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URBAN MORPHOLOGY AND CRIME PATTERNS IN URBAN AREAS: A REVIEW OF THE LITERATURE

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The emerging challenges of urban planning and design professionals across the globe is on how to mainstream crime prevention and control in the planning and management of cities, and that rose the interest of Environmental designers in conducting research on urban morphology and crime. Researches on urban morphology provide sufficient explorations and understandings of crime areas and fear of crime in cities. Despite the effort so far, the existing literature on morphology of crime areas and pattern of crime presents different perspectives to the study of crime and spaces, reflecting the varied field of urban morphological research. There is a need to understand these perspectives in view of their directions and inherent limitations for effective understanding of crime pattern and urban morphogenesis in cities. The focus of the paper is on the understanding of different perspectives in the study of crime pattern and urban morphology in setting up an effective mechanism for crime prevention and control. Eighteen (18) paper articles and six (6) thesis published between 2010 - 2021 where selected based on the Environmental criminological research perspectives from the field of Geography, Urban Planning, Urban Design, Landscape Architecture and Architecture; and systematically reviewed based on their characteristics and then classified according their relevance to environmental criminology for analysis and drawing of inferences. The findings indicated that, there is inadequate empirical research on the influence of urban morphology on crime pattern in cities. Therefore, the paper recommends for further researches to focus on exploring the various elements of urban morphology and how they help in understanding the spatial distribution of crime in areas and the explanations they could provide for effective crime prevention and control in cities.

Keywords: built environment, crime pattern, environmental criminology, urban morphology

INTRODUCTION

The greatest challenges facing the world in the 21st century are poverty, inequality, insecurity and climate change (Beall & Fox, 2009; UN-habitat, 2016 & 2019a). With more than half of the world's population living in urban areas, the reality of the

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21st century is that these issues will impact strongly on cities and as Yunusa (2011) and UN-habitat (2020), indicated that, the battle against these mutually reinforcing situations shall be won or lost in cities.

Urban crime threatens the quality of life, human rights, social and economic instability and sustainable development in cities around the world (Baker, 1998; UN-habitat, 2005; 2019b & Umar, et al., 2015a). This is especially true in developing countries that have high poverty rates and many informal settlements. The poor are the worst affected by urban crime and violence, regardless of their geographical location (UN Habitat, 2007). Other studies further attested to the fact that usually, areas of the city that are most blighted by violence also happen to be the poorest (Alemika & Chukuma (2012); Assiago, 2017; Bernasco & Block, 2009; Winton, 2004; Umar, et al., 2015b).

The 2011 World Bank's position is that, if decisive action is not taken, the scale of urban violence can ellipse that of open warfare (World Bank, 2011, p.24). For millions of people in cities of the developing world, violence or the fear of violence is a daily reality (Ojo & Ojewale, 2019; UN Habitat, 2019a). Rising urban crime across Africa contributes to pervasive fears that impede commerce, fray social capital and undermine normal urban activity (Assiago, 2017). The 2020 Global Report on Human settlements estimated that over 60% of all urban residents have been victims of crime with 70% of them in Asia and Africa (Unhabitat, 2020, p. 16).

Different conceptions of crime in design practice, sociology, environmental psychology, and criminology indicate an extensive articulation of crime in relation to the built environment and urban form in the city (Cozens et al., 2019 & Carr, 2020; Wuschke & Bryan, 2018). Five decades of different studies on urban crime, crime prevention through environmental design, and fear of crime indicate an implicit and gradual movement from deterministic to possibilistic propositions in exploring the relationships between urban crime and environmental design both in theory and practice (Curman, et.al., 2015 & Umar, et al., 2018). In this way, various dimensions of crime prevention in both theory and practice can be categorized into morphological, social, functional, and perceptual dimensions. While the social and perceptual dimensions of crime phenomenon have been widely addressed in criminology, environmental psychology, and sociology disciplines in terms of fear of crime, sense of community, people participation, demographic profiling, socio-economic attributes, risk, and victimization. The morphological and functional dimensions of urban crime have been relatively less explored comprehensively as a complex combination of urban forms and functions in relation to social and perceptual outcomes (Eck & Weisburd, 1995; Wuschke, 2016, & 2018). Moreover, considering the complexity of the city as a combinational network of multi-scalar activities and emergence, the issue of urban crime needs to be explored in relation to various scales and dimensions of the city and urban environments.

