

PEDESTRIAN SAFETY AND SECURITY FOR FEMALE USERS IN URBAN ALLEYS: A SYSTEMATIC REVIEW

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Abstract. The world's rapid urbanization has led to the emergence of hundreds of alleys between towering skyscrapers. Nowadays, there is numerous safety issues associated with urban alleys and people often associate these alleys with dirt, crime and fear. Consequently, using urban alleys hinders people—especially women—from obtaining basic essentials for safety. Numerous studies have indicated that women perceive cities differently than males and they typically feel more uneasy in public places. The purpose of this article is to investigate strategies and features that can enhance the safety of female pedestrians in urban alleys. After thoroughly examining the Web of Science and Scopus databases, 45 publications were identified. These articles were selected by incorporating keywords such as urban alleys, safety, female users and relevant keywords. The review encompasses information on data collection methods, sample strategies, data analysis and outcome analysis. The study reveals that physical factors, social, psychological and crime prevention factors also influence how women use urban alleys. Nevertheless, women's perceptions of the safety of urban alleys are significantly influenced by physical factors. Ultimately, these findings provide managers, planners and urban designers with valuable insights to establish a foundation for safer urban settings.

Keywords: *Urban alley, urban space, safety, pedestrian safety, female pedestrians, woman.*

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1. Introduction

Alleys in urban areas are considered essential not only architecturally but also culturally and socially. They have held significance since 432 BC and alleys have been a part of the city for centuries (Wolch *et al.*, 2010). In the 16th century, alleys were described as “passages between buildings”; they served as front streets as well as auxiliary and service areas on the sides and rear of buildings (Blazy, 2019). At the beginning of the 19th century, alleys were labeled as “poor people's streets” and were used to store unwelcome items. Subsequently, people's perceptions of alleys started to shift and in many cities worldwide, alleys were perceived by the general public as hazardous areas where crime was common, leading to their disappearance at the beginning of the 20th century in several countries, being replaced by streets (Khanal *et*

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al., 2023). Urban alleys are disappearing at that time more often than not as a result of intricate interactions between social, economic and urban planning variables. Based on previous research, there are few main explanations for why urban alleys are disappearing: Urban regeneration initiatives, neglect problems and public safety concerns. Many towns embarked on extensive rehabilitation initiatives during the 20th century's wave of urban renewal. Existing urban alleys are occasionally demolished as part of these redevelopment projects to create additional space for public areas, high-rises and highways (Imai, 2013; Kawabe & Matsuda, 2019). Some urban alleys are frequently disregarded because of their confusing function between public ownership and privatization. Cause these areas are not kept up, they eventually lose their appeal and become unsafe or unsightly, disappearing from the urban scene (Ng & Sze, 2021; Wan Ismail & Ching, 2016). Jiang et al. (2018) said the creation of narrow urban alleys in densely built-up areas has led to negative perceptions in terms of disaster prevention and safety concerns in the central area of Hong Kong City. Additionally, a study in Tehran, Iran, has shown alleys are often perceived as unsafe and neglected spaces, safety concerns and criminal activity are linked to urban alleys (Azad *et al.*, 2018). Cities are consequently demolished or reconstructed to increase public safety and lower the likelihood of criminal activity (Rashid *et al.*, 2017; Shamsuddin & Hussin, 2013; Sreetheran & Van Den Bosch, 2014). However, in the 21st century, urban alleys are once again gaining attention as people recognize the advantages of city living. It is evident that pedestrians and urban alleyways are strongly related and that the underutilization of alleys is mostly due to the impression of safety as a barrier to use. The purpose of this paper is to understand specific issues regarding the safety of female pedestrians in urban alleys.

Urban alleys have silently transitioned from the past to the present, making a comeback from appearance to almost total disappearance to their current status as a crucial component of urban public areas (Blazy, 2019). However, over time, their definitions and applications have evolved. Dense urban development, aimed at optimizing floor area and reducing unprofitable public space, often results in the creation of hundreds or thousands of narrow alleys in dense cities (Jiang *et al.*, 2017). While alleys take up a large portion of outdoor space, they are also an integral part of urban public space, providing important pedestrian paths and connecting various areas within the city (Machado-León *et al.*, 2020). As mentioned by Fialko and Hampton (2011) in their handbook entitled "Activating Alleys for a Lively City", alleys can contribute around 50% of additional public space to the city, creating a new network for pedestrians. We find ourselves once again acknowledging the critical role alleys play in the functioning of our cities and the development of our communities. However, the fields of urban planning and landscape architecture have not paid attention to the association of urban alleys with various environmental and social issues (Jiang *et al.*, 2018).

A study by Fabre et al. (2021) highlights that from the age of eight, 80% of public spaces are occupied by boys and girls believe these spaces make them feel unsafe or excluded. Men's walking behavior is less affected by safety concerns, while women tend to spend less time walking in public places they perceive to be unsafe (Foster *et al.*, 2004). Many studies have reported gender differences in perceived safety in public places such as back alleys. Women are more likely to have personal safety concerns about their use of public spaces than men (Cozens, 2011; Sreetheran & Van den Bosh, 2015; Sweet & Ortiz Escalante, 2015; Yavuz & Welch, 2010).

In urban areas with dense populations and limited public living space, the alley network is a valuable social resource. However, through a troubled and diverse history, alleys have become an environment surrounded by fear, crime, misuse and general neglect within the last century (Wang & Taylor, 2006). At worst, alleys are damp, cluttered, dark and even dangerous, considered lifeless urban spaces. Hovering beneath the consciousness of most city dwellers, alleys are residual urban spaces often associated with crime and trash. Jiang et al. (2017) said urban alleys are perceived as unsafe, especially by females. Women often associate underpasses or cul-de-sacs with street violence and harassment, even if they have no first-hand experience themselves (Anciaes & Jones, 2018). Females alter their routines to avoid using city alleys due to fear of victimization. Also, females tend to display more fear and insecurity in public spaces in developing countries (Dameria & Fuad, 2021). One of the main reasons alleyways are underused is because they are considered unsafe spaces. Therefore, considerations for creating a sense of safety for females in public spaces are crucial. In summary, this paper will seek to answer the following questions: What effective strategy and factors can enhance the safety and security of female pedestrians in urban alleys?

2. Methodology

This study followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines for conducting our systematic review (Moher *et al.*, 2009). Conventional literature reviews that rely on snowballing or random searches may not cover all topics equally or comprehensively. Results from the PRISMA approach can be more thorough and repeatable (Atkinson & Cipriani, 2018). Many academic fields, particularly the environmental and sciences, employ PRISMA extensively (Merlo *et al.*, 2023; Trop *et al.*, 2023).

The steps were divided into three stages: search strategy, study selection and data extraction.

2.1. Search Strategy

For this systematic review search, we developed a search strategy to find relevant literature. This search strategy was applied to two databases: SCOPUS and Web of Science. Generally, high-quality journals are considered to be included in WoS and Scopus because these databases are said to index only the highest quality sources carefully selected according to strict selection procedures (Dorsch *et al.*, 2018). One of the key concerns in the scientometric literature ever since Scopus's launch has been its data veracity and comprehensiveness of coverage (Mika *et al.*, 2016). Scopus has established itself as a trustworthy source of comprehensive bibliographic data and has gained equal significance throughout time (Zhu & Liu, 2020). In addition, the first extensive international bibliographic database is called WoS. Because of this, it has historically emerged as the most significant source of bibliographic information for tasks including choosing journals, assessing research, performing bibliometric analysis and more (Li *et al.*, 2018). Therefore, SCOPUS and the Web of Science offer sophisticated tools for measuring scholarly publishing trends (Cavacini, 2015). Also, both are the two most widely used databases for bibliographic analysis (Singh *et al.*, 2021). Ultimately, the primary factors that led the authors to select these two database interfaces were their ease of use, performance, impact measurements and extra features.

