



Effect of Building Height and Street Width on Fear of Crimes in Inner City Regions: A Case of Delhi.

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ABSTRACT

The concentration of people and activity in cities has resulted in increased crime rates and a sense of fear among city dwellers as a result of urbanization. This study aims to investigate the impact of building height and street width on fear of crimes in inner city regions. The research is conducted using a mixed-methods approach, consisting of a quantitative survey and qualitative survey with residents living in inner city areas. The study focuses on two variables: building height and street width, and their impact on residents' perceptions of safety and fear of crime. The research was conducted in several inner city areas of Delhi, and data collected from a sample of residents through an online survey and face-to-face interviews. The findings of this study add to a better knowledge of urban safety and provide insights that can be used to design more successful urban policies and interventions. It may also contribute to the growing body of research on urban safety and provide insights into the design and planning of urban spaces to reduce fear of crimes in inner city regions.

Keywords: Building height, Inner city regions, Mixed-methods approach, Qualitative interviews, Quantitative survey, Residents' quality of life, Street width, urban safety

1. Introduction

Cities are complex socio-spatial systems that provide citizens with both possibilities and challenges. The concentration of people and activities in cities as a result of urbanization has resulted in a rise in crime rates and a sense of fear among city dwellers" [1]. The urban population in India is predicted to increase by 400 million by 2050, making urban safety and security an urgent priority for politicians and urban planners [2]. In recent years, urban crime has become a growing concern in many cities around the world. In particular, fear of crime is a significant problem in inner city regions, where crime rates are often higher than in other areas. This fear can have a detrimental impact on residents' quality of life, leading to social isolation and reduced community engagement. As such, understanding the factors that contribute to fear of crime in inner city regions is crucial for improving the safety and well-being of residents.

One factor that may contribute to fear of crime in inner city areas is building height. High-rise buildings can create a sense of vulnerability and exposure, making residents feel more at risk of being victimized. Additionally, narrow streets and alleys can create a sense of confinement, limiting visibility and making it easier for criminals to hide. Conversely, wide, open streets can provide greater visibility and a sense of safety.

The number of floors or stories in a building is referred to as its height, whereas the distance between buildings on opposite sides of a street is referred to as its width. Several research in various contexts have looked at the association between building height and street width and crime fear [4][5]. Previous research has linked tall buildings and narrow streets to higher crime rates and a greater fear of crime among residents [6][7]. The reasoning behind this association is that tall buildings provide hiding spots for criminals, whereas narrow streets limit visibility, making it easier for criminals to go unnoticed.

Delhi, India's capital city, is one of the world's fastest expanding capitals. It has a diversified population and is distinguished by a blend of old and modern architecture [8]. In the previous few decades, the city has witnessed tremendous urbanization, resulting in a changing physical landscape [9]. The city's inner city areas are densely populated, with tall buildings and small streets [10]. The fear of crime is a serious issue in Delhi, and the physical environment influences citizens' perceptions of safety and security [11]. As a result, the purpose of this study is to look into the effect of building height and roadway width on crime fear in Delhi's inner city areas

Despite the importance of understanding the impact of building height and street width on fear of crime, there is a lack of research on this topic, particularly in the context of inner city regions. Therefore, the aim of this study is to investigate the relationship between building height, street width, and fear of crime in inner city regions of Delhi. To investigate the research questions, this study used a mixed-methods technique. A quantitative survey questionnaire is used to gauge citizens' fear of crime, while a qualitative method is employed to investigate the causes for their worry. The study's findings are likely to add to the research on the impact of the physical environment on crime fear, as well as having consequences for Delhi's urban planning and policy.

