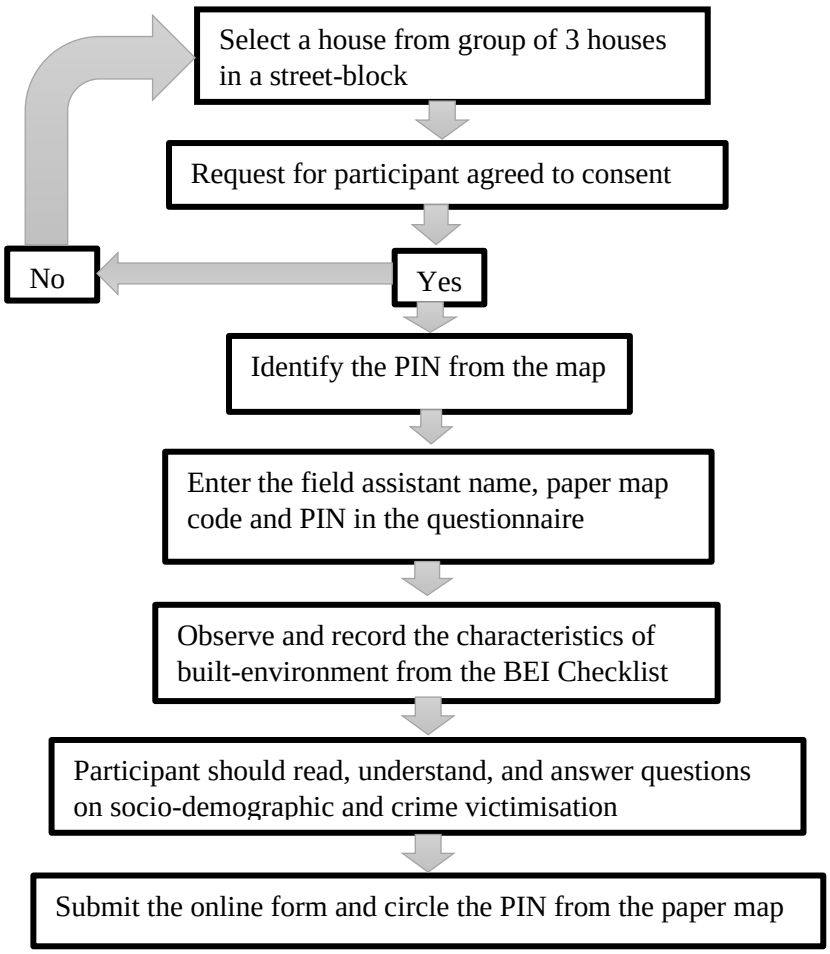


Figure 4 showing the landuse map of the study area.

ii) Built-environment audits and door-to-door survey: A digital questionnaire was designed to collect data concurrently on three items: i) characteristics of the built environment using Block Environmental Inventory (BEI) checklist; ii) sociodemographic survey; iii) victimisation of crime survey. The survey targeted 3,081 residential homes or approximately 33% of the total residential properties. During the survey, 3,280 responses obtained are above the sample threshold. However, only 3,066 responses are accepted. 214 responses are rejected because they had duplicated PIN or important questions are ignored due to participant independence. Systematic random sampling was used during the data collection. Flowchart 1 is a graphical procedure used during the survey.

