

Urban Crime Prevention Through Participatory Planning: Integrating Data, Technology and Community Insights in India

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Abstract

This paper examines the interplay of crime data, participatory planning and digital connectivity in the context of Indian cities, highlighting the critical role of community participation in fostering sustainable and safe urban environments. Crime statistics from the National Crime Records Bureau-NCRB from 2015 to 2022 and literature about urban experiences and residents' perceptions in Indian cities are analysed. A mixed method of quantitative crime trend analysis and qualitative thematic reviews of urban experiences is used to assess the dual role of technological integration and social cohesion in understanding crime patterns and assisting crime prevention. The study underscores that data-driven approaches, when combined with participatory mechanisms, can enhance urban governance significantly. The intrinsic aspect of the Indian social fabric plays a critical and positive role in shaping community dynamics which are characterised by collective vigilance. The NCRB data indicates that the areas with strong community networks- marked by high levels of social interaction, trust and collective vigilance- demonstrate lower rates of violent crime. Conversely, poor visibility and lack of accessibility show higher crime rates, highlighting the impact of urban design on public safety. The study acknowledges that while digital connectivity and data analytics enhance governance efficiency, they cannot replace social cohesion and well-designed public spaces which play a pivotal role in deterring crime. The findings emphasize the need for a integrating community engagement into governance frameworks, ensuring equitable digital literacy, access and connectivity fostering partnerships between local governments and community organisations, for socially sustainable and safe communities in an increasingly complex urban landscape.

Keywords: urban crime, data-driven governance, participatory planning, community cohesion, digital inclusivity, resilient urban environments

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Introduction

India is experiencing an unprecedented phase of urbanisation that is rapidly transforming its social, economic, and spatial landscape. According to the 2011 Census of India, 31.16% of the country's population lives in urban areas (Office of the Registrar General & Census Commissioner, 2011) and this figure is expected to grow to 40% by 2036, accommodating over 60 crore (600 million) people (National Commission of Population, 2020). This trend places India among the fastest urbanising nations, trailing China in terms of urban population size (United Nations, 2023). This has brought about significant socio-economic transformations, leading to the expansion of urban areas and the emergence of new infrastructural developments across India. While urbanisation offers opportunities for economic growth, infrastructure development and improved access to services, it also exacerbates vulnerabilities, particularly concerning crime and social disorder. The urban landscape in India has undergone a remarkable transformation over the past decades, with cities expanding both in population and spatial extent. This urban growth has been accompanied by escalating concerns about various kinds of crime especially violence against marginalised groups, notably women and children. The safety and security of the urban open spaces is put to question with these growing concerns. The interplay between urban planning and crime prevention has become a focal point in addressing violence against women, necessitating a comprehensive examination of how built environment can be leveraged to enhance safety and mitigate violence. The urban fabric in India is complex, featuring stark contrasts between affluence and deprivation, organised urban form and chaotic sprawl, and formal governance and informal systems. These dichotomies create fertile grounds for social disorganisation, a key theoretical lens to understand urban crime. Social Disorganisation Theory posits that elevated residential mobility, ethnic diversity and poverty undermine community cohesion and diminish informal social control (Banerji & Ekka, 2016). Routine Activity Theory further explains that crimes transpire when motivated criminals intersect with eligible targets in the absence of capable guardians, frequently influenced by the spatial and temporal factors (Maniyan, 2023). India's socio-political environment also contributes to the challenge. The urban governance is often fragmented, with multiple agencies operating with limited coordination. This fragmentation hampers timely response to crime and undermines efforts to develop unified safety frameworks. Moreover, the underreporting of crime due to stigma, fear of retaliation and distrust in law enforcement clouds the actual scale of urban crime. The issue of Crime against women in India is a severe one that has drawn more attention lately. The number of recorded incidents of violence against women in the nation has been steadily rising. According to the National Crime Records Bureau (NCRB), there has been a consistent rise in reported cases of crime against women, with 4,45,256 cases registered in 2022 (National Crime Records Bureau, 2023) up from 4,28,278 in 2021 (National Crime Records Bureau, 2022) and 3,71,503 in 2020 (National Crime Records Bureau, 2021). These statistics underscore the urgency of addressing women's safety in the context of urban development. However, many experts believe that these figures underrepresent the true magnitude due to systemic and cultural barriers to reporting (Müller et al., 2022).

