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Creating a Canopy of Civic Security for Women in Cities (District 12 of Tehran)

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Abstract

The purpose of this study is to examine the status of District 12 of Tehran in terms of women's security indicators and to identify the most important factors reducing women's security in this district. This research is descriptive–analytical in method and applied in purpose. Data were obtained through the distribution of questionnaires among 38 women residing in District 12 of Tehran. The results were analyzed using Spearman's correlation coefficient, exploratory factor analysis, and Friedman's test in the SPSS environment. Field survey results indicate that, based on the average of 10 research indicators, women's security in 7 dimensions—including physical, structural, functional, urban management, urban furniture, urban transportation, and cultural–social dimensions—is below 3. This indicates that the status of various indicators related to women's security in District 12 of Tehran is unfavorable. Moreover, the status of three dimensions—urban quality of life, accessibility, and behavioral—is at a relatively moderate level. The correlation coefficient between dimensions also shows that accessibility and quality of life are correlated with the behavioral dimension; the cultural–social dimension is correlated with urban management and urban furniture; and the physical dimension is correlated with the structural dimension. These correlations are at a moderate and positive level. Therefore, any weakness in one dimension can negatively affect its corresponding dimension, thereby reducing overall women's security in District 12 of Tehran. As a result of exploratory factor analysis, latent factors or constructs within the 10 dimensions of women's security were extracted, and 15 factors underlying the 59 research variables were identified. The final 15 extracted factors were able to explain 47.01% of the variance of all research variables. In each factor, among the 15 factors derived from factor analysis, most variables with higher factor loadings were related to physical, urban furniture, urban quality, and accessibility issues. A comparison of dimension averages using the one-sample t-test showed that the women's security index, with a significance level of less than 0.05, is not in a better situation. Furthermore, the results of Friedman's test showed that the structural and urban furniture dimensions ranked eighth and ninth in mean rank, respectively. Therefore, it can be said that these two dimensions play a major role in reducing women's security compared to other dimensions. Overall, the status of women's security indicators in District 12 of Tehran is unfavorable. Moreover, the structural and urban furniture factors are the most important contributors to the reduction of women's security in urban spaces in District 12 of Tehran and should receive special attention from urban managers to improve women's security in urban spaces. Among the indicators affecting women's security in urban spaces, the structural and urban furniture dimensions play a significant role in enhancing both the subjective and objective aspects of women's security. Organizing urban spaces in these dimensions can greatly contribute to increasing the sense of security among citizens, particularly women.

Keywords: civic security, women's security, canopy of security, District 12 of Tehran.

1. Introduction

Urban security, particularly in relation to women, has emerged as one of the most pressing issues in contemporary urban planning and management, influencing both the livability of cities and the extent to which urban spaces are equitably accessible to all citizens. The spatial structure, design, and management of urban environments have a direct effect on individuals' perceptions of safety and on actual security outcomes (Carmona, 2010; Carmona et al., 2012; Jacobs, 1981). Research in this field consistently indicates that women's sense of security is shaped not only by tangible threats and incidents but also by the interplay of environmental, physical, social, and managerial factors within public spaces (Hayati et al., 2020; Karimi & Torkashvand, 2021; Khaliji, 2020; Shafiei, 2019; Zardasht & Khanizadeh, 2020). This multidimensional nature of women's security underscores the need for an integrative approach that considers the design of the built environment, patterns of social interaction, and the presence of responsive governance mechanisms (Askari Zadeh & Asadi Malek Jahan, 2018; Ghasemi et al., 2018; Rasouli Shoorestan, 2018).

The concept of security in urban spaces extends beyond crime prevention to include feelings of comfort, freedom of movement, and the ability to participate fully in public life without fear of harassment or violence (Abedini et al., 2017; Kiani et al., 2017; Rahimi & Sabouri, 2017). This aligns with broader notions of urban quality of life, where safety is regarded as a fundamental pillar of sustainable and inclusive cities (Paydar et al., 2016; Pourahmad et al., 2016). In many contexts, urban security is approached through environmental design strategies, such as Crime Prevention Through Environmental Design (CPTED), which emphasizes the relationship between spatial configuration, visibility, and natural surveillance (Barzegar et al., 2007; Cozens, 2008; Mortazai, 2008; Salehi, 2008). These approaches focus on reducing opportunities for crime and enhancing residents' perception of safety through spatial interventions.

In Iranian urban contexts, particularly in metropolitan districts, physical and social variables intertwine to shape women's security. Studies indicate that the availability of well-maintained pedestrian routes, proper lighting, active street frontages, and coherent land use patterns can significantly reduce insecurity, especially in areas with deteriorated urban textures (Mir Mohammad Tabar et al., 2016; Pourahmad et al., 2015; Pourmousavi et al., 2015). The absence of such qualities can exacerbate perceptions of danger, restricting women's willingness to engage with public spaces (Bahrami et al., 2014; Dezfouli & Mohammadi, 2015; Karimi, 2015; Mousavi et al., 2015). Furthermore, cultural and social norms intersect with spatial characteristics to produce unique security dynamics, as evidenced by gender-segregated usage patterns and the persistence of spaces perceived as male-dominated (Rezazadeh & Mohammadi, 2013).