We therefore determined that these two databases could provide adequate and effective coverage for the review.

Considering our research topic, we conducted searches and analyzed titles and abstracts using various relevant keywords and phrases. Subsequently, we categorized the keywords into three major components: urban public space, gender and safety. With the aim of identifying more specific literature related to our research, we utilized the following keywords: “urban alley” OR “backstreet” OR “pathway” OR “road” OR “street” AND “women pedestrian” OR “female pedestrian” OR “female user” OR “woman user” AND “safety” OR “security”.

2.2. Study Selection

Our approach to screening relevant literature followed the guidelines for systematic reviews incorporating our selected keywords. A preliminary literature review was conducted using two databases, “SCOPUS and Web of Science” and our initial search yielded a total of 376 items. In the first screening, we focused on two criteria for inclusion: (A) Published between 2013 and 2023 and (B) Published in the English language. A total of 313 items met these criteria in the two databases. In the second screening, after removing duplicates, we identified 309 relevant records. Next, we evaluated titles and abstracts, resulting in 20 articles. Finally, we thoroughly read the full texts of these articles, a process that resulted in the inclusion of 12 eligible articles in the research review.

After the systematic search, the snowball method was employed to expand the scope of discovery and ensure a more comprehensive screening of papers; this additional articles system is similar to that described by (Mundher *et al.*, 2022a). The particular procedure employing the snowball approach is: 1) Look at the title of the paper the author cites from the 12 qualifying articles. 2) If the article's title is similar to our study, then look at the article's abstract. The papers we later discovered connected to our investigation were also treated using a similar approach. The keywords are broken down into three primary categories, as we discussed in the previous section: urban public space, gender and security. When employing the snowball approach to locate publications, we will verify that the article is pertinent to our study and include it in our systematic review if the author's citation fits one or two of the three sets of keywords in the article's title. Consequently, we added 33 additional articles related to our research. After adding 33 additional articles relevant to our study, we found that articles matching our topic were published not only between 2013 and 2023. Finally, the obtained documents were published between 2001 and 2023 and the dataset consists of 45 documents, including 41 articles, 3 conference papers and 1 book chapter (Figure 1).

2.3. Data Extraction

Through the study selection process, we collected a total of 45 items that met the inclusion criteria and were relevant to our research. We conducted a comprehensive full-text reading of each article. Key data from each article meeting the inclusion criteria were compiled into a Microsoft Excel spreadsheet. These key data included the first author, publication year, journal, method, key findings, purpose and the paper's purpose/findings related to the research keywords (female, safety, urban alleys), (Appendix, Table A1).

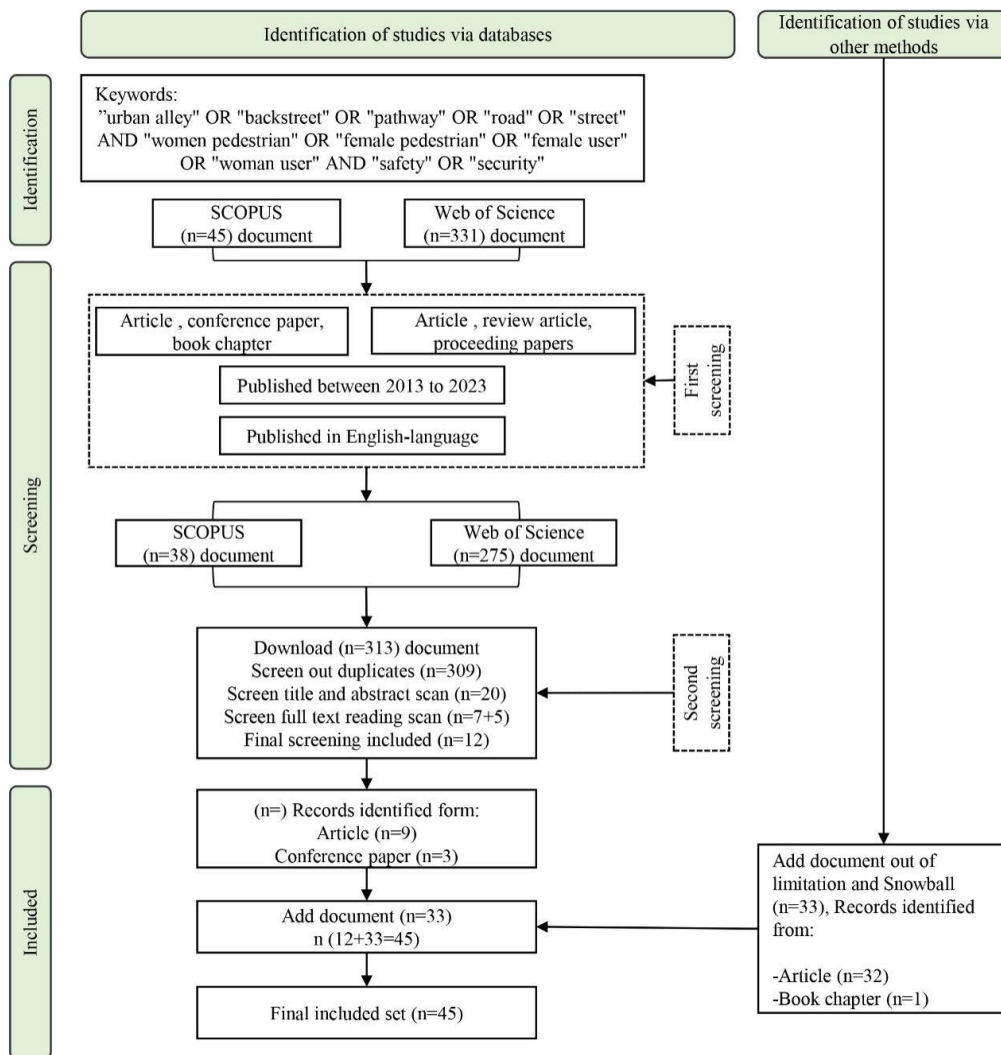


Figure 1. Article screening process and number of relevant records at each stage

3. Results

3.1. Overview of Findings

Through a comprehensive and systematic literature review, this study selected and analysed academic articles published on the relevant topic since 2013. After our initial literature screening in two databases, SCOPUS and Web of Science, there were 38 (SCOPUS) and 275 (Web of Science) related literature on the subject that we used VOS viewer to create a main keyword frequency map (Figure 2). From the two mappings, we can observe that in recent years, keywords such as pedestrian safety, pedestrian, women, female and safety have garnered significant attention. This result also affirms the validity of our chosen keywords for this research paper.