There are substantial social and financial costs associated with violence against women and girls for people, communities, and countries. In addition to limiting women's potential and impeding efforts to reduce poverty, it interferes with their engagement in civic life, work and education. It leads to economic setbacks, diminished professional opportunities and decreased productivity. The effects are multifaceted, placing financial and operational strain on social services, health care providers, the judicial system and businesses and they deal with the costs

of addressing violence, including rehabilitation, medical care, and legal actions. These demands divert resources from broader developmental priorities (UN Women, 2016). A structural impediment to sustainable development, violence against women undermines inclusive growth while perpetuating social marginalisation and gender inequality.

Urban crime, especially violence against women, is not merely a policing problem- it is a planning problem. The design, layout and function of urban spaces significantly influences crime patterns. Poorly lit streets, isolated alleys and underutilised parks are not just symptoms of neglect but active enablers of criminal behaviour. Urban planning, particularly through the lens of Crime Prevention Through Environmental Design (CPTED) is crucial in this context. CPTED posits that the physical environment can be structured to deter criminal behaviour and enhance perceived and actual safety. Yet, urban design alone is insufficient without the inclusion of community voices. Participatory planning offers a democratic approach to city-making, here residents co-create solutions based on lived experiences. Studies have shown that when communities are engaged in urban governance, there is a marked improvement in collective efficacy, leading to reduced crime and enhanced mental well-being (Müller et al., 2023). The 2030 Agenda for Sustainable Development emphasises the urgency of taking immediate action to create resilient egalitarian communities by acknowledging that the eradication of violence is essential to reaching global development goals (Kumari et al., 2025). This paper posits that a comprehensive strategy for urban crime prevention in India must integrate spatial planning, community participation and technological tools. The goal is not to only deter crimes but to foster inclusive urban environments that support rehabilitation and social cohesion for proactive crime governance.

Data and Methodology

This research relies predominantly on secondary data sources. The NCRB datasets spanning a period of 8 years from 2015 to 2022 have been used for the data on crime statistics of crimes against women. (National Crime Records Bureau, 2016; 2023). However, considerations must be made for the data obtained from the NCRB, which is a reputed and reliable source of data in the country, as the compiled data in the NCRB reports is prone to under-recording and under-reporting of crimes across the various States and UTs. For example, more literate States with higher public participation might report more crimes because of higher awareness and exposure to legal systems, while less institutionalized States might have lower reporting rates even with higher crime rates (Ghosh, 2021; Pooja et al., 2024; Ritu, 2023). Such variation can lead to inconsistencies that may affect inter-State comparisons. Furthermore, cultural factors, such as stigma attached to reporting certain crimes, especially those involving violence against women, could add to under-reporting in some areas. Moreover, the National Family Health Survey (NFHS) and the National Crime Records Bureau (NCRB) supplement each other's views on violence against women in India but are varying in scope and methodology (International Institute of Population Sciences, 2021; National Crime Records Bureau, 2023; Suman Kumari, 2025).

The National Crime Records Bureau (NCRB) is the government agency mandated to collect crime statistics in India. Thus, it is one of the most credible datasets released by the GoI in relation to crime. The NCRB data is collected systematically from police records nationwide and offers detailed information on different types of crimes, including crimes against women. Being a government publication, it is extensively accepted as a credible secondary source of crime data, providing standardization in definitions, classification, and reporting measures between States and UTs. Standardization renders the dataset appropriate for inter-State

comparisons and longitudinal analysis since it reduces inconsistencies resulting from irregular data collection mechanisms.