Globally, the discourse on urban public space has expanded to incorporate not just physical safety, but also the fostering of inclusive, vibrant, and socially cohesive environments (Carmona, 2010; Carmona et al., 2012). Foundational works, such as those by Jacobs (Jacobs, 1981), have long emphasized the role of "eyes on the street" and mixed uses in enhancing urban safety. More recent studies adapt these principles to address contemporary challenges, integrating concepts of environmental sustainability, digital surveillance, and community-based management (Soltani et al., 2024; Xu, 2024; Yang et al., 2021). These frameworks underline the importance of both technological and human elements in the perception and reality of safety.

In the Iranian context, urban studies reveal that physical degradation, inadequate maintenance, and insufficient urban furniture contribute directly to insecurity, while targeted interventions can transform such areas into welcoming, safe spaces (Hayati et al., 2020; Khaliji, 2020; Zardasht & Khanizadeh, 2020). This transformation requires integrating urban design principles with social policy measures, ensuring that interventions resonate with community needs and cultural expectations (Ghasemi et al., 2018; Rasouli Shoorestan, 2018; Shafiei, 2019).

A critical dimension in assessing women's security is the subjective perception of safety, which can differ substantially from recorded crime statistics. Women may perceive certain environments as unsafe due to inadequate lighting, lack of active uses, or the presence of social disorders, regardless of actual incident rates (Askari Zadeh & Asadi Malek Jahan, 2018; Kiani et al., 2017; Rahimi & Sabouri, 2017). In Tehran and other major cities, research highlights that areas with mixed-use development, pedestrian-oriented design, and visible community presence often generate higher levels of perceived security

among women (Abedini et al., 2017; Pourahmad et al., 2016). Conversely, isolated or poorly maintained spaces may discourage female participation in public life, reinforcing patterns of spatial exclusion (Mir Mohammad Tabar et al., 2016; Paydar et al., 2016).

Urban management plays an equally crucial role in shaping security outcomes. The presence of responsive policing, effective maintenance systems, and participatory planning processes correlates strongly with improved safety indicators (Karimi, 2015; Mousavi et al., 2015; Pourmousavi et al., 2015). Management approaches that incorporate local feedback, particularly from women, can identify security priorities more effectively and ensure that interventions address both real and perceived risks (Bahrami et al., 2014; Dezfouli & Mohammadi, 2015). This participatory approach aligns with sustainable urban governance models, which emphasize accountability, inclusivity, and resilience in the provision of public services (Rezazadeh & Mohammadi, 2013).

From an urban design perspective, integrating CPTED principles into planning regulations can have long-lasting benefits for women's safety. Measures such as improving natural surveillance, reinforcing territoriality, and enhancing access control can significantly reduce opportunities for crime and disorder (Cozens, 2008; Mortazai, 2008; Salehi, 2008). In practice, however, these strategies must be adapted to local contexts, accounting for cultural norms, climatic conditions, and urban morphology (Barzegar et al., 2007). The application of such frameworks in Iran shows promise but also reveals the challenges of coordinating across multiple institutional actors (Jacobs, 1981; Xu, 2024).

Recent advancements in technology and data analysis offer new opportunities for improving urban safety. The integration of geographic information systems (GIS) in mapping crime hotspots and analyzing spatial vulnerabilities enables planners to allocate resources more strategically (Soltani et al., 2024; Yang et al., 2021). Such analytical tools, when combined with socio-spatial surveys, can identify patterns of insecurity experienced by women in specific districts (Karimi & Torkashvand, 2021; Zardasht & Khanizadeh, 2020). Moreover, leveraging digital finance and social security systems may indirectly contribute to safety by reducing economic inequalities that often correlate with urban crime (Xu, 2024).

In District 12 of Tehran, the interplay between historical urban form, high population density, and socio-economic diversity creates complex security dynamics. This district, characterized by a mix of traditional neighborhoods and commercial hubs, experiences challenges related to physical degradation, congestion, and limited public oversight (Hayati et al., 2020; Khaliji, 2020). Women's security in such environments is influenced by both immediate spatial features—such as lighting, visibility, and street activity—and broader socio-economic factors, including employment opportunities, social cohesion, and public service provision (Ghasemi et al., 2018; Rasouli Shoorestan, 2018; Shafiei, 2019).

The research literature emphasizes that achieving substantial improvements in women's security requires an integrated strategy encompassing environmental design, urban management, and community engagement (Askari Zadeh & Asadi Malek Jahan, 2018; Kiani et al., 2017; Rahimi & Sabouri, 2017). Environmental interventions must be supported by continuous monitoring and adaptive management to remain effective in the face of changing urban conditions (Abedini et al., 2017; Pourahmad et al., 2016). Simultaneously, social programs that empower women and encourage their active participation in urban governance can foster a sense of ownership over public spaces, further enhancing safety (Mir Mohammad Tabar et al., 2016; Paydar et al., 2016).