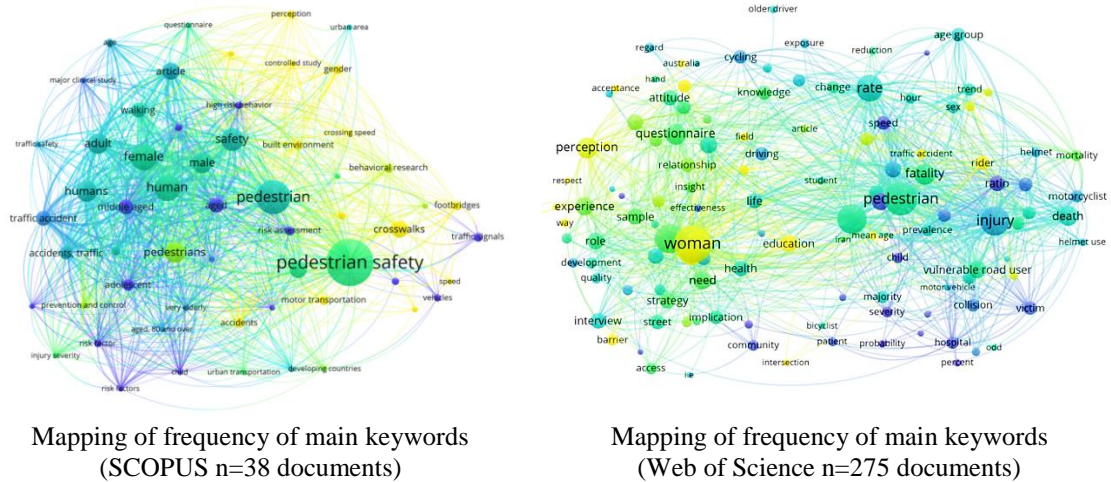


Figure 2. Mapping of frequency of main keywords

Through further filtering of articles, the number of articles on the topic of urban public space safety or pedestrian behaviour and perception in urban pedestrian environments has significantly increased over time. There are twice as many relevant articles published from 2001 to 2014 than from 2015 to 2023. This reflects the growing interest of researchers in the field of urban public space safety or pedestrian behaviour and perception. Therefore, it serves as a motivating factor to explore effective strategies and features that can enhance the safety and security of female pedestrians in urban alleys (Figure 3).

Moreover, the review resulted in a total of 45 articles published in 38 different journals. These articles relate to publications on urban public space safety or pedestrian behaviour and perceptions in urban pedestrian environments (Figure 4). “Cities”, “Sustainability” and “Transportation Research Part F: Traffic Psychology and Behaviour” published the most articles, each with three. This was followed by the number of articles published in “Procedia - Social and Behavioural Sciences”, which is two. The other 34 journals published only one article each.

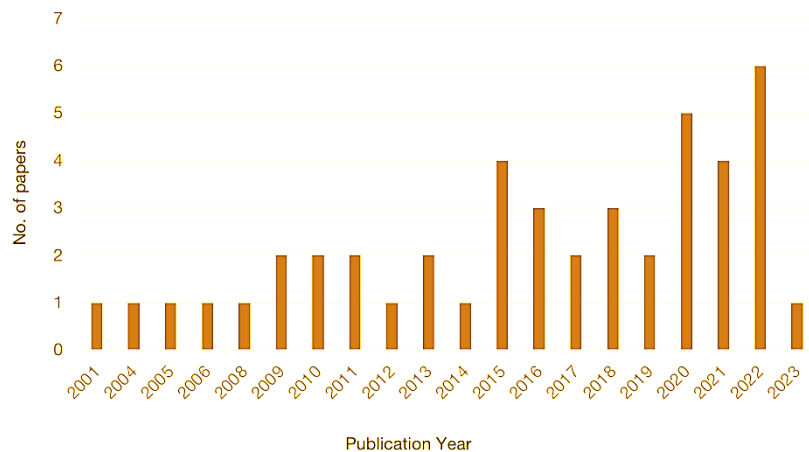


Figure 3. Number of eligible studies by publication year

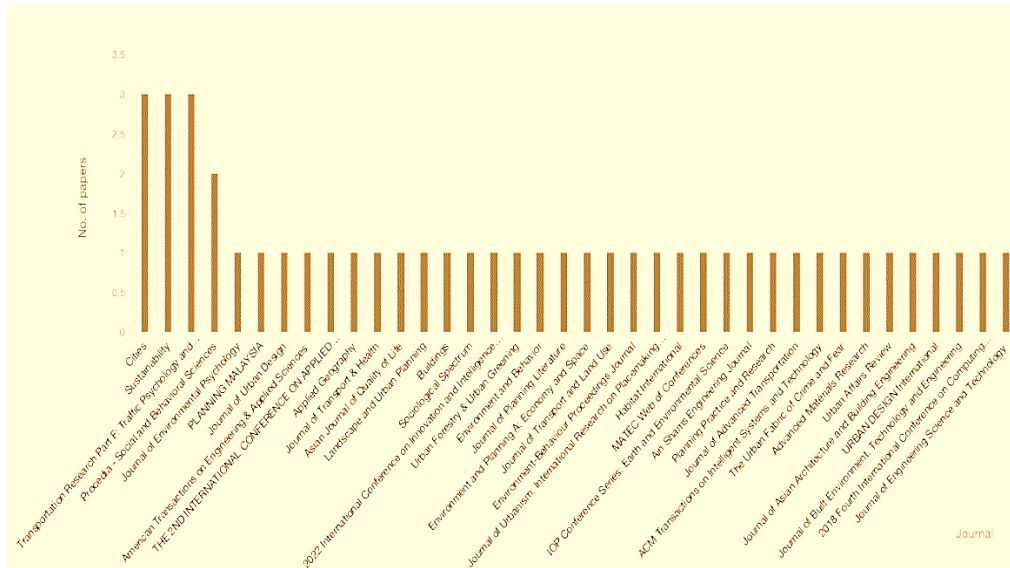


Figure 4. Journal distribution of the 45 research papers reviewed in this study

3.2. *Urban Public Space - Urban Alleys*

Public spaces are crucial in city planning, with squares and streets being fundamental components (Machado-León *et al.*, 2020). In today's context, we view urban public spaces mainly based on physical features like parks, squares, streets and more, which are essential elements of city life (Imai, 2013). Streets and alleys, as linear parts of urban spaces, play a vital role in social interactions (Moreau, 2022). They connect private and public spaces, serving transportation, daily life and cultural expression functions (Mahmoudi *et al.*, 2015).

The term “alley” likely comes from the Latin word “ambulare”, meaning to walk, while “street” is thought to be derived from “sternere” (to pave) (Wolch *et al.*, 2010). Alleys, considered minor roads, are narrow paths between or behind buildings in a city or town (Nizar, 2017). Streets and alleys are considered main public spaces in a city (Zacharias, 2001). Especially in densely populated areas, alleys are valuable social resources, contributing about 50% of additional public space (Wang & Taylor, 2006). They serve as pedestrian pathways, connecting different areas in the city and playing a role in community space, contributing to urban prosperity (Shamsuddin & Ujang, 2008). Due to their importance in urban design and safety, alleys cannot be demolished (Ewing & Handy, 2009). Safe alleys bring people together, discouraging illegal activities and promoting pedestrian movement. However, many cities underutilize alleys, often due to safety concerns (Min *et al.*, 2022). Integrating pedestrian activities in alleys is crucial to ensure their continuous use, address safety issues and maximize their potential (Azmi *et al.*, 2012; Forsyth, 2015).

3.3. *Safety of Female Pedestrians in Urban Alleys*

Safety is the freedom from the threat of danger, injury or loss. Public space safety refers to the harmonious coexistence of people and public space resources without hidden dangers and hazards. In recent years, women's safety has become a prominent issue worldwide. Women in developing countries tend to exhibit more fear and insecurity in public places (Dameria & Fuad, 2021). Women travel every day and

taking to the streets is one of the most important activities; our streets are filled with different types of people from different backgrounds as various groups crowd into public spaces. Crimes are still common on some sidewalks and in most such cases, the victims are women. Crime and the fear of crime are major concerns for society, while safety is an important feature of a high-quality, sustainable environment (Cozens, 2011; Sreetheran & Van den Bosh, 2015). Every day, women, school-going girls and teenage girls are attacked, abused and preyed upon (Basu *et al.*, 2021). As they travel late at night through unknown territory, they have to worry about their safety from violence and harassment. Due to these factors, users, especially women, face challenges and threats. As a result, women experience cities differently than men. There is no doubt that safety is the core demand of women for urban space.

