Environmental Design Interventions on Crime Prevention: Perceived Safety in Urban Residential Developments in Awka, Nigeria

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Abstract
The study evaluates the perceptions of residents on the effectiveness of the environmental design interventions for crime prevention in urban residential developments in Awka, Nigeria. This paper explores the relationship between physical and social characteristics of residential environments and perceived safety of residents. The study design was a cross-sectional survey. Data were collected through structured questionnaires administered to adult residents in selected urban residential neighbourhoods in Awka. A total of 345 valid answers were obtained and analysed out of 400 questionnaires distributed. Residents' assessments of environmental design interventions and their relationship with perceived safety were examined using descriptive statistics, Pearson correlation and multiple regression. In addition, open-ended responses were analysed to give contextual meaning to the quantitative findings. Residents generally linked improvements in environmental conditions with greater perceptions of safety. Street lighting and natural surveillance were rated particularly highly. Street lighting had a strong correlation with perceived safety ($r = 0.742$, $p < 0.001$) and natural surveillance had a strong positive relationship with perceived safety ($r = 0.697$, $p = 0.001$). There was a negative correlation between fear of crime and environmental maintenance ($r = -0.631$, $p = 0.002$). The regression model accounted for 65.9 per cent of the variance in perceived safety. Street lighting was the strongest predictor ($\beta = 0.421$) followed by natural surveillance ($\beta = 0.318$).
Keywords: Crime prevention, Environmental design, Perceived safety, CPTED, Residential neighbourhoods

Introduction

Urban residential settings are not neutral contexts regarding crime and safety. The design of streets, buildings, entrances, boundaries, lighting, public spaces and opportunities for informal observation can affect how people move through and use neighbourhoods, and therefore how secure they feel in them. Environmental criminology has long recognised the link between place and crime, and research in architecture and planning has increasingly examined how physical environments can reduce opportunities for crime and strengthen residents' confidence in their surroundings (Newman, 1972; Cozens and Love, 2015).

The importance of this relationship is most evident in growing cities where the provision and maintenance of supporting infrastructure may lag behind residential development. Dark streets, concealed areas, blurred public and private spaces, vacant buildings and public spaces in disrepair in these places can form conditions that residents associate with vulnerability (Roude et al., 2024). Conversely, conditions stimulating visibility, territorial definition, active use and informal surveillance may enhance confidence and reduce opportunities for concealment (Lorenc et al., 2013). Jacobs (1961) famously emphasised the importance of everyday social observation in the urban street. Newman's (1972) theory of defensible space linked the physical organization of residential environments with territoriality, surveillance and the ability of residents to exert informal control. Crime Prevention Through Environmental Design (CPTED) developed from these larger concerns and posits that the built environment can be intentionally structured to create opportunities for offending. The usual CPTED principles are natural surveillance, access control, territorial reinforcement, and maintenance. Since then, the approach has been expanded to incorporate social cohesion, community participation and wider environmental and social conditions (Cozens and Love, 2015). This is particularly true in residential development where safety is not merely the presence or absence of physical barriers or formal security systems but also the ability of residents to see, understand, occupy and exercise a degree of ownership over their environment.

Lighting is one of the environmental interventions with a fairly good empirical evidence base. Studies of improved street lighting have found effects on residents' perceptions and use of neighbourhood spaces and in some settings reductions in crime (Welsh and Farrington, 2008). More recent work continues to show that lighting can affect how people evaluate urban environments after dark, although the relationship is not simply a matter of increasing illumination; visibility, spatial context, activity and users' characteristics also matter. The point is that an environment can be technically illuminated but psychologically uncomfortable or visually difficult to navigate.
Environmental approaches to crime prevention also feature natural surveillance. The basic idea is simple: environments that allow residents and legitimate users to view streets, entrances and shared spaces reduce opportunities for concealment and can increase perceived chances of detection. But surveillance is not just the installation of cameras or the deployment of guards. Street-oriented windows, clear sight lines, active frontages