Given the significance of urban safety for overall city sustainability, this study focuses on evaluating and enhancing women's security in urban spaces within District 12 of Tehran, drawing on both global theoretical frameworks and local empirical evidence.

2. Methods and Materials

From the perspective of purpose, the present research is an applied study, and in terms of nature and methodology, it is descriptive–analytical, employing a survey technique. In the descriptive section, existing studies and research are utilized, along

with descriptive statistics. In the analytical section, the results of previous studies are examined, and the collected data are tested using inferential statistical methods.

The following methods were employed to collect information for the present study:

• **Documentary or library method**, which includes books, articles, urban development plans, comprehensive urban plans, and related maps. This method is used to identify indicators of *presence* as well as gender equity indicators in urban neighborhoods, which are then examined for the purpose of testing these indicators.

• **Observation or field survey method**, including site visits, field surveys, and questionnaires. Since the present study examines women's presence in urban spaces, it is necessary to assess women's perspectives through questionnaires containing indicators of *presence* and gender equity. The reliability of the questionnaires is tested using Cronbach's alpha on a sample of 30 respondents, and the validity of the questionnaire items is assessed through expert reviews by professors in the relevant field.

The sampling method in this study is random sampling, and the sample size was calculated using Cochran's formula with a margin of error of 0.03. Accordingly, the sample size was determined to be 385 individuals, and an equal number of questionnaires were collected in District 12 of Tehran.

To analyze the collected data, two analytical and inferential approaches were used. In the analytical section, statistics such as mean and standard deviation were employed to provide descriptive information about the population and statistical sample. In the inferential section, inferential statistical tests were applied to test the hypotheses. The software tool used for data analysis in this research is SPSS, and Pearson's correlation coefficient was employed for data analysis.

The table below presents the indicators and criteria for assessing women's security in urban spaces.

Table 1. Indicators and Criteria for Assessing Women's Security in Urban Spaces

Component	Item
Physical (Spatial)	Non-defensible spaces; informal surveillance such as CCTV cameras in streets; openness or enclosure of the environment; familiarity with spaces; safety of women's mobility in the city at night
Structural	Presence of vacant lands and dilapidated buildings; presence of abandoned lands and structures; dark and highly deserted alleys; impact of physical and visual permeability in the neighborhood; presence of worn-out and old fabrics; presence of unfinished buildings in urban spaces; presence of buildings with dirty or damaged facades; condition of sidewalks and streets
Urban Furniture	Streets and passages; roadside vegetation and curbstones; appropriate lighting in streets and alleys; condition of chairs and benches in streets; pedestrian crossings; parks, green spaces, and public gardens; colors in urban spaces
Cultural and Social	Verbal harassment and offensive comments from passersby; presence of social disorders such as addiction and street fights; women's participation; presence of theft, pickpocketing, and bag-snatching; crowded and heavily populated streets
Urban Transportation	Condition of bus and taxi stations in terms of lighting and seating; conditions for women's movement when using public transport; comfort, convenience, and safety in buses and taxis; location of bus and taxi stations within the city; bus and taxi operating hours during the day
Accessibility	Easy access to main streets; access to green spaces and commercial areas; access to sports, cultural, and recreational facilities; access to emergency and safety equipment and installations; access to parks and restrooms; access to public urban transport
Urban Quality of Life	Overall quality of residence in urban spaces; quality of activities and land use; quality of urban infrastructure and services; income level; safety in neighborhoods; quality of recreational spaces

3. Findings and Results

If one or both sets of data in the research are non-normal, it is not possible to use parametric tests such as Pearson to determine the correlation. In such cases, a non-parametric correlation measurement method, such as Spearman, should be applied. The Spearman correlation test is one of the most widely used tests for measuring the relationship between two ordinal variables, between an ordinal variable and an interval/ratio variable, or between two interval/ratio variables that are non-normal.

To examine the relationship between dimensions, the Spearman correlation coefficient was used. In terms of relationship strength, a coefficient between ±0.6 and ±1 indicates a strong relationship, between ±0.4 and ±0.6 indicates a moderate relationship, between ±0.2 and ±0.4 indicates a negligible or weak relationship, and less than ±0.2 indicates a very weak relationship.

The findings in the table below show that the relationship between the physical and structural variables, with a coefficient of 0.42 at the 99% confidence level, is positive. There is no significant relationship between the physical and functional indicators, with a coefficient of −0.26, and the relationship is negative. The relationship between urban management and functional indicators, with a coefficient of 0.101, is positive at the 95% confidence level. The relationship between structural

indicators and functional, behavioral, and cultural–social indicators is not significant. The rest of the relationships between dimensions were also evaluated, and their results are presented in the table below.

