

Original Article

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Urban micro-refuges as resilient lived spaces under wartime conditions: The case of the Ramadan War (Third Imposed War); a case study of the Narmak Neighborhood squares, District 8, Tehran, Iran

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Abstract

The increasing risks associated with urban warfare and security crises have underscored the need to reconsider the role of small-scale urban spaces in enhancing neighborhood resilience. While previous research has predominantly focused on large-scale infrastructure and formal shelters, limited attention has been paid to citizens' lived experiences of locally accessible refuge spaces. This study investigates residents' lived experiences of urban micro-refuges and their impact on the development of neighborhood resilience in the Narmak neighborhood, District 8 of Tehran, during the conflict titled as the Ramadan War (February 27–April 8, 2026). A mixed-methods design with a qualitative interpretive emphasis was adopted. The qualitative phase involved 50 in-depth semi-structured interviews with long-term residents and urban experts, which were analyzed using thematic analysis with MAXQDA software. The quantitative phase comprised a survey of 380 residents, and the data were analyzed using descriptive statistics and Spearman's rank-order correlation. The findings reveal that urban micro-refuges function not merely as protective physical infrastructures but as meaningful lived spaces that enhance citizens' resilience by strengthening perceived safety, social cohesion, collective memory, and a sense of control. The quantitative results further confirmed significant positive relationships between perceived safety, the quality of spatial experience, adaptive coping strategies, and residents' resilience. Moreover, spatial legibility, rapid accessibility, relative enclosure, and opportunities for social support emerged as the most influential characteristics shaping perceptions of refugeability within Narmak's neighborhood squares. The study highlights the need to move beyond purely technical approaches toward place-based planning and design, in which neighborhood public spaces are recognized as active infrastructures for strengthening urban resilience during times of conflict.

Keywords

Urban micro-refuges
lived experience
urban resilience
wartime conditions
neighborhood public squares
Narmak neighborhood
District 8
Tehran

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1. Introduction

In recent decades, escalating geopolitical tensions (Go, 2026), urban warfare, hybrid crises, and anthropogenic threats (Altin & Tokgöz, 2025) have turned cities into primary sites of insecurity and crisis (Zarkhah et al., 2025). Unlike conventional warfare, which was mostly confined to national borders or military zones (Reicher et al., 2025), modern conflicts more often infiltrate everyday urban life, exposing public spaces and the daily lives of civilians to direct threats (Amirzadeh et al., 2025; Graham, 2010; Coward, 2009). In this context, urban security is no longer just about physically protecting critical infrastructure (Bautista-Puig et al., 2022). Rather, it is also shaped by how security is perceived, experienced, and lived within common city spaces (Pain, 2000; Low & Smart, 2020). Concurrently, the concept of urban resilience has undergone substantial reconceptualization (Xi et al., 2025). Early resilience frameworks primarily emphasized the capacity of physical and infrastructural systems to recover after disruptions (Eren, 2025). More recent urban scholarship, however, conceptualizes resilience as a multidimensional, relational, and experience-based process involving social, psychological, spatial, and perceptual aspects (Meerow et al., 2016; Tierney, 2023). Within this perspective, citizens' lived experiences of urban spaces during times of crisis (Sliepstov & Malliani, 2025) constitute a fundamental dimension of urban resilience (Jörgeu et al., 2025). Human responses to crises are shaped not only by the physical capacities of the built environment (Perperi et al., 2023) but also by perceived safety, a sense of control, memories, social relationships, and the quality of spatial experience (Seamon, 2018; Bissell, 2021). Despite the growing body of research on urban resilience, the existing literature mostly emphasizes macro-scale systems, governance strategies, and critical infrastructure, while paying comparatively limited attention to small-scale urban spaces and citizens' everyday experiences during crises (Rusu, 2025). Yet, during severe disruption, it is often not large urban systems that most directly affect citizens' bodies, perceptions, and daily routines (Antonescu & Florescu, 2025), but rather the small, proximate, and readily accessible spaces embedded within the urban fabric (Moyo et al., 2025). Although many of these spaces were not originally designed as shelters (Shamsuddin, 2023), they often become places of refuge, gathering, pause, mutual support, and social reorganization during wartime and other crises (Elfversson et al., 2023). In this study,

these spaces are conceptualized as urban micro-refuges – spaces at the intersection of physical, social, and perceptual dimensions that can function as micro-infrastructures of urban resilience (Elfversson & Gušić, 2023). Recent studies on urban shelters and protective urban infrastructure suggest that conventional conceptions of shelters as solely technical, isolated, and militarized facilities (Ba et al., 2022) are no longer adequate for addressing the complexity of contemporary cities. Instead, there is a growing need for flexible, context-aware, and human-centered models integrated into the everyday urban environment (UN-Habitat, 2023; Allan & Bryant, 2024). From this perspective, urban micro-refuges should not be understood merely as physical structures; rather, they constitute relational and emergent spaces where safety, fear, solidarity, and survival strategies are simultaneously produced and reproduced (Vasilevska & Slavkovic, n.d.). Understanding these complex processes requires moving beyond exclusively objectivist and physical approaches to urban space (Cheshmehzangi, 2021). Phenomenological perspectives in human geography and urban studies instead offer a framework for examining how space is experienced and given meaning (Relph, 1976; Norberg-Schulz, 1980). From this viewpoint, space is not a neutral container but a lived phenomenon imbued with sensory, emotional, and symbolic meanings (Ljungkvist, 2021). During wartime, these experiential dimensions intensify, creating experiences of fear, anxiety, hope, social cohesion, and resistance that are embodied within urban micro-refuges (Allam, 2020). Consequently, urban micro-refuges may be understood as liminal spaces where boundaries between safety and insecurity, individuality and collectivity, and order and disorder are constantly negotiated and redefined (Turner, 1969; Simone, 2024). Extending this perspective, Lefebvre's theory of the production of space provides a conceptual lens through which urban micro-refuges can be understood not as fixed physical entities, but as socio-spatial constructs that emerge through power relations, daily practices, and citizens' ongoing processes of spatial appropriation (Lefebvre, 1991). Likewise, assemblage theory, which highlights the contingent articulation of heterogeneous elements – including bodies, affects, infrastructure, memory, and social relations – offers a valuable framework for examining the emergent dynamics through which these spaces are continuously constituted and transformed (DeLanda, 2016; Anderson & McFarlane, 2011). Additional perspectives, such as affect theory,

suggest that experiences of safety and insecurity are not exclusively cognitive phenomena but are first experienced through embodied intensities, affective atmospheres, and pre-reflective bodily responses (Massumi, 2002; Thrift, 2008). Despite the explanatory potential of these theoretical perspectives, a significant gap remains in the literature concerning the interrelationships among urban micro-refuges, citizens' lived experiences, and micro-scale resilience under wartime conditions (Christmann et al., 2019). This gap is particularly evident in Middle Eastern cities, where crises, insecurity, and multilayered socio-political tensions are an integral part of everyday urban life, yet have rarely been examined through experiential or phenomenological perspectives (Rodrigues et al., 2017). Moreover, much of the existing scholarship has focused either on the physical shelter features or on issues of security and emergency management, leaving little attention to the psychosocial dimensions, memories, spatial perceptions, and adaptive strategies of citizens. The present study investigates citizens' lived experiences of urban micro-refuges within the neighborhood squares of Narmak, District 8, Tehran, under wartime conditions. Narmak was selected as the case study because of its distinctive spatial morphology, interconnected network of neighborhood squares, high level of accessibility, and the potential of these public spaces to function as gathering points and temporary places of refuge during crises. The primary objective is to explore how experiences of safety, fear, belonging, solidarity, and resilience are socially and spatially constructed within urban micro-refuges, and how these spaces shape patterns of individual and collective adaptation and resistance under wartime conditions. Methodologically, the study combines interpretive phenomenology with constructivist grounded theory to move beyond the descriptive documentation of lived experiences toward the identification of the underlying patterns, relationships, and emergent processes through which urban micro-refuges are experienced and understood. Within this interpretive framework, concepts and analytical categories are not imposed a priori; rather, they emerge through the iterative interaction between empirical data, participants' narratives, and the researcher's interpretive analysis (Charmaz, 2014). Accordingly, the objective of this research extends beyond the examination of refuge spaces as physical settings. Instead, it seeks to reconstruct the processes through which lived resilience is produced at the

micro-urban scale during crisis – a process in which space, body, memory, affect, and social relations operate as deeply interconnected dimensions of everyday urban life. The findings are expected to bridge the existing gap between physical and experiential approaches in urban crisis research while contributing to the theoretical development of urban resilience studies, the geography of fear, crisis urban planning, and experience-based urban design. More broadly, the study aims to reconceptualize urban micro-refuges as an integral component of the lived infrastructure of urban resilience, thereby offering a new perspective on the role of daily public spaces in strengthening cities' adaptive capacity under conflict and crisis.

2. Theoretical framework and literature review

2.1. From physical security to lived security

Over recent decades, the concept of urban security has evolved beyond narrowly physical and protective perceptions toward a multidimensional, relational, and experience-based understanding. Classical approaches primarily defined urban security in terms of protecting critical infrastructure, controlling access, physical surveillance, and reducing the vulnerability of the built environment. Within this perspective, the city was largely conceived as a collection of physical assets requiring protection against external threats (Coaffee, 2013). However, the proliferation of complex crises, urban warfare, and anthropogenic threats has demonstrated that urban security cannot be adequately explained solely through the robustness of structures or the efficiency of infrastructure. In contemporary conflicts, the city is no longer merely the setting in which military operations unfold; rather, it has become both the object and the instrument of conflict itself. Graham (2010) argues that the boundary between everyday urban life and militarized logics has become increasingly blurred; streets, public squares, public spaces, and even ordinary places of everyday life can be transformed into arenas of surveillance, insecurity, fear, and resistance. Similarly, Coward (2009), through the concept of urbicide, contends that the destruction of cities extends far beyond the demolition of buildings; it constitutes an assault on social relations, collective memory, place identity, and the very possibility of collective urban life. From this perspective, urban insecurity manifests not only through physical destruction but also through the erosion of meaning, belonging, and social trust. These

developments have prompted growing scholarly attention to the concepts of “the geography of fear” and “perceived security”. Pain (2000) demonstrates that urban fear is not simply a direct response to objective threats; rather, it is socially and spatially produced through everyday experiences, collective memory, social relationships, and subjective representations of place. Consequently, a space may be physically secure while simultaneously being experienced as unsafe; or conversely, a small, familiar, and locally embedded space may generate feelings of refuge, control, and psychological comfort despite its physical limitations. More recent studies further suggest that security within public spaces is shaped by factors such as environmental legibility, perceived control, social trust, predictability, spatial familiarity, and place attachment (Low & Smart, 2020; Kapucu et al., 2024; Li et al., 2025). These developments support the notion of “lived security,” which conceptualizes security not as a fixed or objectively measurable condition, but as a dynamic and multidimensional experience emerging through the interaction of the built environment, the embodied subject, perception, memory, and social relations. Under conditions of war and crisis, experiences of security are often generated less through large-scale infrastructure or macro-level policies than through proximate, everyday, and readily accessible urban spaces. From this perspective, certain small-scale urban spaces can serve as urban micro-refuges, providing physical protection while also fostering the restoration of psychological comfort, social trust, and a sense of belonging.