Fear does affect people's perceptions and the physical design of a street or park is also crucial in influencing their behavior. Scholars often study the physical conditions that affect the perception of pedestrians or female users (Reid & Konrad, 2004). The most important factors that provide a sense of security are visibility, cleanliness, other users, surveillance, trees, time, etc. Targeted urban design practices (e.g., functional use of vacant land, increased land use diversity, adequate street lighting) can be employed to improve safety perceptions and reduce gender inequalities in safety perceptions (Basu *et al.*, 2021). Women feel unsafe when encountering negative environmental factors such as garbage and graffiti, with more than 80% of respondents stating they feel unsafe (Rashid *et al.*, 2017). Safety awareness is enhanced when women can observe their surroundings and feel monitored while walking. 90% of respondents feel safer with a transparent facade because it provides a wider visual field of view (Dameria & Fuad, 2021). Optimal natural surveillance can enhance female pedestrians' safety perceptions. Safe public spaces have also been explored from different aspects and angles in these studies. There are similar predictions and research results. According to research published in (Basu *et al.*, 2021, 2022), women's and men's sense of security is influenced by built environment (BE) characteristics, which also have an impact on attractiveness, safety and security. There are similar studies, but with different results: Pedestrians perceive walking environments to be more attractive, safer and more secure when trees are present (Basu *et al.*, 2022). In addition, Evensen *et al.* (2021) said the height of hedges along the path affects users' sense of security. Field research shows that cutting down hedges improves female users' perceived outlook on the surrounding area, which again makes them feel safer in the park.

When women live in cities, safety becomes their primary concern. Unfortunately, urban planning and design often fall short of addressing women's basic needs. Due to fear, women make compromises every day when using public spaces. Public streets are among the most complex urban environments, requiring planners and designers to consider multiple levels and categories of users (Loukaitou-Sideris & Fink, 2009). In potentially unsafe spaces, people inevitably feel insecure and may then "abandon" the space, ultimately making it even more unsafe. Therefore, safety is the objective sense of safety in urban public spaces, while the sense of security is the subjective perception of safety (Dymén & Ceccato, 2012).

In this section, we identified 16 out of the 45 articles related to women's safety (Table 1). The most frequently published journal titles include Transportation Research Part F: Traffic Psychology and Behavior, Sustainability, Urban Affairs Review, the Urban Fabric of Crime and Terror, Journal of Transport & Health, Buildings, etc. The articles were published between 2004 and 2023. Despite differences in journals, each

paper discusses women's safety/fear in various sections; for instance, women typically travel less due to concerns about their personal safety. Additionally, compared to men, women often experience higher levels of worry and terror. When women feel observed and can see their surroundings while walking, their level of safety awareness rises. When they encounter unfavorable environmental elements like waste and graffiti, women experience insecurity. Therefore, there is a growing concern about women's safety in public spaces. Existing research explores various aspects of women's safety in urban environments, including the impact of safety perceptions on characteristics of the built environment (BE) and how the height of hedges along pathways affects users' sense of security. Adverse environmental factors often contribute to women feeling unsafe. Ultimately, this study focuses on urban alleys, which are frequently overlooked, to enhance the safety of female pedestrians in the complex urban environment and to create a safer urban alley environment for female pedestrians.

Table 1. The 16 literatures (out of 45) involve specific descriptions of women's safety/fear

N.	References	Publication Title	Women's safety/fear is involving in literature
1	(Reid & Konrad, 2004)	Sociological Spectrum	Women reported higher levels of fear of sexual assault than men (2.95 for women vs. 2.54 for men).
2	(Loukaitou-Sideris & Fink, 2009)	Urban Affairs Review	Survey results show that a majority of respondents believe women have unique safety and security needs.
3	(Dymén & Ceccato, 2012)	The Urban Fabric of Crime and Fear	Research shows that women tend to have higher levels of fear and anxiety than men.
4	(Rashid <i>et al.</i> , 2017)	The 2nd International Conference On Applied Science And Technology 2017	Questionnaire results show that women feel unsafe when encountering negative environmental factors such as garbage and graffiti, with more than 80% of respondents saying they feel unsafe.
5	(Stark & Meschik, 2018)	Transportation Research Part F: Traffic Psychology and Behaviour	The findings also confirm that women generally limit their travel behavior due to concerns about their personal safety.
6	(Chaudhari <i>et al.</i> , 2018)	2018 Fourth International Conference on Computing Communication Control and Automation	Women still fear for their safety from violence and harassment as they must travel late at night through unknown territory.
7	(Lis <i>et al.</i> , 2019)	Sustainability	Women are afraid of walking through green areas, especially after dark.
8	(Hidayati <i>et al.</i> , 2020)	Transportation Research Part F: Traffic Psychology and Behaviour	Our findings indicate that, overall, there are fewer female pedestrians than male pedestrians, which can be traced to sociocultural structures related to street profiles and usage patterns.
9	(Levy <i>et al.</i> , 2020)	ACM Transactions on Intelligent Systems and Technology	Recent research shows that 85% of women have changed their travel routes to avoid harassment and assault. 67% of women changed the time they left an event or location.
10	(Dameria & Fuad, 2021)	IOP Conference Series: Earth and Environmental Science	Safety awareness is enhanced when women are able to observe their surroundings and feel monitored while walking.
11	(Evensen <i>et al.</i> , 2021)	Sustainability	Field research shows that cutting down hedges improves female users' perceived outlook on the surrounding area, which again makes them feel safer in the park.

12	(Basu <i>et al.</i> , 2021)	Journal of Transport & Health	In all scenarios tested in this study, women have a higher perceived risk of being assaulted/robbed/harassed than men.
13	(Basu <i>et al.</i> , 2022)	Transportation Research Part F: Traffic Psychology and Behaviour	Women perceive suburban walking environments to be less safe at night.
14	(Polko & Kimic, 2022)	Ain Shams Engineering Journal	The results show that there are statistically significant differences in safety perceptions between male and female respondent groups in more than half of the factors.
15	(Akgün-Tanbay <i>et al.</i> , 2022)	Journal of Advanced Transportation	Gender has an impact on perception. Male users were more likely than female users to describe shared streets as safe to walk on and comfortable to use microtransit, while females rated walking as more chaotic than males.
16	(Cui <i>et al.</i> , 2023)	Buildings	Women's own subjective evaluation of safety perceptions is difficult to replace by men.

3.4. Safety and Security Strategy of Female Pedestrians in Urban Alleys

In urban settings, public spaces are generally areas that are open and accessible to all. The interpretation of safety and security in urban public spaces may vary depending on the context. In general, safety refers to the physical well-being of an individual, while security pertains to the protection of property (Rashid *et al.*, 2017). Safety has always been a primary concern in urban construction (Cui *et al.*, 2023). Street safety, a fundamental objective in street space design, directly influences pedestrians' social activities (Basu *et al.*, 2022). Hence, the Crime Prevention through Environmental Design (CPTED) strategy, originating in the United States in the 1960s, emerged. Architect Oscar Newman introduced the concept of “defensible space” and criminologist C. Ray Jeffery coined the term Crime Prevention through Environmental Design. CPTED focuses on how the design of the physical environment can contribute to preventing criminal behavior. In the late 1980s, CPTED became the foundation for the “Safe Cities” approach (Shamsudin & Hussin, 2013). The safe city concept is an approach that focuses on the problem of crime in urban areas and is part of the urban life concept (Anuar *et al.*, 2012). In this approach, a sense of security takes precedence, considering the fear of crime as more significant than crime itself. The safe city concept contends that women require special attention in urban public settings because they are particularly vulnerable to violent and sexual crimes and are more fearful of such crimes than men (Shamsudin & Hussin, 2013). The European Commission emphasized that this approach particularly addresses vulnerable groups such as women, children, the elderly and ethnic minorities (Bahari *et al.*, 2014). This approach shows how environmental elements and physical architecture can encourage or discourage criminal conduct; this is the principle from which strategies are known as Crime Prevention through Environmental Engineering (CPTED).