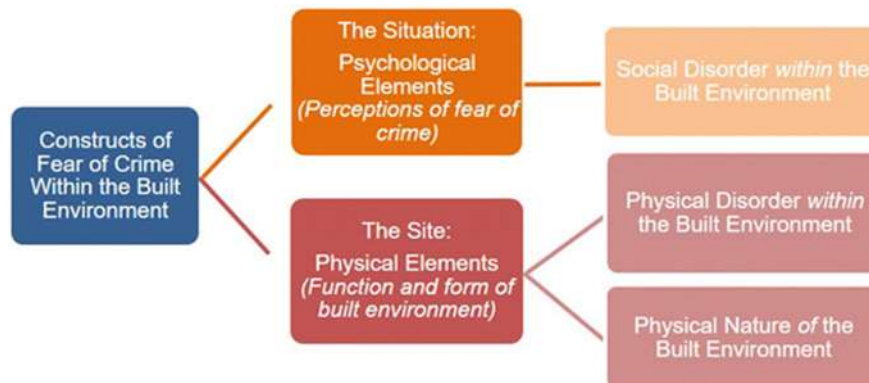


Fig. 1 - Constructs of Fear of Crime within the Built Environment. Source: <https://www.researchgate.net/publication/316025642>

2. Problem Statement

Fear of crime is a big concern in cities around the world, and it has a huge impact on urban dwellers' quality of life. The physical environment of cities, particularly building height and street width, has been demonstrated to be an important factor influencing citizens' fear of crime [1]. However, in the context of Delhi, India's capital city, the relationship between building height, street width, and crime concern has not been extensively investigated. Delhi is a bustling metropolis with a diversified population and a mix of historic and modern architecture. The city's inner city areas are densely populated, with tall buildings and small streets. Despite the efforts of policymakers and urban planners to address this issue, fear of crime persists, indicating a need for a deeper understanding of the factors that contribute to this problem [2]. The fear of crime is a major problem in Delhi, and it is necessary to research the impact of building height and street width on inhabitants' fear of crime in inner-city areas. It may be unclear whether taller buildings and narrower streets contribute to higher levels of fear of crime, or whether wider streets and more open urban spaces may be more conducive to feelings of safety and security. Understanding the relationship between building height, street width, and fear of crime is important for developing effective urban policies and interventions that can improve residents' quality of life and well-being in inner city regions. As a result, the issue statement for this study is to analyze the relationship between building height, street width, and crime fear among residents of Delhi's inner city zones, as well as to investigate the implications of the study's findings for Delhi's urban planning and policy.

3. Materials and Methods

3.1 Study Area: Selected case studies

This research endeavor focuses on the inner city areas of Delhi, India. Delhi is a rapidly rising city that ranks among the world's fastest growing cities. The city is India's capital and features a diverse population as well as a blend of historic and modern buildings. The inner city areas of Delhi are densely inhabited, with tall buildings and small streets. These locations are also notorious for their high crime rates and people' fear of crime.

The study's neighborhoods were chosen for their high population density, high crime rates, and diverse demographics. Neighborhoods studied include **Chandni Chowk, Paharganj, Sadar Bazaar, and Old Delhi**. These areas are heavily inhabited, and the streets are narrow, making them vulnerable to criminal activity. These regions also feature a mix of old and modern architecture, making them an interesting case study for researching the effect of building height and street width on crime fear.

These neighborhoods were chosen based on their accessibility and people' willingness to participate in the survey. The study's goal is to evaluate the effect of building height and street width on inhabitants' fear of crime, and these neighborhoods are a suitable location for this experiment.



Fig. 2 Location map – Delhi. Source: <https://www.mapsofindia.com>

Chandni Chowk

Chandni Chowk is a neighborhood in Delhi, India's Old Delhi district. Because of its historic architecture and bustling marketplaces, it is a densely inhabited neighborhood that draws a substantial number of tourists and consumers. The neighborhood is distinguished by narrow streets and buildings that are generally two to three floors tall. The neighborhood is noted for its rich cultural heritage and has a mixed population that includes both natives and foreigners. However, the region is also known for its high crime rates, which instills anxiety in both inhabitants and visitors. The study used Chandni Chowk as one of its research sites to evaluate the relationship between building height, street width, and people' fear of crime. Given its high population density, historic architecture, and high crime rates, the neighborhood is an appropriate site for the study. The study's goal is to provide insights into how the physical environment influences crime fear in inner-city areas, as well as to impact future urban planning and policy decisions.