From engineering resilience to lived resilience

Urban resilience, like the concept of security, has evolved from a technical, infrastructure-centered notion toward a more social, spatial, and experience-based framework. In its earliest formulations, resilience was primarily understood within an engineering paradigm, referring to the system’s ability to return rapidly to its initial state following a disruption. Within this perspective, crises were treated as temporary events, and the primary objective was the restoration of infrastructure functionality and minimizing recovery time (Holling, 1973). As the complexity of urban systems became increasingly apparent, a second generation of resilience thinking introduced the concept of adaptability into the literature. Cities were no longer conceptualized as mechanical systems capable of returning to a fixed equilibrium, but rather as dynamic, multi-layered

systems embedded in social, institutional, and spatial relations (Folke, 2006). Within this shift, social resilience studies demonstrated that post-crisis recovery is not solely dependent on physical resources, but is also fundamentally shaped by social networks, trust, social capital, and collective support capacities (Norris et al., 2008). In more recent scholarship, the notion of “transformative resilience” has gained prominence. From this perspective, crises are not merely temporary disruptions but critical moments for rethinking, reorganizing, and reconfiguring socio-spatial relations (Tierney, 2023). Resilience, therefore, is not limited to the capacity to “bounce back,” but also encompasses the ability to change, learn, and reconstruct ways of living under new conditions. Contemporary reviews further emphasize that urban resilience is inherently multidimensional, simultaneously encompassing social, human, spatial, institutional, and infrastructural dimensions (Meerow et al., 2016; Kapucu et al., 2024; Saptono et al., 2025). Nevertheless, a substantial portion of resilience research remains focused on the macro scale, emphasizing governance, policy-making, infrastructure, and indexing. In contrast, during moments of crisis, citizens experience resilience not at the level of policy or systems, but at the scale of the body, neighborhood, path, square, temporary shelter, and close relationships. This shift in analytical scale highlights the significance of the concept of “lived resilience,” which conceptualizes resilience as something produced and experienced through everyday practices, adaptive strategies, networks of cooperation, collective memories, and small urban spaces. Empirical evidence from war-affected cities further reinforces this shift in scale. Studies on Ukraine, for instance, indicate that local spaces such as metro stations, neighborhood shelters, and small public spaces have functioned not only as protective infrastructures but also as sites of psychological support, social organization, and the reconstruction of a sense of safety (Antonenko, 2026). Accordingly, in wartime contexts, resilience is not produced solely through formal infrastructure systems; rather, it emerges through micro-scale spaces, human relations, and shared lived experiences. From this perspective, urban micro-refuges can be understood as key sites for the production of lived resilience, where materiality, perception, mutual care, memory, and emotion are deeply intertwined.

Urban micro-refuges as lived infrastructures of resilience

In classical planning literature, infrastructure has predominantly been understood as technical networks, such as transportation, energy, communication, and urban services. However, contemporary scholarship has increasingly demonstrated that cities do not endure solely through physical infrastructure. A significant dimension of urban durability and resilience is embedded in social spaces, local relations, everyday interactions, and places that enable care, solidarity, and mutual support. Within this context, the concept of “social infrastructure” has emerged, referring to public spaces such as libraries, parks, neighborhood squares, and community facilities that are not merely sites of everyday use but foundational environments for the production of trust, social connection, and collective cohesion (Klinenberg, 2018). This perspective becomes particularly critical in the context of crises, where small-scale and embedded urban spaces can become operational more rapidly and flexibly than formal infrastructure systems. Research on urban open spaces indicates that such environments can undergo functional transformation during emergencies, shifting from recreational or transit-oriented uses to spaces of pause, congregation, temporary shelter, service distribution, social support, and psychological relief (Sönmez, 2025). Evidence from war-affected cities further suggests that small-scale local spaces often perform functions beyond physical protection, becoming sites for maintaining social relations, reproducing peace, and sustaining everyday life (Antonenko, 2026).

Thus, the present study employs the concept of “urban micro-refuges” to theorize this category of spaces. Urban micro-refuges refer to small-scale, accessible, embedded, and experienced spaces that, under conditions of crisis or war, temporarily function as sites of refuge, pause, collective support, and the production of lived resilience. This concept is derived from the intersection of literature on urban refuge spaces, micro-infrastructure, social infrastructure, and everyday refuge spaces. Its central argument is that the “refuge” function of space is not determined solely by its physical attributes, but is fundamentally produced through processes of experience, use, and social meaning-making.

Within this framework, urban micro-refuges differ significantly from conventional shelters. Formal shelters are typically evaluated based on structural

resistance, capacity thresholds, accessibility routes, and emergency facilities. In contrast, urban micro-refuges incorporate perceptual, affective, social, and mnemonic dimensions. These spaces are not necessarily designed for crises; rather, they acquire refuge functions in moments of threat through familiarity, accessibility, the presence of others, opportunities for mutual aid, and a sense of perceived control. From this perspective, urban micro-refuges can be understood as a form of lived infrastructure that operates not only through material form and construction, but also through experience, relationality, and meaning. These spaces simultaneously serve multiple functions: reducing direct exposure to threat, generating a minimal sense of safety, strengthening support networks, alleviating anxiety, restoring a sense of control, maintaining daily life continuity, and reproducing a sense of belonging. Accordingly, urban micro-refuges are not merely spaces for survival, but environments for reconstructing psycho-social order under conditions of exception.

Lived experience and the phenomenology of space

Phenomenology provides a critical theoretical foundation for understanding urban micro-refuges, as it conceptualizes space not as a neutral and pre-given container for human activity, but as an experienced, perceived, and meaning-constituted phenomenon. In this view, individuals do not merely occupy space; rather, they encounter, interpret, and transform it into place through the body, movement, memory, affect, and social relations. The roots of this perspective can be traced to the phenomenology of perception. Merleau-Ponty (1962) conceives the body as the primary medium of perception; the embodied subject that does not stand outside space as an observer, but is always already immersed within it, understanding the world through movement, touch, orientation, fear, and sensory engagement. Similarly, Tuan (1977) distinguishes between “space” and “place,” arguing that space becomes place when it is infused with meaning, memory, and lived experience. Relph (1976) and Norberg-Schulz (1980) further emphasize the significance of place identity, sense of place, and existential qualities of the built environment. More recent scholarship has expanded this line of inquiry toward multisensory and affective dimensions of spatial experience. Pallasmaa (2005) demonstrates that architectural and environmental experience is not primarily visual, but multisensory, emerging through sound, smell, tactility, temperature, and bodily

memory. Seamon (2018) highlights the role of everyday practices, bodily routines, and habitual movements in the production of place meaning, arguing that place is not designed into existence but gradually constituted through lived repetition and embodied engagement. Bissell (2021) further illustrates, through the concept of affective atmospheres, that spaces carry emotional intensities capable of generating feelings of anxiety, calmness, hope, or fear within both bodies and social interactions. Under conditions of war and crisis, these experiential dimensions of space become significantly intensified. Familiar environments may suddenly be reconfigured as threatening, while small-scale and accessible urban locations may emerge as sites of refuge, pause, and psychological relief. In such contexts, spatial experience is not solely determined by physical form; it is rather deeply intertwined with prior memories, the presence of others, opportunities for assistance, perceived control, spatial orientation, and the affective atmosphere of the environment (Seamon, 2018; Bissell, 2021; Pilav, 2012). Accordingly, urban micro-refuges should be understood as fundamentally lived spaces in which body, memory, fear, hope, social relations, and meaning-making processes simultaneously contribute to the production of safety and resilience. From this perspective, what transforms a space into an urban micro-refuge is not merely its small scale, spatial form, or structural resistance, but rather its capacity to become a site where safety, psychological relief, belonging, and collective support are experienced in unstable conditions. Thus, urban micro-refuges can be conceptualized as points of intersection between material form, lived experience, collective memory, and social relations—small yet meaningful spaces that, in moments of crisis, enable refuge, solidarity, and the micro-production of resilience.

3. Literature review

Research on urban security, resilience, refuge spaces, and lived experience has undergone a significant transformation over the past four decades. A review of the literature suggests that the trajectory of knowledge development has shifted gradually from early approaches grounded in the physical and functional characteristics of the city toward more complex understandings that incorporate social, perceptual, and experiential dimensions. In early studies, the primary focus was placed on the physical attributes of the environment, infrastructural performance, and the engineering dimensions of urban security. However, with the emergence of complex crises, urban warfare, and multilayered hazards, scholarly attention has increasingly shifted toward the role of social relations, social capital, lived experience, perceived security, and the affective dimensions of space. At the same time, an examination of the existing literature reveals that the majority of studies have either concentrated on macro-scale dimensions of resilience, such as urban infrastructure, governance, and policy frameworks, or have examined the performance of public spaces under normal (non-crisis) conditions. Similarly, research on refuge spaces has largely been approached from technical and managerial perspectives, with limited attention to human experience, spatial perception, and the role of small-scale urban spaces in producing feelings of safety and resilience. Accordingly, the present literature review is not organized solely on a chronological basis; it rather adopts an analytical and evolutionary perspective to trace the shift in urban knowledge from studies of public space and urban security toward emerging concepts such as social infrastructure, lived resilience, and urban micro-refuges. The table below summarizes key studies from the 1980s to 2026, highlighting their main findings as well as the limitations and research gaps that inform the present study.

Table 1. Review of the literature

Author	Year	Research topic	Methodology	Key findings	Limitations	Research gap in relation to this study
Whyte	1980	Social behavior in public urban spaces	Behavioral observation & field video analysis	Small-scale urban spaces shape patterns of social interaction	Focus on everyday behavior	No consideration of crisis or emergency conditions
Gehl	1987	Public life in urban spaces	Field observation	Spatial quality directly influences social interaction	No crisis-oriented analysis	Lack of attention to refuge spaces

Author	Year	Research topic	Methodology	Key findings	Limitations	Research gap in relation to this study
Pain	2000	Urban fear and insecurity experience	Qualitative study	Security is fundamentally shaped by perception and experience	Focus on individual fear	Lack of supportive spatial analysis
Norris et al.	2008	Social resilience in crises	Theoretical model + empirical analysis	Social capital and trust are central to recovery processes	Macro-scale focus	Absence of micro-scale spatial analysis
Pilav	2012	Urban lived experience in the Sarajevo war	Case study + interviews	New patterns of survival and urban dwelling emerge in conflict	Limited spatial analysis	Lack of focus on urban micro-refuges
Klinenberg	2018	Social infrastructure and urban resilience	Multi-case study	Public and local spaces function as infrastructures of resilience	Focus on normal conditions	Lack of war/crisis context
Yabe et al.	2021	Socio-spatial resilience systems	Big data mobility analysis	Social relations strongly influence recovery dynamics	Data-driven macro approach	No lived experience perspective
Latham	2022	Social infrastructure and urban life	Theoretical–empirical analysis	Public spaces foster care and social interaction	Western-centric focus	No crisis or conflict context
Chen et al.	2023	Multidimensional urban resilience assessment	Quantitative modeling	Urban resilience is multi-dimensional (social, economic, spatial)	Indicator-based approach	Lack of affective and perceptual dimensions
Kapucu et al.	2024	Multilayered urban resilience	Mixed-methods review	Urban resilience is a complex, multi-layered phenomenon	Macro-scale orientation	No focus on micro-urban spaces
Favier et al.	2025	Social capital and infrastructure	Network analysis	Overlap of social and physical infrastructure enhances resilience	Network-centric model	Lack of human experience analysis
Enneking	2025	Transformation of social infrastructure	Conceptual + empirical analysis	Social infrastructure strengthens collective care and belonging	Limited to public spaces	No analysis of refuge spaces
Sönmez	2025	Urban open spaces in crisis conditions	Case study	Public spaces can transform into emergency spaces	Physical-functional focus	No lived experience perspective
An-tonenko	2026	Spatial adaptation in Ukrainian war cities	Case study + spatial analysis	Local spaces become centers of social and psychological support	Geographic limitation	Lack of everyday micro-scale analysis
Current study	2026	Urban micro-refuges as lived infrastructures of resilience	Interpretive phenomenology + spatial analysis	Explores the interrelation of space, experience, memory, security, and resilience	—	Fills theoretical, methodological, and geographical gaps