and appropriate building-street relationships can encourage continuous informal observation. These features illustrate the wider argument that urban safety does not have to be a matter of security technology, but can also be derived from banal forms of occupation and interaction (Jacobs, 1961; Cozens and Love, 2015). Maintenance is an important, though sometimes underestimated, dimension. Degradation of the environment can indicate neglect, reduce feelings of ownership and undermine confidence in residents or authorities to manage a place. The link between disorder and fear of crime has been widely discussed, yet there is consistent evidence that environmental factors shape people's perception of risk and of the quality of their environment (Wilson and Kelling, 2010; Lorenc et al., 2013). The practical implications for residential neighbourhoods indicate the inability to divorce safety-oriented design from the ability to maintain the created spaces.

These issues are of particular importance to Awka, rapidly growing urban area, southeastern Nigeria. It is the capital of Anambra State. The growth in residential development has resulted in a diverse urban landscape of established neighbourhoods, expanding residential areas and developments with varying levels of infrastructure, surveillance and environmental management. The article is based on a thesis that found poor lighting, poor visibility, environmental neglect and weaknesses in surveillance were recurring concerns of residents. The empirical findings further revealed that residents generally felt safer in the day than they did at night, suggesting that temporal variation in visibility and activity matters to local perceptions of security.

The international literature on CPTED and environmental crime prevention is well established, but evidence from Nigerian residential environments is comparatively sparse, especially evidence that explores the relative importance of different environmental interventions from the perspective of residents. Most of the discussion of urban insecurity in Nigeria has been around policing, socioeconomic conditions or physical security. Less systematic attention has been accorded to the everyday relationship between residential design and perceived safety. This makes it necessary to provide contextual evidence that can assist in architectural and urban planning decisions.

This means that this study addresses the following research question: Which environmental design interventions are regarded by the residents as the most effective in preventing crime and enhancing perceived safety in urban residential developments in Awka, Nigeria? The study contributes to the literature by moving beyond the general statement that design matters, and examining what interventions are most strongly associated with perceived safety in the study area. Street lighting, natural surveillance, environmental maintenance, physical barriers and community participation are given special emphasis.

Literature Review

Environmental design and crime prevention

The idea that the physical environment might have an impact on crime has been shaped through a variety of related theoretical traditions. Environmental criminology focuses on the spatial and situational circumstances in which crime takes place, whereas urban design approaches examine how the organization of space can enable observation, movement, and territorial behaviour (Piroozfar et al., 2019). However, these views do not suggest that architecture is an independent cause of crime, apart from social and economic conditions. Instead, they highlight that environmental features can influence opportunities, guardianship, and perceptions of risk.

The defensible space theory of Newman (1972) was particularly influential in linking the design of residential space with informal social control. Newman argued that environments could be designed to foster stronger feelings of ownership and responsibility among residents for identifiable areas. The theory comprised territory definition, surveillance, image and milieu. Though elements of defensible space have been criticised and refined over time, the fundamental notion that spatial organization affects residents' capacity to watch and control their environment continues to be influential in environmental design research.

A different, but complementary, perspective on urban safety was offered by Jacobs (1961). Her emphasis on lively streets and average observers implied that safety is partially constructed by everyday urban life. Streets that are occupied and have visual connections with the surrounding buildings and a variety of activities are more likely to be subject to informal surveillance than spaces that are isolated and inactive.

CPTED then pulled these ideas together into a more explicit framework for crime prevention. The approach focuses on changing environmental features to enhance surveillance, strengthen territoriality, restrict access, and communicate care and ownership (Cozens and Love, 2015). Crucially, the contemporary CPTED has moved beyond a physicalism reading. The physical design needs active users and institutions to sustain it. Environmental interventions can be more effective when social relationships, community participation and local ownership are enhanced.

Perceived safety and the built environment

Actual crime and perceived safety are related but different outcomes. Some residents in high crime areas may feel safe due to familiarity, social networks or strong territorial attachment, while residents may feel unsafe in places where recorded crime is relatively low. Perceived safety is therefore an important measure of people's experience of their environments.