Implementing the concept of public safety in a town or city has become a primary agenda in developing countries today. Cities play a crucial role in ensuring the safety of their inhabitants and effective implementation of CPTED can help reduce and prevent crime occurrences (Shamsudin & Hussin, 2013). CPTED aims to enhance the safety of developments and minimize opportunities for crime. Improving the safety of urban alleys is a complex task that requires considering multiple factors, with CPTED widely accepted and supported as recognizing the impact of the built environment on crime and fear of crime (Golan *et al.*, 2019).

Based on the CPTED strategy, the physical environment, coupled with psychological behavior, plays a crucial role in preventing criminal behavior and enhancing urban alley safety. This study will focus on two main factors: physical factors and psychological factors (Figure 5).

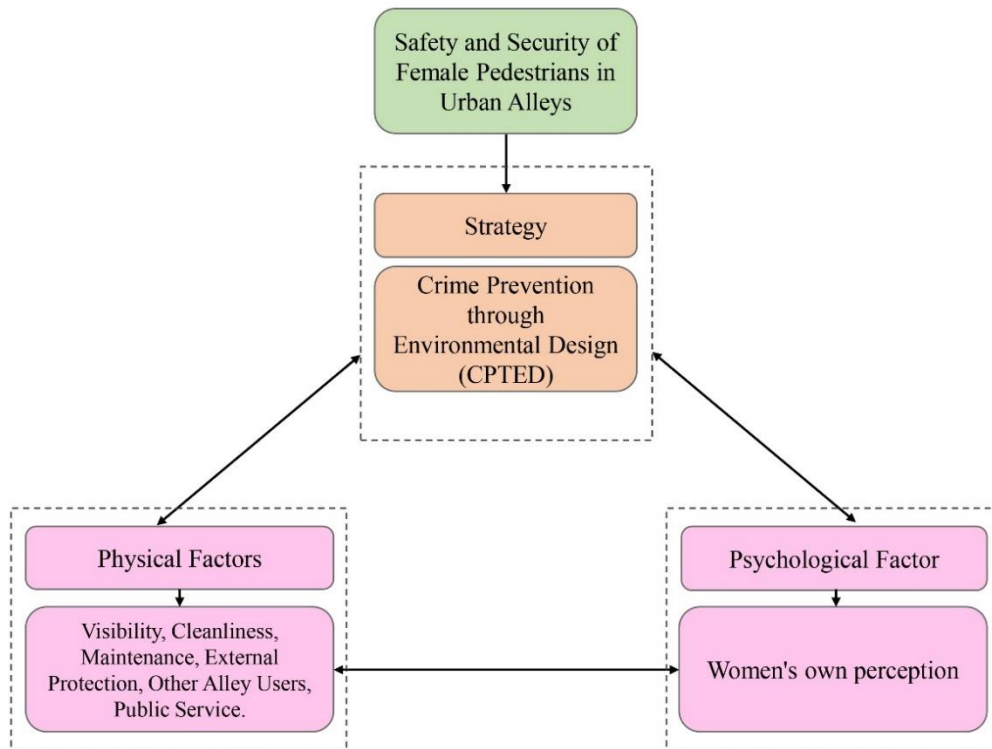


Figure 5. Safety and security strategy of female pedestrians in urban alleys

3.4.1. Physical Factors

Fear does influence women's perceptions and the physical design of streets plays a crucial role in shaping their behavior (Rashid *et al.*, 2017). Wolch *et al.* (2010) offer a comprehensive definition that encompasses compactness and safety, with physical allure being a significant aspect. Research indicates that many social issues in urban spaces originate from their physical challenges (Min *et al.*, 2022; Wolch *et al.*, 2010). Basu *et al.* (2021) identify some problems with streetscapes that negatively impact livability, including improper paving and flooring, insufficient greenery, narrow roads, inadequate facilities for people with disabilities, traffic congestion, insufficient parking spaces and inadequate public services and maintenance.

The physical attributes of a space collectively contribute to perceived safety; for example, adequate lighting combined with abundant greenery, such as tall shrubs, can reduce discomfort. People generally prefer lower green areas that allow for clearer visibility of the entire space (Rashid *et al.*, 2017). Conversely, open views and spaces with good visibility ensure safety, while tall, dense vegetation may induce fear by obstructing views of buildings and streets, creating dark hidden spaces and impeding escape (Stark & Meschik, 2018). Many women adjust their travel strategies due to fear, often opting for daytime travel over nighttime. Consequently, lighting emerges as a

crucial physical element discussed in various literature. Well-lit areas are rated as the most significant factor influencing women's sense of security (Polko & Kimic, 2022).

Furthermore, the presence of people in public spaces is linked to security; a sufficient number of individuals in a public space lead to a form of self-securitization, where people can watch over one another and be vigilant against potential violations (Golan *et al.*, 2019; Wan Ismail & Ching, 2016). Pedestrian activities in the alley need to be well-integrated to ensure continuity and intensity of activities. Underutilization poses a dual challenge and serves as a factor preventing respondents from utilizing alleys. However, women do not necessarily feel safer on the street merely due to the presence of strangers, such as beggars or drunks (Stark & Meschik, 2018). The fear of being approached by a beggar on the street is more common among women (Polko & Kimic, 2022).

Other issues, such as a lack of amenities and public services, improper paving and poor maintenance, contribute to the degradation of alley quality (Nizar, 2017). As highlighted by Rashid *et al.* (2017), encountering negative environmental factors like garbage and graffiti makes women feel unsafe, with over 80% of respondents expressing discomfort. Ultimately, the primary physical factors influencing urban alley safety, as identified in the literature, include visibility, cleanliness, maintenance, external protection, other alley users and public service (Table 2).

Table 2. The literatures (out of 45) involve specific descriptions of physical factors

Physical Factors	Description	References	
1	Visibility	<p>Visibility is the ability to see more, allowing potential threats to be detected at a distance, thereby enhancing security and safety. Visibility levels are influenced by several variables, including artificial street lighting at night, natural lighting in the morning and other elements that obscure vision making it unsafe.</p>	<ul style="list-style-type: none"> • (Blöbaum & Hunecke, 2005) • (Loukaitou-Sideris & Fink, 2009) • (Wolch <i>et al.</i>, 2010) • (Shamsudin & Hussin, 2013) • (Sarkar <i>et al.</i>, 2015) • (Singh, 2016) • (Rashid <i>et al.</i>, 2017) • (Stark & Meschik, 2018) • (Basu <i>et al.</i>, 2021) • (Dameria & Fuad, 2021) • (Polko & Kimic, 2022) • (Min <i>et al.</i>, 2022) • (Ng & Sze, 2022)
2	Cleanliness	<p>Cleanliness is the degree of cleanliness or dirtiness and It is categorized as a disorganized physical environment, encompassing dirty or unkempt areas, litter on the floor, overflowing trash cans, graffiti, damaged equipment and deteriorating buildings. Cleanliness plays a crucial role in heightening insecurity in urban spaces.</p>	<ul style="list-style-type: none"> • (Rashid <i>et al.</i>, 2017) • (Basu <i>et al.</i>, 2022) • (Akgün-Tanbay <i>et al.</i>, 2022) • (Polko & Kimic, 2022)
3	Maintenance	<p>Maintenance is a matter of concern for the place and the safety of the users. The absence of proper maintenance can create hotbeds of crime and fear, particularly for women. Fear is heightened when there are unmaintained elements, such as</p>	<ul style="list-style-type: none"> • (Reid & Konrad, 2004) • (Rashid <i>et al.</i>, 2017) • (Basu <i>et al.</i>, 2021) • (Basu <i>et al.</i>, 2022) • (Akgün-Tanbay <i>et al.</i>, 2022) • (Polko & Kimic, 2022) • (Min <i>et al.</i>, 2022)

