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Explaining The Role And Impact Of Urban Public Spaces On Enhancing Public Health In Iranian Metropolises (Case Study: Tabriz City)

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ABSTRACT: The accelerated pace of urbanization in Iranian metropolises has underscored the need to reevaluate the role of public spaces in promoting public health. This study investigates the influence of urban public spaces on enhancing the physical and mental well-being of citizens in the metropolis of Tabriz. Adopting a quantitative and analytical method, data were collected through a purposive documentary review and field studies. The statistical sample consisted of visitors and users, with an average of 5,000 individuals per public space. Using Cochran's formula and a 10% margin of error, 96 questionnaires were collected for each space. Considering the existence of eight urban spaces—including Sa'at Square, Maqbarat-ol-Sho'ara, Shahid Beheshti Square, El-Goli Park, Golestan Park, Tarbiat Pedestrian Path, Valiasr Park, and Laleh Park Commercial-Recreational Complex—the total number of questionnaires required for this study was 752. Documentary data were analyzed using qualitative content analysis, while field data were examined using descriptive statistical techniques. The findings demonstrate that accessibility, safety, environmental design quality, social vitality, and opportunities for physical activity are critical factors contributing to public health improvement. These urban public spaces, beyond their recreational and social roles, function as strategic infrastructures for health promotion in large cities. The results suggest that integrating a health-oriented approach into the design and governance of public spaces can substantially enhance the quality of life in Iran's metropolitan contexts.

Keywords: *Public Health, Urban Public Spaces, Mental Well-Being, Tabriz Metropolis.*

INTRODUCTION

In recent decades, the expansion of urbanization and population concentration in major Iranian cities has transformed public health into a central challenge for urban planning systems. The rapid physical development of cities, coupled with lifestyle changes and increased environmental stressors, necessitates a re-evaluation of urban design policies and strategies, particularly concerning public spaces (Yulie Reindrawati, 2023). Urban public spaces, including parks, pedestrian pathways, squares, and green areas, play a significant role in promoting citizens' physical, mental, and social well-being (Zaman et al., 2024). In its broadest sense, public health encompasses not only the absence of physical illness but also mental health, a sense of social belonging, psychological well-being, and active civic participation (Guan & Wang, 2023). Public spaces hold substantial potential to enhance urban quality of life, as they provide opportunities for social interaction, physical activity, reduction of social isolation, and psychological restoration (Wang et al., 2024). Properly designed public spaces can lead to increased physical activity, reduced anxiety and depression, and improved social relationships. This issue is particularly critical in metropolises facing environmental crises, air pollution, and rising non-communicable diseases. Thus, a comprehensive understanding of the relationship between public space quality and public health is recognized as a fundamental necessity in urban policymaking processes (Guzman et al., 2021). Within the socio-historical structure of Iranian cities, public spaces have long exceeded mere physical functionality; they have served as arenas for social interaction and as foundations for collective identity and social capital. However, in recent decades, the

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unregulated and unsustainable expansion of urban fabric, population growth, environmental pressures, and the decline of integrated planning have contributed to a reduction in spatial quality and the weakening of the health-related functions of public spaces in Iranian metropolises. Cases such as Tehran reveal that declining equitable access to public spaces, their uneven distribution, and the lack of health-oriented design have not only deepened social inequalities but also imposed considerable psychological and physical burdens on citizens (Dabdabeh et al.,2024). From this perspective, rethinking the role of public spaces with an emphasis on spatial justice, civic participation, and improved design quality is essential for achieving sustainable urban health. Analyzing both successful and failed models in Iranian cities can provide realistic and effective strategies for enhancing public health through an evidence-based and interdisciplinary approach. Tabriz, as one of the major metropolitan areas in northwestern Iran, possesses distinct historical and climatic characteristics that have influenced the development of its public spaces. These spaces offer considerable potential to promote public health. However, rapid urban expansion and population growth have highlighted the need to reassess the quantity and quality of public spaces in Tabriz. Field studies indicate that many of these spaces lack health-oriented design and, due to insufficient infrastructure, have lost their social and psychological effectiveness. This issue has had disproportionately negative impacts in densely populated areas and among vulnerable groups such as the elderly and children. Therefore, a scientific analysis of the role of public spaces in promoting public health—particularly at the neighborhood level—is essential. The central research question of this study is: How can urban public spaces contribute to enhancing public health in Iranian metropolises, and what physical, social, and managerial factors influence this process? Within this framework, Tabriz is selected as the case study to extract generalizable patterns for other Iranian cities. The primary objective of this research is to explore and analyze the role of public spaces in improving the public health of Tabriz's citizens and to propose strategies for enhancing these spaces through a health-centered approach. The core hypothesis posits that well-designed and effectively managed urban public spaces can significantly improve both physical and mental health outcomes for urban residents.