Considering the large body of knowledge and research on the issue of crime in relation to the built environment in terms of spatial structure, demographic status, urban morphology, sociocultural and economic condition, it is probable to conceive an evolutionary process in which different approaches and trends advocate for a comprehensive articulation of the complex relation between crime and the city (Cozens, 2007; Perkins, et.al, 2009; Salau & Lawanson, 2010; Silva & Li,

2020). Despite the fact that crime is one of the critical problems of cities worldwide, most of the previous studies have been conducted in sociology, criminology, and psychology in order to either explore the sociocultural and economic predictors of crime, whether in sociocultural context or individuals, or evaluate the proposed theories or propositions (Cozens, 2011). However, although the studies have gradually extended the crime discourse over the hedge of narrow-minded determinism that was implicitly embedded with the early trends of environmental research on the issue of crime, they have relatively ignored or reduced the "complexity of the city problems" (Jacobs, 1961; Jones & Fanek, 1997; Lamya & Madanipour, 2006) into crime statistics while abstracting crime from its urban context. However, whilst planners and designers need to adopt theories and propositions in relation to spatiality and sociality domains in order to forecast the social outcomes of their spatial amendments in the built environment, the efficiency of these propositions remains ambiguous while societies are paying the price and the challenge is overwhelmingly critical when "design-level" theories are needed for interventions (Hillier & Sahbaz, 2008; Ojo & Ojewale, 2019; Umar, et al., 2020). Thus, conducting a theoretical review the paper posed a question on what should guide the focus of future research in crime and environment through the exploration of the morphology of urban spaces, for understanding the pattern of crime and criminal activities in cities as basis for drawing up a Planning and Design framework for developing crime resilient cities.

METHODS AND MATERIALS

Literature search

This paper focused on the role of urban morphology in understanding crime pattern. It also attempted to review the influence of such findings in shaping crime prevention frameworks in cities. The research objectives were addressed by conducting a comprehensive systematic review of most recent literature that examines the influence of built environmental elements in understanding crime pattern in urban areas. A systematic and extensive search was conducted in several electronic databases, which include articles published from 2010 to 2021 as suggested in the PRISMA statement (Moher, et.al., 2009). The literature search was conducted between August, 2019 to January, 2021; using the major databases, including Web of Science, Scopus, ScienceDirect and Sci-hub. The search keywords used include: 'environmental criminology', 'urban morphology', 'Design out crime', 'crime pattern', 'crime and urban form 'and 'crime prevention through environmental design'.

Literature review criteria

In the course of selecting publications to include in the review and subsequent analysis, no geographical limit was set against inclusion or exclusion of materials, but rather adopted a worldwide domain. The selection process was conducted in two stages. The titles and abstracts were assessed, and then the whole text of selected articles was reviewed. A definition of inclusion criteria was conducted prior to the extensive search. The inclusion criteria for articles used include:

- published between 2010-2021,
- published in peer-reviewed journals and unpublished Thesis written in English,
- highly cited,

- relevancy to the objectives of the study,
- outcomes related to Sociological, Psychological and Economic aspects of crime were excluded,
- interconnection analysis and ability to answer research questions.

Our search identified 106,097 records. After title screening, approximately 312 articles were found appropriate. Consequently, further screening was carried out based on the content of the abstract, 55 records were selected based on their appropriateness to the study focus. Finally, 20 records were selected for detailed content analysis. Unpublished thesis was also used, six (6) Thesis were purposively selected and analysed; the findings have been presented in the discussion.

LITERATURE REVIEW: CONCEPTS AND THEORIES EXPLAINING CRIME PATTERN IN URBAN AREAS

Concept of urban morphology

Before identifying urban morphology and urban form, it would be useful to look into the origin of the words. As stated in various dictionaries, morphology is constituted from the Latin words morphe (form) and logos (description); therefore, morphology is concisely the description of form. The Oxford English Dictionary defines morphology as the particular shape, form, or external structure of an organism, or landform. It is also described as the history of variation in form. Form is characterised as the general system of arrangement, whereas figure is defined by lines and angles. Ching (1996) defines form as a three-dimensional mass, which also concerns figure and shape; it is the external outline, internal structure, and the unity of the whole.

Urban morphology is defined as "the organized body of knowledge" and "integral part of urban geography"; it relates forms to their socio-economic context and historical development (Psarra, 2012 & Krieger, 2006; Whitehand, 1987). Urban morphology is about shapes, forms, spaces and places; it is also associated with the nature and scale of physical places and the connections between them. It can be both descriptive and classificatory. It also focuses on the question of "how and why settlements took the shape they did" which includes analytical element of morphogenesis (Kalimapour, 2016). It is the study of the city as a human habitat (Moudon, 1997). Despite multiple definitions, briefly, urban morphology means the structure or the study of urban form (Kropf, 2005; Larkham, 2005; Whitehand, 2005).