	abandoned buildings, vacant lots and unpaved roads.	
4	External Protection	<p>External protection refers to elements outside the urban alley design, represented by CCTV cameras and video surveillance, commonly referred to as “eyes on the street”. Women undoubtedly feel safer when the alley is monitored by security cameras.</p> <ul style="list-style-type: none"> • (Loukaitou-Sideris & Fink, 2009) • (Wan Ismail & Ching, 2016) • (Nizar, 2017) • (Golan <i>et al.</i>, 2019) • (Lim <i>et al.</i>, 2020) • (Lim <i>et al.</i>, 2020) • (Basu <i>et al.</i>, 2021) • (Polko & Kimic, 2022)
5	Other alley users	<p>Other alley users are strangers who are unpredictable and their behavior cannot be controlled. Feelings of security are influenced by the presence of potential “illegal users”, such as individuals who appear dangerous, drug addicts, alcoholics, people sleeping on benches, beggars and homeless individuals, including wandering teenagers.</p> <ul style="list-style-type: none"> • (Sreetheran & Van den Bosh, 2015) • (Stark & Meschik, 2018) • (Golan <i>et al.</i>, 2019) • (Lis <i>et al.</i>, 2019) • (Hidayati <i>et al.</i>, 2020) • (Basu <i>et al.</i>, 2021) • (Polko & Kimic, 2022)
6	Public service	<p>Public service encompasses public facilities and infrastructure, such as sewerage, drainage and garbage collection. Alleys cannot be eliminated, as they play an important role in urban design, especially concerning safety considerations.</p> <ul style="list-style-type: none"> • (Wan Ismail & Ching, 2016) • (Rashid <i>et al.</i>, 2017) • (Ng & Sze, 2022) • (Akgün-Tanbay <i>et al.</i>, 2022) • (Dhasmana <i>et al.</i>, 2022)

3.4.2. Psychological Factors

Everyone engages in a process called perception, wherein they arrange and make sense of the sensory information they receive, providing context for their surroundings (Seymour *et al.*, 2010). The development of street quality measures can help investigate the relationship between street conditions and safety perceptions. Feelings of security can only be measured subjectively and vary depending on the individual experiencing them (Khalid *et al.*, 2018). It reflects an individual's reaction to a place and how they assess conditions there. People need to consider their own attitudes and preferences (Dhasmana *et al.*, 2022).

Overall, safety perceptions influence pedestrian behaviour. In particular, women perceive a higher risk of being assaulted, robbed or harassed (Chaudhari *et al.*, 2018). Regarding safety responses, women are more sensitive to their surroundings and associated safety risks when walking than men (Dameria & Fuad, 2021). For women, city streets are often perceived as threatening. Urban structures have a greater impact on women than men, making it challenging for women to replace their subjective evaluation of safety perceptions with that of men (Cui *et al.*, 2023). Finally, previous literature has successfully identified the determinants of safety perceptions and the reasons behind street anxiety from a psychological perspective, including demographics such as gender, age and race (Arshad *et al.*, 2016; Dymén & Ceccato, 2012; Hidayati *et al.*, 2020).

4. Discussion

The study's discussion revolves around the multifaceted role of urban alleys in shaping people's perceptions of safety, with a specific focus on women's experiences and concerns. This study reveals that research on safety perceptions in urban public spaces varies in focus across articles, suggesting that men and women have distinct experiences in cities. While men and women are acknowledged, the idea that they have different experiences when using urban public spaces is not further discussed. Concerning safety issues faced by women in urban public spaces, 16 out of 45 articles are related to women's safety. Although this data may not be comprehensive when searching for articles, we can understand that articles focusing on women as research subjects only account for 35% of the review. This percentage indicates that comparable studies on the safety of women are still quite scarce. Despite differing degrees of concern or related research on women in various parts of the world in recent years, global urban planning is still primarily dominated by men. These findings align with (Parashar, 2014), emphasizing men's dominance over women and the frequent disregard for women's demands.

In the contemporary context of developing countries, implementing a Safe Cities approach has become a primary agenda. This study acknowledges the pivotal role of cities in ensuring the safety of inhabitants and the effective implementation of Crime Prevention through Environmental Design (CPTED) emerges as a key strategy for reducing and preventing crime occurrences. Building on the CPTED strategy, this study narrows its focus to two main factors: physical and psychological considerations. Accordingly, perception emerges as a significant influencer of psychological perceptions and the physical design of streets plays a pivotal role in shaping their behavior. This result is consistent with Sohn (2016), who confirmed that the CPTED strategy is effective in assessing the relationship between residential crime and the built environment, reflecting the principles of crime prevention through environmental design and thus achieving safety. Mihinjac and Saville (2019) also affirmed that this strategy is effective in raising the level of safety in cities and providing residents with opportunities to enhance their personal aspirations and improve their quality of life.

The study identified specific physical factors influencing urban alley safety, including visibility, cleanliness, maintenance, external protection, other alley users and public service. Visibility enhances security and safety by allowing potential threats to be detected at a distance. Maintenance is a critical concern and the absence of proper maintenance can create hotbeds of crime and fear, particularly for women. Cleanliness, categorized as a disorganized physical environment, plays a crucial role in heightening insecurity. These findings align with Mundher et al. (2022b), who explained that maintenance and cleanliness contribute to displaying the ideal situation and increasing the quality of the place through active and careful management. Moreover, external protection, represented by CCTV cameras, contributes to women's perceived safety. Other alley users, such as unpredictable strangers, influence feelings of security, emphasizing the need for careful consideration in urban planning. These results are consistent with Polko and Kimic (2022), who explained that alleys that do not contain CCTV cameras and are infested with illegal users, such as beggars and addicts, raise greater concerns regarding women's safety. Lastly, public service, encompassing facilities and infrastructure, is deemed crucial, highlighting those alleys play an indispensable role in urban design and safety considerations.

The study also delves into the psychological aspect, emphasizing that everyone engages in a process called perception. This process, shaped by individual attitudes and preferences, involves arranging and making sense of sensory information in the context of surroundings. Safety perceptions are crucial in influencing pedestrian behavior. This finding aligns with Al-Sharaa et al. (2022), who defined the effect of safety perception on pedestrian behavior and the possibility of finding the appropriate way. These safety perceptions are particularly notable in women, who perceive a higher risk of assault, robbery or harassment and are more sensitive to their surroundings and associated risks when walking. Therefore, city streets and alleys are often perceived as threatening for women, emphasizing the disproportionate impact of urban structures on women compared to men. Tandogan and Ilhan (2016) articulated this in their research, describing the fear of crime as a psychological feeling of insecurity stemming from a woman's emotions and women prefer to stay in closed and safeguarded places, avoiding urban streets and alley areas.

Ultimately, the study navigates through the intricate dynamics of safety perceptions in urban alleys, underscoring the multifaceted interplay of physical and psychological factors. The findings contribute to the ongoing discourse on urban planning and safety considerations, especially with a focus on the distinct experiences of women in public spaces. The implications extend beyond alleys, offering valuable insights to create safer urban environments.