Literature Review

With the rapid expansion of urbanization and increasing interactions between citizens and public spaces, the quality of such spaces has become a vital factor in shaping lived experience, place identity, and social participation. Theoretically, public spaces are viewed as the foundation for urban democracy and the manifestation of the collective right to the city. However, in practice, they often suffer from gaps in quality, accessibility, and perception. These spatial inequalities—reflected in layers such as infrastructure, safety, accessibility, and cultural context—not only affect spatial experience but also challenge the realization of spatial justice. Comparative analyses reveal that the spatial distribution of quality across contemporary cities is uneven. Some areas benefit from a balanced combination of functional and perceptual qualities and are identified as desirable spaces, while others remain marginalized. This pattern of inequality, underpinned by theoretical frameworks such as spatial justice (Edward Soja) and the right to the city (Henri Lefebvre), highlights the need to rethink space-oriented policies and adopt socially just design strategies (Davatgar Khorsand & Rahimi, 2024). Urban public spaces, as intersections of lived experience, social connectivity, and place attachment, hold a central position in contemporary urban theories. Their quality—particularly in perceptual and functional terms—plays a critical role in either strengthening or undermining collective urban life.

Analytical frameworks such as Cremona's nine-dimensional model, which focuses on indicators including adaptability, permeability, diversity, legibility, flexibility, dynamism, visual proportion, sustainability, and efficiency, offer a multifaceted lens for assessing spatial quality. Studies inspired by this framework suggest that public spaces often lack balance across these indicators. For instance, while attributes such as place identity and diversity may be preserved, there are often deficiencies in aspects like dynamism, visual harmony, or flexibility. Such an imbalance affects the livability, social inclusiveness, and functional sustainability of these spaces, reflecting a disconnect between theoretical design and user-centered experience. These findings underscore the need to reassess planning and design models for public spaces, with a particular emphasis on quality, perception, and performance (Topchi Khosroshahi et al., 2022).

Urban parks, as spaces for recreation and leisure, play a significant role in promoting both physical and mental health. However, the capacity of specific park elements to support targeted health-related activities has been insufficiently explored. Traditional studies have mostly focused on general attributes such as park size, green coverage, and accessibility, while the role of specific components in promoting health has often been overlooked. A six-category classification of health-oriented activities—including physical, mind–body, nature appreciation, environmental, social, and cultural activities—offers a more nuanced analytical framework for evaluating park capacities. Comparative research across cities reveals notable differences in how parks support health-promoting activities. For example, North American parks tend to emphasize physical activities, whereas European parks provide more opportunities for nature-based experiences. Moreover, a significant disparity exists in the provision of social and cultural activities, with peripheral urban areas often facing greater limitations in this regard (Dietz et al., 2024). Urban public spaces, serving as arenas for social interaction, play a crucial role in supporting citizens' mental health. However,

current research primarily addresses isolated correlations between specific social mechanisms and mental health, often neglecting the complexity of sequential and multilayered social processes. The degree of "publicness" of urban spaces—including fully public, semi-public, and private spaces—can significantly influence mental health outcomes among different social groups. Both explicit mechanisms (e.g., direct social interactions) and implicit mechanisms (e.g., perceived social cohesion) play pivotal roles in this relationship. Notably, perceived social integration appears to have a more significant impact than superficial interactions in enhancing mental health, as it fosters meaningful connections. Fully public and private spaces, by facilitating deeper interpersonal interactions, tend to be more effective in supporting mental well-being, whereas semi-public spaces often exhibit limitations in this regard (Gao et al., 2024).

Based on (Table 1), the detailed review of the existing literature can be thoroughly analyzed.

Research Background

Urban Health

Urban health is an interdisciplinary concept that focuses on studying and improving the quality of livability and the physical, mental, and social well-being of residents within urban environments. This field extends beyond addressing prevalent diseases in cities to encompass structural and environmental determinants of health, such as air pollution, spatial insecurity, lack of green spaces, and socio-economic disparities. Urban health is closely aligned with the notion of spatial justice, emphasizing health not merely as an individual state but as a broader outcome of urban planning and governance at the macro level. Thus, urban health should be seen not only as a public health indicator but as a reflection of the quality of urban policymaking, spatial design, and management. Key components in achieving urban health include equitable access to healthcare services, active transportation, healthy housing, and high-quality public spaces (Kapucu et al.,2024). Overall, urban health represents the intersection of three critical domains: public health, social justice, and sustainable development. In this framework, Richard J. Jackson, professor of public health and environmental sciences at UCLA, is one of the pioneers who explored the link between urban design and public health. His research demonstrates how poor urban design contributes to obesity, depression, reduced physical activity, and mental disorders. Jackson's approach frames the city not as a neutral backdrop for human life but as a dynamic agent that can either promote or undermine health.

On the other hand, Sharon Friel, focusing on the concept of social-health inequalities, highlights the decisive role of urban policies and the spatial distribution of infrastructure and public spaces in determining health outcomes across different social groups. In her view, urban health cannot be understood without analyzing power dynamics and institutional structures. She advocates for a critical approach to spatial–social relations to uncover the embedded mechanisms of urban health inequality (Radwan & Ghaney Morsi, 2020).