3.1. Research gap

Although research on urban security, resilience, public spaces, and emergency shelters has expanded considerably in recent decades, the relationship between lived experience, perceived security, collective memory, and micro-scale resilience remains insufficiently theorized and empirically underdeveloped. A substantial body of resilience scholarship has primarily focused on macro-level

infrastructures, institutional capacity, crisis governance, and performance-based indicators, while paying limited attention to how citizens actually experience security and resilience in proximate, everyday, and accessible urban spaces during moments of crisis. From this perspective, the primary theoretical gap lies in the absence of an integrated framework that can explain the interrelationship between space, body, memory, perception, social relations, and

resilience at the micro scale. Existing studies rarely conceptualize these dimensions as a unified experiential system, where spatial conditions and embodied practices co-produce feelings of safety, refuge, and adaptive capacity. Methodologically, much of the existing literature relies on quantitative models, spatial indicators, macro-scale spatial analysis, and functional performance assessments. While such approaches are essential for measuring structural dimensions of resilience, they are limited in revealing the perceptual, affective, and meaning-making layers of urban experience. Consequently, phenomenological, interpretive, and experience-based approaches are needed to capture how feelings of safety, refuge, solidarity, and adaptation emerge within small-scale urban environments. Additionally, from a geographical perspective, existing research has been largely concentrated in North America, Europe, and East Asia. In contrast, cities in the Global South, particularly in the Middle East, have been comparatively underexplored, despite their long-standing exposure to war, political instability, security threats, and multi-layered uncertainty. These urban contexts, including cities such as Tehran, are characterized by a unique combination of population density, collective memories of crisis, localized social networks, and fine-grained public space systems, all of which may play a critical role in producing security and resilience under conditions of conflict. Accordingly, the present study aims to address this theoretical, methodological, and geographical gap by focusing on urban micro-refuges in the neighborhood squares of Narmak, District 8, Tehran. By emphasizing lived experience, perceived security, collective memory, social relations, and micro-scale resilience, this research aims to demonstrate how small urban spaces can transcend their physical and functional roles and be transformed into lived infrastructures of resilience in wartime conditions.

4. Methodology

This study employs a mixed-methods design with a dominant qualitative–interpretive orientation, aiming to analyze the multilayered lived experiences of citizens regarding urban micro-refuges under crisis conditions. The epistemological stance of the research is grounded in an interpretivist–experiential paradigm, which emphasizes understanding the meanings of lived experience as articulated by urban actors within socio-spatial contexts, and how perceptions of security, threat, collective memory, and spatial agency

are constructed and represented. The temporal and spatial context of the study is a period of intensified security tensions and urban crises at the national level in Iran, analytically referred to in this article as the “Ramadan War.” This period spans from March 1, 2026 (9 Esfand 1404) to April 8, 2026 (19 Farvardin 1405), characterized by heightened perceived insecurity in the metropolitan context of Tehran, activation of emergency urban conditions, and increased implementation of civil defense measures at the local scale. Within this framework, the Narmak neighborhood in District 8 of Tehran was selected as the case study. This selection is not merely sampling-based but grounded in the unique structural and morphological characteristics of the area. Narmak is widely recognized for its distinctive spatial organization, featuring an extensive and systematically arranged network of neighborhood squares (approximately 100 plazas), making it a rare example of grid-based, node-oriented urban design in Tehran that is particularly suitable for micro-scale spatial analysis. From a morphological perspective, Narmak is structured as a cellular–grid system, in which neighborhood squares function as repetitive spatial nodes that organize movement, social interaction, and urban pauses. This configuration positions open spaces not as peripheral voids but as integral structural elements of the residential fabric. For analytical purposes, the square network is categorized into two functional typologies: 1) primary squares, located at major intersections of movement corridors and adjacent to arterial roads, functioning as aggregation and transitional nodes; and 2) secondary neighborhood squares, embedded within residential clusters, characterized by finer human scale, lower traffic intensity, and higher spatial enclosure. This distinction provides the analytical foundation for examining variations in perceived security and the function of urban micro-refuges in subsequent sections of the study. In this research, urban micro-refuges are conceptualized as socio-spatial events rather than fixed physical entities. Within the squares of Narmak, existing material elements, including vegetated edges, geometric discontinuities in spatial layout, subtle topographical variations, semi-enclosed boundaries, and permeable surrounding interfaces, temporarily acquire refuge functions in moments of crisis through the lived perception of threat and the embodied need for shelter. This process is grounded in the situated re-interpretation of space by bodies exposed to risk, demonstrating that a “refuge” is not an architectural

object but a dynamically produced condition emerging from the relationship between body, space, and crisis. From a methodological perspective, a preliminary spatial-morphological analysis of the square network was conducted. The results were synthesized into a conceptual spatial map of the neighborhood structure, illustrating nodes, linkages, and spatial hierarchies. This map subsequently informed the selection of interview sites, observation points, and fieldwork locations. This spatial map functions as a bridging device between phenomenological data and spatial reality, thereby preventing excessive abstraction in perceptual analysis. Consequently, the Narmak neighborhood is not treated as a neutral backdrop, but rather as an “active structure producing lived experience,” a structure in which spatial geometry, the scale of neighborhood squares, and accessibility patterns directly influence the formation of perceived safety, adaptive behaviors, and the experiential quality of urban micro-refuges. In the qualitative component, the study is grounded in an interpretive phenomenological approach aimed at extracting and interpreting citizens’ perceptions of security, insecurity, refuge, lived spatial experience, and adaptive strategies under crisis conditions. Qualitative data were collected through semi-structured in-depth interviews and field observations conducted within the micro-spaces of neighborhood squares in Narmak. Participants included 50 individuals, comprising long-term residents and experts in urban planning and urban studies. The interview protocol focused on lived spatial experiences, collective memories associated with crises, behavioral patterns in response to perceived threats, and individual as well as collective coping strategies. Qualitative data analysis was conducted using thematic analysis. Data were processed through systematic stages of initial coding, thematic organization, and the extraction of higher-order themes. MAXQDA software was employed to facilitate data management and organization. To enhance analytical reliability, in addition to the systematic coding process, intra-coder agreement review and control were conducted during the analysis stages to ensure conceptual coherence and reduce

interpretive bias. Participant review was also conducted to align the researcher’s interpretations with the actual lived experiences of the actors. Within this framework, the aim of the analysis was not to generate a rigid or formal theory, but rather to extract meaning structures and perceptual patterns of lived experience in response to urban crises. In the quantitative component, a descriptive survey method was employed to measure citizens’ perceptions regarding spatial performance and the resilience capacity of urban micro-refuges. The statistical population consisted of residents in the Narmak neighborhood of District 8 of Tehran. The sample size was determined to be 380 respondents based on Cochran’s formula. A cluster random sampling technique was applied. The data collection instrument was a structured questionnaire developed based on the study’s theoretical framework. Following several rounds of expert review, redundant and overlapping items were removed to reduce conceptual redundancy and measurement bias. The validity of the instrument was confirmed through face validity (expert judgment) and content validity (theoretical alignment with the literature). Reliability was assessed using Cronbach’s alpha coefficient, yielding a value of 0.915, indicating strong internal consistency. To enhance the credibility and robustness of the findings, methodological triangulation was employed by integrating interview data, observational data, and survey results. This approach enabled the cross-validation of findings across multiple data sources, thereby strengthening the internal validity of the study. In the quantitative analysis phase, data were examined using descriptive statistics and Spearman’s rank correlation test to explore relationships among perceived security, spatial experience, cognitive memories, socio-psychological outcomes, and adaptive strategies. Overall, by combining an interpretive phenomenological approach in the qualitative phase with a descriptive survey design in the quantitative phase, this study seeks to provide a multi-layered, integrated, and context-sensitive understanding of urban micro-refuges as lived infrastructures of resilience under conditions of urban crisis.

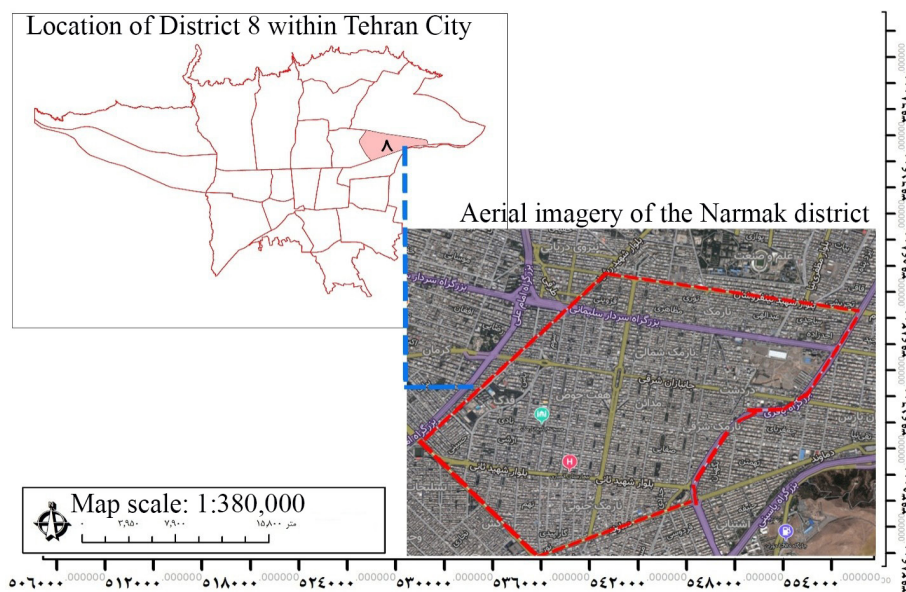


Figure 1. Location of District 8 within Tehran City

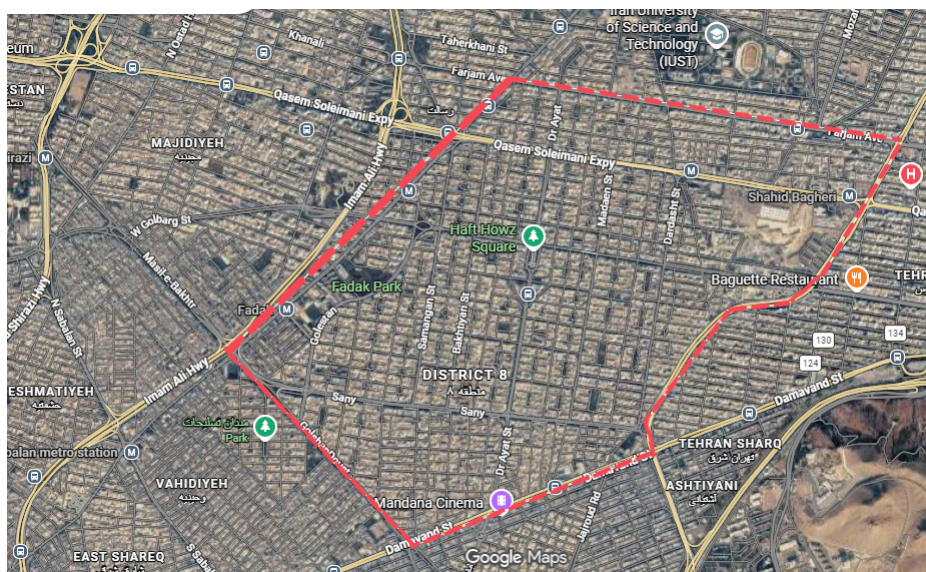


Figure 2. Narmak neighborhood

Table 2. Indicators, components, and sub-components of the study

Indicator	Component	Sub-components	References
Perceived sense of safety in micro urban shelters	Perceptual and control-based safety	Sense of protection; environmental monitoring capability; access control	Go (2026); Altin & Tokgöz (2025); Zarkhah et al. (2025); Reicher et al. (2025)
	Psycho-social comfort	Reduced anxiety; sense of belonging; positive interactions	
	Accessibility and evacuation capability	Ease of entry/exit; safety of escape routes	
	Reliability of support systems	Access to essential resources (water, sanitation, medical services)	
	Structural and functional safety	Structural stability; efficiency of ventilation and lighting	