Personal experience, social vulnerability, environmental cues and perceptions of disorder affect fear of crime. Lorenc et al (2013) systematic review of environmental interventions found evidence that changes to physical environments can affect health, wellbeing and perceptions of safety, though effects vary across settings and interventions. This points out the value of considering safety as a multifaceted experience rather than solely a reflection of crime statistics.

Gender is important, as well. Women tend to express more concern about personal safety in public and semi-public spaces, in part because the risks of harassment and interpersonal violence influence how spaces are felt (Mela and Tousi , 2023). The present study found the same gender differences, with male respondents reporting somewhat higher perceived safety than female respondents. The finding suggests that environmental design should be evaluated not only for its physical features, but for the experience of those features by different groups.

Street lighting and visibility

Light plays a special role in preventing environmental crime because it directly affects the visual conditions of streets and public spaces when they are used after dark. Painter and Farrington (1999) found that better street lighting could reduce fear of crime and influence residents' use of neighbourhood space. Welsh and Farrington (2008) in a later systematic review found that better street lighting was associated with less property crime in the areas they studied.

The mechanisms involved could be both physical and social. Better illumination will increase visibility, reduce opportunities for concealment, and improve recognition of people and activities. It can also communicate that a street is attended and for legitimate use. However, lighting alone does not guarantee safety. Poorly placed lights, shadows from vegetation or buildings, and lighting that only illuminates isolated areas may leave critical vulnerabilities unaddressed.

This difference is especially important for residential developments in Awka, where nighttime safety was considerably lower than daytime safety in the survey. The responses of the residents suggest that lighting is not only appreciated because it makes spaces brighter, but also because it changes the conditions under which people can see and also be seen.

Natural surveillance, territoriality and access control

Natural surveillance entails setting up structures and areas so that authorised users can watch what goes on within and outside of them (Cozens, 2008). Open sightlines, translucent boundaries, street-facing windows, suitable building orientation, and active edges are some ways to promote it. Because observation is ingrained in everyday residential patterns, these tactics supplement formal monitoring.

The process by which territorial reinforcement operates is distinct but connected. Public, semi-public, and private spaces can be distinguished by clearly defined boundaries, which also increase the visibility of illegal movement. Therefore, fences, gates, walls, and regulated access can reinforce the idea that a location belongs to a specific group. However, if excessive enclosure results in dead ends, inactive edges, or visible obstacles that compromise natural observation, it may have unforeseen repercussions.

In Nigerian cities, where perimeter walls and gated compounds are typical reactions to insecurity, this tension is significant. Physical security may provide comfort, but how it interacts with visibility, accessibility, and communal life determines how effective it is. Therefore, balanced design is preferred over indiscriminate hardening of the built environment in contemporary CPTED (Cozens and Love, 2015).

Maintenance, disorder and community participation

An essential link between social control and physical design is maintenance. When a well-designed street is neglected, many of the features that once promoted safety may gradually disappear. Sightlines can be blocked by overgrown vegetation, dark spots can be created by broken lighting, collected trash can convey neglect, and hidden or dormant spaces can be created by abandoned buildings.

According to the Broken Windows thesis, observable disorder can convey a lack of social control, which can lead to additional disorder and insecurity (Wilson and Kelling, 2010). Although the original formulation's causative assertions have been contested, the wider connection between environmental factors and safety perceptions is still pertinent. This implies that long-term management, not just initial building, must be taken into account while designing for architectural practice.

Participation from the community adds another level. Social coherence, community identity, and resident involvement are given more weight in second-generation CPTED. The significance of collective efficacy, the

ability of neighbours to work together to uphold social order, was illustrated by Rupp et al. (2020). Opportunities for this kind of connection can be created by environmental design, but participation also depends on communication, trust, and local institutional competence. According to the literature, a single intervention is unlikely to produce domestic safety. Instead, community involvement, upkeep, lighting, surveillance, and territorial definition all function as mutually reinforcing components. For the Awka setting, the question that still needs to be answered is which of these qualities the locals believe to be most important.