Table 1: Detailed Literature Review

.No	Author(s)	Title	Methodology	Findings
1	Davatgar Khorsand & Rahimi, 2024	Investigating The Quality Of Urban Public Spaces In Residential Areas Of Tabriz City From The Residents' Point Of View Using Hot Spot Analysis And Moran's Index	Descriptive–Analytical	Spatial inequalities in the quality and accessibility of urban public spaces have constrained the realization of collective rights and spatial justice. This highlights the need for space-oriented policymaking that is grounded in a social justice approach.
2	Dietz et al., 2024	Examining Inequality In Park Quality For Promoting Health Across 35 Global Cities	Integrative	An imbalance among perceptual and functional components of public spaces—particularly deficiencies in dynamism and flexibility—hinders the achievement of livability and effective social participation within these spaces.
3	Gao et al., 2024	Revisiting The Impact Of Public Spaces On The Mental Health Of Rural Migrants In Wuhan: An Integrated Multi-Source Data Analysis	MGSEM	The uneven distribution of health-promoting activities in urban parks, particularly across different geographic contexts, underscores the need for more precise design strategies that consider cultural and social dimensions in the development of recreational spaces.
4	Khos- Topchi roshahi et al., 2022	Assessing The Feasibility Of Quality Indicators Of Urban Public Spaces From The Perspective Of Carmona ((Case Study: Tabriz City	Convergent Mixed-Methods Design	The degree of publicness in urban spaces plays a decisive role in enhancing mental health and perceived social integration by influencing both explicit and implicit social mechanisms in distinct ways.

Social-Ecological Perspective

The social–ecological perspective is a holistic and multilayered approach to analyzing human behavior—particularly within the field of health—which has begun to influence urban planning and public health since the 1970s. Rather than focusing solely on individual-level factors, this framework examines interacting layers that shape behavior, including individual, interpersonal, institutional, community, and policy levels. Within this model, the built environment is regarded as a key factor influencing collective health through its impact on infrastructure, spatial patterns, and environmental quality (Salaripour et al., 2023). This perspective enables an analysis of public space impacts beyond their physical dimensions, taking into account interpersonal interactions, social norms, opportunities for civic engagement, and institutional dynamics. Healthy public spaces are thus understood as intersections of individual and structural factors in advancing public health, and they play a pivotal role in health-oriented urban policymaking. Urie Bronfenbrenner, a developmental psychologist, was the foundational figure in establishing this framework within the social sciences. His well-known "ecological systems theory" illustrates that human behavior results from the interaction of multilevel influences and must be analyzed through a systemic lens. His theory was later widely adopted in public health, urban sociology, and environmental psychology (Sameh, 2018). Daniel Stokols expanded upon this perspective by integrating it into environmental planning and urban health. He emphasized that improving health is not solely dependent on modifying individual behaviors but requires structural transformations in the spatial and social organization of cities. Through his "health as a design outcome" theory, Stokols laid the conceptual foundation for numerous health-oriented urban initiatives in developed cities.

Health-Oriented Urban Design

Health-oriented urban design refers to a comprehensive set of approaches, principles, and strategies that aim to enhance the physical, mental, and social well-being of urban residents through deliberate spatial and functional organization. From this perspective, the city is viewed as a platform for preventive and structural interventions in public health (Hematian & Ranjbar, 2022). Factors such as walkability, mixed land use, spatial vitality, accessibility, and inclusive design are considered key health-promoting stimuli. Experiences from cities like Copenhagen, Melbourne, and Vancouver demonstrate that prioritizing the quality of public spaces, reducing automobile dependency, enhancing pedestrian safety, and developing social spaces can significantly reduce depression, increase physical activity, and foster life satisfaction. Health-oriented design, therefore, is not only a physical necessity but also a policy-driven urban strategy (Mohsin et al., 2023). Jan Gehl, Danish architect and theorist, is a leading figure in human-centered urban design. His work frames public spaces as instruments for improving the quality of life and mental and social health. Through empirical observations and behavioral studies, Gehl shows how sidewalk design, human scale, lighting, soundscape, and even pavement texture can influence public health outcomes. Similarly, Francis Tibbalds, with a focus on "liveable cities", advocates for urban design that prioritizes human experience over mechanistic patterns. He emphasizes the role of public spaces as enablers of social interaction and collective well-being, suggesting that a good city enhances public health without relying solely on formal healthcare systems (Kanayo Ashinze et al., 2021).