Indicator	Component	Sub-components	References
Spatial experience and environmental perception in micro urban shelters	Sensory-perceptual quality	Spatial dimensions; light; sound; smell; temperature	Amirzadeh et al. (2025); Bautista-Puig et al. (2022); Xi et al. (2025); Eren (2025); Sliepstov & Malliani (2025); Jörgen et al. (2025)
	Functional compatibility	Fit between space and biological/functional needs	
	Semantic-symbolic meaning	Individual/collective interpretation; meaning beyond function	
	Orientation and sense of place	Wayfinding; emotional attachment to environment	
	Spatial density and stress	Perceived overcrowding; spatial constraints	
Mental memories and narratives about micro urban shelters	Sensory-perceptual memory	Recall of sensory details (sound/smell/visual cues)	Perperi et al. (2023); Rusu (2025); Antonescu & Florescu (2025); Moyo et al. (2025); Shamsuddin (2023); Elfversson et al. (2023)
	Emotional memory	Recall of emotional states (fear/hope/anxiety)	
	Survival narratives	Encounter; adaptation; crisis endurance	
	Social interaction memory	Memories of relationships and group dynamics	
	Representation of suffering and loss	Recall of traumatic and painful experiences	
Psychosocial impacts of micro urban shelters	Mental health outcomes	Anxiety; depression; mood disorders	Ba et al. (2022); Vasilevska & Slavkovic (n.d.); Cheshmehzangi (2021); Ljungkvist (2021); Allam (2020); Christmann et al. (2019); Rodrigues et al. (2017)
	Social relationship dynamics	Cohesion/disruption; support networks	
	Identity formation	Effects on individual/group/local identity	
	Behavioral-adaptive changes	New behavioral patterns; survival strategies	
	Resilience capacity	Recovery and post-crisis adaptation	
Individual and collective adaptation and resistance strategies	Preventive strategies	Preparedness; anticipation; proactive measures	Zarkhah et al. (2025); Reicher et al. (2025); Amirzadeh et al. (2025); Bautista-Puig et al. (2022); Xi et al. (2025); Perperi et al. (2023); Rusu (2025); Antonescu & Florescu (2025); Moyo et al. (2025)
	Coping strategies	Immediate crisis management; real-time response	
	Mutual support strategies	Cooperation; resource sharing; collective assistance	
	Information and communication strategies	Crisis information acquisition, processing, and dissemination	
	Post-crisis strategies	Recovery; reconstruction; strengthening adaptive capacity	

5. Descriptive findings

Based on the data collected through the research questionnaire, a total of 380 participants from the residents of Narmak neighborhood participated in the survey. In terms of gender distribution, the sample consisted of 216 females (56.9%) and 164 males (43.1%). This indicates a relatively higher participation of women, which may reflect potential differences in perceptual patterns related to perceived safety, shelter-seeking behavior, and behavioral responses in micro-scale urban spaces. The age distribution of

respondents shows a relatively balanced pattern. Individuals under 25 years of age accounted for 86 participants (22.6%), mainly comprising young residents and students of the neighborhood. The 25–35 age group, with 135 participants (26.8%), represents the largest share and reflects the presence of economically active individuals and young households. The 35–45 age group included 90 participants (23.7%), while those above 45 years comprised 69 participants (18%). Overall, this age structure indicates a heterogeneous sample in terms of generational

composition, allowing the study to capture diverse perspectives shaped by lived experience and neighborhood familiarity. Regarding the length of residence in Narmak, the average duration of residency was estimated at 18 years, with 72% of respondents reporting more than 10 years of residence in the area. This variable is particularly significant, as residents' perceptions of open spaces and neighborhood squares are largely shaped by repeated experiences, collective memory, and lived environmental familiarity. In terms of educational attainment, 58% of participants held a bachelor's degree, while 34% had a master's degree. Only approximately 8% of respondents fell outside these two categories, either having lower or higher levels of education. This distribution suggests that a substantial proportion of respondents possess an

adequate educational background and cognitive capacity to understand concepts related to resilience as well as the social functioning of urban spaces. Overall, the socio-demographic characteristics of the sample (380 residents of Narmak neighborhood) indicate sufficient diversity in terms of gender, age, education, and lived experience. This enhances the representativeness of the data in reflecting users' perceptions of micro urban shelters in Narmak. Such a balanced structure provides a suitable foundation for a multi-layered analysis of physical, psychological, and social perceptions under crisis conditions, as well as for assessing the actual capacity of these spaces to function as resilience-enhancing elements in the urban environment.

Table 3. Descriptive statistics of respondents to the research questionnaire

Demographic variable	Category	Frequency/percentage
Gender	Female	216 (56.9%)
	Male	164 (43.1%)
Age group	Under 25 years	86 (22.6%)
	25–35 years	135 (26.8%)
	35–45 years	90 (23.7%)
	Above 45 years	69 (18%)
Education level	Bachelor's degree and below	58%
	Master's degree	34%
	PhD and higher	8%

5.1. Descriptive data of the targeted study population

The demographic characteristics of the purposive sample in the present study are as follows. In terms of gender distribution, the sample consists of 28 males and 22 females. Regarding age distribution among female participants, 10 individuals were under 35 years of age, five were in the 35–45 age group, five were in the 45–55 age group, and two were over 55 years old. Among male participants, 11 were under 35 years of age, seven were between 35 and 45 years, six were between 45 and 55 years, and four were over 55 years old. In addition, 20 respondents had more than 30 years of residential experience in the Narmak neighborhood, reflecting a high level of place-based

knowledge and lived experience within the study context. Furthermore, 30 participants were selected as experts and key informants familiar with the research topic. These individuals predominantly have professional experience in urban crisis management, urban planning, and municipal governance, providing specialized and practice-based insights relevant to the objectives of the study. Overall, this purposive sample integrates both long-term residents and domain experts, ensuring a balanced combination of experiential and professional knowledge for the analysis of micro urban shelters and related urban resilience dimensions.

Table 4. Descriptive data of interview participants

Selection criteria	Age group	Gender distribution
20 participants with more than 30 years of residential experience in the Narmak neighborhood	Under 35 years: 10 females, 11 males	22 females (44%)
	35–45 years: 5 females, 7 males	
30 experts and key informants familiar with the research topic, mainly with professional experience in urban crisis management, urban planning, and municipal governance	45–55 years: 5 females, 6 males	28 males (56%)
	Above 55 years: 2 females, 4 males	

Analytical findings

The analysis of field data gathered from 380 questionnaires indicates that residents' perception and lived experiences of micro urban shelters in Narmak neighborhood are predominantly positive and multidimensional. Most indicators reveal that more than two-thirds of respondents rated these spaces as "satisfied" and "completely satisfied." This suggests that these spaces are not merely perceived as physical infrastructures, but as lived environments with protective, psychological, and social functions embedded in everyday experience. Regarding protection from threats, 72.6% of respondents reported satisfaction, indicating a strong perception of these spaces' sheltering capacity. A similar pattern is observed in the anxiety reduction, where more than 75% of participants recognized a calming and stabilizing role for these shelters. This highlights the psycho-spatial function of micro urban shelters in mitigating perceived stress and emotional tension during crisis. Approximately 69% of residents felt they had some sense of control over the crisis, reflecting a moderate but significant sense of agency. Indicators related to accessibility show even stronger results: 84% found it easy to enter quickly, and over 80% felt exit routes were safe, indicating a high perceived efficiency in emergency access and evacuation. Collectively, these findings confirm that residents positively evaluate these spaces' functional aspects, especially their quick response and sheltering capacity. At the social and perceptual level, indicators such as sense of belonging, neighborly assistance, and local cohesion all demonstrate high satisfaction levels ranging between 78% and 80%. This suggests that micro urban shelters in Narmak function not only as physical protective spaces but also as platforms for reinforcing social solidarity, mutual support, and neighborhood interactions, thereby contributing to the reproduction of collective social ties. In terms of physical qualities, structural stability received 75% satisfaction, indicating a relatively solid sense of safety regarding the stability of structures. However,

environmental comfort indicators scored lower, with ventilation and lighting adequacy at 70.5%, and spatial dimensions, noise, odors, and thermal comfort around 68%. This points to certain limitations in environmental and climatic performance. Accordingly, residents' positive perceptions appear to be driven more by psychological, social, and cultural dimensions than by purely physical attributes. From the perspective of spatial legibility and cognitive familiarity, indicators such as perceived sense of safety and familiarity, wayfinding clarity, and sense of place recorded satisfaction levels between 77% and 81%. This suggests a strong connection between collective neighborhood memory and the cognitive readability of space. In other words, perceived safety and trust are not solely outcomes of physical design but are also shaped by accumulated lived experience and social memory. Findings on sensory memory and crisis narratives support this interpretation. On average, respondents rated memories of mutual assistance, neighbor presence, and crisis survival experiences positively at around 80%, indicating the formation of a collective memory of survival at the neighborhood scale. This narrative memory has the potential to function as an internal mechanism of resilience in future crises. Psychological recovery and emotional regulation indicators also confirm the restorative role of these spaces. Satisfaction levels ranging from 74% to 78% for items such as post-entry anxiety reduction, psychological recovery after crisis, and social relationship restoration indicate that these shelters serve both therapeutic and restorative functions at individual and collective levels. Moreover, indicators related to preparedness, cooperation, and collective action exhibit some of the highest satisfaction levels, often exceeding 80%. Variables such as post-crisis recovery capacity, resource sharing, collective coordination, and risk anticipation suggest that, from the residents' perspective, the function of micro urban shelters extends beyond physical protection to include the organization of collective behavior, emergency management, and continuity of local social relations.

Despite the generally high levels of satisfaction, several indicators, including perceived overcrowding, spatial restrictions, inadequate ventilation, and limited spatial dimensions, show moderate dissatisfaction levels between 28% and 34%. These point to design issues concerning human comfort and environmental quality. Overall, the results indicate that micro urban shelters

in Narmak operate simultaneously across three interconnected layers: As safe and accessible physical structures, as psychologically meaningful and calming environments, and as social infrastructures that facilitate cooperation, recovery, and the continuity of collective life under crisis conditions.