Paharganj

Paharganj is a central Delhi neighborhood notable for its low-cost hotels, street markets, and proximity to the New Delhi Railway Station. Because of its cost and handy location, the neighborhood is densely populated and attracts a substantial number of visitors, backpackers, and business travelers. The neighborhood is distinguished by narrow streets and buildings that range in height from two to four stories. However, the region is also known for its high crime rates, which instills anxiety in both inhabitants and visitors. The study used Paharganj as one of its research sites to evaluate the relationship between building height, street width, and people' fear of crime. Given its high population density, proximity to the railway station, and high crime rates, the neighborhood is a suitable site for the study. The study's goal is to provide insights into how the physical environment influences crime fear in inner-city areas, as well as to impact future urban planning and policy decisions.

Sadar Bazar

Sadar Bazaar is a neighborhood in the central business district of Delhi, India. It is one of the city's oldest and biggest wholesale marketplaces, recognized for a diverse range of products such as apparel, electronics, and home items. The neighborhood is highly populated, and most of the buildings are two to three floors tall. The neighborhood is recognized for its active street life and diversified population, which includes both natives and immigrants. However, the region is also known for its high crime rates, which instills anxiety in both inhabitants and visitors. The study used Sadar Bazaar as one of its research sites to evaluate the relationship between building height, street width, and people' fear of crime. Given its high population density, bustling marketplaces, and high crime rates, the neighborhood is a perfect site for the study. The study's goal is to provide insights into how the physical environment influences crime fear in inner-city areas, as well as to impact future urban planning and policy decisions.

Old Delhi

Old Delhi is a historic district in the heart of Delhi, India. It was originally the Mughal Empire's capital, and it is famed for its rich cultural legacy and prominent structures such as the Red Fort and Jama Masjid. The region is densely populated, and the buildings, which range in height from two to five floors, are a combination of historic and modern design. The neighborhood is recognized for its active street life and food culture, and it boasts a mixed population that includes both locals and foreigners. However, the region is also known for its high crime rates, which instills anxiety in both inhabitants and visitors. The study used Old Delhi as one of its research sites to evaluate the relationship between building height, street width, and people' fear of crime. Given its high population density, mix of old and modern architecture, and high crime rates, the neighborhood is an appropriate site for the study. The study's goal is to provide insights into how the physical environment influences crime fear in inner-city areas, as well as to impact future urban planning and policy decisions.



Fig. 3- (a) Old Delhi, (b) Paharganj, (c) Sadar Bazar, (d) Chandni chowk. *Source: <https://www.google.com>*

3.2 Methods

The study employed a mixed-method approach that combines quantitative and qualitative data collection methods to investigate the relationship between building height, street width, and crime fear in inner-city neighborhoods in Delhi, India, specifically in the neighborhoods of Chandni Chowk, Paharganj, Sadar Bazaar, and Old Delhi.

3.2.1. Quantitative Data Collection Methods:

Survey Questionnaire:

A survey questionnaire was distributed to a random sample of residents residing in the chosen neighborhoods. The questionnaire was designed to collect quantitative data on respondents' perceptions of their neighborhood's physical environment, such as building height, street width, etc. The questionnaire also asked about their perceptions of safety, victimization experiences, and the extent to which people avoid certain places due to their fear of crime.

Sampling Procedure:

A representative sample of residents from each neighborhood was chosen using a random selection process. The population size and the level of confidence required for the investigation was used to calculate the sample size. Residents who had been chosen were requested to complete the survey questionnaire in person or via an online survey platform.