Table 2. Results of the Spearman Correlation Coefficient Test for Dimensions of Women's Security in Urban Spaces

Variables	Physical	Structural	Functional	Behavioral	Urban Management	Urban Furniture	Cultural & Social	Urban Transportation	Accessibility	Urban Quality of Life
Physical	r = 1.002, p = 0.000	r = 0.420**, p = 0.001	r = −0.260, p = 0.601	r = 0.119, p = 0.012	r = 0.270**, p = 0.000	r = 0.223**, p = 0.000	r = 0.023, p = 0.621	r = 0.153**, p = 0.001	r = 0.360**, p = 0.000	r = 0.390*, p = 0.000
Structural	r = 0.490**, p = 0.000	r = 1.010, p = 0.000	r = −0.052, p = 0.315	r = 0.039, p = 0.423	r = 0.201**, p = 0.000	r = 0.349**, p = 0.000	r = 0.069, p = 0.162	r = 0.218**, p = 0.001	r = 0.172**, p = 0.000	r = 0.251**, p = 0.000
Functional	r = −0.026, p = 0.601	r = 0.050, p = 0.315	r = 1.002, p = 0.000	r = 0.223**, p = 0.000	r = 0.101*, p = 0.042	r = 0.112*, p = 0.023	r = 0.215**, p = 0.000	r = 0.098, p = 0.051	r = −0.034, p = 0.450	r = −0.161**, p = 0.001
Behavioral	r = −0.121*, p = 0.017	r = 0.040, p = 0.423	r = 0.226**, p = 0.000	r = 1.000, p = 0.000	r = 0.091, p = 0.065	r = 0.172**, p = 0.000	r = 0.502**, p = 0.000	r = 0.243*, p = 0.000	r = −0.250**, p = 0.000	r = −0.032**, p = 0.000
Urban Management	r = 0.270**, p = 0.000	r = 0.190**, p = 0.000	r = 0.101*, p = 0.041	r = 0.091, p = 0.065	r = 1.000, p = 0.000	r = 0.439**, p = 0.000	r = 0.170**, p = 0.000	r = 0.259**, p = 0.000	r = 0.123*, p = 0.014	r = 0.131**, p = 0.001
Urban Furniture	r = 0.220**, p = 0.000	r = 0.320**, p = 0.001	r = 0.110*, p = 0.024	r = 0.181**, p = 0.000	r = 0.420**, p = 0.000	r = 1.000, p = 0.000	r = 0.379**, p = 0.000	r = 0.370**, p = 0.000	r = 0.130**, p = 0.004	r = 0.100, p = 0.290
Cultural & Social	r = 0.023, p = 0.610	r = 0.070, p = 0.161	r = 0.022, p = 0.001	r = 0.501**, p = 0.000	r = 0.160**, p = 0.000	r = 0.190**, p = 0.000	r = 1.000, p = 0.000	r = 0.340**, p = 0.000	r = −0.210**, p = 0.000	r = −0.241**, p = 0.000
Urban Transportation	r = 0.140**, p = 0.001	r = 0.210**, p = 0.000	r = 0.098, p = 0.052	r = 0.246**, p = 0.001	r = 0.260, p = 0.000	r = 0.370**, p = 0.000	r = 0.352**, p = 0.000	r = 1.000, p = 0.000	r = 0.132**, p = 0.007	r = −0.004, p = 0.910
Accessibility	r = 0.360**, p = 0.000	r = 0.160**, p = 0.001	r = −0.034, p = 0.491	r = −0.266**, p = 0.000	r = 0.121**, p = 0.004	r = 0.130**, p = 0.004	r = −0.245**, p = 0.000	r = 0.132**, p = 0.007	r = 1.000, p = 0.000	r = 0.516**, p = 0.000
Urban Quality of Life	r = 0.390**, p = 0.000	r = 0.250**, p = 0.000	r = −0.161**, p = 0.001	r = −0.320**, p = 0.000	r = 0.121**, p = 0.001	r = 0.109*, p = 0.020	r = −0.241**, p = 0.000	r = −0.004, p = 0.920	r = 0.520**, p = 0.000	r = 1.000, p = 0.000

In order to identify the main and latent factors and variables influencing women's security, exploratory factor analysis (EFA) was employed. The assessment of the factorability of the variables in the table below shows that, given the KMO value of 0.83—which is greater than the criterion value of 0.61—and a significance value (Sig) of less than 0.05, the relationship is statistically significant, and the variables are suitable for factor analysis. Therefore, factor analysis can be applied to the measurement items.

Table 3. Output of KMO and Bartlett's Test

Measure	Value
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.83
Bartlett's Test of Sphericity – Approx. Chi-Square	1,072,345.01
Bartlett's Test of Sphericity – df	1,605
Sig.	0.000

The communalities table determines how much of the variance of each variable is explained by the final extracted factors. This represents the variance explained by the extracted final factors. The closer the variance of each variable is to 1, the more suitable the extracted factors are considered to be. Generally, the minimum acceptable extracted variance for each variable is 50%. The results of this table indicate that the final factors were able to explain more than 0.50 of the variance for each variable.