Table 5. Analytical data of questionnaire respondents

Construct / item	Strongly dissatisfied	Dissatisfied	Somewhat dissatisfied	Satisfied	Strongly satisfied	Total
Sense of protection against threat	18	34	52	148	128	380
Perceived control over a crisis	20	39	58	141	122	380
Anxiety reduction upon entering the space	16	31	46	151	136	380
Sense of belonging and companionship	14	27	45	155	139	380
Ease of rapid entry into shelter	10	18	32	154	166	380
Safety of evacuation and exit routes	12	22	40	150	156	380
Access to essential resources	19	35	52	142	132	380
Possibility of neighbor assistance	13	24	39	156	148	380
Structural stability	17	30	48	150	135	380
Adequacy of ventilation and lighting	21	36	55	138	130	380
Acceptable spatial dimensions	24	39	58	139	120	380
Environmental conditions (light, sound, odor, temperature)	22	38	61	136	123	380
Functional suitability for emergency needs	18	33	49	147	133	380
Possibility of temporary multi-use	20	36	55	143	126	380
Perceived reliability in residents' minds	16	29	44	152	139	380
Sense of a safe and familiar place	14	26	40	154	146	380
Wayfinding and entry/exit legibility	12	21	37	158	152	380
Sense of place attachment	15	28	43	151	143	380
Perceived overcrowding	28	41	60	132	119	380
Mobility constraints in space	26	39	59	136	120	380
Sensory memory of space	17	30	47	151	135	380
Simultaneous fear and calm memory	20	34	52	145	129	380
Crisis survival narratives	13	24	39	158	146	380
Adaptation to emergency conditions	15	28	42	154	141	380
Memories of cooperation and assistance	12	22	35	160	151	380
Memory of neighbor presence	11	20	34	162	153	380
Memory of psychological stress	24	40	58	136	122	380
Experience of insecurity loss	21	37	54	140	128	380
Anxiety reduction after entry	18	32	49	147	134	380
Emotional regulation support	16	29	46	150	139	380

Construct / item	Strongly dissatisfied	Dissatisfied	Somewhat dissatisfied	Satisfied	Strongly satisfied	Total
Strengthening local cohesion	13	24	38	157	148	380
Reduced distrust among acquaintances	17	31	48	148	136	380
Strengthening neighborhood identity	14	26	40	153	147	380
Reframing urban belonging	15	27	41	152	145	380
Formation of adaptive behaviors	12	22	35	160	151	380
Reduction of disruptive behaviors	16	28	44	151	141	380
Post-crisis recovery capacity	10	19	31	160	160	380
Readiness for future crises	11	21	33	158	157	380
Pre-crisis preparedness	14	25	39	154	148	380
Risk anticipation and rapid response	12	23	37	157	151	380
Momentary anxiety management	17	30	47	149	137	380
Crisis control	15	27	43	152	143	380
Cooperation and mutual support	10	19	32	160	159	380
Resource and facility sharing	11	21	34	157	157	380
Information exchange and communication	13	24	38	155	150	380
Collective guidance and coordination	12	22	35	158	153	380
Psychological recovery after a crisis	16	29	45	150	140	380
Social recovery and return to normalcy	14	26	41	153	146	380

Statistical analysis

To examine the relationships between the study's conceptual constructs, Spearman's rank-order correlation test was employed. Given the ordinal nature of Likert-scale data and the non-normal distribution assumption of the variables, this method was considered the most appropriate for analyzing the relationships among different dimensions of lived experience and spatial resilience. The results indicated that all main constructs of the study are positively and statistically significantly correlated at the 0.01

significance level. Specifically, the strongest correlation was observed between spatial experience and mental memories ($r = 0.65$), indicating the important role of environmental perception in the formation of collective memory. Furthermore, spatial resilience showed significant relationships with psycho-social outcomes ($r = 0.63$) and perceived sense of safety ($r = 0.60$), highlighting the interdependent nature of cognitive, psychological, and environmental dimensions in shaping resilience in micro urban refuges.

Table 6. Spearman's rank correlation coefficients

Constructs	Perceived safety in micro urban refuges	Spatial experience	Mental memories	Psycho-social outcomes	Adaptation and resistance strategies
Perceived safety in micro urban refuges	1	0.62**	0.58**	0.55**	0.60**
Spatial experience	0.62**	1	0.65**	0.52**	0.59**
Mental memories and narratives	0.58**	0.65**	1	0.60**	0.57**
Psycho-social outcomes	0.55**	0.52**	0.60**	1	0.63**
Adaptation and resistance strategies	0.60**	0.59**	0.57**	0.63**	1

Methodology of qualitative content analysis

Qualitative content analysis is a systematic, iterative, and dynamic process through which the researcher continuously moves between different stages of analysis to achieve a deeper level of meaning extraction from textual data. This methodological approach is conducted within a defined temporal framework and aims to identify underlying semantic patterns embedded in the data. The implementation process, grounded in established qualitative analysis frameworks, is outlined as follows.

Data immersion

The first step in content analysis involves achieving a comprehensive understanding and full engagement with the data. Through data immersion, facilitated by repeated and interactive readings, the researcher seeks to uncover the underlying layers of meaning and latent patterns within the text. At this stage, an active interpretive stance is adopted, enabling the extraction and identification of key concepts related to the lived experiences of research subjects (street musicians) from interview data.

Initial coding and data segmentation

After reaching a sufficient level of data familiarity, the initial coding phase begins. At this stage, the researcher distinguishes between the “unit of analysis” and the “coding unit” to identify and label meaningful features relevant to the research objectives. All data extracts are systematically coded and categorized. To enhance methodological rigor, ensure efficient data management, and facilitate structured analysis, MAXQDA software is employed for organizing and managing the extracted codes.

Categorization and theme development

In this stage, initial codes are grouped into broader categories or themes based on conceptual similarities. The researcher adopts an analytical–synthetic approach to examine relationships among codes, eliminate redundant codes, and merge overlapping concepts. This process results in a more coherent and hierarchical structure of categories and subcategories. Ultimately, data reduction is achieved, leading to more abstract conceptual categories that form the basis for the final interpretation of the findings.

Table 7. Open coding: Categories and initial codes

Main category (construct)	Descriptive code (component)	Initial codes (extracted examples for analysis)
1. Safety in micro urban refuges	Perceptual/control-based safety	Secure enclosure, environmental visibility, access control, collective surveillance
	Psycho-social comfort	Reduction of fear, sense of refuge, mental calmness, sense of place attachment
	Accessibility and evacuation	Safe escape routes, rapid exit, non-obstructed pathways
	Support reliability	Access to water/food, first-aid kit, adequate ventilation
	Structural safety	Structural resistance, physical resilience, system functionality
2. Spatial experience	Sensory-perceptual quality	Spatial congestion, darkness, environmental noise, oppressive temperature
	Functional compatibility	Functional transformation, spatial adequacy, operational flexibility
	Semantic-symbolic meaning	Sacredness of space, refuge as home, life–death associations
	Orientation and sense of place	Spatial semiotics, sense of belonging, environmental memorability
	Spatial density and tension	Overcrowding, loss of privacy, collective anxiety
3. Memories and narratives	Sensory-perceptual memory	Persistent smells, alarm sounds, visual anxiety cues
	Emotional memory	Recall of fear, minimal hope, psychological pressure
	Survival narratives	Narratives of rescue, hiding experiences, coping with hardship
	Interaction memory	Neighborhood solidarity, collective support, shared suffering
	Representation of loss and trauma	Spatial mourning, memory of destruction, emotional scars

Main category (construct)	Descriptive code (component)	Initial codes (extracted examples for analysis)
4. Psycho-social impacts	Mental health	Anxiety disorders, environmental depression, and post-event trauma
	Social dynamics	Social cohesion, resource-based conflicts, support groups
	Identity formation	Victim identity, resilient identity, crisis-based local identity
	Adaptive behaviors	Avoidance patterns, altered nocturnal lifestyle, concealment strategies
	Resilience capacity	Crisis acceptance, psychological recovery, return to normal life
5. Adaptation strategies	Preventive strategies	Stockpiling, identification of safe zones, evacuation drills
	Coping strategies	Emergency management, instant decision-making, rapid sheltering
	Support strategies	Local solidarity, resource sharing, informal networking
	Communication strategies	Safe information dissemination, local alerts, radio/digital channels
	Post-crisis strategies	Spatial restoration, relationship rebuilding, micro-scale infrastructure recovery

Systematic refinement and review of themes

The fourth stage of qualitative content analysis involves the critical review and refinement of the extracted themes. This recursive process involves two analytical levels: Assessing the internal homogeneity and coherence of codes within each category and examining the validity of each theme in relation to the entire data corpus. At this stage, the researcher evaluates the theoretical fit of the thematic map to ensure that the developed categories accurately represent participants' lived experiences. If the thematic map lacks conceptual coherence or if sufficient empirical evidence is not found to support certain categories, the researcher returns to earlier stages of coding and classification to refine and reconstruct the analytical structure. The ultimate objective of this phase is to achieve a deeper

understanding of interrelationships among categories and to construct a refined interpretive narrative of the study. During this process, all extracted indicators are subjected to systematic screening, and codes lacking explanatory power or identified as redundant are removed to enhance conceptual clarity and theoretical precision. Furthermore, to ensure research ethics and guarantee participant confidentiality, a structured coding system is employed. Each data segment is assigned a unique identifier labeled as "MIX," where "M" denotes Interview, "I" represents the interview ID, and "X" indicates the extracted code number from the transcript. This systematic coding scheme not only ensures participant anonymity but also enhances auditability and analytical reproducibility for future researchers and reviewers.

Table 8. Refined category coding (theme review and refinement)

Refined main theme	Conceptual code	Sub-dimensions and analytical description	Sample identifiers (MIX-coded data)
1. Biophysical-spatial perception and psychological calmness	Spatial perception and sense of safety	Changes in perceived presence (security, calmness, belonging); boundary perception; anxiety and stress modulation	M31–M21, M42
	Environmental sensory experience	Environmental sounds, odors, light, and temperature; physiological sensory regulation (darkness, heat, cold); shared vs. individual perception	M13–M33, M49–M24
	Functional transformation of space	Conversion of spatial use (e.g., residential to safe space); adaptability and crisis responsiveness	M25–M15
	Spatial density and congestion	Overcrowding, loss of privacy, spatial tension and stress	M12–M19, M13–M10
	Spatial interpretation and meaning	Symbolic meanings of refuge and resistance; spatial memory and crisis symbolism	M20–M14, M21–M15

Refined main theme	Conceptual code	Sub-dimensions and analytical description	Sample identifiers (MIX-coded data)
2. Perceptual security, stability, and spatial control	Hierarchy of protection	Access control, gates and barriers, perceived safety and containment in crisis contexts	M23–M22, M17–M45
	Infrastructure reliability	Ventilation systems, lighting, water supply, medical resources, protective systems	M18–M36, M14–M27
	Structural resilience	Building stability, resistance to hazards, durability under extreme conditions	M22–M16, M23–M13
	Spatial defensibility	Sense of ownership, spatial exclusivity, vulnerability awareness in conflict conditions	M24–M18
3. Survival narratives, memory, and collective remembrance	Sensory memory	Persistent auditory, visual, and olfactory memories embedded in lived space	M02–M42, M09–M27
	Emotional memory	Fear, hope, despair, anxiety, and attachment experiences	M11–M38, M02–M39
	Survival narratives	Accounts of survival, coping, rescue, and mutual assistance	M34–M22, M15–M13
	Trauma and loss representation	Psychological and physical scars; memory of destruction and suffering	M36–M44, M17–M15
4. Psycho-social impacts, identity, and social relations	Mental health and psychological distress	Anxiety, depression, short- and long-term psychological effects of crisis	M25–M18, M26–M19
	Social cohesion and group dynamics	Mutual support networks, cooperation, and conflict over resources	M27–M20, M28–M21
	Identity formation in crisis contexts	Individual, group, and collective identities; resilience-based identity construction	M29–M22, M30–M23
	Adaptive behavioral patterns	Avoidance, concealment, lifestyle change, and coping mechanisms	M31–M24, M32–M45
	Resilience and recovery capacity	Psychological recovery and return to normal conditions	M33–M26, M34–M27
5. Adaptation, resistance, and post-crisis strategies	Preventive preparedness strategies	Training, planning, preparedness, and resource stockpiling	M35–M28, M41–M33, M39–M45
	Immediate response strategies	Rapid decision-making	

Explanation of relationships among categories based on the paradigm model

In this study, the Strauss and Corbin paradigm model was employed to develop a deeper understanding of how the lived experiences of residents are formed and structured in relation to micro urban refuges. The purpose of this modeling approach extends beyond mere description of phenomena, aiming instead at a theoretical explanation of the underlying dynamics of “spatial refuge-making” within the urban fabric of the Narmak neighborhood. The governing paradigm of this research is an interpretive–critical one. This means that, on the one hand, the study acknowledges and emphasizes the subjective meanings and lived experiences of residents (interpretive orientation), while on the other hand, it critically examines power relations, distributive inequalities in safety

infrastructures, and deficiencies in urban governance in crisis management (critical orientation). This dialectical tension provides a conceptual foundation for repositioning micro urban refuges not merely as “physical shelters,” but as “a field of social action,” where spatial, social, and institutional forces intersect and interact. Within this framework, micro urban refuges are understood as dynamic socio-spatial constructs shaped by the continuous interaction between perceived safety, spatial experience, collective memory, psychosocial consequences, and adaptive strategies. Accordingly, these categories are not isolated variables, but interconnected components of a broader systemic process in which spatial conditions, lived experiences, and structural constraints mutually reinforce one another in shaping patterns of urban resilience and vulnerability.