Flowchart 1: Graphical procedure for digital door-to-door survey



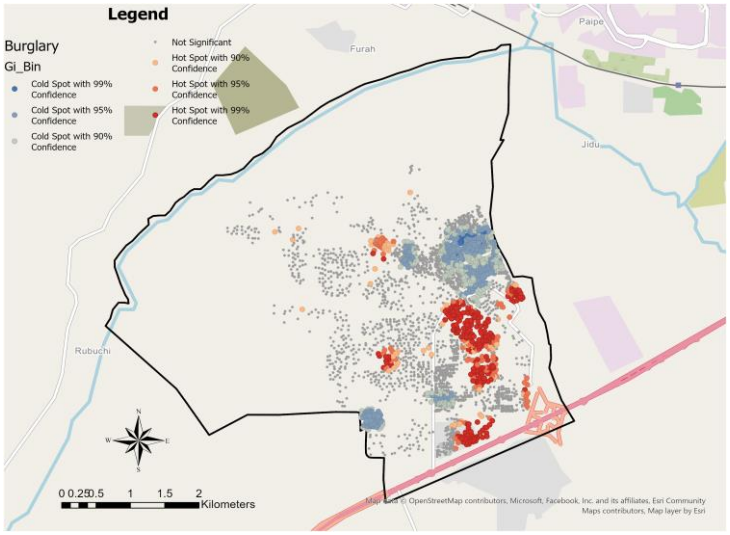
4. Result and discussion

There are different approaches to detect crime hotspot and cluster analysis (Chainey, 2010) but for obvious reasons, one of which was to measure spatial and statistical association, Gi Local Statistics (Getis & Ord, 1992) was employed at this stage in identifying hotspot areas. Other hotspots analyses which only involve visual interpretation does not provide statistical significance of clusters, however, Gi local statistics is able to detect clusters of high and low values from the crime data. It provides p and z value confident levels at 99%, 95% and 90% of how statistically significant the clusters are. GI Statistics have been applied in a number of disciplines that uses point patterns such as crime, epidemiology, and demographics etc. Table 2 is a summary of the incidents of crime drawn from the survey. Figure a – e are hotspots maps of various types of crime. From the maps, red clusters have intense clustering with high crime rates while blue clusters have intense clustering with low crime rates. The white clustering are statistically insignificant clusters. It is evident from the intensity of the hotspot and cold spot clusters for one to suggests that crime pattern is unevenly distributed across the study area; some areas have high concentration of crime while others have less. Similarly, the spatial and statistical patterns is diverse across different type of crime. Follow-up work will begin to explore some of the potential explanatory variables for the crime patterns drawn from physical and social environment. This result is in conformity with what is obtained in Europe-American settings that there is significant clustering (hotspot) of crime in a typical suburban context in Sub-Saharan Africa.

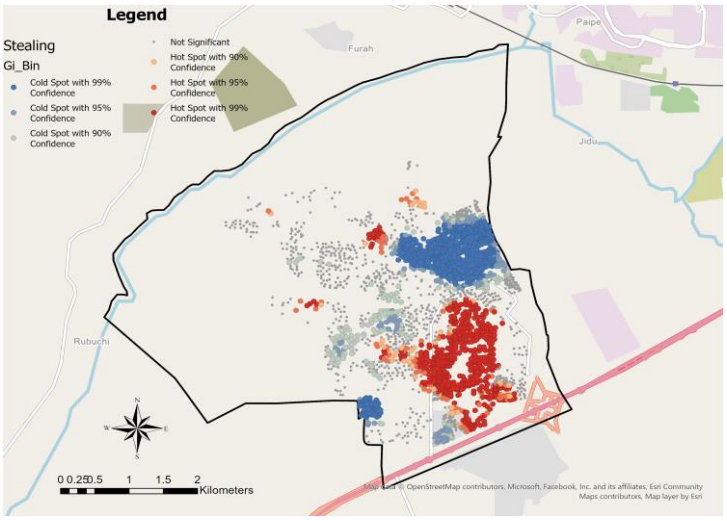
Table 2: Summary of the Crime Incidents

Type of crime	Number of properties with incidents	Number of Incidents including repeat victimisation
Burglary	153	200
Stealing	387	606
Criminal damage to property	122	159
Motorcycle theft	43	46
Vehicle theft	33	38
Total properties	3066	100%
Total properties with incidents	738	24.1%
All incidents including repeat victimisation	1,048	