Environmental Exposure & Green Space

Environmental exposure refers to individuals' contact with various environmental factors that can have both positive and negative impacts on their health. Among these, urban green space stands out as one of the most critical health-supportive environmental elements. Green areas such as parks, gardens, and urban vegetation have been shown to reduce stress, improve mental health, and promote physical activity. Numerous studies have demonstrated that access to green spaces correlates with lower rates of chronic illnesses, such as diabetes, hypertension, and cardiovascular diseases (Carmona, 2014). The "dose–response relationship" model in green space exposure aims to quantify the amount and quality of green space required to achieve optimal health outcomes. This model enables data-driven policy planning to optimize the public health benefits of green infrastructure. Mark J. Anderson has investigated the dose–response relationship between green space exposure and reduced symptoms of depression. His findings show that even brief but regular interactions with green environments can yield substantial psychological benefits, with outcomes depending on both duration and frequency of exposure. Robert G. Arredondo, through his research on population and environmental data, highlights the role of green space in reducing anxiety and improving sleep quality. He has analyzed correlations between the availability of green areas near residential zones and various mental health indicators, highlighting the importance of equitable access to green space across urban populations (Hama Radha, 2022).

Public Space & Social Interaction

Urban public spaces play a critical role beyond their physical infrastructure in fostering social interactions, enhancing social capital, and cultivating a sense of place attachment. These aspects have profound implications for individual and collective mental and social health. Empirical studies have shown that active engagement in public spaces reduces feelings of loneliness, increases perceived safety, and strengthens social support networks—all of which are essential indicators of social well-being. Theoretically, public space is conceptualized as a platform for cultural, civic, and political interaction, where individuals engage in dialogue, express solidarity, and

participate in civic life. Such engagement fosters psychological resilience, improves quality of life, and strengthens collective capacity to cope with urban challenges (Harvey, 2009). Gianfranco Arighi emphasizes the importance of urban social capital, arguing that public space facilitates social interaction and plays a pivotal role in supporting community mental health. His work demonstrates that inclusive and diverse public spaces promote civic participation and reduce health disparities. Rainer Baunach, through his studies in environmental psychology, highlights the role of public space in reducing stress and fostering a sense of belonging. His theory posits that the quality of social interactions within public environments is directly linked to mental health metrics and that well-designed public spaces can significantly contribute to collective well-being (McGee Park, 2020).

This study adopts a novel approach by exploring the role of urban public spaces in promoting public health in Iranian metropolises, with a focus on Tabriz. Its innovation lies in applying a health-oriented, interdisciplinary lens—an area largely underexplored in Iranian urban studies. Moving beyond conventional spatial and functional analyses, the research highlights how public spaces can contribute to both physical and mental well-being. Through the comparative assessment of eight key urban spaces in Tabriz using indicators such as accessibility, safety, design quality, social vitality, and physical activity potential, the study introduces a localized model for health-based evaluation of urban spaces. It further reframes public spaces as strategic infrastructures for health promotion and advocates for integrating health-driven criteria into urban design and governance. This perspective offers both theoretical depth and practical value for improving urban quality of life. Based on (Table 2), a more precise articulation of this investigation can be presented.

MATERIALS AND METHODS

This study adopts a quantitative-analytical approach, aiming to explain the role and impact of urban public spaces on enhancing public health in the metropolis of Tabriz. The research methodology is based on the collection and analysis of quantitative data, supplemented by qualitative content analysis of documentary sources and field studies. The statistical population comprises eight selected and representative public spaces in Tabriz, identified based on cultural, social, functional, and accessibility criteria. These spaces, as prominent urban

Table 2: In-depth Analysis of Literature and Theoretical Foundations of Key Concepts

No.	Theoretical Concept	Key Dimensions	Key Theorists & Approaches	Research Perspective
1	Urban Health	- Physical and mental well-being - Environmental and spatial justice - Urban policy impact	Richard J. Jackson: Connections between urban design and public health Sharon Friel: Social inequalities in urban health	Views urban health not only as a medical concern but as an outcome of spatial planning, environmental conditions, and social infrastructure in
2	Social-Ecological Perspective	- Multilevel influences (individual to policy) - Systems interaction - Role of the built environment	Urie Bronfenbrenner: Ecological systems theory Daniel Stokols: Integration of environmental design and public health	Examines how public spaces serve as convergence points for individual behaviors, community norms, and institutional urban health policies
3	Health-Oriented Urban Design	- Walkability and accessibility - Mixed-use vitality - Preventive spatial interventions	Jan Gehl: Human-centered urban design principles Francis Tibbalds: Concepts of livable cities	Highlights how urban design strategies, such as inclusive public spaces and pedestrian-friendly environments, enhance physical and mental well-being.
4	Environmental Exposure & Green Space	- Green infrastructure - Dose-response relationship - Nature's restorative effects on mental health	Mark J. Anderson: Impact of green space exposure on depression Robert G. Arredondo: Reduction of anxiety and improved sleep quality	Investigates how exposure to green space contributes to mental health, utilizing spatial metrics to inform urban planning and health policy in Tabriz.
5	Public Space & Social Interaction	- Social cohesion - Sense of belonging and inclusion - Stress reduction through social engagement	Gianfranco Arighi: Role of social capital in urban interactions Rainer Baunach: Public space as a buffer against psychological stress	Examines how interactive and inclusive public spaces enhance social support networks, thereby directly impacting mental and emotional health in densely populated urban areas.

landmarks, fulfill diverse roles in improving the psychological and physical well-being of citizens. Each public space was assigned a unique code as presented in (Table 3). Data were collected from two main sources. First, documentary data included official reports from the Tabriz Municipality, previous studies, scholarly articles, and documents related to the features and functions of public spaces. These were analyzed through qualitative content analysis to identify the key determinants influencing public health. Second, field data were collected through direct observation, targeted questionnaires, and semi-structured interviews with space users and urban planning experts.