Table 9. Paradigm interpretation of the study

Paradigm component	Conceptual and analytical interpretation
Research paradigm	This study is framed within an interpretive–critical paradigm. At the interpretive level, the focus is on understanding the lived meaning of individuals’ presence in emergency shelters, perceptions of security, experiences of anxiety, encounters with spatial constraints, and the development of adaptive coping mechanisms. At the critical level, the research critiques power relations, spatial inequalities, inefficiencies in crisis management policies, and the gap between human-centered requirements of sheltering and the actual conditions of shelter infrastructures. This duality enables a simultaneous understanding of both experience and structure, providing a more comprehensive explanation of socio-spatial dynamics in micro urban refugees.

Causal conditions

Table 10. Causal conditions interpretation

Causal condition	Conceptual and analytical interpretation	Research manifestation / empirical meaning
Biophysical and emergency threats	The emergence of shelter-seeking behavior in emergency refugees is primarily driven by life-threatening conditions that disrupt normal urban functioning and transform access to safe space into an immediate necessity.	War, attacks, earthquakes, floods, crises, severe insecurity
Sense of insecurity and existential fragility	Shelter-seeking is not merely a physical reaction, but is rooted in a profound experience of insecurity and existential vulnerability. This condition shifts individuals from everyday life into a survival-oriented mode of existence.	Fear, anxiety, helplessness, loss of environmental control
Disruption or collapse of everyday living environments	When homes, neighborhoods, streets, and urban infrastructure lose their safety and functional stability, emergency shelters become temporary substitutes for ordinary living environments.	Housing destruction, service disruption, loss of place attachment
Lack of prior individual and institutional preparedness	The absence of training, planning, infrastructure, and preventive systems results in the abrupt and unstructured movement of individuals and households toward shelters during crises.	Lack of crisis education, weak emergency management systems, insufficient equipment

Contextual conditions

Table 11. Interpretation of contextual conditions

Contextual condition	Conceptual and analytical interpretation	Research manifestation / empirical meaning
Physical characteristics of shelters	The physical configuration of shelters—including shape, size, structure, ventilation, lighting, temperature, accessibility, and overall environmental quality—constitutes the primary setting that shapes individuals’ lived experiences.	Narrow spaces, dark environments, poor ventilation, inadequate facilities
Urban fabric and spatial location	The spatial placement of shelters within the urban fabric, along with accessibility, connectivity to street networks, and surrounding environmental quality, significantly influences how shelters are perceived and used.	Basement shelters, metro stations, public spaces, dense urban neighborhoods
Socio-economic conditions of residents	Income level, social capital, educational attainment, and social vulnerability shape how individuals experience crises and interact with shelter environments.	Poverty, inequality, vulnerability of disadvantaged groups
Institutional and policy structures	Crisis governance frameworks, regulations, and urban management systems form the macro-level context within which shelters are constructed, managed, and operated.	Disaster management regulations, urban policies, weak monitoring and maintenance
Collective memory and prior crisis experience	Previous experiences of crises, collective fears, and historical memories of risk function as a meaningful background shaping current perceptions and behaviors.	Past experiences of war, earthquakes, attacks, emergency evacuations

Intervening conditions

Table 12. Interpretation of intervening conditions

Intervening condition	Conceptual and analytical interpretation	Research manifestation / empirical meaning
Quality of crisis management	The manner of information dissemination, organization, population guidance, and institutional response can either facilitate or intensify the experience of refuge environments.	Order, chaos, ambiguity, lack of coordination
Level of social trust	The degree of trust among residents and toward authorities plays a fundamental role in shaping cooperation, psychological calmness, and acceptance of crisis conditions.	Trust, cooperation, tension, distrust
Social capital and support networks	The presence of neighborhood relations, family ties, support groups, and collective actions helps mitigate the pressure of crisis conditions.	Solidarity, mutual assistance, collective care, support
Individual psycho-emotional characteristics	Resilience, anxiety sensitivity, prior experiences, and coping mechanisms influence how individuals perceive and tolerate shelter conditions.	Calmness, distress, psychological resilience, exhaustion
Behavior of other occupants in the shelter	The actions of other individuals, from cooperation to conflict, can transform the shelter environment into either a supportive or stressful space.	Cooperation, disorder, conflict, empathy

Central phenomenon (core category)

Table 13. Interpretation of the central category

Central category	Conceptual and analytical interpretation
Adaptive lived experience in emergency shelters: from survival to meaning reconstruction	This core category indicates that emergency shelters are not merely spaces for survival, but arenas in which individuals, in response to threats, move from a basic survival condition toward meaning-making, adaptation, reconfiguration of social relations, and reconstruction of perceived safety. In this process, lived experience shifts from "sheltering" to "living under exceptional conditions," where safety is not understood as a purely physical attribute, but as a multidimensional outcome emerging from the interaction of space, social relations, meaning systems, and human agency.

Strategies

Table 14. Strategies

Strategy	Conceptual and analytical interpretation	Research manifestation / empirical meaning
Behavioral and cognitive adaptation	Individuals adjust their behavioral patterns and mental frameworks to tolerate and manage emergency conditions within micro urban shelters.	Acceptance of conditions, change of habits, regulation of time and behavior
Creation and strengthening of supportive relationships	The formation of empathetic and cooperative social ties serves as a key mechanism for reducing psychological pressure and enhancing perceived safety.	Mutual assistance, resource sharing, reciprocal care
Search for safety and control	Individuals employ various strategies to regain a sense of control over the environment or at least establish a perceived sense of stability.	Selecting appropriate locations, organizing space, caring for children and the elderly
Meaning-making of crisis experience	Re-narration and reinterpretation of crisis experiences help individuals frame suffering within a more manageable and meaningful structure.	Storytelling, emotional reassurance, meaning construction, hope-building
Immediate situational management and problem-solving	Direct and practical responses to urgent needs such as sleep, food, hygiene, and emotional regulation constitute essential survival strategies within shelters.	Daily problem-solving, temporary adjustment, rapid decision-making

Table 15. Consequences

Consequence	Conceptual and analytical interpretation	Research manifestation / empirical meaning
Increase or decrease in perceived safety	The experience of micro urban refugees may either enhance perceived safety or intensify psychological insecurity; this outcome depends strongly on spatial quality and the nature of social relations.	Calmness, anxiety, reassurance, fear
Strengthening or weakening of social cohesion	When supportive relationships emerge, shelters can become spaces of solidarity; otherwise, they may transform into environments characterized by tension and conflict.	Empathy, cooperation, conflict, distrust
Transformation in spatial perception and sense of safety	Crisis experiences reshape individuals' perceptions of urban space and safety infrastructure, increasing their sensitivity to the spatial quality and environmental conditions.	Reinterpretation of home, neighborhood, city, and shelter environments
Emergence of individual and collective resilience	Through crisis exposure, individuals and groups develop enhanced capacities to respond to and manage similar future situations.	Resistance, adaptation, improved preparedness
Revealing structural and policy gaps	Lived experiences within micro urban refugees expose deficiencies in planning, design, and crisis management systems, enabling institutional critique.	Design weaknesses, managerial inefficiency, lack of resources

Integrative paradigm model summary

Dialectical relations among categories

The present paradigm model reflects a dynamic and relational process:

1. Causal conditions (perceived threat), when situated within contextual conditions (spatial and infrastructural inadequacies), drive residents toward forms of action and adaptive behavior.
2. In this process, intervening conditions such as "collective memory" and "social capital" determine whether refuge-seeking leads to an "isolating experience" or to "strengthening social solidarity."
3. The central category emphasizes that within the constrained environment of urban micro refugees, "security" is not an intrinsic property of the building, but rather the product of residents' ongoing interaction with the available space and the use of local wisdom to adapt to the crisis.

Critical interpretation (institutional critique)

From a critical perspective, the findings demonstrate that emphasizing residents' "spontaneous resilience" must not lead to the delegation or withdrawal of institutional responsibility. The analysis reveals a structural gap between residents' lived needs and designed infrastructural capacities. In other words, spatial justice in urban crisis management is achieved only when policy shifts from a purely technical shelter-provision approach to a community-centered model of micro refuge planning, where spatial resilience is

interwoven with social resilience. The final stage of analysis indicates that the lived experience in emergency shelters is not merely a spatial or temporary situation, but rather a complex, multi-layered, and processual phenomenon in which biological threats, disrupted life order, and the sense of insecurity provide the basis for the formation of adaptive actions among residents. This process is important since, contrary to popular belief, an emergency shelter is not just a physical space for protection; it acts as a socio-psychological field where individuals are forced to balance survival, dignity, belonging, and the redefinition of security. In the meantime, causal conditions such as crisis exposure, fear of harm, disconnection from everyday life, and the inability to predict the future form the primary driver of people entering a state of life emergency. However, the intensity and quality of this experience are strongly mediated by contextual factors, such as the physical quality of the shelter, population density, spatial layout, access to basic amenities, and the characteristics of the surrounding social and urban context. When these conditions are inadequate, the micro refuge experience shifts from "protection" to stress, tension, and instability. Intervening conditions – including crisis management quality, trust in authorities, transparency of communication, and levels of social capital – play a decisive role in amplifying or mitigating these effects. Effective

governance can transform micro refuges from mere emergency structures into livable temporary environments, whereas weak coordination and distrust intensify anxiety and conflict. Therefore, what is at the center of the paradigmatic model is not simply “shelter” as a construct, but “adaptive lived experience” as a process in which individuals, in response to crisis, employ various methods to adapt, protect themselves and others, and minimally reconstruct meaning. The central phenomenon is therefore defined as “adaptive lived experience in emergency shelter: From survival to meaning reconstruction.” This reflects that residents are not solely concerned with physical survival, but progressively engage in processes of interpretation, adjustment, and reconstruction of meaning under crisis conditions. Adaptation in this sense is not passive acceptance, but an active form of agency aimed at maintaining psychological, social, and behavioral balance in the case of instability. It may manifest through cooperation, support networks, acceptance of constraints, and meaning-making of suffering. In this context, emergency shelters become functionally meaningful only when they evolve from physical protective structures into socio-spatial security ecosystems – spaces that simultaneously provide physical protection, emotional stabilization, social dignity, basic order, and a sense of belonging. On the

other hand, residents are not passive recipients of conditions; they actively employ adaptive strategies such as behavioral adjustment, emotional regulation, cooperation, resource sharing, and informal support networks. These strategies generate outcomes at two levels:

- Individual level: Reduced anxiety, regained sense of control, and situational resilience
- Collective level: Changing social cohesion, fluctuating trust, and evolving perceptions of safety

However, these outcomes are not fixed; they depend on the interaction between structure, space, governance, and everyday social practices. Accordingly, emergency shelter should not be understood merely as a purely physical phenomenon, but rather analyzed as a socio-spatial and experiential situation. This perspective moves beyond descriptive accounts of crisis conditions, demonstrating how spatial design, governance practices, and social relations directly shape the lived experiences in emergency contexts. Accordingly, when the goal of refuge management shifts from mere bodily protection to dignity preservation, trust enhancement, and enabling minimally livable yet meaningful conditions, emergency shelter can be conceptualized not as temporary containment spaces, but as supportive social infrastructures of urban resilience.

Table 16. Conceptual synthesis

Section	Conceptual summary
Overall logic of the model	In this study, the lived experience within the emergency shelter emerges from the interaction between objective threats, physical and social contextual conditions, and intervening factors. This interaction ultimately produces a multi-layered and meaning-making adaptive experience.
Role of the core category	The core category connects all components of the model and shows that an emergency shelter is not a purely physical place, but a space for survival, interaction, meaning-making, and rebuilding security.
Theoretical implication	The findings suggest that security in crisis contexts is not solely the product of engineering or physical infrastructure. Rather, it is the outcome of the simultaneous interaction between spatial design, management, social relations, and individuals’ lived experiences.