Table 4. Communalities

Variable	Initial	Extracted Variance	Variable	Initial	Extracted Variance
S1	1.000	0.723	S31	1.000	0.661
S2	1.000	0.651	S32	1.000	0.598
S3	1.000	0.578	S33	1.000	0.670
S4	1.000	0.662	S34	1.000	0.680
S5	1.000	0.601	S35	1.000	0.670
S6	1.000	0.682	S36	1.000	0.642
S7	1.000	0.645	S37	1.000	0.593
S8	1.000	0.662	S38	1.000	0.621
S9	1.000	0.637	S39	1.000	0.701
S10	1.000	0.572	S40	1.000	0.671
S11	1.000	0.610	S41	1.000	0.629
S12	1.000	0.648	S42	1.000	0.623
S13	1.000	0.590	S43	1.000	0.718
S14	1.000	0.560	S44	1.000	0.621
S15	1.000	0.701	S45	1.000	0.677
S16	1.000	0.501	S46	1.000	0.689
S17	1.000	0.691	S47	1.000	0.679
S18	1.000	0.702	S48	1.000	0.737
S19	1.000	0.701	S49	1.000	0.701
S20	1.000	0.652	S50	1.000	0.712
S21	1.000	0.610	S51	1.000	0.723
S22	1.000	0.623	S52	1.000	0.641
S23	1.000	0.639	S53	1.000	0.701
S24	1.000	0.689	S54	1.000	0.654
S25	1.000	0.684	S55	1.000	0.671
S26	1.000	0.658	S56	1.000	0.672
S27	1.000	0.650	S57	1.000	0.631
S28	1.000	0.671	S58	1.000	0.672
S29	1.000	0.621	S59	1.000	0.638
S30	1.000	0.626	S60	1.000	0.602

The total variance explained table shows the number of extracted factors determined by eigenvalues. The minimum eigenvalue for selecting final factors is 1, and factors with eigenvalues greater than 1 are considered final factors. The results show that 15 factors have eigenvalues greater than 1, and thus, the number of extracted factors is 15. In terms of the percentage of variance explained by each factor, the first factor (Urban Quality of Life) explains 18.26% of the variance of all research variables, and this value for the second factor (Urban Management) is 9.79%. In total, the final 15 extracted factors explain 47.01% of the variance of all research variables.

Table 5. Eigenvalues, Variance, and Cumulative Variance of Factors

Extracted Factor	Eigenvalue	% of Variance Explained
Urban Quality of Life	10.80	17.99
Urban Management	5.07	9.82
Accessibility	3.21	5.62
Urban Furniture	2.58	4.36
Structural	2.01	3.87
Cultural & Social	1.89	3.36
Urban Transportation	1.91	3.32
Urban Furniture	0.52	3.21
Behavioral	1.49	2.65
Cultural & Social	1.37	2.49
Cultural & Social	1.36	2.32
Behavioral	1.31	2.21
Functional	1.21	2.06
Physical (Spatial)	1.17	1.95
Functional	1.09	1.87

As a result of the exploratory factor analysis, the variables grouped under each factor were identified. Using the exploratory model, the factors corresponding to the latent constructs within the 10 dimensions of women's security were extracted, and 15 factors forming the basis of the 59 research variables were identified. The results indicate that 11 variables load onto the first factor. Of these, three variables relate to the accessibility index—namely, easy access to main streets, access to green spaces and commercial areas, and access to public urban transport during both day and night hours—and eight variables relate to the urban quality of life index, including: overall quality of residence in urban spaces, quality of infrastructure and urban services, income status, safety in neighborhoods, quality of recreational spaces, quality of housing safety in neighborhoods, and walkability. The highest factor loading within these dimensions is for the variable *quality of activities and land use*, with a coefficient of 0.729.

The second factor includes eight variables. Of these, five relate to the urban management index—police performance, attention of urban managers to the visual appearance of the city, condition of asphalt surfaces, daily cleanliness of streets, and maintenance of curbs and gutters and control of surface runoff—and three relate to the urban furniture index—streets and pathways, appropriate lighting in streets and alleys, and pedestrian crossings. The highest factor loading is for *maintenance of channels and gutters and control of surface runoff*, with a coefficient of 0.768.

The third factor includes nine variables: street harassment (behavioral index), daily cleanliness of streets (behavioral index), roadside vegetation and curbstones, condition of street benches and seating, pedestrian crossings, colors in urban spaces (urban furniture index), crowded streets (cultural–social index), comfort, convenience, and safety in buses and taxis (urban transportation index), and income status (urban quality of life index). The highest factor loading is for *colors in urban spaces*, with a coefficient of 0.757.

The fourth factor includes six variables: location of bus and taxi stations within the city (urban furniture index), access to sports facilities, access to emergency and safety equipment and installations, access to parks and restrooms, access to public urban transport during both day and night hours (accessibility index), and quality of recreational spaces (urban quality of life index). The highest factor loading is for *access to emergency and safety equipment and installations*, with a coefficient of 0.802.