A purposive sampling method was employed to ensure the participation of experienced users and primary beneficiaries of public spaces. The statistical population of this study consisted of visitors and users of eight selected public spaces in Tabriz, including Sa'at Square, Maqbarat-o-Sho'ara, Shahid Beheshti Square, El-Goli Park, Golestan Park, Tarbiat Pedestrian Path, Valiasr Park, and the Laleh Park Commercial-Recreational Complex. Given the public nature of these spaces and the lack of precise records on visitor numbers, an approximate average of 5,000 individuals per location was considered as the population size. The adjusted Cochran formula was employed to determine the sample size. With a 95% confidence level, a success proportion of $p = 0.5$, and a margin of error of $e = 0.1$, the required sample size for each space was 96 individuals.

Consequently, considering all eight public spaces, a total of 752 questionnaires were administered for this study. This approach ensures a representative and statistically valid sample for assessing the influence of public spaces on the physical and mental health of urban residents. The designed questionnaire included 25 items, structured into five key dimensions: accessibility, safety, environmental design quality, social vitality, and opportunities for physical activity. Each dimension consisted of five questions, evaluated using a five-point Likert scale ranging from "strongly agree" to "strongly disagree." The questionnaire was developed to assess the degree to which each dimension impacts public health and the quality of urban life. In addition, observation forms were used to record user behaviors, usage patterns, and levels of physical activity in each public space. The validity of the questionnaire was confirmed through expert panel review by professionals in urban planning and public health, and its reliability was measured using Cronbach's alpha coefficient ($\alpha = 0.83$), indicating high internal consistency. The data analysis was conducted in two phases. First, documentary data were coded and categorized using qualitative content analysis to extract effective factors contributing to public health improvement. Second, the quantitative data from questionnaires and observation forms were analyzed using descriptive statistical methods, including means, standard deviations, frequency percentages, and distribution charts, to determine the impact level of each dimension on public health. Additionally, correlation analysis was employed to investigate the relationships between the variables and overall public health.

Study Area

The metropolis of Tabriz, located in northwestern Iran, serves as the capital of East Azerbaijan Province and plays a pivotal role in the country's settlement system, economy, history, and culture. Geographically, the city is situated on the northwestern slopes of the Sahand Mountains and is adjacent to the Tabriz Plain, located between 38°08′ and 38°15′ N latitude and 46°11′ and 46°23′ E longitude. Tabriz is classified as a cold mountainous region in terms of its natural, climatic, and geomorphological characteristics, with an average elevation of approximately 1,350 meters above sea level. According to the 2016 census by the Statistical Center of Iran, the urban population of Tabriz was 1,558,693, while the total population of the greater Tabriz County reached 1,773,033, comprising 563,660 households. Based on demographic projections for 2025, the population of the Tabriz metropolitan area is estimated at approximately 1,696,000, with an annual growth rate of about 1.07%. Since the 1950s, this demographic trend has led to rapid physical

Table 3: Coding of Selected Public Spaces in the Study

Code	Public Space Name
F1	Meydan-e Sa’at
F2	Maqbarat-o-Sho’ara
F3	Shahid Beheshti Square
F4	El-Goli Park
F5	Golestan Park
F6	Tarbiat Pedestrian Zone
F7	Valiasr Park
F8	Laleh Park Commercial–Recreational Complex

expansion and significant horizontal sprawl of the city. Studies indicate that the built-up area of Tabriz has increased more than 35-fold over the past five decades. Administratively, Tabriz is divided into 10 municipal districts, each with independent administrative and service responsibilities, yet collectively governed by the central municipality and the Islamic City Council. The urban fabric of Tabriz comprises three main typologies: (1) the historic core, including sites such as the UNESCO-listed Tabriz Bazaar, Sa'at Square, and traditional neighborhoods like Shaterban and Amirkhiz; (2) mid-century developments, constructed during the past several decades; and (3) peripheral informal settlements, particularly in the southwestern, northeastern, and eastern parts of the city. These peripheral zones often lack adequate infrastructure and low-quality public spaces. From an environmental and spatial quality perspective, the city faces major challenges. According to official data from the Tabriz Municipality, the per capita green space is approximately 3.8 square meters, which is well below international standards (Mahmoudzadeh et al., 2021). Moreover, only 2.4% of the total urban area is allocated to public green spaces. Simultaneously, the existence of over 6,880 hectares of vacant and underutilized land within the approved urban boundary presents considerable potential for place-based regeneration strategies. Studies have revealed that approximately 4,715 hectares of Tabriz's green areas have been converted to other uses in recent decades due to unbalanced urban development and non-localized planning policies. This trend has negatively impacted the vitality of public spaces and environmental quality. Despite its rich historical urban fabric, strategic geopolitical position, and cultural and social resources, Tabriz has faced persistent challenges in urban management, equitable infrastructure distribution, and enhancing public space quality in recent decades. This situation underscores the urgent need for innovative approaches, such as place-based urban governance, in urban planning and policymaking. Based on (Table 4), the selected study area and its eight representative public spaces can now be precisely delineated for further analysis.