Results

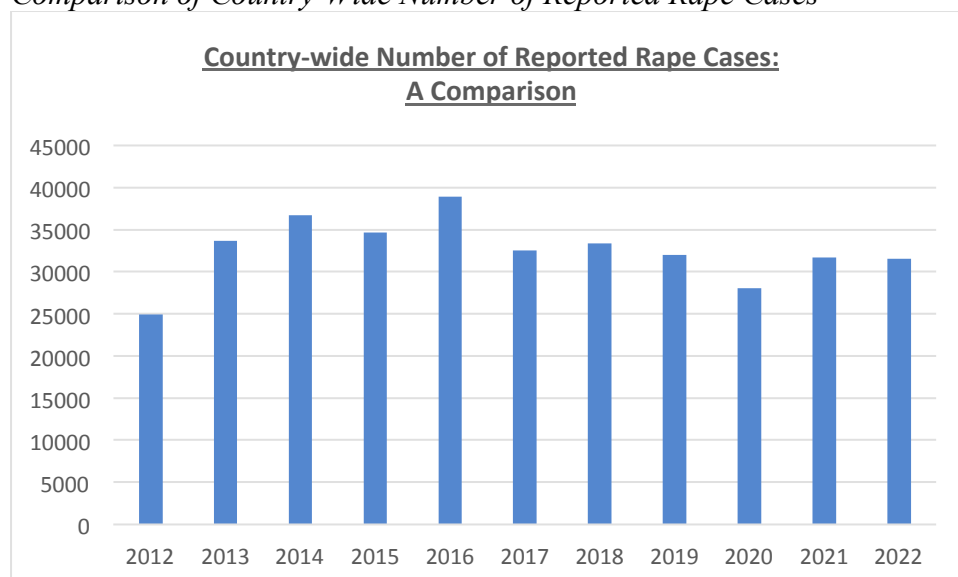
The National Crime Records Bureau (NCRB) has the crime statistics against women, which indicate alarming trends. The number of reported cases of sexual harassment, molestation, and assault increased over 36% between 2012 and 2022 (National Crime Records Bureau, 2013, 2023).

Key findings of NCRB reports:

- Women's crimes increased from 2.4 lakh in 2012 to 4.5 lakh in 2022.
- Delhi continued to record the highest number of crime against women with 25% of total urban city cases.
- Public areas, bus stops, and railways were identified as high-risk areas for molestation.

Figure 1

Comparison of Country-Wide Number of Reported Rape Cases



Source: National Crime Records Bureau (2013, 2023)

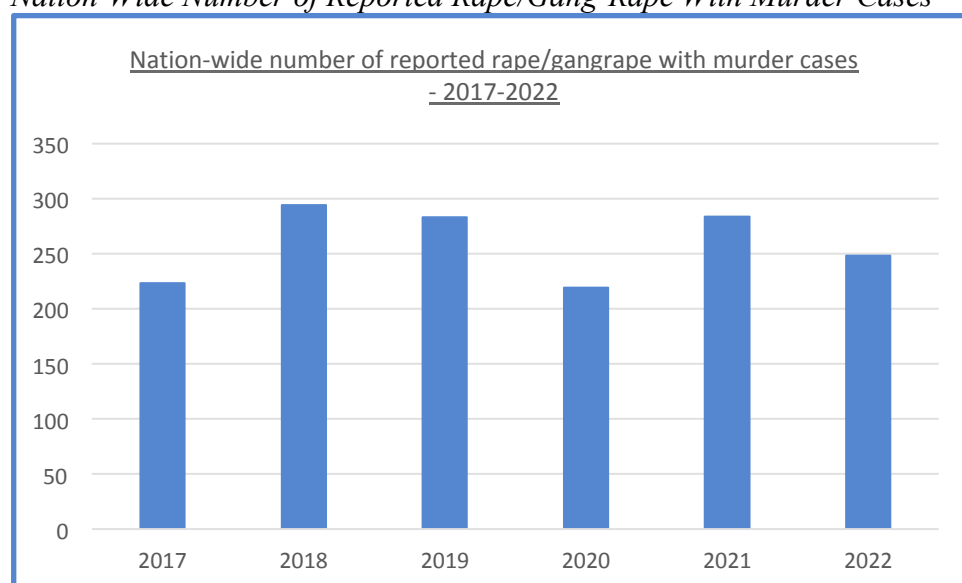
As per the National Crime Records Bureau (NCRB), there were significant differences in the number of rape cases registered in India between 2012 and 2022 (National Crime Records Bureau, 2013, 2023). The reported rape cases increased from 24,923 in 2012 to 31,677 in 2021, averaging 86 incidents per day (National Crime Records Bureau, 2023). Madhya Pradesh (2,947), Maharashtra (2,496), Uttar Pradesh (2,845), and Rajasthan (2,337 cases) had the highest number of rape cases in 2021, as per the NCRB's "Crime in India 2021" report (National Crime Records Bureau, 2016, 2021, 2023).