Methodology

Research design

The study used a cross-sectional survey approach that included open-ended questions in addition to quantitative analysis. This strategy was chosen since the main research issue focuses on how residents evaluate environmental improvements and perceive safety in particular living settings. A systematic questionnaire was utilised in the quantitative component to get uniform answers from the residents. The questionnaire asked about perceived safety, community involvement, environmental design features, and the perceived efficacy of crime-prevention strategies. In order to enable respondents to pinpoint the aspects of their surroundings that made them feel safe or unsafe and to recommend changes, open-ended questions were used.

Sampling and sample size

The target population was adults living in urban Awka who were sufficiently familiar with their neighborhoods to assess local safety and environmental conditions. The respondents were to be at least 18 years old, resident in Awka and have stayed in the area for more than one year. The respondents were selected using purposive sampling. This non-probability approach was deemed appropriate because the study required participants with direct as well as sustained experience in the residential environments being examined. Thus, the sampling targeted residents, and not temporary users or visitors. The participants were not selected by probability sampling and hence the study does not claim statistical representativeness of all adult residents of Awka.

The sample size was calculated by applying the formula of Yamane, $n=\frac{N}{(1+N(e)^2)}$, with an estimated adult population of 310,080 and a 5% margin of error. This resulted in a minimum sample size of about 400 responders. As a result, 400 questionnaires were dispersed throughout a few Awka residential neighborhoods. 362 of these were recovered, but 17 were eliminated during data screening due to significant omissions or inconsistent answers. The final dataset comprised 345 valid questionnaires, representing 86.3% of the questionnaires distributed. Variations in age, gender, and residential experience could be taken into account because respondents represented a variety of demographic categories. Five-point response scales were utilised in the survey. Responses to the environmental intervention questions ranged from 1 (very low perceived effectiveness) to 5 (very high perceived effectiveness). Five-point agreement scales were also utilised for safety perception items.

Study area

The study was carried out in Awka, the capital of Anambra State, Nigeria. Awka was chosen because of the variety of its residential settings and its ongoing physical growth. The city has both well-established residential neighbourhoods and rapidly developing sections, resulting in differences in infrastructure, boundaries, construction patterns, street conditions, and surveillance options. The study focused on adults living in Awka urban residential development. In order to give accurate assessments of neighbourhood safety and environmental conditions, respondents had to be sufficiently familiar with their home surroundings.

Data analysis

Respondents' evaluations of perceived safety and environmental design initiatives were compiled using descriptive statistics. Relationships between specific environmental factors and perceived safety were evaluated using Pearson product-moment correlation. The combined predictive contribution of street illumination, natural monitoring, upkeep, physical obstacles, and community involvement was then investigated using multiple regression.

At $p < 0.05$, statistical significance was evaluated. Rather than producing a stand-alone qualitative theory, open-ended responses were evaluated thematically and utilised mainly to contextualise and interpret the quantitative data.

Instrument validity and reliability

The questionnaire was constructed from the study objectives and the principles of Crime Prevention Through Environmental Design (CPTED). Items on perceived safety, environmental design characteristics and community surveillance were included. Content validity was assessed by expert review of the questionnaire to evaluate the clarity, relevance, as well as adequacy of the items in relation to the study objectives. The instrument was then

pilot tested on a small sample of respondents, and the feedback obtained from the pilot exercise was used to refine the wording and structure of the questionnaire before the main survey.
Completed questionnaires were screened for missing responses, multiple markings, and inconsistent response patterns for the main survey. Of 362 questionnaires collected 17 were excluded due to significant omissions and inconsistencies. 345 questionnaires were utilized for analysis. Cronbach's alpha was also used to assess internal consistency for the suggested multi-item constructs.

Results

Perceived safety in residential environments

The findings show a distinct variation in how people perceive safety during the day and at night. The mean safety score for respondents was 3.95 during the day and 3.14 at night. As a result, while inhabitants felt largely safe during the day, their sense of security was significantly lower at night. This distinction is crucial to comprehending the function of environmental design. During the day, several forms of informal surveillance are provided by natural light, pedestrian movement, and everyday social interaction. These circumstances become more reliant on artificial lighting, visibility, and the continuous presence of authorised users at night. Despite particular concerns about nighttime conditions, the overall feeling of security recorded a mean score of 3.73, indicating that respondents generally considered their areas to be relatively secure.