Urban morphology was firstly defined in the geography literature. Geography deals with the morphological processes of settlements; and the main pioneers of this discipline are (Conzen, 1960; Kropf, 2001; Larkham, 2005; & Whitehand, 1987). Secondly, Architecture tackles the typological processes of the subject and here we can mention (Lefebvre, 1994; Malfroy, 1986; Moudon, 1998; Psarra, 1997) as the forerunners. Thirdly, philosophy, which tackles the philosophical processes within urban morphology, differs from the other disciplines in that it questions more the social issue of space. The key proponents of this approach are Harvey, Foucault, Lefebvre and Harvey (Madanipour, 1996). Fourth, urban design deals with the public space network, space and place issues, and (Krieger, 2006; Lynch, 1960 & 1981; Jacob, 1961) and many others can be mentioned here. Finally, by the late

twentieth century, in terms of science, Geographical Information Systems GIS, Space Syntax by Hillier and his colleagues (1970s), and other mathematical models by (Alexander, 1977; & Salingaros, 2000) can be cited as recent quantitative approaches to the analysis of urban morphology (Cozens, 2019; Sima & Zhang, 2009).

In addition, urban form is described as the basic element that gives character to cities. Morris (1994) mentions that it is how we conceptualise the complexity of physical form. Urban form is composed of buildings, streets, squares, roads, and all the elements that comprise the city. It is the outcome of a process that is formed by specific determining forces (Larkham, 2005). Alkim, (2006) classifies these forces under two groups; firstly, geographical factors such as climate, topography, and local construction materials, and secondly, man-made determinants such as socio-political and economic powers, culture, and religion.

Therefore, urban morphology is related to the history of the city, spatial relations, social relations, economic relations, culture, traditions, various factors shaping that form, and its rural/urban landscape. It is about the people, institutions, regulations, and management. Therefore, it is an important phenomenon and an analytic tool, which helps cities to understand their development processes, and the characteristics of each element in the city.

Crime and urban form

Exploration of crime and place is a rapidly evolving area of research in the 21st century. Some of the early works in the 1970s examined topological structure of neighborhoods, identifying a way to measure the permeability of edges of the neighborhood, allowing crime committed by non-residents to drift away from the usual location along major streets into roads toward the centers of neighborhoods (Brantingham & Brantingham, 1993c). For decades, researches focus on understanding of crime and the urban environment, particularly how people live in and interact with the landscape (buildings, people, roads, and activities) that surrounds them. It advances understanding of crime within the urban landscape (Brantingham & Brantingham, 1995). Crime changes with urban development patterns. Opportunities for criminal activity emerge, disappear, or move as geography changes across the urban landscape (Weisburd et al., 2012). Patterns emerge, dissipate, or persist; but crimes are far more predictable by place of occurrence than by a particular offender (Umar, 2020).

Jacob's book The Death and Life of Great American Cities (1961) was the first contemporary piece to show how an active street life could considerably reduce opportunities for crime. This was followed by Jeffery's book Crime Prevention through Environmental Design (1971 & 1977). Jeffery considered a broad array of environmental factors that influence offenders, including the physical environment (urban form and design), the legal environment (reinforcing rules and regulations), the economic environment and social structures and social organization. The work stimulated researchers such as the Brantingham, Felson and Clarke, as well as professionals such as planners, geographers, sociologists, psychologists and architects to study crime in relation to environmental factors (Cozens et al., 2019).

Criminal events are inseparable from the environments in which they occur. The origins, pathways, and destinations of individuals are shaped by their physical

surroundings. In urban environments, in particular, the built physical form of the city encourages (and often restricts) movement along specific, planned pathways, which connect the origin and destination points such as; residences, workplaces, schools, shopping and entertainment areas, to name a few (Boivin & D'Elia, 2017; Boivin & Felson, 2017; Frank et al. 2013). As urban structure shapes patterns of movement, so too does it shape patterns of criminal activity (Brantingham & Brantingham, 1995; Brantingham et.al. 2015; Bowers, 2010; Boivin & D'Elia, 2017; Johnson & Wuschke, 2007; Wuschke 2016; Wuschke & Bryan, 2018; Silva & li, 2020). Changes to the built urban environments, such as urban development, growth, decline or gentrification, are designed to shift the movement within and use of urban spaces; as such, these processes may have considerable impacts on the distribution of criminal activity.