The fifth factor includes nine variables: presence of vacant lands and dilapidated or abandoned buildings, dark and deserted alleys, physical and visual permeability in the neighborhood, presence of worn-out and old fabrics, presence of unfinished buildings in urban spaces, presence of buildings with dirty or damaged facades, condition of sidewalks and streets (structural index), nighttime economy, and land-use diversity (functional index). The highest factor loading is for *presence of worn-out and old fabrics*, with a coefficient of 0.757.

The sixth factor includes nine variables: familiarity with spaces, safety of women's mobility in the city at night (physical index), physical and visual permeability in the neighborhood, condition of sidewalks and streets (structural index), women's participation (cultural–social index), condition of asphalt surfaces (urban management index), conditions of women's movement when using public transport (urban transportation index), easy access to main streets, and access to green spaces and commercial areas (accessibility index). The highest factor loading is for *women's participation*, with a coefficient of 0.687.

The seventh factor includes seven variables: conditions of women's movement when using public transport, comfort, convenience, and safety in buses and taxis, location of bus and taxi stations within the city, daily operating hours of buses and taxis (urban transportation index), easy access to main streets, access to green spaces and commercial areas, and access to public urban transport during both day and night hours (accessibility index). The highest factor loading is for *daily operating hours of buses and taxis*, with a coefficient of 0.755.

The eighth factor includes eight variables: presence of vacant lands and dilapidated or abandoned buildings (structural index), nighttime economy (functional index), attention of urban managers to the visual appearance of the city (urban management index), parks, green spaces, and gardens; shelters, shades, and structures (urban furniture index); condition of bus and taxi stations in terms of lighting and seating; conditions of women's movement when using public urban transport; and location of bus and taxi stations within the city (urban transportation index). The highest factor loading is for *parks, green spaces, and gardens*, with a coefficient of 0.668.

The ninth factor includes six variables: familiarity with spaces (physical index), land-use diversity (functional index), possessing personal skills, risky driving behaviors, experiencing inappropriate behavior (behavioral index), and presence of

social disorders such as addiction and street fights (cultural–social index). The highest factor loading is for *risky driving behaviors*, with a coefficient of 0.687.

The tenth factor includes six variables: presence of visual obstructions such as trees and fences (functional index), street harassment (behavioral index), shelters, shades, and structures (urban furniture index), verbal harassment and offensive comments from passersby, crowded streets (cultural–social index), and condition of bus and taxi stations in terms of lighting and seating (urban transportation index). The highest factor loading is for *verbal harassment and offensive comments from passersby*, with a coefficient of 0.683.

The eleventh factor includes five variables: condition of street benches and seating, pedestrian crossings (urban furniture index), presence of social disorders such as addiction and street fights, presence of theft, pickpocketing, and bag-snatching, and crowded streets (cultural–social index). The highest factor loading is for *presence of theft, pickpocketing, and bag-snatching*, with a coefficient of 0.690.

The twelfth factor includes three variables: presence of visual obstructions such as trees and fences (functional index), women's use of makeup and jewelry in public, and women's clothing and hijab (behavioral index). The highest factor loading is for *women's use of makeup and jewelry in public*, with a coefficient of 0.375.

The thirteenth factor includes three variables: informal surveillance such as CCTV cameras in streets, openness or enclosure of the environment (physical index), and presence of vacant lands and dilapidated or abandoned buildings (structural index). The highest factor loading is for *informal surveillance such as CCTV cameras in streets*, with a coefficient of 0.712.

The fourteenth factor includes three variables: presence of vacant lands and dilapidated or abandoned buildings, presence of buildings with dirty or damaged facades (structural index), and absence of incompatible land uses (functional index). The highest factor loading is for *absence of incompatible land uses*, with a coefficient of −0.805.

The fifteenth factor includes two variables: presence of street vendors and beggars (functional index) and absence of incompatible land uses (behavioral index). The highest factor loading is for *presence of street vendors and beggars*, with a coefficient of 0.770.

To assess the status of women's security indicators, the mean of each indicator was calculated. Given that the present study was designed using a five-point Likert scale, indicators with mean values below 3 are considered unfavorable; indicators with means between 3.00 and 3.33 are considered relatively moderate; indicators with means between 3.33 and 3.66 are considered to be in good condition; and indicators with means between 3.66 and 5.00 are considered favorable. This standard evaluation scale was applied in the data analysis.

The results presented in the table below show that the mean for the physical index (2.70), structural index (2.49), functional index (2.63), urban management index (2.75), urban furniture index (2.49), urban transportation index (2.38), and cultural–social index (2.83) are all below the mean value of 3 and thus are in an unfavorable condition. Moreover, the behavioral index (3.25), accessibility index (3.25), and urban quality of life index (3.31) fall within the relatively moderate range. Subsequently, to compare women's security indicators, the one-sample t-test was applied.

Based on this test, since the significance value (Sig) is less than 0.05, it can be concluded that the status of women's security indicators in District 12 of Tehran is unfavorable and significantly lower than 3.