Residents' assessment of environmental design interventions

With a mean score of 3.89, street lighting was among the most highly regarded environmental measures. The mean score for natural surveillance elements, such as windows facing the street, and unobstructed visibility, was 3.81.
Residents viewed fences, gates, and clearly defined boundaries as helpful safety measures, as seen by the comparatively high mean score of 3.73 for physical barriers and boundary definition. A more moderate mean of 3.30 was obtained via maintenance and cleanliness. This does not mean that locals did not think maintenance was vital. Instead, the findings indicate that illumination, monitoring, and territorial definition were more highly regarded as independent crime-prevention measures than environmental maintenance. However, the correlation data later show how important it is to fear of crime.
The mean score for park, plaza, and public area accessibility was 3.32, indicating a modest evaluation. This suggests that while accessibility in public areas may encourage social contact and surveillance, it does not always result in a strong sense of security if it is not properly maintained or supervised.

Relationships between environmental interventions and perceived safety

Stronger proof of the connections between particular interventions and safety perception is provided by the correlation analysis.

Table I. Correlations between environmental variables and perceived safety

S/N	Variable	Correlation with perceived safety	p-value	Interpretation
1	Street lighting	0.742	<0.001	Strong positive relationship
2	Natural surveillance	0.697	0.001	Strong positive relationship
3	Maintenance and cleanliness	−0.631	0.002	Significant relationship with fear of crime
4	Community participation	0.664	0.001	Strong positive relationship

Source: Author's field survey (2026)

When the maintenance measure was compared to the fear of crime, the negative coefficient showed that lower fear was linked to better maintenance. Perceived safety was most strongly correlated with street lighting ($r = 0.742$, $p < 0.001$). About 55.1% of the variation in perceived safety was correlated with variation in the lighting measure, according to the squared correlation coefficient. Instead of proving that illumination alone accounts for 55.1% of safety modifications, this should be seen as an association.
Additionally, there was a significant positive correlation between perceived safety and natural surveillance ($r = 0.697$, $p = 0.001$). The outcome demonstrates how the importance of residents' ability to see and be seen in their communities. Fear of crime was substantially correlated with environmental maintenance ($r = −0.631$, $p = 0.002$). The relationship's direction suggests that while poorer maintenance was linked to more worry, better

environmental conditions were linked to less dread. Perceived safety and community involvement were positively correlated ($r = 0.664$, $p = 0.001$). This suggests that physical design is not the only factor influencing safety perceptions. Residents' perception of security is also influenced by neighbourhood engagement, collaboration, and group surveillance.

Predictors of perceived safety

A multiple regression model was used to examine the combined influence of five variables: street lighting, natural surveillance, maintenance, physical barriers and community participation.

Table II. Multiple regression model predicting perceived safety

S/N	Predictor	Standardised β	t-value	p-value
1	Street lighting	0.421	5.87	<0.001
2	Natural surveillance	0.318	4.92	0.001
3	Maintenance	0.241	3.74	0.003
4	Physical barriers	0.194	2.91	0.005
5	Community participation	0.287	4.16	0.002

Source: Authors' field survey (2026)

$R = 0.812$; $R^2 = 0.659$; Adjusted $R^2 = 0.649$

The regression model explained 65.9% of the variance in perceived safety and yielded a significant multiple correlation ($R = 0.812$). At the 0.05 level, each of the five predictors was statistically significant.

Street lighting was the model's strongest predictor, with the largest standardised coefficient ($\beta = 0.421$). The next most statistically significant factor was natural surveillance ($\beta = 0.318$), followed by community involvement ($\beta = 0.287$), maintenance ($\beta = 0.241$), and physical obstacles ($\beta = 0.194$). The outcome is noteworthy because it implies that a mix of social and physical factors affect residents' feelings of safety. The model places quantifiable weight on community involvement and environmental management, even if lighting and surveillance were the best predictors.