Table 1*Country-Wide Number of Reported Rape Cases: A Comparison*

Year	No. of Cases
2012	24923
2013	33707
2014	36735
2015	34651
2016	38947
2017	32559
2018	33356
2019	32033
2020	28046
2021	31677
2022	31516
Total	299520

Source: National Crime Records Bureau, 2013, 2023

NCRB started reporting statistics of rape or gang rape leading to murder from the year 2017 (Commonwealth Human Rights Initiative, 2024; National Crime Records Bureau, 2018). Before 2017, NCRB conceded that, as per the principle of “principal offence” (the offence with the most severe penalty), only murder would be reported from such cases for inclusion in its annual CII reports (Commonwealth Human Rights Initiative, 2024; National Crime Records Bureau, 2018). Until 2022, six years of comparative data are available. In the period from 2017 to 2022, 1,551 incidents were reported in this category. This is approximately 258 cases per year on average. (National Crime Records Bureau, 2023) There were the maximum number of instances (294) in 2018 and the minimum (219) in 2020 (National Crime Records Bureau, 2021). There have been approximately five (4.96) rape/gangrape with murder cases every week on average (National Crime Records Bureau, 2018, 2021, 2023).

Figure 2*Nation-Wide Number of Reported Rape/Gang-Rape With Murder Cases*

Source: National Crime Records Bureau (2023)

In the first year of the pandemic, the gang-rape cases reduced by 22% from the previous year (while rape cases reduced by a mere 12.44% in comparison). indicates the number of cases in this category reported countrywide, year by year (Commonwealth Human Rights Initiative, 2024; National Crime Records Bureau, 2021).

Table 2

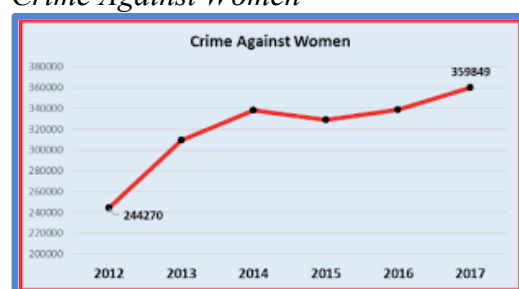
Nation-Wide Number of Reported Rape/Gang-Rape With Murder Cases

Year	Cases
2017	223
2018	294
2019	283
2020	219
2021	284
2022	248
Total	1551

Source: National Crime Records Bureau (2018)