RESULTS AND DISCUSSIONS

In line with the study's objective of examining the role of urban public spaces in enhancing public health among the citizens of the Tabriz metropolis, data analysis was conducted in two major phases: first, a qualitative content analysis of documentary sources to identify the key influencing indicators; and second, a quantitative analysis of field data collected via structured questionnaires, direct observations, and semi-structured interviews. The main findings are discussed across five core dimensions: Accessibility, Safety, Environmental Design Quality, Social Vitality, and Opportunities for Physical Activity.

Table 4: Explanation of Documentation and Studies Related to the Research Study Area

Study Area Description: The Metropolis of Tabriz							
							
Geographical Location							
Code		**Code**		**Code**		**Code**	
F1		F2		F3		F4	
F5		F6		F7		F8	

Accessibility

The results derived from the questionnaire analysis indicate that the overall accessibility of public spaces in Tabriz is evaluated at a relatively satisfactory level. The mean score for this dimension was 3.91 out of 5, with a standard deviation of 0.62, reflecting moderate variation among sites. The highest accessibility ratings were recorded for Tarbiat Pedestrian Street (F6) and El-Goli Park (F4). These spaces benefited from their central urban location, proximity to public transportation networks, and pedestrian connectivity with surrounding residential neighborhoods, which contributed to higher accessibility scores. In contrast, the Laleh Park Complex (F8), despite its favorable vehicular access, received a lower score of 3.27 due to its limited pedestrian-friendly infrastructure and weaker public transportation connections. Field observations further revealed that public spaces with higher levels of accessibility tend to attract a more diverse user demographic, including different age groups and social backgrounds, thereby reinforcing the health-promoting potential of those environments. (Table 5).

Safety

The analysis of data related to the safety dimension revealed that the average perceived safety across public spaces in Tabriz was 3.68 out of 5. The highest safety scores were recorded in Valiasr Park (F7) and Sa'at Square (F1), with ratings of 4.03 and 3.95, respectively. These locations were characterized by the continuous presence of law enforcement officers, adequate lighting, and high visibility, which significantly contributed to the users' sense of security. Conversely, Maqbaratoshoara (F2) received a relatively low average score of 3.18, primarily due to users' concerns about social insecurity, especially the presence of vulnerable groups during certain nighttime hours. The findings from semi-structured interviews further underscored the critical role of perceived safety as a prerequisite for active civic participation in public spaces. Several respondents noted that feelings of insecurity are directly correlated with urban stress levels and that enhancing environmental safety could significantly improve both psychological comfort and usage frequency (Table 6).

Table 5: Average score of the "Accessibility" component

Code	Public Space Name	Mean Score	Standard Deviation	Rank
F1	Meydan-e Sa’at	4.00	0.58	2
F2	Maqbarat-o-Sho’ara	3.45	0.66	7
F3	Shahid Beheshti Square	3.32	0.70	8
F4	El-Goli Park	4.12	0.52	1
F5	Golestan Park	3.80	0.61	4
F6	Tarbiat Pedestrian Zone	4.08	0.49	3
F7	Valiasr Park	3.76	0.55	5
F8	Laleh Park Commercial–Recreational Complex	3.27	0.68	6
Overall Mean		3.91	0.62	-

Table 6: Average score of the "Security" component

Code	Public Space Name	Mean Score	Standard Deviation	Rank
F1	Meydan-e Sa’at	3.95	0.59	2
F2	Maqbarat-o-Sho’ara	3.18	0.72	8
F3	Shahid Beheshti Square	3.40	0.67	7
F4	El-Goli Park	4.82	0.64	4
F5	Golestan Park	3.70	0.60	5
F6	Tarbiat Pedestrian Zone	4.60	0.66	6
F7	Valiasr Park	3.03	0.55	1
F8	Laleh Park Commercial–Recreational Complex	3.55	0.58	3
Overall Mean		3.68	0.63	-

Environmental Design Quality

Environmental design quality has emerged as a significant determinant in assessing public spaces from a health-promoting perspective. The mean score for this dimension was 3.75, with Elgoli Park (F4) and Tarbiat Pedestrian Street (F6) receiving the highest ratings of 4.11 and 3.98, respectively. These spaces demonstrated notable alignment with human-scale design principles, visual coherence with the urban landscape, adequate street furniture, and a diversity of functional zones. In contrast, Shahid Beheshti Square (F3) received the lowest score of 3.17, largely due to environmental design deterioration, insufficient seating arrangements, and poor nighttime aesthetics. Direct field observations confirmed that physical maintenance issues notably diminished the spatial appeal and overall user experience. These findings highlight the crucial role of well-maintained, aesthetically pleasing, and inclusively designed environments in promoting public engagement and enhancing urban health (Table 7).