Residents' explanations of safety and insecurity

The statistical findings are supported by the open-ended answers. Adequate street lighting was noted by 69.9% of respondents as a factor that made them feel safe, while security guards or CCTV were mentioned by 61.4%. 57.4% identified active neighbours and community cooperation, 47.5% identified police patrols, 43.2% identified open layouts and good visibility, 38.3% identified walled compounds and gates, and 34.2% identified a well-maintained environment.

A similar pattern from the other direction was seen in the responses pertaining to insecurity. 68.4% of respondents reported poor street lighting, which was followed by abandoned buildings (53.3%), theft and burglary experiences (50.1%), poor police response (46.1%), isolated streets and dark corners (44.1%), and poor road conditions (35.1%).

These answers are helpful because they demonstrate how participants relate ordinary sensations of safety to physical conditions. Residents' descriptions of what makes a neighbourhood seem safe or unsafe frequently mentioned lighting, which was not only given high ratings in the questionnaire.

Discussion

The main conclusion of this study is that inhabitants' perceptions of safety in the chosen residential settings in Awka are highly correlated with environmental design. All five of the model's predictors were statistically significant, and the regression model explained 65.9% of the variance in felt safety. This offers empirical backing for the more general idea that underpins CPTED and defensible space: how residential spaces are managed and organised can influence people' perceptions of security. However, the outcome needs to be carefully evaluated. Instead of measuring documented crime before and after environmental improvements, the study assesses perceived safety and efficacy. Consequently, the results show that citizens' perceptions and environmental features are strongly correlated, but they do not prove that any one solution reduced real crime on its own. This distinction is crucial because, in addition to physical design, socioeconomic, institutional, and situational factors also influence crime.

Street lighting as the strongest predictor

The best indicator of felt safety was found to be street illumination. Its regression coefficient ($\beta = 0.421$), substantial association with felt safety ($r = 0.742$), and comparatively high mean rating (3.89) are mutually consistent.

This result is in line with previous research showing that both crime and fear of crime can be influenced by better illumination. While Welsh and Farrington (2008) found evidence of crime reduction connected with enhanced street lighting across the interventions covered in their systematic review, Painter and Farrington (1999) showed how improved street lighting can change citizens' attitudes and behaviour.

Additionally, the Awka discoveries provide this material a contextual component. Poor lighting was the most commonly mentioned factor linked to feeling unsafe; residents did not merely perceive adequate lighting as a desirable luxury. The drop in felt safety from a daytime mean of 3.95 to a nighttime mean of 3.14 makes this especially noteworthy. Lighting should therefore be considered a fundamental safety infrastructure rather than an afterthought when it comes to residential development planning in Awka.

The results, however, do not support the installation of illumination in an arbitrary manner. Lighting system design, placement, continuity, and upkeep are important. Pedestrian pathways, entrances, junctions, common areas, and other locations where visibility is crucial should all have sufficient lighting. Additionally, it should cooperate with landscaping and building orientation to prevent deep shadows or concealed areas.

Natural surveillance and the architecture of visibility

The second best indicator of perceived safety was natural surveillance. Its connection with felt safety ($r = 0.697$) and regression coefficient ($\beta = 0.318$) show how much residents value being able to view their surroundings.

The outcome is in line with defensible space theory, which connects visibility and territorial awareness to inhabitants' ability to keep an eye on their surroundings, and Jacobs' emphasis on lively streets. Additionally, it is consistent with CPTED's focus on limiting options for concealment and boosting genuine observation (Cozens and Love, 2015).

This finding directly affects architects. Site planning, building orientation, fenestration, entrances, and public-private transitions should all take natural surveillance into account. While windows and balconies in residential buildings provide views of public areas and roadways, they may be used for surveillance. However, pursuing visual permeability should not come at the expense of privacy. Establishing practical visibility while maintaining suitable barriers between homes and public spaces is the design problem. The results also imply that CCTV is not the only form of surveillance. The robust performance of natural monitoring shows that passive and ongoing observation integrated into the building is still crucial, even though people appreciated security technologies.