Table 6. Status of the Mean of Women's Security Indicators in Urban Spaces

Cultural & Social	Urban Transportation	Accessibility	Urban Quality of Life	Physical	Structural	Functional	Behavioral	Urban Management	Urban Furniture
2.83	2.38	3.25	3.31	2.70	2.49	2.63	3.24	2.75	2.49
Unfavorable	Unfavorable	Relatively Moderate	Relatively Moderate	Unfavorable	Unfavorable	Unfavorable	Relatively Moderate	Unfavorable	Unfavorable

To identify the most important factors contributing to the reduction of women's security in District 12 of Tehran, the Friedman test was applied. Based on the results of this test, presented in the two tables below, the urban quality of life index achieved the highest mean rank (7.25) and thus the best ranking. The accessibility index (7.01) and the behavioral index (7.00) ranked second and third, respectively. The lowest rank was observed for the urban transportation index, with a mean rank of 4.02.

Therefore, it can be inferred that the three most negatively influential indicators on women's security in District 12 of Tehran are the structural, urban furniture, and urban transportation indices.

Table 7. Results of Mean Ranks of Women's Security Indicators

Research Indicators	Mean Rank	Rank
Urban Quality of Life	7.25	1
Accessibility	7.01	2
Behavioral	7.00	3
Cultural & Social	5.49	4
Urban Management	4.29	5
Physical	5.11	6
Functional	4.87	7
Structural	4.38	8
Urban Furniture	4.37	9
Urban Transportation	4.02	10

Table 8. Friedman Test Statistics

Chi-Square	df	Sig.
584.6	9	0.000

4. Discussion and Conclusion

The findings of the present study reveal that the security situation of women in the public spaces of District 12 of Tehran is in an overall unfavorable state, with most security dimensions falling below the neutral point of the five-point Likert scale. Specifically, the results indicate that the physical, structural, functional, urban management, urban furniture, urban transportation, and cultural–social dimensions are all below the mean score of 3, reflecting a clear deficiency in both the objective and subjective conditions of safety. Only the behavioral, accessibility, and urban quality of life dimensions were rated in the relatively moderate range, though still not reaching a satisfactory level. This outcome is consistent with research emphasizing that the security of urban spaces for women is highly dependent on integrated environmental, social, and managerial factors (Hayati et al., 2020; Karimi & Torkashvand, 2021; Zardasht & Khanizadeh, 2020). The one-sample t-test confirmed that these deficiencies are statistically significant, suggesting that women in this district experience a level of security notably below the acceptable threshold. Furthermore, the Friedman test results identify structural, urban furniture, and urban transportation dimensions as having the most negative influence on women's security in this context, placing them at the forefront of priority areas for urban intervention.

These findings align with earlier research showing that degraded physical environments, such as worn-out urban fabrics, poorly maintained sidewalks, and inadequate lighting, significantly reduce perceptions of safety among women (Bahrami et al., 2014; Mousavi et al., 2015; Pourmousavi et al., 2015). The presence of dark and deserted alleys, dilapidated buildings, and lack of visual permeability in neighborhoods has been identified as a major driver of fear and avoidance behaviors (Abedini et al., 2017; Dezfouli & Mohammadi, 2015). In the current study, the structural dimension scored among the lowest, underscoring the persistent challenges posed by the built environment in the historical and congested context of District 12. This resonates with the CPTED approach, which emphasizes natural surveillance, territorial reinforcement, and maintenance as critical to reducing crime opportunities and enhancing perceived safety (Cozens, 2008; Salehi, 2008). Similarly, Jacobs's "eyes on the street" principle highlights the role of active street life and mixed uses in generating continuous social monitoring, which can be particularly protective for women (Jacobs, 1981).

The low ranking of urban furniture as a security dimension in this study also reflects observations from previous works indicating that poorly designed or insufficient public amenities—such as benches, pedestrian crossings, shelters, and street lighting—can discourage women from using public spaces and increase vulnerability to harassment or crime (Mortazai, 2008; Rezazadeh & Mohammadi, 2013). This is especially relevant in contexts like District 12, where public facilities may not be evenly distributed or adequately maintained. Lighting, in particular, plays a dual role in both increasing visibility and deterring potential offenders, as demonstrated in studies on women's safety in parks and pedestrian areas (Hayati et al., 2020; Rahimi

& Sabouri, 2017). The findings here mirror the conclusions of research in Ilam and Shiraz, where environmental improvements in green spaces directly contributed to heightened perceptions of safety among women (Hayati et al., 2020; Zardasht & Khanizadeh, 2020).

Urban transportation emerged as the weakest-ranked dimension, reflecting both infrastructural and service-related shortcomings. Factors such as the poor condition of bus and taxi stops, inadequate lighting, overcrowding, and unreliable schedules contribute to women's insecurity, especially during evening hours. These results are consistent with studies that emphasize the importance of accessible, well-lit, and well-managed transport facilities for promoting women's mobility and participation in urban life (Ghasemi et al., 2018; Kiani et al., 2017; Paydar et al., 2016). Public transportation is a critical enabler of economic and social participation, and when it is perceived as unsafe, women are disproportionately affected in terms of mobility restrictions and reduced access to opportunities (Mir Mohammad Tabar et al., 2016; Pourahmad et al., 2016).