Lived experience-based analysis of categories in urban micro refuges under wartime conditions

Spatial-physical category: Micro refuges as “nearby shelter, but not necessarily safe”

The lived experiences of residents and users of neighborhood squares in the Narmak district indicate that the value of urban micro refuges in wartime conditions is less associated with their physical capacity and more strongly linked to proximity, accessibility, and the possibility of rapid entry. Many participants emphasized that, at the moment of

hearing danger or experiencing an attack, the short distance to these spaces becomes the decisive factor in the decision to stay or move. However, these spaces are not consistently perceived as synonymous with “security.” Rather, they are frequently experienced as temporary, compressed, and incomplete environments that merely reduce the intensity of threat without fully eliminating it. One resident (m28) states:

“When the sounds get closer, you just look for a nearby place to reach quickly. This place is safer than home because it is open and you can collect yourself, but it is

not really a complete refuge; it is more of a pause than safety.”

This narrative indicates that urban micro refuges are cognitively constructed as a protective threshold space – an intermediary condition between danger and survival. In this experience, physical qualities, enclosure, visual control, and spatial capacity for crowding directly shape perceived safety. Another participant (m20) explains:

“Sometimes the space itself doesn’t reduce anxiety; overcrowding, light, noise, and not knowing what will happen next all add pressure. You are only separated from the street, not from fear.”

Overall, for residents, urban micro refuges are not neutral physical structures but part of the lived experience of crisis, simultaneously incorporating protection, anxiety, and suspended temporality.

Social category: Reproduction of micro-scale solidarity under uncertainty

The findings indicate that one of the most significant capacities of urban micro refuges in wartime conditions is not merely spatial protection, but activating empathetic actions and informal support networks. In many residents’ accounts, moments of crisis lead to the formation of an emergent ethics of care among neighbors, passersby, and individuals present in the space, an ethics manifested through spontaneous verbal communication, assistance to children and older adults, and informal coordination of movement. One user (m15) describes:

“In those moments, people look at each other more than ever. Someone keeps the door open, someone guides a child forward, someone helps an elderly person sit down. It feels like a crisis forces people to become neighbors again.”

This statement suggests that urban micro refuges can become sites for the reproduction of social ties; however, this is contingent upon pre-existing levels of trust and familiarity among residents. In other accounts (m45), the absence of prior social recognition, combined with overcrowding and fear, becomes itself a source of tension:

“If people know each other, the space is calmer. However, when there are many strangers, everyone is just trying to find their own place, and stress increases. Then even a small space can become highly tense.”

Accordingly, the social dimension of micro refuge experience cannot be reduced to mere co-presence. It should instead be understood as a process of either trust production or trust erosion under emergency conditions. These spaces become resilient lived

environments only when they evolve from simple aggregation sites into structured forms of mutual support and coordinated solidarity.

Psychological–perceptual category: From explosion-induced anxiety to the reconstruction of a sense of control

A significant dimension of lived experience in urban micro refuges concerns the psychological–perceptual level, where users are confronted not only with external threats but also with instability, unpredictability, and a profound loss of control. In the narratives, seeking refuge in the Narmak neighborhood squares is often accompanied by a form of “psychological pause” that allows individuals to detach from environmental chaos, yet without fully eliminating anxiety. One resident (m25) states:

“When you arrive here, you take a breath, but it is not a calm breath; it is more like collecting yourself. Your ears are still searching for sounds.”

This experience suggests that urban micro refuges simultaneously serve as tension-reducing environments and as spaces that reproduce heightened awareness of danger. Rather than forgetting the crisis, presence in these spaces generates a suspended state of alertness. Another participant (m17) explains:

“Outside, you just know there is danger. When you come here, the danger does not disappear, but at least you feel you have some control over yourself; you can calm the children, sit someone down, or just wait.”

From this perspective, one of the key functions of urban micro refuges is the partial restoration of a sense of agency and control, allowing individuals to perceive themselves not solely as passive victims, but as actors capable of managing the situation within constrained conditions.

Institutional–managerial category: Livable micro refuges through crisis governance

Residents’ experiences demonstrate that the effectiveness of urban micro refuges is strongly dependent on their management, maintenance, and organization. Although these spaces may appear as ordinary public environments under normal conditions, they transform into temporary survival infrastructures during wartime, requiring predictability, guidance, safety protocols, and managerial support. One participant (m30) emphasizes:

“The space alone is not enough; if there is no one who knows how to guide the crowd, where the safer areas are, or how to maintain order, the same space turns into chaos.”

This statement clearly indicates that resilient micro refuges are not solely produced through physical design, but through real-time crisis governance. In several accounts (m18), the absence of signage, insufficient lighting, or lack of knowledge about evacuation routes intensified feelings of insecurity:

"Sometimes you don't know where to stand, where to go, or what to do if things get worse. That uncertainty itself is no less dangerous than the threat itself."

Accordingly, the managerial dimension is not a peripheral concern in this study but a fundamental condition for transforming urban micro refuges into resilient lived environments, spaces that can transform from a mere place into a minimal organizing system in a moment of crisis.

Cultural-semantic category: Redefining "refuge" in the collective memory of the neighborhood

The findings also indicate that urban micro refuges not only gain meaning through their physical function but also become part of the culture of living in crisis, in the collective memory of residents and local narratives. In this experience, "refuge" does not merely signify protection; it is also associated with familiarity, continuity, and the possibility of remaining within one's place. One resident (m23) explains:

"This place is not just a point on the map for us; it is where you feel the neighborhood has not completely fallen apart. When you know you can reach it, it feels like a piece of everyday order remains."

This statement suggests that urban micro refuges carry a cultural meaning of "neighborhood continuity." Within this framework, some participants (m47) emphasize that prior familiarity with the square and spatial memory contributes significantly to reducing anxiety:

"When you already know a place, it feels less strange. You trust it more easily, and that familiarity itself brings a kind of calm."

Therefore, the cultural-semantic dimension of these spaces is directly shaped by memory, belonging, and spatial familiarity, transforming them from purely technical infrastructures into layers of the urban lifeworld.

Overall synthesis

Overall, the lived experiences of residents and users of urban micro refuges in the Narmak neighborhood suggest that these spaces, under wartime conditions, are not merely temporary shelters but intermediate spaces that produce resilience. In this context, resilience does not imply the elimination of crisis, but rather the capacity of space to reduce tension,

organize collective presence, reconstruct a sense of control, and sustain social and symbolic ties. However, the realization of these functions is highly dependent on the quality of design, governance, spatial legibility, and social capacity of the neighborhood. Accordingly, if urban micro refuges are to function as resilient lived environments, they must move beyond safety-oriented physical infrastructures and simultaneously respond to the physical, psychological, social, managerial, and cultural needs of residents.

6. Discussion and conclusion

The findings of this study indicate that urban micro refuges in the neighborhood squares of Narmak, District 8 of Tehran, do not function merely as protective physical elements or emergency stopping spaces in crises. Rather, at the level of citizens' lived experience, they emerge as multi-layered, co-produced, and meaning-generating spatial formations. In this research, the concept of urban micro refuges is not defined as a standard defensive structure with the engineering characteristics of formal shelters, but rather as "a situated spatial-perceptual configuration" embedded within the everyday fabric of neighborhood squares. Accordingly, urban micro refuges are understood as the outcome of the simultaneous activation of existing physical elements in Narmak's public squares, including dense green edges, localized level differences, visual discontinuities and partial enclosure of built edges, temporary shading structures, semi-active urban thresholds, and semi-subterranean or adjacent spaces (such as basement entrances and nearby service zones). During crises, these elements are reinterpreted and activated by citizens as perceived refuge points. Thus, in this study, the urban micro refuge is not a pre-designed space, but rather "a space produced in the crisis lived action," temporarily formed at the perceptual, behavioral, and physical levels, and can emerge within a single square as multiple and dynamic nodes. In line with Lefebvre's theory of the production of space (1991), these spaces are not neutral containers but the simultaneous outcome of bodily practices, risk perception, neighborly relations, local memory, and crisis governance mechanisms. Within this framework, users are not passive consumers of space; rather, through patterns of presence, pause, coordination, mutual aid, and adaptation, they actively participate in the production of spatial quality in urban micro refuges. At the spatial-physical level, the most significant finding is that the effectiveness of urban micro refuges depends primarily

on “instant legibility,” “rapid accessibility,” and “the possibility of immediate sheltering.” This indicates that, under crisis conditions, space enters a liminal–threshold state, in which citizens’ decisions between remaining in open space or entering a safer zone are strongly influenced by distance, visibility, and clarity of pathways. In this sense, neighborhood squares in Narmak can be interpreted as urban “rhythmic refuges,” where the normal rhythm of urban life is abruptly interrupted, placing bodies into a condensed and emergency-driven condition. The results also show that if this spatial compression is not accompanied by a clear and structured design, it leads to increased anxiety, congestion, and spatial disorder. Accordingly, the findings can be translated into operational urban design principles at the micro scale. First, at the level of spatial geometry, neighborhood squares should be designed as semi-open, multi-directional systems with distributed safe pause points to enable rapid refuge-seeking and balanced crowd dispersion. Second, at the level of street furniture, elements should be functionally flexible, operating as both everyday urban amenities and crisis-responsive infrastructures for protection and crowd guidance. Third, at the level of micro infrastructure, providing minimal essential resources, such as emergency lighting, ventilation, water access, and redundant entry/exit routes, is a fundamental requirement for functional resilience. This translation effectively transforms abstract concepts such as lived security and care atmospheres into actionable design criteria for urban planning. From a social perspective, the findings demonstrate that urban micro refuges in crisis contexts become sites for the emergence of temporary and micro-scale solidarities. Within these spaces, short-term interactions, information exchange, assistance to vulnerable groups, and collective presence regulation generate a momentary support network. This finding can be interpreted through de Certeau’s notion of everyday tactics (1984), with the important distinction that in wartime conditions, such tactics become fragile, unstable, and highly dependent on the intensity of the crisis. Accordingly, community in these spaces does not emerge as a stable structure, but rather as “crisis-oriented ephemeral collectives.” From a psychological perspective, urban micro refuges do not eliminate fear; instead, they function as “mediators of anxiety regulation.” These spaces enable a temporary restoration of perceived control, allowing citizens to move beyond peak psychological stress. In this sense, security is not an absolute condition but a

gradual and relative experience, produced through the interplay of environmental legibility, the presence of others, and the possibility of minimal agency. This highlights that the psychological quality of space is as critical as its physical configuration in urban design. At the managerial level, the findings indicate that the effectiveness of urban micro refuges depends on “real-time crisis governance,” which includes clear signage, crowd guidance, defined entry and exit routes, and minimal operational rules. In this framework, management is not an external mechanism but an embedded component of lived spatial experience. In other words, spatial legibility and locally shared informal rules become instruments of self-organization under emergency conditions. Culturally, neighborhood squares in Narmak operate as “semantic refuges.” Lived experiences, collective memories, and local narratives contribute to the stabilization of certain urban locations as perceived safe zones in residents’ mental maps. This demonstrates that resilience is not solely the product of physical infrastructure, but emerges from the interrelation of collective memory, place cognition, and prior experience. Overall, urban micro refuges should be understood as embedded resilient socio-spatial ecosystems, in which spatial, social, psychological, managerial, and cultural dimensions operate in a deeply interdependent manner. The primary theoretical contribution of this study lies in translating abstract concepts, such as “affective atmospheres,” “production of space,” and “phenomenological perception,” into concrete urban design principles. These include legible and multi-directional spatial geometry, flexible urban furniture, micro-scale emergency infrastructure, and real-time crisis governance systems. The findings further demonstrate that urban micro refuges in Narmak neighborhood squares are not merely defensive physical elements, contrary to reductionist approaches in prior studies (e.g., Sönmez, 2025) that emphasize purely material performance. Rather, they constitute lived fields of action. In line with Lefebvre’s (1991) theory of the production of space, these spaces are the outcome of the simultaneous interaction between bodily practices, risk perception, and local memory. At the spatial–physical level, the findings align with Whyte’s (1980) emphasis on the importance of microscales, yet extend it by introducing the notion of “crisis temporality,” showing that the effectiveness of urban microshelters is more a function of “instantaneous legibility and accessibility.” These spaces function as “rhythmic refuges,” interrupting