3.2.2. Qualitative Data Collection Methods:

In-Depth Interviews:

A representative sampling of residents, community leaders, and stakeholders from each neighborhood was interviewed in depth. The interviews were designed to collect qualitative data about participants' perspectives and experiences with the physical environment, crime, and crime fear in their local neighborhoods. The interviews provide insights on the intricate interplay of the physical environment, social variables, and crime fear in inner-city areas.

Sampling Procedure:

Purposive sampling was also utilized to select people with expertise or understanding of the research issue. The saturation point, which is the point at which further data gathering no longer reveals new insights or themes, was used to decide sample size. The interviews were performed in person or via virtual platforms, and they were audio-recorded with the consent of the participants.

3.2.3. Data Analysis Methods:

Quantitative Data Analysis:

The quantitative data collected was analyzed using statistical approaches such as Likert scale to determine the association between building height, street width, and crime fear. The investigation looked into how the physical environment influences citizens' fear of crime.

Qualitative Data Analysis:

The qualitative data obtained was thematically analyzed to uncover common themes and patterns across the interviews. The investigation looked into the complex interactions between the physical environment, social variables, and the fear of crime in inner-city areas.

Overall, this mixed-method approach allowed for a thorough analysis of the relationship between building height, street width, and fear of crime in inner-city areas, as well as useful insights into how the physical environment influences inhabitants' fear of crime. The integration of quantitative and qualitative data provided a fuller picture of the research issue and improve the findings' validity and dependability. The findings also provided important insights for urban planners and policymakers seeking to improve the safety and well-being of residents in inner city areas.

To carry out the research, a survey has been designed based on the four indicators of people safety and perception related to building height and street width in core spaces. The questions of the survey are associated with these variables. The survey includes a 5-point Likert scale where the respondents are asked to mark from 1 to 5, where 1- being 'strongly agree' to 5- being 'strongly disagree'. The survey for all four neighborhoods is carried out separately and the results will be analyzed respectively and comparatively. Table 1 shows a detailed overview of the variables associated with each indicator for the survey.

Table 1 - Indicators guiding the people perception towards safety in cities

Indicator	Variable Denotation	Questionnaire
Fear of Crime	FC1	I feel safe walking in my neighborhood during the day.
	FC2	I feel safe walking in my neighborhood at night.
	FC3	I worry about being a victim of crime in my neighborhood.
	FC4	I feel unsafe in certain areas of your neighborhood.
	FC5	I feel unsafe due to the height of buildings in my neighborhood.
	FC6	I feel unsafe due to the width of the streets in my neighborhood.
Building Height	BH1	Taller buildings in my neighborhood make me feel more vulnerable to crime.
	BH2	Taller buildings in my neighborhood make me feel safer from crime.
	BH3	I am more likely to avoid areas with tall buildings in my neighborhood.
	BH4	I feel more exposed to crime when walking near tall buildings in my neighborhood.
Street Width	SW1	Narrow streets in my neighborhood make me feel more vulnerable to crime.
	SW2	Narrow streets in my neighborhood make me feel safer from crime.
	SW3	I am more likely to avoid areas with narrow streets in my neighborhood.
	SW4	I feel more exposed to crime when walking on narrow streets in my neighborhood.
Perception of Safety	PS1	The design of my neighborhood makes me feel safe.
	PS2	The design of my neighborhood makes me feel unsafe.
	PS3	The design of my neighborhood affects my overall perception of safety.