Theories explaining crime pattern in urban areas

Studies in environmental criminology have also indicated that there is a strong relationship between the patterns of crime in a city and the urban form. In 1978, Paul and Patricia Brantingham studied how crime locations scatter themselves into specific patterns in relation to the variables that govern growth of cities. Older cities with concentric zonal forms have crime-locations concentrated towards the dense core of the city. The cities with mosaic patterns that are relatively newer seemed to have a scattered pattern of crime spots. The patterns of roads in a city also have a relation with the patterns of crime because the roads determine the accessibility to potential crime spots in a city. Cities built on gridiron patterns are known to have higher crime rates when compared to cities with naturally developed street layouts, (Brantingham & Brantingham, 2000, 2008; Silva & Li, 2020).

Environmental criminologist attempted to predict crime based on elements such as target distribution, land use patterns, transportation pathways, and offender residence distributions (Suryavanshi, 2001; Rengert, 2004; Wuschke & Bryan, 2019). They have proposed models of decision making that lead potential offenders to specific targets and specific locations (Brantingham & Brantingham et al. 2009; Curman et al. 2015; Brantingham & Brantingham, 2015; Hashim et al., 2019). The criminality of place is most often connected to the level of activity, ease of access, the presence of juveniles, and the presence of easy targets or victims. The sense of place is temporal by nature. People may feel fear in a dark parking lot at night, but completely safe in the same parking lot during the daytime. In essence, criminal places as well as criminal activities have a temporal dimension in accordance with environmental criminology (Meena, 2016 & Perry, 2017). Crime and urban form researches have also explored potential offender decision making by arguing that crime is associated with offender awareness of space that led to decisions about target attractiveness. Crimes occur where and when the immediate environment makes the offender feel that a crime can be committed with reasonable safety and ease. Conversely, victim decision making can affect crime patterns. Victims 'choices about where to work, shop, or play affect their chances of coming in contact with offenders (Kim, 2018 & Cozen, 2019). Several theories have emerged over time to provide comprehensive understanding on the inter play between crime and the environment, table 2.0 has provided summery of these theories and their fundamental assumptions and inherent limitations as observed by researchers.

Table 2.0: Theories explaining crime pattern in urban areas

Theories	Author (s)	Assumptions	Emerging criticisms
Opportunity Theory	Clarke, 1983; Wortly, 2008, 2010	The theory proposes that urban crime analysts should search for concentrations of offence targets and reduce the chances of re-offending. The basic assumptions here is that more opportunities lead to more crime, easier ones attract more offenders and such existence of easy opportunities makes possible for a lifestyle of crime within urban settings.	The theory attracts its own criticisms. It was considered counterproductive as it does not alter the disposition of criminals to continue offending and was also criticized on the grounds that it led to crime displacement across areas.
Social Disorganisation	(Park & burgess, 1928; Park et. al., 1969; Shaw & Mckay, 1942)	The effects of location and location specific characteristics of fragile communities such as poverty, ethnic heterogeneity, and weakened social stability influences the perpetuation of crime.	The theory has been criticized by environmental criminologist for been purely offender focused approach to investigating the occurrence of crime while ignoring the influence of built environment on crime - criminal events.
Rational Choice Theory	(Cornish & Clarke, 1986; 2008)	The theory assummes that criminals think exactly the same way as non-criminals. That crime perpetrators within urban settings intentionally choose to commit offence largely because they feel it would be more rewarding for them than non-criminal behaviour. The theory also, places greater emphasis on the influence of purposive behaviour in the risk-reward calculation of offenders.	The theory placed emphasis on impulsive behaviours of offenders in committing crime. Several critics argue that impulsive emotions can have significant effects on the predisposition to commit crime. Other critic of the theory shows that other extenuating factors may influence offenders and that they may not always act rationally.
Routine Activity Theory	(Cohen & Felson, 1979; Eck, 1995; Felson, 1995; Felson & Clark, 1998; Felson, 2008)	The theory suggests that the organization of repetitive activities in urban settings creates opportunities for crime. The assumption here is that crime occurs when: there is an offender who is motivated enough to commit a crime; there is a target against which the motivated offender can strike; a capable guardian for the potential victim is absent at the place and time when the offender strikes; there is a presence of a place manager and a handler capable to exert some control over the offender.	The theory over time has attracted a number of criticisms. This includes the assumptions that: the offender has to be motivated; it contradicts the assumptions of other criminological theories such as crime pattern theory which focus on the spreading of crime.
Crime Pattern Theory	(Branting ham & Brantingh am, 1993, 1995, 2008; Eck & Weisburd, 1994)	The underlying premise for the crime pattern theory is that crimes do not happen randomly or uniformly in time, urban space, across social groups and during daily or lifetime routines. Similarly, there are those offenders who repeatedly commit crimes within urban settings and there are targets (persons and places) that repeatedly fall victim to such crimes.	Although the theory has been popularized within the domain of environmental criminology, it still faces some criticisms. The underlying assumptions that are used to create the routine activities triangle comprising Nodes, Paths, and Edges focus largely on the behaviours of criminals and victims which can change from time to time. Consequently, the theory struggles to address the root causes of crime.
Crime Prevention Through Environmental Design (CPTED)	(Jeffery, 1971; Newman, 1972; Moffat, 1983; Cozens & Love, 2015)	The central assumptions made by CPTED is that the built environment represents an important underlying determinant of crime. The idea here is that an efficient and effective utilization of the physical environment helps to reduce crime. "There are no criminals…only environmental circumstances that result in criminal behaviour. Given the proper environmental structure, anyone will be a criminal or a non-criminal" (Jeffery, 1977, p.177).	CPTED has attracted a range of criticisms from criminologists. CPTED proposes environmental design methods such as target hardening and restrictions and control of access; some of these methods actually create urban fortresses which further entrench urban segregation. Another criticism of CPTED is that it also led to the displacement of crime.