Social Vitality

The mean score for social vitality across the selected public spaces was 3.82. Observational indicators such as the consistent presence of diverse age groups, social interactions, group activities, and cultural participation were employed as key criteria in evaluating vitality. Tarbiat Pedestrian Street (F6) and Saat Square (F1) ranked highest in this category, with scores of 4.35 and 4.06, respectively. These areas, due to their bazaar-like structure, high pedestrian density, and historical identity, offered vibrant platforms for daily social engagement and communal encounters. Conversely, Laleh Park Commercial Complex (F8) received a relatively lower score of 3.24, being perceived more as a consumer-oriented environment than a space fostering social interaction. Insights derived from semi-structured interviews further reinforced the notion that socially vibrant spaces contribute to a stronger sense of belonging, mitigate urban isolation, and play a pivotal role in enhancing mental well-being (Table 8).

Physical Activity Potential

This dimension received a mean score of 3.64, indicating moderate performance compared to other components. Spaces such as Golestan Park (F5) and Valiasr Park (F7) achieved the highest scores of 3.99 and 3.87, respectively. These areas featured pedestrian pathways, public exercise equipment, and

Table 7: Average score of the "Environmental Design Quality" component

Code	Public Space Name	Mean Score	Standard Deviation	Rank
F1	Meydan-e Sa’at	3.82	0.58	3
F2	Maqbarat-o-Sho’ara	3.20	0.71	7
F3	Shahid Beheshti Square	3.17	0.74	8
F4	El-Goli Park	4.11	0.51	1
F5	Golestan Park	3.63	0.59	5
F6	Tarbiat Pedestrian Zone	4.98	0.55	2
F7	Valiasr Park	3.71	0.62	4
F8	Laleh Park Commercial–Recreational Complex	3.38	0.60	6
Overall Mean		3.75	0.61	-

Table 8: Average score of the "Social Vibrancy" component

Code	Public Space Name	Mean Score	Standard Deviation	Rank
F1	Meydan-e Sa’at	4.06	0.53	2
F2	Maqbarat-o-Sho’ara	3.30	0.64	8
F3	Shahid Beheshti Square	3.44	0.68	7
F4	El-Goli Park	4.88	0.58	3
F5	Golestan Park	3.60	0.56	5
F6	Tarbiat Pedestrian Zone	4.35	0.48	1
F7	Valiasr Park	3.67	0.61	4
F8	Laleh Park Commercial–Recreational Complex	3.24	0.66	6
Overall Mean		3.82	0.60	-

open green spaces, making them conducive to physical activity. In contrast, Maqbarat-o-Shoara (F2) and Shahid Beheshti Square (F3) received lower scores due to their limited open spaces and inadequate physical infrastructure. Observational forms completed across different time intervals revealed that spaces offering greater opportunities for physical activity significantly promoted daily movement among citizens, particularly elderly individuals and children (Table 9).

Integrated Analysis and Correlation Assessment

Pearson correlation analysis between the five key components and the public health index revealed that social vitality had the strongest correlation with public health (r = 0.74), followed by environmental design quality (r = 0.68). These findings suggest that urban public spaces characterized by high levels of social interaction and spatial quality have a direct, positive influence on both the mental and physical well-being of citizens. Moreover, a significant correlation was observed between accessibility and physical activity potential (r = 0.61), suggesting that individuals are more likely to engage in physical activity in spaces that are easily accessible. Perceived safety also showed a moderate correlation with public health (r = 0.57), underlining the critical role of psychological security in encouraging the use of public spaces and in reducing urban stress. Finally, physical activity itself was significantly correlated with overall public health (r = 0.63), confirming that environments conducive to movement and exercise play a key role in preventing lifestyle-related diseases. As illustrated in (Table 10), a Pearson correlation matrix was constructed to display the pairwise relationships among all five dimensions and their respective associations with the public health indicator. The overall correlation pattern is also visually presented in (Figure 1).

Final Ranking and Multi-Criteria Analysis of Selected Public Spaces in the Metropolis of Tabriz

This section presents a comparative analysis of selected public spaces in the metropolis of Tabriz. The analysis is based on the final ranking of these spaces, determined through the aggregated scores derived from five key components: Accessibility, Security, Environmental Design Quality, Social Vitality, and Physical Activity Potential. The data used for this evaluation were extracted from the average scores obtained from participants' responses to five-point Likert scale questionnaires (Table 11). Additionally, according to (Figure 2), a smoothed and complex curve (Spline Interpolation) is presented, designed based on the aggregated average scores of each public space. This chart allows us to visually interpret and analyze the ranking variations among the spaces effectively.