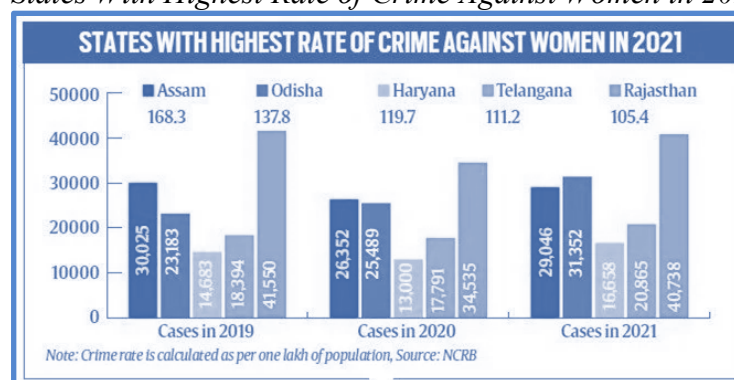
Figure 3

Crime Against Women



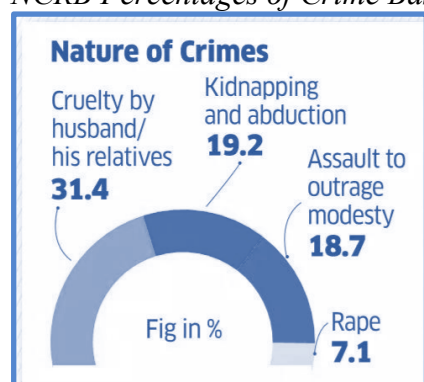
Source: National Crime Records Bureau (2018)

Between 2012 and 2017, crimes against Indian women had a growing trend according to the National Crime Records Bureau (NCRB) (National Crime Records Bureau, 2013, 2018). The number of crimes against women in 2012 was around 2.44 lakh cases, which went up to 3.59 lakh cases in 2017 (National Crime Records Bureau, 2013, 2018). The rate of crime, per one lakh women, increased from 41.7 in the year 2012 to 57.9 in 2017 (National Crime Records Bureau, 2018). The incidence of rape grew from 24,923 in 2012 to 32,559 in 2017 (National Crime Records Bureau, 2018). Uttar Pradesh registered the maximum number of crimes against women at all times, whereas the highest crime rate per lakh population was reported by states such as Assam. Domestic violence (IPC Section 498A), rape (Section 376 IPC), and assault on women (Section 354 IPC) continued to be the most reported offenses (National Crime Records Bureau, 2018). Yet, though legal reforms took place, conviction rates were still low, and underreporting remained a challenge. The period also witnessed cyber-crimes against women on the rise, an indication of shifting patterns of crime (National Crime Records Bureau, 2023).

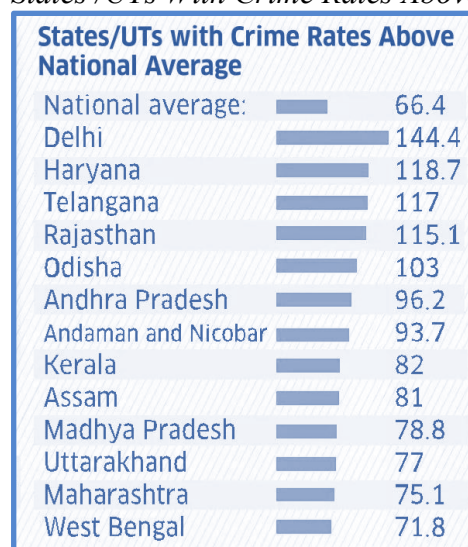
Figure 4*States With Highest Rate of Crime Against Women in 2021*

Source: National Crime Records Bureau (2022)

Crime against women doubled in India in 2021, the National Crime Records Bureau (NCRB) found, with a 15.3% rise over the last year. In 2020, there were 56.5 crimes per 100,000 women; in 2021, 64.5 (National Crime Records Bureau, 2021, 2022). Reverse migration, social isolation, and economic hardship during the Covid-19 pandemic—all which saw heightened internal tensions—are attributed to the increase. Domestic violence remains a big issue, as per NCRB reports, and contributes to over 30% of crimes against women (National Crime Records Bureau, 2021). Additionally, in 2021, there were 31,677 cases of rape, which is 28,046 compared to 2020, highlighting the continuing issue of sexual assault. During the same year, 1,250 rape cases were registered in Delhi (National Crime Records Bureau, 2023). The fact that such crimes keep happening underlines the necessity for more effective implementation and social transformation, even when more stringent rules and punishments were enacted after 2012, including the Criminal Law (Amendment) Act, 2013, and setting up fast-track courts (Agarwal, 2023; Sengupta, 2022). The increase in cases that have been documented could also be attributed to survivors' growing confidence to report and end age-old stigmas surrounding sexual assault. Yet, the evidence suggests that to be able to successfully counter and reduce the prevalence of rape and gang rape in India, multifaceted approaches tackling societal attitudes, police responsiveness, and support mechanisms for survivors need to be introduced alongside legislative reforms.