FINDINGS AND DISCUSSIONS

Perspectives of researches on urban morphology and crime pattern

It is clear that research on Environmental Criminology has largely focused on the relationship between patterns of crime and urban form and has gained considerable attention in the last four to five decades (Cozens, 2007; Meena, 2016 and Carr, 2020; Song et.al. 2016). Advances are evident from theoretical perspectives, pointing at best approach to view and better understanding of crime events, management, prevention and control, and in terms of methodologies in conducting empirical research to test the validity of such theories. This trend has addressed a lot of pressing questions with some fascinating explanations as to why, where, when and how crimes occur. As new findings continue to emerge prompting new sets of questions, much research is still needed to provide more answers (Azande, 2015; Danis, 2012; Groff & Lockwood, 2014; Mihinjac & Saville, 2019; Umar, 2018; Zubairu, 2016).

Table 3.0: Perspectives of researches on urban morphology and crime pattern

Perspectives of Researches	Author(s)	Discussions	Limitations of the studies
Geographical	(Ahmed, 2010; Ackerman & Murray, 2004; Adel, et al., 2016; Arthur, 1994; Appiahene-Gyamfi, 1999; Emamanuel et.al, 2015; Hillier & Shu, 2000; Isin, 2012; Rengert & Brain, 2009; Ratcliffe, 2012; Song, et al., 2013a. Umar, 2017, 2020)	Urban form and pattern of crime largely focus on exploring the spatial pattern of crime in spaces over period of time, with emphasis on macro scale of analysis for the understanding of the social and spatial environmental elements that could provide explanations of crime for effective crime prevention and control.	The studies are limited to the exploration of crime pattern over space and understanding of the influence of spatial forms at neighbourhood level of analysis, ignoring the role of social indices such as poverty level, education and land use mix in explaining crime events and pattern across areas of the city.
Urban Planning	(Cozens et al., 2020; Hillier, 2008; Heidarzadeh, 2014; Kim, et al., 2017; Kim & Hipp, 2019; Lopez & Nes, 2007; Ojo & Ojewale, 2019; Satiawan, et al., 2018; Salau & Lawanson, 2010; Summers & Johnson, 2017; Wuschke, 2016; Zubairu, 2017).	Urban form and pattern of crime researches largely dwell on the impact of planning decisions on urban transformation with respect to land use change dynamics, social and physical infrastructures and safety and insecurity in cities. The focus here is on how these decisions explain crime events and distribution over space and how possible it is to plan for crime prevention and control in cities.	The studies mostly focused on micro to macro spatial design conditions which are relevant to spatial design intervention, spatial designer and spatial design prevention policy making. These explanations are limited in terms of scale of analysis to district levels without consideration to the wider city network of crime flow.
Urban design	(Arabi et al., 2020; Armitage, 2004; Azande, 2015; Beavon et al., 1994; Bowers, 2013; Brantingham & Brantingham, 1995; Crowe, 2000; Curman et al., 2015; Dwidinita et al., 2018; Frank et al., 2013; Groff, (2014; Groff & McCord, 2012; Kinney et al., 2008; Jeffery, 1992; Lin, 2010; McCord & Ratcliffe, 2009; Newman, 1996)	Urban form and crime studies largely deals with the public space network, space and place issues with respect to crime prevention through urban design. The focus of urban design studies on morphology of space and pattern of crime is to reduce the opportunities for crime through alteration of situational factors or modification of physical settings at which a crime event is likely to occur, i.e., Crime prevention through Environmental Design.	These studies consider only the physical elements at the buildings and streets level (micro scale), without making reference to the social fabrics of the places of crime events. The studies are limited to the physical fabrics of the places in terms of Target hardening, Surveillance and image of the areas, ignoring the influence of macro form elements such as connectivity to other areas and Land use dynamics of the city.
Architectural	(Bafna, 2012; Lefebvre, 1994; Legeby, 2009; Marcus, 2007; Psarra, 2009; Carr, 2020; Marzbali, et al., 2015, 2016, 2017, 2018, 2019a & 2019b; Meena, 2016; Milinjac & Saville, 2019)	Urban morphology and pattern of crime studies focus on typological process of buildings and opportunities they present to crime events in terms of attraction, prevention or control. The research concern here is on how building design and construction as well as organised open spaces attracts crime or deter crime in areas and what inform a better design of buildings and Spaces for crime prevention and control.	Most of these studies evaluated the role of Crime prevention through environmental design (CPTED) models in understanding the crime pattern, fear of crime and victimization across areas. The studies largely looked into the CPTED suitability and applicability in crime prevention while under plying the model's adaptability to different urban forms.