5. Limitations

Despite its findings, this study has several limitations. One limitation is the restriction on the number of articles used; we may still overlook significant articles by omitting some related keywords during the search process, even though we employed broad inclusion criteria, conducted a thorough search for articles and used a snowballing approach to ensure a representative sample of the literature on the subject. Additionally, women's expression and embodiment in urban alleys may vary depending on the social norms and cultural backgrounds developed in each country and location. Therefore, we recommend conducting additional studies in other countries and locations. Ultimately, the scope of this study is confined to identifying the strategies and factors that can enhance the safety and security of female pedestrians in urban alleys; this remains an active field of research. Hence, we recommend future studies to research further and provide both theoretical and practical investigations for each of the six major factors used to enhance the safety and security of female pedestrians in urban alleys.

6. Conclusion

This systematic review explores the relationship between females' safety perceptions and urban alleys, emphasizing practical strategies and factors to enhance the safety of female pedestrians in such settings. The study underscores the dominance of men in global urban planning, aligning with the observation of the frequent disregard for women's demands. In response to these challenges, the contemporary context of developing countries necessitates the implementation of a Safe Cities approach. Urban alleys play a pivotal role in ensuring the safety of inhabitants, with the effective

implementation of Crime Prevention through Environmental Design (CPTED) identified as a key strategy for reducing and preventing crime occurrences.

The CPTED strategy illuminates the intricate interplay of physical and psychological factors that significantly influence safety perceptions and behaviors in urban alleys. Physical factors, including Visibility, Cleanliness, Maintenance, External Protection, Other Alley Users and Public Service, are highlighted. Among psychological factors, women's own perceptions emerge as particularly crucial. These factors collectively contribute to enhancing the safety of female pedestrians in urban alleys. However, the safety of women in these spaces is a complex topic requiring a multifaceted, multilevel and multi-angle examination.

The study emphasizes the need to transform every city alley into a safe space free from harassment and criminal activity, allowing people, especially women, to travel freely and fully experience the joys of city living. Ultimately, it serves as a call to action for planners and designers to prioritize safety considerations in urban spaces, addressing the unique concerns of women. The wealth of research findings presented contributes to a nuanced understanding of safety perceptions, providing a foundation for targeted interventions and improvements in urban design practices.

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Appendix

Table A1. Summary of 45 reviewed articles

N.	First Author	Year	Journal	Method	Findings	Purpose	Article related to		
							Female	Safety	Alley
1	Zacharias	2001	Journal of Planning Literature	Review	There are clear differences in interpersonal space in pedestrian environments depending on city and culture that also clearly affect our experience of the space.	Planning pedestrian environments requires assumptions about how pedestrians will respond to characteristics of the environment as they formulate and enact their walking itineraries.			✓
2	Reid	2004	Sociological Spectrum	Survey	Women express greater levels of fear of burglary and sexual assault than men. The effect of perceived risk of robbery is greater for men than for women.	Explore the interaction between gender and perceived risk of victimization on levels of fear of crime.	✓	✓	
3	Blöbaum	2005	Environment and Behavior	Survey	Relevance of lighting, prospect and possibilities of escape for the design of living in urban public places for men as well as for women.	Determine what are the most relevant factors influencing perceived hazards in urban public spaces.	✓		
4	Wang	2006	Journal of Environmental Psychology	Ratings of site-level	Safety concerns varied as respondents proceeded down an alley and such variation was a function of both Nasar/Fisher features, where they were in the alley and who they were.	The purpose of the current study was to extend the Nasar/Fisher model linking site-level attributes to fear in real urban alleys, and to a slightly different methodology		✓	✓
5	Shamsuddin	2008	Habitat International	Survey	Place attachment has a significant contribution to the sense of place	Examining attachment to traditional shopping streets in the city center of Kuala Lumpur.			✓
6	Ewing	2009	Journal of Urban Design	Expert Assessments	To shed further light on factors contributing to urban design qualities and their importance in explaining walking behaviour and quality of life	To arm researchers with operational definitions they can use to measure the street environment and test for significant associations with walking behaviour.			✓
7	Loukaitou-Sideris	2009	Urban Affairs Review	Survey	Most respondents believe women have distinct safety and security needs, but most do not think agencies should put specific programs into place to address these needs.	To examine the issue of women's safety on transit through a survey of U.S. transit operators.	✓	✓	
8	Seymour	2010	Applied Geography	Focus Group	Sometimes necessity was trumped by fear. Alleys are not currently attractive social or recreational spaces to the majority of the members of the communities we met in our focus groups.	Investigates the perceptions of alley-adjacent residents in low-income Los Angeles neighborhoods regarding residential alleys and possible greening measures.			✓
9	Wolch	2010	Environment and Planning A: Economy and Space	Focus Group + GIS	Most alleys in Los Angeles are underutilized and walkable, quiet and clean, although they can be and are often perceived as, dirty and unsafe.	To explore the distribution, physical features, activity patterns and resident perceptions of alleys in one major US city, Los Angeles, California.		✓	✓
10	Cozens	2011	Planning Practice and Research	Review	Permeable street configurations, mixed-used developments and high population densities are associated with higher levels of recorded crime	Critically inspects the theories and evidence from the field of environmental criminology and interrogates some of the safety assumptions underpinning planning policy			✓
11	Dymén	2012	The Urban Fabric of Crime and Fear	Case study	Three features of permeability, mixed land uses and high densities are not always benign and socially beneficial.	To develop and test a method to analyse and visualise different factors that influence gender differences in perceived safety in public spaces.	✓	✓	
12	Azmi	2012	Procedia - Social and Behavioral Sciences	Survey	Walking distance, walking speed and walking time are the factor that must take into consideration with research related to walking behaviour.	A comparative study of walking behaviour of residents between urban and rural neighborhood.			✓
13	Imai	2013	Cities	Case study	Alleyway fulfills a personal but especially economic function, supporting their local business and hybrid lifestyle, as they embody past and present elements in a modern lifestyle.	To critically reflect on the potential of the recovery of the Japanese urban alleyway roji.			✓
14	Shamsuddin	2013	American Transactions on Engineering & Applied Sciences	Review	Successful implementation of the CPTED concept in Malaysian cities can be achieved by increasing the awareness and understanding of implementers of the concept.	Through Environmental Design (CPTED) for Urban Sustainability in Malaysian Cities			✓
15	Bahari	2014	Advanced Materials Research	Survey	The female pedestrian used the existing pedestrian facilities more than male for every group profile except for elderly person with disabilities/with prams.	To assess on the pedestrian profile pattern in one of the Central business district within Kuala Lumpur City Center	✓		
16	Mahmoudi	2015	Cities	Observation + survey	Most of the streets' examined attributes were not of quality condition, reveal a major difference in the livability of the studied streets.	To understand whether the physical attributes of streetscapes affect the livability of Kuala Lumpur streets.			✓
17	Sreetheran	2015	Urban Forestry & Urban Greening	Semi-structured in-depth interviews	Among the residents of Kuala Lumpur there is some form of defensive behaviour towards crime in urban parks but this was only observed among the women.	To determine the attributes which evoke 'fear of crime' and to determine the defensive behaviour among the urban park users.	✓	✓	