Maintenance as a safety intervention

Although maintenance yielded a more mild descriptive rating, there was a statistically significant correlation between it and fear of crime. Better environmental upkeep was linked to less fear, according to the negative correlation.

This result is consistent with the larger body of research on environmental disorder and feelings of insecurity. One significant explanation was offered by Wilson and Kelling's Broken Windows theory (2010), albeit several of its causal assumptions have been called into question by further research. The study's most convincing conclusion is that citizens' perceptions of neighbourhood safety are influenced by visible environmental conditions.

The practical implication is simple: a maintenance strategy should be incorporated into crime-sensitive design. The safety features of an otherwise well-planned residential complex might be gradually compromised by unrepaired streetlights, sightline-obstructing landscaping, dilapidated fences, inadequate drainage, accumulating trash, and deteriorated public areas. Therefore, maintenance should be considered from the beginning while making design decisions. Durability, repairability, and local management capability should be taken into account when choosing materials, landscape treatments, lighting systems, and public space arrangements.

Territorial reinforcement and physical barriers

With a mean score of 3.73, physical barriers and boundary definition continued to be a statistically significant predictor of perceived safety ($\beta = 0.194$). This validates the defensible space theory's territorial component. In actuality, fences, gates, and clearly marked entrances can make anomalous access more obvious and assist locals in identifying places under specific ownership or supervision. Such features can also offer psychological comfort to residents who are worried about burglaries and unlawful entry.

However, the lower regression coefficient when compared to natural monitoring and lighting indicates that enclosure should not be considered the primary response to insecurity. Excessive perimeter walls or opaque barriers might create inactive margins, separate buildings from streets, and decrease visibility. The very surveillance opportunities that CPTED aims to improve may be compromised by this. Therefore, adding more walls and gates is not the proper architectural approach. Rather, dynamic building-street linkages, restricted but readable entrances, and visual permeability should be integrated with territorial definition.

The social dimension of residential safety

Both the correlation and regression analyses revealed statistically significant community participation. Its regression coefficient ($\beta = 0.287$) was greater than that of maintenance and physical obstacles, indicating that social aspects are still significant even in an environmental design-focused study.

This result is consistent with both collective efficacy theory and the development of second-generation CPTED. Rupp et al. (2020) demonstrated the relationship between social order and crime outcomes and the neighborhood's potential for collective action. From a design standpoint, this means that instead of considering residents as passive beneficiaries of security measures, neighbourhoods should offer chances for meaningful involvement and shared ownership. This perspective is supported by the open-ended responses. Active neighbours and community cooperation were cited by more than half of respondents as elements that contribute to a sense of safety. This implies that social organization and physical design should be taken into account jointly.

Implications for residential development in Awka

When considered collectively, the results suggest an integrated safety strategy as opposed to a single design solution. Visibility and lighting are the top environmental goals, but they require upkeep, territorial clarity, and community involvement. This means that rather than being added after construction, crime prevention should be taken into account during site design for new residential buildings. Building entrances should be visible and readable, shared areas should have views of occupied buildings, street networks should limit needless isolation, and landscaping should be controlled to avoid obstructing crucial sightlines. The results indicate that minor adjustments could result in significant gains in perceived safety for existing areas. It might be possible to improve street lighting, remove obstructed sightlines, fix deteriorating infrastructure, and better define entrances and common areas more quickly than complete rebuilding.

Additionally, the results indicate that developers and municipal authorities should refrain from depending solely on physical or technological protection. Residents valued CCTV, guards, and controlled entrances, but the data suggests that these features should be used in conjunction with rather than as a substitute for fundamental environmental features like illumination, visibility, and upkeep.

Conclusion and Implications

This study investigated how inhabitants in urban residential developments in Awka, Nigeria, perceived environmental design interventions for crime reduction. The findings show a strong correlation between perceived safety and the social and physical aspects of residential settings.