It is important, however, to note that contributions to this field of research have been approached from different disciplinary perspectives, such as; Geography, Urban Planning, Urban Design and Architecture, to explore the interaction of crime with space through morphological analysis of places (Groff and Lockwood, 2014; Kamalipour et al., 2012; Kamalipour et al., 2014; McCord & Ratcliffe, 2007; Kinney et al., 2008; Perry, M.A., 2017; Wuschke, 2016). However, table 3.0. indicated that, even within these professional disciplines there are lots of variation in context in terms of research focus.

LIMITATIONS OF RESEARCHES ON URBAN MORPHOLOGY AND CRIME PATTERN

Lynch, 1960 and Jacobs, 1961 has identified the critical role of urban planning in explaining urban crime, violence and juvenile as well as a profession that provides a viable opportunity and environment for prevention, management and control of deviance in urban areas (Moudon, 1997). Since then, the study of crime has become a research interest to several urban researchers, such as; (Adel et.al., 2016; Ahmed, 2010; Azande 2015; Cozens, 2008; Felson and Boivin, 2015; Kalimapour et.al., 2014; Kropf, 2001; Larkham, 2005; Umar, 2017; Whitehand, 1981). Most of these studies examined crime in the context of urban morphology and draw understanding on the explanation of crime events and pattern in urban areas. Though the studies vary in the context of morphological analysis and approaches adopted. According to the morphological theory, for effective explanation to be provided through morphological analysis on crime pattern, it is necessary to consider all the fundamental elements of form, resolution (scale) and time (history) (Conzens, 2001, 2005, 2008; Kumar & Borbor, 2018; Moudon, 1997; Wharton, 2005; Whitehand, 1981, 2005).

Moreover, most studies adopt different elements for consideration in the analysis from which explanations were drawn. For instance, using police recorded data (1980 – 1996), the PhD work of Appiahene–Gyamfi applied morphological approaches to examine the spatial ecology of six crime types in Ghana (Appiahene–Gyamfi, 1999). Although much of the analyses presented in that work were descriptive, the findings suggested that crime is unevenly distributed across regions of Ghana. Considering the patterns of journey to crime in the city of Accra, the study also revealed that suspected burglars lived in slum neighbourhoods but travelled to planned neighbourhoods to commit burglary offences (Owusu et al., 2015). The study adopted crime ridges theory which seek to explain pattern of crime in spaces by exploring journey to crime areas; and is limited to only elements of form and resolution (scale) ignoring the role of time (historical transformation) of areas.

Suryavanshi (2001), studied urban morphology and opportunities for crime in the cities of Sarasota Florida and Boston. The study used elements of form (Land uses) and history of city transformation to draw understanding of the crime pattern in the areas of the cities, the morphogenic factors responsible for the spread of crime events. The study is limited to only land uses and how the transformation of land uses influences change in the form of areas and how the form informed the crime events in the hot spots studied.