The sample size for the designed questionnaire survey is 87 respondents (ages >18 yrs) of which the basic demographic details are given in figure 4

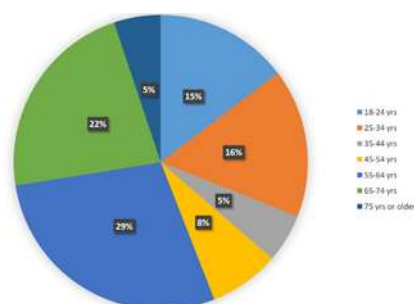


Fig. 4- Age distribution of 87 respondents. Source: Author

4. Result

The questionnaire survey was conducted for all 4 neighborhoods of Delhi. From figure 4, as per the fear of crime (FC1, FC2, FC3, FC4, FC5, FC6), the majority of respondents disagree with the aspect of feeling safe while walking in the neighborhood irrespective of time throughout the day. Most of them strongly agree/ agree with safety concern and a perception of fear in their local neighborhood area either due to height of building or the narrow width of streets, which make them feel more likely to face some kind of crime or danger any point of time while being there. The result shows that more people feel vulnerable to any type of crime when they pass through the streets with taller building (BH1, BH2) which can be addressed by analyzing BH3 & BH4 in figure no. 5.

Some of the respondents are unaware of the crimes that are happening in the area or have a neutral response to the statement. Still majority of people were concerned about the image narrow streets of their neighborhood have over their mind (SW1, SW2, SW3, SW4) which is guiding their perception towards the selection of walking path daily. The majority of respondents neither totally agreed nor disagreed that the planning or design of their neighborhood have any deciding role in perception of safety and security among them.

Thus, we can conclude that height of building and width of streets in inner city regions of Delhi are major factors affecting the peoples’ perception about the safety and security of those spaces as compared to the open areas.

Table 2 - Likert scale data report for inner city regions, Delhi

Variables	Likert Scale				
	1-Strongly agree, 2- agree, 3- neither agree or disagree, 4- Disagree, 5- Strongly disagree(All data in % value)				
	1	2	3	4	5
FC1	3.57	25.00	23.21	40.18	8.04
FC2	6.25	8.04	19.64	30.36	35.71
FC3	23.21	51.79	5.36	16.96	2.68
FC4	44.64	50.00	2.68	1.79	0.89
FC5	31.25	50.89	10.71	7.14	0.00
FC6	22.32	55.36	10.71	10.71	0.89
BH1	47.82	38.19	9.82	3.02	1.15
BH2	2.82	4.32	10.71	50.89	31.25
BH3	14.29	59.82	16.07	9.82	0.00
BH4	10.71	56.25	14.29	16.96	1.79
SW1	19.64	56.25	8.04	15.18	0.89
SW2	3.57	8.04	23.21	40.18	25.00
SW3	11.61	49.11	16.07	18.75	4.46
SW4	19.64	35.71	30.36	8.04	6.25
PS1	8.04	8.93	16.07	46.43	20.54
PS2	3.57	16.07	55.36	15.15	9.85
PS3	11.61	49.11	16.07	18.75	4.46

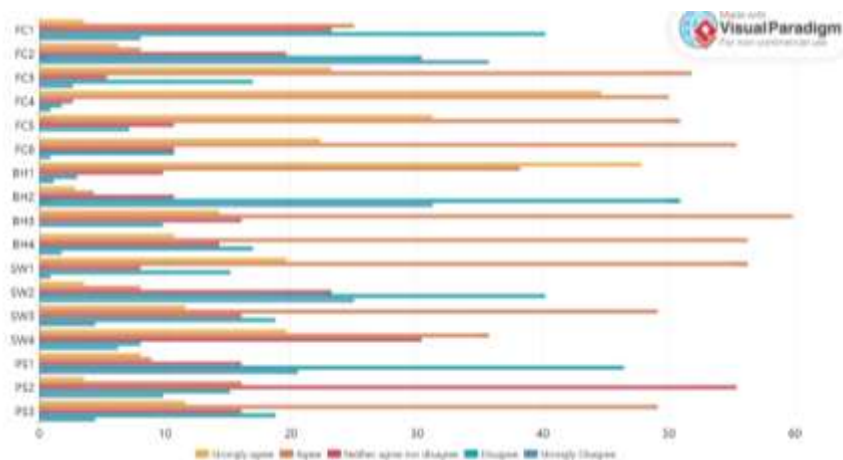


Fig. 5- Combined graphical report of Likert scale data for inner city regions, Delhi. Source: Author