Figure 5*NCRB Percentages of Crime Based on Classification by Nature*

Source: National Crime Records Bureau (2023)

Figure 6*States /UTs With Crime Rates Above the National Average*

Source: National Crime Records Bureau (2023)

Women's crimes in India rose by 4% in 2022 to 445,256 cases from 428,278 in 2021 (National Crime Records Bureau, 2021, 2022). The rise was most pronounced in urban cities, where there was a 12.3% rise, or 48,755 cases. Delhi reported the highest number of these cities with 14,158 incidents, followed by Bengaluru (3,924) and Mumbai (6,176) (National Crime Records Bureau, 2022). Interestingly, Jaipur recorded the highest crime rate against women at 239.3 per 100,000 female population, more than Delhi (186.9) and Indore (174.3). The majority of them were under rape (7.1%), assault with intent to outrage modesty (18.7%), kidnapping and abduction (19.2%), and cruelty by husbands or relatives (31.4%). Specifically, 1,204 rape cases—or an average of about three cases a day—were registered in Delhi in 2022 (National Crime Records Bureau, 2022).

Geographical Variations in the Crime Rate

A more detailed reading of NCRB data accounts for the fact that some cities experience a consistent higher crime rate than others. For instance:

- Delhi (40,000 in 2022) has been described as the most unsafe city for women, mostly due to poor policing and a lack of gender-sensitive urban planning.
- Mumbai, being the economic centre of India, has relatively lower crime rates due to well-lit streets, community police being present, and gender-segregated public transport facilities but still has crime against women over the national average.
- Kolkata experiences lower sexual violence rates than other metropolitan cities, which is primarily attributed to high-density urban areas with greater pedestrian visibility.

Role of Urban Planning in Crime Prevention

Crime Trends in Urban Areas

Crime patterns, particularly violence against women in urban areas, are significantly influenced by urban planning and design. Inclusive planning on aspects of visibility, accessibility and social integration has emerged as a major determinant of curbing such crimes. Indian urban crime has seen mixed trends over the past decade. Based on the NCRB

reports, crime against women such as rape, sexual harassment, domestic violence and stalking rose substantially between 2012-2019, reaching a peak in 2020 (National Crime Records Bureau, 2021). Delhi, Mumbai, Bangaluru and Kolkata had the highest consistent rates of crimes against women (National Crime Records Bureau, 2023). The 2020-2021 COVID lockdown resulted in domestic violence cases on the rise, reflecting a shift in crime due to spatial lockdown (National Crime Records Bureau, 2022). This further proves that most violence against women is inflicted in public spaces with poor infrastructure and weak policing. Isolated public places, dark roads and vacant urban spaces are found to be high risk areas for women. Crime trends indicate that isolated city areas, lack of surveillance and ineffective policing are factors in the increasing threat to women's safety. These results highlight the need for urban planning approaches that incorporate security elements into the built environment.

These statistics show that crime rates are not increased merely due to urbanisation but are significantly influenced by the built environment and state institutions.

Providing safe housing, better policing, and gender-sensitive urban development can significantly reduce the risks faced by women in informal settlements. Addressing the root causes—poverty, lack of education, and social exclusion—remains key to mitigating crime against women in these vulnerable urban spaces.

The data reveals that states with poor urban infrastructure, limited surveillance, and restricted visibility report higher incidents of crime against women. Conversely, cities that prioritize inclusive urban planning, well-lit public spaces, and active community participation tend to exhibit lower crime rates. This suggests that the design and governance of urban spaces play a critical role in determining the safety and security of women in public areas.