In a Ph.D work by Armitage (2004) attempts were made looking into the performance of an existing crime prevention programme "Secured by Design (SBD)" in areas of Huddersfield UK. The research examined the history of crime and the programme, the current practices and the possible future challenges of the programme. The work is a morphological study of crime places in the areas of the city, and its focus were mainly on the micro scale analysis of the selected estates and as well as planning history for the understanding of the current situation of crime incidences within the areas studied. Less emphasis was given to the physical form of the study areas; therefore, the study was limited to the understanding of the crime in places rather than influence of flow of people and activities on the crime events in the city.

The analysis made by (Ahmed, 2010), examined the pattern of crime distribution in Osun State of Nigeria over a period of Fifteen years (1985-2000). The study was limited to the understanding of pattern and distribution of crime incidence in the areas of the state. Moreover, the morphological elements used in the study were scale (neighbourhoods and local governments) and history of crime locations or areas; ignoring the roles of elements of form in providing adequate explanation on the pattern and distribution of crime incidences across areas of the state.

Crime spatial analysis were carried out in Akure Town, Ondo state of Nigeria by (Emmanuel, et.al, 2015), to established the factors responsible for the spatial spread of crime activities in the town; focused mainly on the spatial analysis of the spread of the factors of crime activities in the area. The study used only element of scale in analyzing the morphology of the areas in explaining the spread of crime activities across space; hence ignoring the elements of form and time which could have provided an in depth understanding on the geographic spread of crime activities in the areas of the town and also inform better policy decisions on prevention and control measures to be taken.

The applicability of CPTED in city of Accra, Ghana was studied by (Owusu et al., 2015), the study found that rising crime rates in the city of Accra has led to the adoption of target hardening measures (e.g., use of burglary– proofed windows, high walls, security doors etc.). Responding to crime through these measures in the context of Ghana, however, has had limited impact on the rates of crime in communities and in the long term, has tendency to weaken social cohesion among communities. The study explored the applicability of Target hardening component of Crime prevention through Environmental Design with respect to understanding its impact on crime control in communities of Accra Ghana. The study considered only spatial scale and history of community transformation, while ignoring the role of form of spaces in explaining the crime pattern across communities in Accra Ghana.

The applicability of Territoriality principle of CPTED were looked at by (Azande, 2015) in Makurdi Town with the view of establishing its effectiveness in reducing the crime prevalence in the High, Medium and Low-income residential areas of Makurdi town, Benue state of Nigeria. The work dwell on the statistical tests to measure its applicability and effectiveness. The findings indicated that there is no variation of the effectiveness of the application of the principle among the three categories of selected residential areas. The study concluded with a call for further

studies to conduct an in-depth micro and macro analysis of residential areas so as to provide better explanation on how best to apply the CPTED approach for effective crime prevention and mitigation in Nigerian cities. Again, this research focuses mainly on form and scale ignoring the influence of the historical transformation of the area on crime prevalence.

In a PhD work by (Wuschke, 2016), the connections between urban space, development and pattern of crime in the selected areas of cities of Coquitlam and Port Coquitlam BC, Canada were examined. The study was able to establish that, built urban environment influences the spatial distribution of criminal activity. Common activity nodes are clustered in specific urban areas, drawing individuals from within and beyond municipal boundaries for legitimate, daily needs; and the importance of locally based, micro-scale analysis when exploring connections between crime and the urban environment. Despite these explorations, the study has not provided explanation on the transformation process of the form of the areas of the cities studied for drawing adequate understanding of the flow of crime activities beyond boundaries for driving effective planning policy for effective crime prevention and control.

The PhD. work of (Umar, 2017), specifically looked into utility of the Euro-American theories in explaining spatial pattern of crime in developing cities, using Kaduna metropolis, Nigeria as a case study. The work was purely based on statistical test, and hypotheses were tested regarding (a) whether the; law of crime concentration at places applies in the context of Nigeria and (b) the utility of the two main theoretical perspectives. The study adopted two environmental criminological perspectives; opportunity and social disorganization in explaining variations in the rates of urban crime supported by morphological analytical approaches of form and scale. The results of the findings were mixed, supporting premise of such theories in some cases but and different in others. The study made a novel exploration on spatial criminological research in developing countries, but yet could have done much better if it had extended the analysis to include the urban transformation process over time that brought about changes in the form and explanations drivable from that would have inform better planning policy for prevention and control of crime in the city.

The Ph.D. research by (Kim, 2018), further elaborated the relationship between urban environment and crime pattern in cities. Kim examined how the Land uses, street network connectivity, and physical boundaries in urban settings dictate the activity patterns of persons; and thus, influence spatial crime patterns. The research made remarkable contributions to the understanding of the roles of urban form and structure in explaining varied crime patterns in urban areas, yet less attention was paid by the study in distinguishing the specific characteristics of the physical environment that is of utmost important for the understanding of crime location and patterning in cities.