everyday urban rhythms and transforming into liminal thresholds where an existential decision is made between staying in the open and the safety of shelter, which is contrary to Gehl (1987), who views space as a context for normal interactions. A key innovation of this study is the articulation of the relationship between spatial density and psycho-spatial stress, an aspect underexplored in macro-level models (Favier et al., 2025). Socially, the findings resonate with de Certeau's (1984) concept of everyday tactics and complement Klinenberg's (2018) notion of social infrastructure, with the difference that, contrary to Klinenberg's view of normal conditions, we showed that in Narmak, local solidarity is formed in the form of "temporary and fragile communities" in moments of crisis. This research fills a gap in the literature concerning the instability of social networks in wartime contexts, often overlooked in optimistic resilience frameworks (Norris et al., 2008); it reveals that distrust and tension are the twin of solidarity in micro-spaces. Psychologically, the study challenges purely technical perspectives such as Pilav (2012) by redefining urban micro refuges as "psychological mediators" that regulate rather than eliminate anxiety. This is consistent with Pain's (2000) work on perceived security, yet extends that beyond the individual level to a collective neighborhood-scale experience, positioning space as a means of restoring agency under conditions of uncertainty. In managerial terms, while the findings align with crisis management literature by Kapucu et al. (2024), the key innovation lies in "the internalization of governance within lived spatial experience." Unlike externally imposed models by Yabe et al. (2021), this study demonstrates that spatial legibility and informal local rules transform management into an intrinsic component of spatial identity, addressing a gap in participatory crisis governance literature by Antonenko (2026). From a cultural perspective, the findings demonstrate that neighborhood squares in Narmak function as "semantic refuges." This significantly extends prior theoretical discussions, as in contrast to Latham (2022), who primarily focuses on Western urban contexts, we demonstrated in the dense urban fabric of Tehran that prior experience and collective neighborhood narratives transform physical resilience into cultural resilience. This research moves beyond top-down approaches and conceptualizes urban micro refuges as lived ecosystems that extend beyond their material and infrastructural dimensions into ontological domains. The key contributions include: i)

articulating the linkage between micro-scale spatial configurations and macro-scale resilience, addressing a gap in Xi et al. (2025); ii) localizing the concept of refuge through collective memory in Narmak; and iii) proposing a framework for phenomenological crisis design. Accordingly, the study redefines urban micro refuges as "relational and lived constructs," offering a context-sensitive model of urban resilience for Middle Eastern cities, aligned with advanced qualitative approaches (e.g., Enneking, 2025), while remaining responsive to the socio-spatial conditions of dense urban environments. From a managerial perspective, the findings highlight that the effectiveness of urban micro refuges is highly dependent on real-time crisis governance, crowd management, clear spatial signage, and minimal operational rules. Even when physical space is adequate, the absence of governance can lead to disorder, congestion, and reduced protective performance. These findings align with urban crisis management literature and suggest that micro refuges should be understood not as passive elements, but as active governance infrastructures. In this framework, spatial legibility, clarity of entry and exit routes, and coordination between residents and authorities are integral dimensions of spatial resilience. Management, therefore, is not external to space but embedded within lived spatial experience. Culturally, the findings reveal that urban micro refuges in Narmak are not merely emergency provisions but are deeply embedded in collective memory and residents' perception of "safe places." Familiarity with the neighborhood, emotional attachment, and perceived reliability of certain locations gradually stabilize these spaces within residents' mental maps. Thus, urban micro refuges embody a culture of survival, where local knowledge, prior experience, and collective narratives actively shape the meaning of refuge. This cultural dimension extends beyond symbolic representation and reflects a deeper sense of belonging and memory that is central to urban resilience. A structural-morphological analysis further reveals that the spatial network of Narmak squares is not homogeneous but characterized by internal differentiation in morphology, accessibility, and spatial privacy. Accordingly, two main typologies can be identified: 1) primary squares, located along arterial routes with higher accessibility, greater visibility, and stronger aggregation capacity; and 2) inner-local or cul-de-sac squares, embedded within deeper residential fabrics, characterized by smaller scale, higher spatial enclosure, and stronger social familiarity.

The findings indicate that perceived safety and the performance of urban micro refuges differ significantly across these typologies. Primary squares offer faster access and clearer escape routes but tend to generate higher levels of immediate stress due to congestion and reduced perceptual control. In contrast, inner-local squares provide a higher degree of stable perceived safety, supported by spatial familiarity and human-scale proportions, although they may face limitations in rapid accessibility during peak emergencies. This demonstrates that the performance of urban micro-shelters is not solely a function of spatial availability but is strongly conditioned by topological position within the urban network and the degree of accessibility–privacy. From a design perspective, primary squares should prioritize instantaneous legibility, congestion management, and multi-directional evacuation pathways. Conversely, inner-local squares should be reinforced as “stable cores of calm and refuges.” Accordingly, the Narmak square network can be conceptualized as a complementary system of urban micro refuges, in which high-exposure and low-exposure spaces perform distinct but interdependent roles in urban resilience. Overall, the study demonstrates that resilience in Narmak is not produced at the level of isolated spaces but emerges from the systemic integration of the entire spatial network. This finding addresses a key gap in previous research on square-

based urban systems in dense residential fabrics, emphasizing that perceived security is fundamentally shaped by hierarchical spatial structure. In conclusion, urban micro refuges in wartime conditions operate as lived resilient ecosystems, where spatial, social, psychological, managerial, and cultural dimensions are deeply intertwined in shaping crisis experience. Therefore, these spaces cannot be reduced to technical or infrastructural entities; rather, they must be understood as part of everyday urban life, local interactions, and collective memory. Accordingly, urban planning and design must move beyond top-down and purely physical approaches toward place-based, participatory, and experience-driven frameworks. Policy implications include shifting from exclusive reliance on large-scale shelters to strengthening urban micro refuges, improving spatial legibility, enhancing public preparedness, implementing effective signage systems, and fostering community participation. Finally, the study emphasizes that lived experience in emergency shelters is not merely an experience of fear and survival, but also an experience of temporary order-making, social solidarity formation, and redefinition of human–urban relations. Thus, urban micro refuges in Narmak should not be viewed solely as points of concealment, but as sites for reinterpreting the city during crisis, spaces that reveal resilience as a fundamentally relational and lived condition rather than a purely technical construct.

Table 17. Strategies (derived from the lived experience of residents in micro refuge spaces)

Category (themes)	Strategies
Physical–security: Perceived safety and sense of control	1) Enhancing perceived control through clear rules within micro refuge spaces: Providing visible “quick guides” (printed and symbol-based) explaining entry/exit procedures, spatial prioritization, anti-congestion rules, and safe zones. 2) Improving visibility and reducing blind spots: Reorganizing spatial layout, minimizing visual obstructions for coordinators, and designing clearly legible circulation paths. 3) Regulating access and collective order: Assigning defined roles (e.g., crowd manager, evacuation guide, and information monitor) and establishing short information-sharing cycles during emergencies.
Psychological–social: Emotional comfort and anxiety reduction	1) Reducing anxiety through predictable social order: Creating small-group arrangements and semi-personal spatial boundaries to reduce chaos-induced stress. 2) Activating social support instead of individual isolation: Forming informal support groups for vulnerable individuals (elderly, children, and disabled persons). 3) Short guided communication moments: Brief collective reassurance and situation updates during the early stages of refuge occupancy. 4) Conflict management mechanisms: Introducing local mediation practices to prevent escalation of tensions.
Functional–safety: Accessibility and evacuation capacity	1) Multi-layered evacuation signage: Visual cues on floors, walls, and multiple points of perception. 2) Scenario-based evacuation training: Short behavioral drills for movement, queuing, and crowd behavior under stress. 3) Removing physical barriers and ensuring continuous accessibility of exits. 4) Scheduled safety inspections to maintain evacuation functionality.

Category (themes)	Strategies
Resource continuity: Reliability of essential services (water, hygiene, and medical support)	1) Structured resource distribution planning (who/when/how). 2) Fixed and clearly identifiable service stations to reduce uncertainty. 3) Defined medical referral pathways even in limited-resource contexts. 4) Ensuring minimum hygiene standards (ventilation, waste control, and cleanliness).
Structural–operational safety: System functionality	1) Preventive maintenance of ventilation, lighting, and structural systems. 2) Ensuring operational reliability under stress conditions (lighting, airflow, and usability). 3) Risk identification and rapid mitigation of structural vulnerabilities.
Sensory–perceptual environment: Light, sound, smell, and temperature	1) Controlling disturbing sensory stimuli (noise, odor, and overcrowding effects). 2) Designing calm lighting for orientation and anxiety reduction. 3) Continuous monitoring of “negative sensory hotspots” and spatial correction.
Functional adaptability: Spatial flexibility and usability	1) Functional zoning of space (rest, circulation, service, and storage). 2) Rapid reconfiguration capability based on changing crisis phases. 3) Designing for liveability, not only protection.
Meaning–symbolic dimension: Hope and collective meaning-making	1) Positive symbolic reinforcement through culturally sensitive visual cues and messages. 2) Collective storytelling of survival and resilience. 3) Embedding local cultural identity in spatial experience.
Place–orientation: Sense of place and spatial legibility	1) Stabilizing spatial layout and reducing unnecessary changes. 2) Rapid orientation briefing within the first minutes of arrival. 3) Enhancing predictability to support emotional attachment and spatial comfort.
Crowd management: Density and spatial tension	1) Capacity management and controlled entry waves. 2) Organized circulation flows (one-way or separated paths where possible). 3) Ventilation and spatial dispersion strategies to reduce stress.
Post-crisis recovery: Psychosocial resilience	1) 30/60/90-day post-crisis follow-up programs for mental health monitoring. 2) Social network reconstruction through collective reflection sessions. 3) Adaptive learning loops for updating crisis protocols based on lived experience.
Information & communication strategies	1) Reliable and regular communication channels to reduce rumors. 2) Clear, action-oriented instructions (what to do rather than general statements). 3) Coordination of messages among responsible actors to avoid inconsistency.
Coping and mutual support strategies	1) In-the-moment coping training (breathing, behavioral regulation, and help-seeking). 2) Formalizing mutual aid roles within the refuge environment. 3) Simple and clear emergency help-request mechanisms.
Post-crisis learning and institutional memory	1) Translating lived narratives into operational guidelines. 2) Continuous updating of evacuation and management protocols. 3) Intergenerational transmission of crisis experience and lessons learned.

Based on the lived experiences of residents, micro urban refuges are not merely physical infrastructures; rather, they constitute a psycho-social lifeworld in which “perceived safety,” “sensory–environmental quality,” “social order,” “access to resources,” and “information management capacity” are the key determinants. Accordingly, the proposed strategies in this study emphasize a multi-scalar approach that integrates infrastructural and safety improvements with the design of supportive mechanisms, precise communication, and post-crisis programs for sustainable resilience.

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Author 1: 50%
Author 2: 50%

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Perplexity AI, to enhance linguistic fluency, idiomatic accuracy, and scholarly tone while maintaining the fidelity of the original scientific content.

Conflict of Interest

The authors declare that there is no conflict of interest.

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