Inferences and Role of Technology in Urban Crime Management

1. Understanding the spatial and demographic distribution of crime is essential for designing targeted interventions in urban safety planning. NCRB serves as a primary repository of crime statistics, but its data, while comprehensive in some respects, lacks the fine-grained spatial resolution and real-time accessibility. The NCRB does not yet provide crime data with spatial granularity to inform ward-level or neighbourhood level planning. Integrating crime statistics with municipal GIS systems and Smart City dashboards could significantly enhance planning precision. This would allow safety interventions to be hyper-localised and evaluated continuously for effectiveness. Longitudinal analysis of NCRB data when correlated with urban design parameters such as land use, lighting infrastructure, population density and gender ratios can provide valuable insights into crime trends.
2. Research by Maniyan (2023) involving a survey of 320 women across different Indian states found that the perception of safety is closely tied to physical attributes of urban spaces. Women reported avoiding poorly lit streets, enclosed bus stops and underpasses- areas that lack visibility and escape routes. Moreover, the fear of crime often outweighs the actual victimisation, significantly affecting how different demographic groups interact with urban spaces. Women and the elderly, in particular, often self-restrict their movement due to perceived threats. This restricts their access to employment, education and social life, thereby contributing to broader gender and age inequalities in urban living. These fear patterns must therefore be addressed through data-informed spatial planning and policy.

3. Advanced analytics and machine learning now allow urban planners and criminologists to go beyond basic statistics. By integrating crime data with Geographic Information Systems (GIS), researchers can visualise and analyse crime hotspots and clusters in real-time. For instance, overlay of crime incidence on population density, open space availability and lighting infrastructure can help to identify high-risk zones. These tools are especially helpful for law enforcement in resource-constrained setting, enabling more effective deployment of patrols and surveillance infrastructure (Banerji & Ekka, 2016).
4. Participatory GIS is another valuable tool, where community members contribute data about unsafe zones through digital platforms. This democratizes crime mapping and ensures that official data is supplemented with on ground realities, particularly in informal or underserved areas where crime reporting is often minimal.
5. Urban form and zoning regulations also influence crime patterns. For example- monofunctional zones- areas designated for a single use like housing or industry- tend to become isolated after certain hours, providing cover for illicit activities. Mixed use zone, in contrast, encourage round the clock activity and natural surveillance.
6. Public transport infrastructure is another critical correlate. Studies indicate that women face the highest risk of harassment during transit, particularly in underregulated public transport stands, poorly monitored buses and isolated train stations (Fraser et al., 2017; Varghese, 2020). Enhancing visibility, installing CCTV, and creating safe transit corridors -especially during off-peak hours – are proven deterrents that need wider adoption.
7. Crime trends are also seasonal and temporal. Data from NCRB indicates spikes in certain crimes during festival seasons, at night and in low-traffic hours. Urban design must therefore incorporate temporal considerations- such as increased lighting during high-risk periods, adaptive surveillance strategies and variable policing shifts.

Policy Recommendations

Impact of Public transport and Mobility Infrastructure

Women are more vulnerable to crime when commuting. Surveys indicate that 58% of women feel unsafe while using public transport at night (Safetipin, 2013). Key safety challenges include:

- Poorly monitored bus stops and railway stations
- Lack of gender segregated transport facilities
- Inadequate CCTV surveillance

Efforts such as Mumbai's Women's -Only Local Trains have proven successful in reducing harassment cases, demonstrating that gender-sensitive transport planning can improve safety. NCRB statistics indicate that cases of sexual harassment and stalking are disproportionately higher in urban transport systems. Inadequately monitored metro stations, dark bus stops and crowded public transport systems lead to heightened vulnerability (Mahadevia & Gough, 2020). Smart surveillance, panic buttons and women only transport facilities have been implemented in major cities to counter these threats.

Safe and Inclusive Public Spaces

Community Participation in City Planning

Ensuring that marginalised groups, notably women and elderly, are involved in urban planning can significantly improve safety outcomes. Citizen-led urban audits have proven effective in cities like Bengaluru and Hyderabad, where women have successfully lobbied for better street lighting and bus stop safety measures.