The study on the influence of Urbanization on Urban crime is the work by (Ojo & Ojewale, 2019). The research made an in-depth exploration on the relationship between urbanization and Crime in some selected Nigerian cities. The study offered theoretical and empirical explanations of the factors within the Urban environment in Nigerian cities that shape and are shaped by criminal activities. The

data used for the empirical analysis to arrive at the conclusions were drawn from Police crime records which were poorly recorded, were scanty and does not represent the true situation of crime events on ground across the sample areas used in the study. The main limitation of the study is under playing the importance of understanding the relationship between the Built environmental transformation as influenced by Urbanization processes and Urban crime pattern.

Several researches were carried out to further understand Urban crime occurrences in relation to built environmental characteristics (Urban Morphology) and its implications on the future of Urban design strategies in cities, one of which is the work by (Silva & Li, 2020). Silva and Li attempted to further explore the influence of the built environmental elements on urban crime occurrences and how the understandings of the factors will inform the future urban design strategies using African cities as case study. The research further developed a set of Urban Environmental Quality Indicators (UBEIs) for the cities under study based on the two data sets: Building footprints and Road networks at the neighbourhood level across the studied areas. The research concluded that, the physical form of the urban built environment is substantially associated with the crime rates. The limitation of the research is that the spatial mobility of crime across areas were not captured in the variables used in the analysis, and this limits the findings on understanding the flow of crime across neighbourhoods and the built environmental characteristics that drives the flow and the factors responsible for the spatial variation of crime rates across space.

Recently, (Carr, 2020), in a thesis argued that Crime Prevention Through Environmental Design (CPTED) results to the development of Hostile Urban Architecture that excludes the major segment of the community in an attempt to instill crime preventive mechanisms in place for the few. The study further argued to justify that much has not been achieved in terms of crime reduction in the areas were CPTED were implemented, but rather exclusion of the Urban majority from getting access to the shared Urban public spaces. The researched concluded that, the proponents of CPTED: Jacobs, Newman, Jeffery, Cozens and a host of others attempted to established a program to enhance public security and safety through the manipulation of the built environment, but instead researched has established that they only end up with a dangerous precedent for urban public space. The study was limited in focus to the impact CPTED implementation on the Urban public spaces rather than looking at it in the context of Urban built environment and its influence on manipulating the built environmental characteristics towards achieving an improved secured habitation for people.

In summary, a number of common themes emerged from within the focused body of these researches exploring crime within the context of built urban form. First, while consistencies exist across a number of urban areas, key environmental features can have different associations with crime patterns in different urban environments (Ahmed, 2010; Arabi et al., 2020; Bolton, et.al., 2017; Carr, 2020; Chiodi, 2015; Erdogan & Erkan, 2020; Frank et al., 2013; Hashim et al., 2019; Heidarzadeh, 2014; Hipp, et.al., 2018; Kim, 2018; Kim & Hipp, 2019; Nangia, et.al., 2019; Ojo & Ojewale, 2019; Perkins et al., 2009; Siti & Abdullahi, 2012; Silva & Li, 2020; Song et al., 2016; Taylor & Harrell, 1996; Umar, 2018, 2020; Wuscke & Bryan, 2018). However, while such findings have clear potential value to Planners, Urban

designers and policy makers alike, there is still inadequate understanding of the influence of urban morphology on crime pattern in our cities as established in the previous studies. There is absence of an existing study that explore adequately the morphology of urban spaces and crime pattern in the context of form, scale and time, therefore there is an existing gap in the literature that needs to be filled by future researches so as to provide better understanding of local crime pattern for effective crime prevention and management in our towns and cities.

CONCLUSION

Urban crime has largely been addressed with different approaches to the conception of crime and its main initiatives. However, the growing body of knowledge in the studies of urban crime refers to the social and spatiality aspects of the problem in the cities worldwide. While different approaches to the study of crime do exist as identified in the paper, it is possible to denote that urban crime pattern cannot be thoroughly explored in the absence of social constructs and spatial features of spaces in the context of form, scale and time. Furthermore, the issue of urban crime is multidimensional. That is why any desire for planning and designing a safe place in cities should incorporates functional and morphological analysis of the urban environment. Therefore, there is need for further researches to focus on providing explanation on the relationship between morphological character of spaces and the pattern of crime in places within the context of urban environment. This is with the view of actualizing the Sustainable Development Goals (SDGs) and mainstreaming the mandates of New urban Agenda towards realizing the safe city and crime resiliency in our cities.

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