18	Sarkar	2015	Landscape and Urban Planning	Survey	The role of street-level design features in positively influencing individual decisions to walk.	Examine the salutogenic environment effects of urban green upon walking behavior and how such effects are mediated by built environment configuration and street-level physical accessibility.	✓	
19	Forsyth	2015	Urban Design International	Review	What is considered a walkable place varies substantially between definitions, leading to substantially different designs.	This review both problematizes the idea of walkability and proposes a conceptual framework distinguishing these definitions.	✓	
20	Wan Ismail	2016	Environment-Behaviour Proceedings Journal	Observation + Interview	The evolution of back lane from service lane into other interesting functions has successful activate the back lane to avoid negative spaces and to increase crime rate in the city.	Concerns the use of the back lanes of the old shop houses in China Town, Kuala Lumpur.	✓	
21	Singh	2016	Procedia - Social and Behavioral Sciences	Case study	Factors relating to urban morphology like enclosure, block length and edge conditions, were found crucial in creating the perception of a walkable neighborhood.	Identifies the factors that contribute to increased urban walkability in order to improve neighborhood sustainability and public life.	✓	
22	Arshad	2016	MATEC Web of Conferences	Survey	Significant differences in mean satisfaction value between male and female pedestrians.	To investigate whether gender differences influences the pedestrian perception and satisfaction level at three sidewalks located within the Kuala Lumpur City Center	✓	
23	Rashid	2017	The 2nd International Conference On Applied Science And Technology	Observation + Survey	Fear does affect women's perception and physical design of the streets are important in affecting their behavior.	To explore women's perception of safety in the streets of Kuala Lumpur.	✓	✓
24	Nizar	2017	Journal of Built Environment, Technology and Engineering	Survey	These alleys are valuable community assets, but without appropriate policies, cities miss out on the potential and benefits these urban forms can offer. Especially the lack of amenities and public facilities.	To improve the use of alleys in Kuala Lumpur as transitional space and / or social space.	✓	
25	Khalid	2018	Asian Journal of Quality of Life	Survey	The quality of parks was found relevant to peoples' life satisfaction, whereas the quality of health was correlated with the level of happiness and satisfaction, regardless of respondents' age, sex, occupation, ethnicity and marital status.	To assess the quality of urban park by empirically evaluating through behavioral competencies and psychological well-being from the model of Lawton's Quality of Life.	✓	
26	Stark	2018	Transportation Research Part F: Traffic Psychology and Behaviour	Survey	Women in general have constrained travel behaviour because of fear about their personal security.	To investigate frightening situations women face in their everyday mobility. The focus is on all situations causing fear such as harassment and the influence on the travel behaviour of women.	✓	
27	Chaudhari	2018	Fourth International Conference on Computing Communication Control and Automation	Android application developed using GPS	The performance of the proposed system is evaluated based on accuracy.	To recommend the user about the safety level of the local streets	✓	
28	Lis	2019	Sustainability	Survey	The tendency to rate settings with shrubs lower is partly connected with the fact that shrubs decrease space safety.	Compared the impact of the presence of trees and shrubs and their capability of offering concealment, as well as perceived space use intensity on perceived danger and preferences in Poland, Latvia and China	✓	
29	Golan	2019	Journal of Transport and Land Use	Focus groups + GIS	The Women's Walkability Index is heavily influenced by crime, homelessness and sidewalk cleanliness.	To address this gap by exploring women's subjective pedestrian experiences and creating a women-specific walkability index focusing on daytime walking, when fear of crime is assumed to be less pronounced.	✓	✓
30	Lim	2020	Planning Malaysia	in-depth interviews	Understanding of a safe city programme could be differentiated through the lens of sustainability and resilience challenges, as well as their levels of prevention.	Assess local players' views of the challenges facing the safe city programme in KL and to provide a framework for the prevention strategies.	✓	
31	Hidayati	2020	Transportation Research Part F: Traffic Psychology and Behaviour	On-street surveys + Video analysis	A large proportion of women ascribed to negative perceptions of safety as compared to men.	To identify the interplay between gender differences, perceptions of safety and transport mobility choices whereby the perceptions of safety is assumed to be correlated to spatial configuration and socio-cultural constructs.	✓	✓
32	Machado-León	2020	Cities	Case study	Cities increasingly recognize the potential to incorporate the increase in resources provided by functional alleys for environmental, economic and social benefits.	To examine design features at the alley endpoints, alley aprons and alley interiors.	✓	
33	Lim	2020	Sustainability	Survey	Prevention methods through the actor of "capable guardians" (i.e., authorities) are effective; however, methods through the actor of "suitable victims" (i.e., communities) is ineffective.	To identify the factors contributing to the prevention of crime and fear of crime.	✓	
34	Levy	2020	ACM Transactions on Intelligent Systems and Technology	SafeRoute application	SafeRoute avoids dense crime areas on a map	To prevent street harassment by routing users away from local crime areas.	✓	
35	Ng	2021	Journal of	Survey	Pedestrian activities in the alley must integrate	Analysed the spatial attributes/factors that	✓	

			Engineering Science and Technology		well to support the activities' continuity and intensity. The alley will support more social activities in daily life while it becomes a walkable pathway in the city.	make the alleys an informal public space in the context of Kuala Lumpur.		
36	Basu	2021	Journal of Transport & Health	Survey	Targeted urban design practices (e.g., functional use of vacant land, increasing diversity of land use, adequate street lights) could be used to improve perceived security and also reduce gender inequality in security perceptions.	To identify the characteristics of the street level BE that influence the perceived security of women and men pedestrians	✓	✓
37	Dameria	2021	IOP Conference Series: Earth and Environmental Science	Case study	Through its openness and its transparency, can create a safe walking experience for female pedestrians in an urban context.	Investigates the relationship between the permeability of building frontages and female pedestrians' perceptions of safety on the sidewalk.	✓	✓
38	Evensen	2021	Sustainability	Survey	Environmental attributes such as perceived prospect and concealment should be considered in the design of urban green spaces	To explore the impact of a safety-enhancing landscape design measure on visitors' experiences in an urban park.		✓
39	Moreau	2022	Journal of Urbanism: International Research on Placemaking and Urban Sustainability	Case study	The conventional infill developments create overdetermined conditions that limit social activities.	To examine the relationships between public/private interfaces and activities in residential alleys in Melbourne, Australia.		✓
40	Min	2022	Journal of Asian Architecture and Building Engineering	Quasi-experimental on-site study	It is strongly suggested to avoid dark and obscure alleys surrounded by trees or tall shrubs.	To investigate fear-evoking factors in different environmental contexts, two POPS were selected: one with a wooded enclosure surrounded exclusively by office buildings and the other with open lawn near street retail facilities.		✓
41	Polko	2022	Ain Shams Engineering Journal	Survey	The results showed statistically significant differences in the perception of safety between groups of male and female respondents in the case of more than a half of the factors.	To investigate how gender differentiates the perception of safety in urban parks.	✓	✓
42	Basu	2022	Transportation Research Part F: Traffic Psychology and Behaviour	Web-based experiment	Urban design strategies such as increasing land use diversity and providing adequate trees enhance perceived environmental attractiveness, safety and security, ultimately resulting in more walking for transport.	To examine how BE factors influence an individual's perceptions of attractiveness, safety, and security together within the walking environments used to walk to or from a public transport stop in suburban areas		✓
43	Dhasmana	2022	International Conference on Innovation and Intelligence for Informatics, Computing and Technologies	Survey + interviews	User-preference by female users is dominantly governed by comfort because of the safety concerns faced by women, while vitality took dominance in case of male user preferences for public space that offer vivid mediums of entertainment and variety of activities.	To identify the factors influencing the user preference of public spaces in Chandigarh through the lens of gender inclusivity	✓	✓
44	Akgün-Tanbay	2022	Journal of Advanced Transportation	Case study	Females feel less safe while walking and less comfortable while cycling at shared spaces compared to males.	To investigate the impacts of perception of infrastructure, sociodemographic characteristics, frequency of road use and road user perception on safety, comfort and chaos with respect to shared spaces.	✓	✓
45	Cui	2023	Buildings	Case study	Verified the hypothesis that women perceive streets as less safe. men's hypothetical assessments were less sensitive than women's. identified the non-replaceability of women in street safety evaluations.	Proposes a safety perception evaluation method from the female perspective based on street view images (SVIs) and mobile phone data, taking the central city of Guangzhou as an example.	✓	✓