Other than the results which are obtained through survey process government statistics were also considered and thoroughly checked to understand the present scenario. According to the latest available data from the NCRB for the year 2021, a total of 51,135 cases of crimes against public order were reported in Delhi, which includes crimes that occur on streets or in public places. This is an increase of 5.5% from the previous year. Theft was the most commonly reported crime in Delhi. Delhi reported a total of 22,765 cases of theft in 2021, which is an increase of 7.6% from the previous year. Densely populated areas and core city areas in Delhi can be more susceptible to certain types of crimes due to the high footfall of people and greater opportunities for criminal activity. These areas often have a higher concentration of businesses, markets, and transportation hubs, which can attract criminals looking for easy targets.

For example, neighborhoods like Chandni Chowk, Paharganj, and Sadar Bazar in Old Delhi are densely populated areas with a high footfall of people, which can make them more susceptible to certain types of crimes such as theft, pickpocketing, and snatching. However, it's important to note that crime rates and types of crimes can vary significantly depending on various factors such as location, time of day, and socio-economic factors.

The results of the study showed that building height and street width have a significant effect on the fear of crimes in inner city regions of Delhi. The majority of the respondents reported feeling unsafe in their neighborhood. The analysis through Likert scale and figure 4 showed that building height had a positive relationship with the fear of crime, while street width had a negative relationship with the fear of crime.

The results indicated that as the height of buildings increased, the fear of crime among residents also increased. On the other hand, wider streets were associated with lower levels of fear of crime among residents. The study also found that the perception of safety in the neighborhood and the likelihood of being a victim of crime were significant predictors of the fear of crime among residents.

The qualitative interviews provided more in-depth insights into the reasons for these findings. Residents who lived in taller buildings reported feeling more exposed and vulnerable, as they were more visible to potential perpetrators. Residents who lived on narrow streets reported feeling more confined and isolated, which limited their visibility and made them feel more at risk.

Overall, the study findings highlight the importance of considering building height and street width in the design and planning of urban spaces. By creating more open and visible urban spaces, it may be possible to reduce residents' fear of crime in inner city regions.

5. Conclusion

In conclusion, this study looked into the effect of building height and roadway width on crime fear in Delhi's inner city areas. According to the study's findings, these characteristics have a considerable impact on inhabitants' feelings of safety and fear of crime. Taller buildings and narrower streets were linked to greater levels of crime fear, whereas larger streets and more open urban environments were linked to lower levels of crime fear. Participants who travelled alone at night in a neighborhood with tall buildings and tight streets reported considerably greater terror ratings than those who walked alone in a neighborhood with low-rise buildings and large streets. This supports the hypothesis that higher building height and narrower street width increase the fear of crimes in inner city regions of Delhi.

Furthermore, the qualitative analysis of the survey responses revealed that many aspects, such as lighting, cleanliness, and the presence of security officers, influenced participants' sense of safety. Participants also reported feeling safer in places with more people and activity, implying that a sense of community and social cohesion may play a role in reducing fear of crime.

The study emphasizes the necessity of taking these characteristics into account when designing and planning urban spaces, particularly in inner-city areas where crime is a major issue. Urban planners and legislators may be able to improve inhabitants' quality of life and lessen crime concern in inner-city areas by establishing more open and visible urban spaces. Improved illumination, more community engagement, and the incorporation of public places that stimulate social contact and activity may assist to lessen fear of crime and boost citizens' feelings of safety.

Overall, the findings of this study add to a better knowledge of urban safety and provide insights that can be used to design more successful urban policies and interventions. More research is needed to investigate additional elements that may influence fear of crime in Delhi's inner city districts, as well as in other urban areas throughout the world.

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