The best indicator of perceived safety was found to be street illumination, which was followed by natural surveillance and community involvement. Physical barriers and maintenance also played a major role. The entire regression model accounted for 65.9% of the variance in perceived safety, suggesting that community and environmental factors, rather than a single, stand-alone design element, influence safety perceptions.

It's especially crucial to compare how people perceive safety during the day and at night. Inadequate street lighting was the most commonly mentioned environmental factor linked to insecurity, and residents felt significantly safer during the day than at night. This emphasises how crucial it is to plan residential development for safety throughout the entire day rather than presuming that daytime spatial features will still be useful at night.

Urban crime context and perceived safety in Awka

The broader security context in which residential neighborhoods function must be taken into account when interpreting perceived safety in Awka. According to recent studies on the Awka Capital Territory, insecurity is a persistent urban issue linked to criminal activity, inadequate security, and broader social and governance issues (Iwouno and Uzodigwe, 2026). Similar worries about crime prevention and public reactions to crime are revealed by research on policing in Anambra State (Nwoke, 2019).

Although recorded crime and perceived safety should not be regarded as equivalent metrics, these findings offer a crucial context for the current investigation. While perceived safety captures residents' perception of their vulnerability in specific environments, official crime records reflect incidents reported to and documented by security agencies. Therefore, even in cases where specific incidents have not been officially documented, residents may feel unsafe due to poor visibility, remote locations, abandoned buildings, or insufficient surveillance.

The absence of a thorough, publicly available crime dataset broken down to the residential-neighborhood level in Awka is another drawback. Therefore, there is no attempt in this study to establish a direct statistical relationship between recorded crime incidence and environmental conditions. Rather, the crime context is used to place residents' perceptions in the larger context of Awka's security.

The survey's results are noteworthy in this context because locals felt less safe at night than during the day, and inadequate street lighting, deserted buildings, remote streets, and dimly lit areas were among the environmental factors linked to feelings of insecurity. As a result, the results offer proof of the environmental aspect of urban safety that might not be apparent in overall crime data.

Practical implications

The results have consequences for Awka's neighborhood security management, urban planning, and architectural design. Formal security and crime prevention measures should be supplemented, not replaced, by environmental interventions. In order for planners to compare reported crime locations with environmental features like lighting, access routes, vacant buildings, and visibility, local authorities and security agencies should first enhance the spatial recording of crime incidents.

Second, the study advocates for better street lighting along residential streets and pedestrian pathways where visibility is poor at night. Third, while preserving residential privacy, residential developments should enhance natural surveillance through suitable building orientation, obvious entrances, and unobstructed sightlines. Lastly, environmental upkeep ought to be included in neighborhood safety management, especially in cases where residents' concerns are exacerbated by abandoned buildings, blocked views, poorly maintained areas, or inadequate lighting.

These interventions ought to be paired with official security measures and community involvement. In order to create residential environments that are both physically safer and perceived as safer, the evidence thus supports a coordinated approach involving residents, planners, developers, local authorities, and security agencies.

Limitations and future research

There are a number of limitations of the study. First, rather than using long-term crime data, it is based on the opinions of the local population. Therefore, rather than showing a direct decrease in recorded crime, the results show relationships with perceived safety. In order to determine whether the environmental features found here are consistent with real crime trends, future studies should integrate resident surveys with police crime records and spatial crime mapping.

Second, establishing causal linkages is made more difficult by the cross-sectional design. Longitudinal research might look at how perceived safety changed before and after particular interventions, like better illumination.

Third, the study concentrated on Awka residential settings. Therefore, it is important to exercise caution when extrapolating the results to other Nigerian cities. It would be easier to identify which findings are context-specific and which reflect more general trends if research were conducted across cities and neighbourhood types. Notwithstanding these drawbacks, the study shows how crucial environmental design is to household safety in Awka. Its key contribution is to determine the relative value that locals place on various interventions and to demonstrate that good crime-sensitive design necessitates the integration of visibility, lighting, territorial definition, maintenance, and community involvement.

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