The relative strength of the accessibility and urban quality of life dimensions, despite being only moderately rated, suggests that certain structural advantages—such as proximity to main roads, availability of some green spaces, and partial access to essential services—help to offset, though not fully mitigate, the negative effects of other insecure conditions. This partially reflects the findings of Rahimi and Sabouri (Rahimi & Sabouri, 2017) and Askari Zadeh and Asadi Malek Jahan (Askari Zadeh & Asadi Malek Jahan, 2018), who highlight that even when environmental and social factors are suboptimal, good connectivity and accessibility can sustain a baseline level of safety perception. However, the results here also confirm that accessibility alone cannot compensate for deficiencies in urban management, environmental quality, and social order (Mousavi et al., 2015; Pourmousavi et al., 2015).

The cultural–social dimension's low performance reveals the persistence of social disorders—such as harassment, substance abuse, and theft—that directly undermine women's sense of safety. This finding aligns with the results of Rasouli Shoorestan (Rasouli Shoorestan, 2018) in Gorgan and Ghasemi et al. (Ghasemi et al., 2018) in Tehran's District 11, both of which identified social pathology as a major deterrent to women's active use of public space. The interaction between physical and social factors is also critical here; deteriorated environments can signal neglect, inviting further antisocial behavior and contributing to a cycle of decline (Carmona, 2010; Carmona et al., 2012).

The current study's exploratory factor analysis further enriches these findings by identifying specific latent variables that explain variance in women's security across dimensions. Factors such as "urban quality of life" and "urban management" emerged as particularly influential, corroborating previous research that emphasizes the centrality of effective governance, service provision, and maintenance in sustaining safe environments (Soltani et al., 2024; Xu, 2024; Yang et al., 2021). The identification of structural, furniture-related, and transportation deficiencies as core areas for intervention confirms the interconnectedness of tangible environmental qualities and intangible perceptions of safety, echoing global urban safety frameworks and local empirical evidence alike (Cozens, 2008; Jacobs, 1981; Paydar et al., 2016).

By situating these results within the broader literature, it becomes evident that improving women's security in District 12 will require a multi-layered strategy. Physical upgrades must be paired with active urban management and community-based initiatives that foster social cohesion and ownership of public spaces (Abedini et al., 2017; Mortazai, 2008; Rezazadeh & Mohammadi, 2013). Crime prevention strategies should be adapted to the district's specific socio-spatial conditions, integrating CPTED measures with culturally appropriate programming (Bahrami et al., 2014; Salehi, 2008). The empirical evidence here strongly supports the argument that without addressing the physical, social, and managerial determinants of insecurity in tandem, improvements in one area are unlikely to produce substantial and lasting changes in women's perceptions of safety (Mir Mohammad Tabar et al., 2016; Pourahmad et al., 2015).

This study, while offering valuable insights into the multi-dimensional nature of women's security in urban spaces, is limited by its focus on a single district within Tehran, which constrains the generalizability of the findings to other urban contexts. The use of a cross-sectional design means that seasonal or temporal variations in women's security perceptions could not be captured, potentially overlooking fluctuations in conditions such as lighting, crowd density, or crime incidence. Additionally, the reliance on self-reported measures introduces the possibility of response bias, as participants' answers may have been

influenced by recent experiences or social desirability tendencies. While the study incorporated both objective and subjective indicators, the integration of crime statistics, ethnographic observations, and longitudinal tracking could further enrich the analysis.

Future studies should expand the geographical scope to include multiple districts with differing socio-economic and spatial profiles, enabling comparative analysis of women's security across diverse urban contexts. Incorporating mixed-methods approaches, combining quantitative surveys with qualitative interviews or participatory mapping, could yield deeper insights into the lived experiences of women in public spaces. Research should also investigate the temporal dynamics of safety, exploring how patterns vary across different times of day, days of the week, and seasons. Integrating spatial analysis tools, such as GIS-based crime mapping, with perceptual surveys would allow for a more robust understanding of the relationship between environmental factors and security outcomes. Finally, future work should explore the role of emerging technologies, including smart lighting, surveillance systems, and digital reporting platforms, in enhancing both actual and perceived safety.

For practitioners and policymakers, the results of this study highlight the urgent need to prioritize interventions in structural, urban furniture, and transportation dimensions to improve women's security in District 12. Targeted investments should be directed toward upgrading deteriorated infrastructure, enhancing lighting and visibility, and maintaining public amenities to encourage continuous and safe usage of urban spaces. Urban management strategies must be strengthened through regular maintenance, responsive policing, and participatory planning processes that involve women in decision-making. Integrating social programs aimed at reducing harassment, substance abuse, and petty crime with environmental upgrades will ensure a holistic approach to security. By adopting a coordinated, cross-sectoral strategy that combines environmental design, social policy, and active governance, city managers can create safer, more inclusive, and more vibrant public spaces for women.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

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Conflict of Interest

The authors report no conflict of interest.

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