Smart Urban Infrastructure and Surveillance

Technological advancements in AI-powered crime mapping, CCTV surveillance and emergency response systems can help law enforcement predict and prevent crimes. Cities like Jaipur and Pune have initiated smart lighting projects, reducing night-time crimes against women.

Inclusive Urbanism

Policies must mandate gender budgeting, social impact assessments and crime audits in urban development projects. The Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines in India could be revised to explicitly incorporate inclusivity and safety as core planning goals.

Conclusion

Urban design and planning have a great impact on crime patterns in cities, determining the safety and well-being of their residents. One of the most important aspects of this connection is how well-planned and inclusive environments can make everyone, especially, women and children safer. Technology has become a game changer in urban safety. Crime prevention in India requires a holistic, multi-dimensional framework that integrates participatory planning, spatial design, data driven governance and community-based interventions. Traditional policing-centric approaches, while necessary, are insufficient to address the structural and spatial roots of urban crime. As urbanisation accelerates, so does the complexity of crime patterns, necessitating proactive and inclusive solutions.

Intelligent surveillance, panic buttons in public transport systems, and mobile apps that enable women to report harassment in real-time, though currently in use, must all be broadened in scope for impactful implementation to enhance security. Several Indian cities have introduced mobile apps that give women direct access to police support and emergency response teams, making it possible for action to be taken against crimes more quickly. In addition, the use of artificial intelligence (AI) in public security infrastructure—e.g., AI-powered cameras that identify suspicious behaviour—has been found to be effective in preventing crime. Urban policy initiatives that adopt technological solutions not only reduce crime but also create an enabling environment that stimulates active engagement in urban life.

Although these improvements have been made, there are still serious challenges. Much of the urban public space is still ill-maintained, and implementation of safety policies is not consistent. Statistics show that even in cities with established safety mechanisms, a lack of public awareness and low trust in the police discourage women from reporting crime. Solving

these problems needs a multi-faceted strategy, such as improved training of law enforcement officers on gender sensitivity, enhancing public confidence in security systems, and providing quick judicial processes to punish the perpetrators. Furthermore, making urban safety policies accessible to all socioeconomic groups is important, as poor women tend to be at greater risk of gender-based violence but have limited access to safety measures.

Education and awareness campaigns play a crucial role in changing attitudes in society regarding gender-based violence. Promoting bystander intervention, supporting gender-sensitive learning programs in schools, and organizing safety workshops at universities can foster a culture of accountability and respect for each other in cities. Projects that involve men and boys in training on gender equality and respectful behaviour have also proved to be effective in minimizing harassment and violence against women in public areas.

The importance of community engagement cannot be overstated. Participatory planning platforms- ranging from safety audits and digital mapping apps to neighbourhood watch programs and youth-led design labs- play a crucial role in identifying vulnerabilities and co-creating solutions that are locally grounded and socially accepted. This requires urban planners, healthcare professionals, civil society actors and community members to work in tandem under a shared vision of restorative urbanism.

In conclusion, well-planned, inclusive, and community-driven urban spaces significantly contribute to reducing gender-based violence. Integrating safety measures into city planning, fostering local community engagement, and leveraging technological innovations are essential strategies to ensure safer urban environments. Meeting these challenges necessitates an inter-sectoral response that integrates governance, law enforcement, urban planning, and community engagement to ensure cities in which women can travel with ease without exposure to violence. Urban policies in the future need to persist in ensuring gender-sensitive strategies so that safety in the urban areas is informed by the underpinning principles of city planning and development. Indian cities must shift from reactive, punitive responses to proactive, inclusive governance. This means institutionalising data transparency, embedding community voices in planning processes and designing urban environments that are inherently safe and equitable for all.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

During the preparation of this manuscript, the author(s) utilized generative AI and AI-assisted technologies to assist in writing, improving, and proofreading the text. Specifically, Grammarly for language checks and OpenAI's language model (Perplexity) was employed to support the formatting.

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