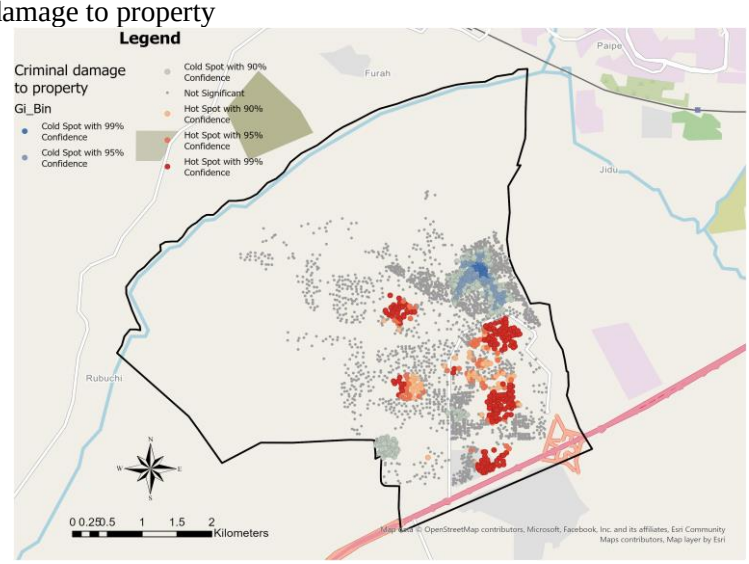
a) Burglary



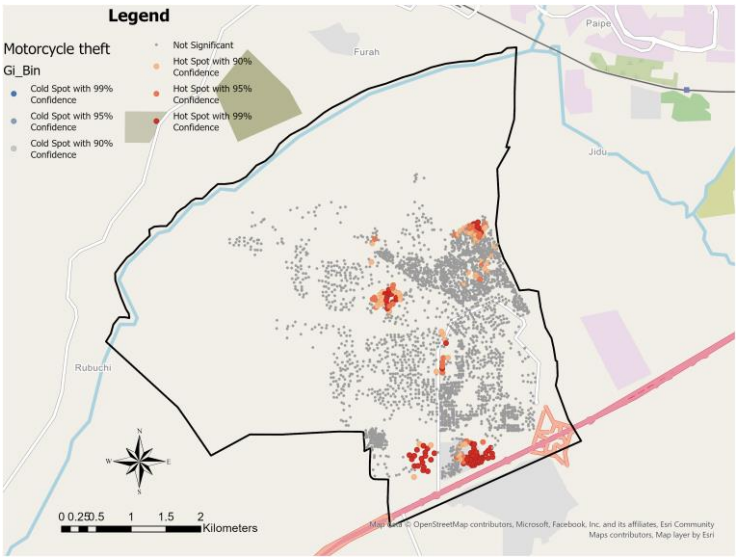
b) Stealing



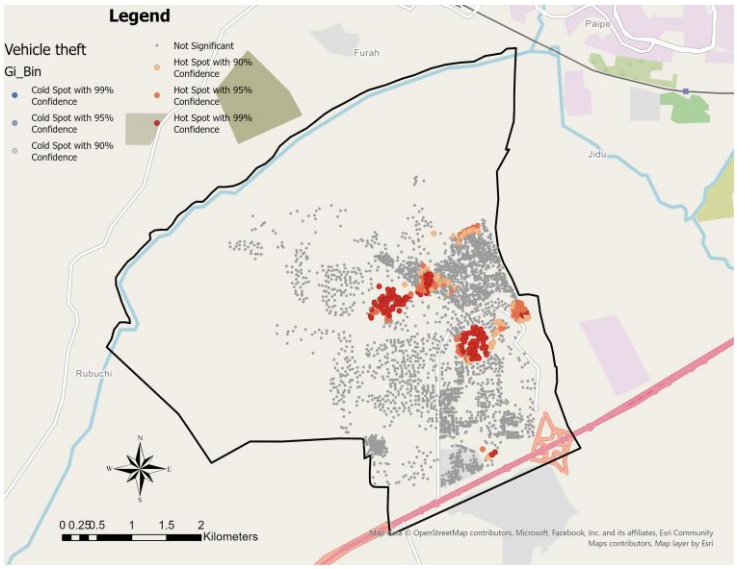
c) Criminal damage to property



d) Motorcycle theft



e) Vehicle theft



5. Conclusion and future work

The aim of this paper is to explore spatial crime hotspots using victimisation survey in Nigeria where micro-level crime data does not exist. Few research focused on spatial patterns of crime in developing countries - a discipline that is taken for granted in Europe and North America. In this research, detecting the spatial concentration of crime is the first step. It is worth mentioning that the research also developed a largescale (N=3,066) geodatabase comprising the incidents of crime and associated components drawn from physical and social environment. The next stage is to measure the level of crime concentration at street segments and to statistically analyse the relationship between the incidents of crime and environmental correlates guided by theoretical assumptions of opportunity and social disorganisation theories. These theories have for long been proved to be effective in the western countries but are rarely tested in developing countries. The future work will be interesting to test spatial criminological theories in suburban context of a developing country and will contribute to knowledge, the existing gap in international literature of place-based criminology.

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Biographies

Abdulaziz is a PhD student at the NTU School of Social Sciences. His interests centered around spatial social sciences, much of which involves geospatial analytics. He received MSc GIS from the University of Leeds, and BTech Urban and Regional Planning from ATBU Bauchi – Nigeria.

Dr. Andy Newton is an Associate Professor in Policing and Criminology at NTU. His current research focuses on developing Framework for Analysing Crime Events in Time and Space. He received PhD, MSc GIS and BSc Geography from the Universities of Liverpool, Edinburgh, and Sheffield respectively.

Dr. James Hunter is a principal lecturer in Public Policy at the NTU School of Social Sciences. His current research focuses on Using Google Maps and Google Street View to identify burglar alarm impact on residential burglary victimisation and identifying illegitimate businesses working in the informal economy in the UK.

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