Table 9: Average score of the "Physical Activity Opportunity" component

Code	Public Space Name	Mean Score	Standard Deviation	Rank
F1	Meydan-e Sa'at	3.55	0.57	5
F2	Maqbarat-o-Sho'ara	3.12	0.72	8
F3	Shahid Beheshti Square	3.18	0.69	7
F4	El-Goli Park	3.76	0.60	3
F5	Golestan Park	3.99	0.52	1
F6	Tarbiat Pedestrian Zone	3.48	0.65	6
F7	Valiasr Park	3.87	0.58	2
F8	Laleh Park Commercial–Recreational Complex	3.35	0.59	4
Overall Mean		3.64	0.61	-

Table 10: Pearson Correlation Matrix Between Key Components and Public Health Index

Variables	Accessibility	Safety	Environmental Design Quality	Social Vitality	Physical Activity Potential	Public Health
Accessibility	1	0.49	0.55	0.58	0.61	0.59
Safety	0.49	1	0.53	0.50	0.46	0.57
Environmental Design	0.55	0.53	1	0.63	0.60	0.68
Social Vitality	0.58	0.50	0.63	1	0.66	0.74
Physical Activity	0.61	0.46	0.60	0.66	1	0.63
Public Health Index	0.59	0.57	0.68	0.74	0.63	1

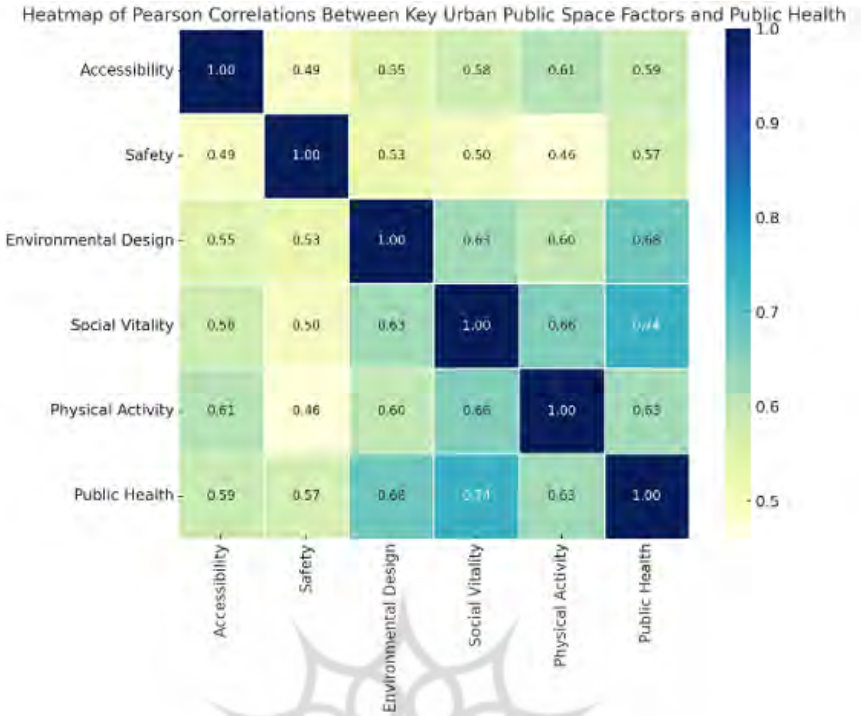

Fig. 1: A Visual Analysis of the Link Between Urban Public Space Quality and Public Health in Metropolitan Areas

Table 11: Final Ranking of Selected Public Spaces in the Metropolis of Tabriz Based on the Aggregated Scores of Key Analyzed Components

Rank	Public Space	Composite Mean Score
1	Tarbiat Pedestrian Zone	4.03
2	El-Goli Park	3.98
3	Meydan-e Sa'at	3.89
4	Valiasr Park	3.76
5	Golestan Park	3.67
6	Laleh Park Commercial–Recreational Complex	3.45
7	Shahid Beheshti Square	3.34
8	Maqbarat-o-Sho'ara	3.26

This ranking reveals significant distinctions among various public spaces in terms of their performance in enhancing public health indicators:

• **1st Rank – Tarbiat Pedestrian Street (F6):** With an average score of 4.03, this space emerged as the top-performing public space due to its well-balanced integration of key components. Features such as pedestrian orientation, high public presence, functional diversity, relative safety, and opportunities for social interaction play a crucial role in improving both the mental and physical well-being of citizens.

• **El Goli Park (F4):** Ranked second with an average of 3.98, this public space is distinguished by its attractive environmental design, natural landscapes, walking paths, and recreational opportunities, making it a strong contributor to urban health.

• **Saat Square (F1):** With an average score of 3.89, this historically significant space received high ratings in accessibility and activity potential, reinforcing its role as a socially engaging urban node.

• **Lower-ranked spaces, such as Shahid Beheshti Square (F3) and Maqbarat-o-shoara (F2):** demonstrated weaker performance in supporting public health due to functional limitations, lack of recreational infrastructure, or shortcomings in environmental design.

In general, public spaces characterized by human-centered design, functional diversity, opportunities for interaction and social vitality, easy access, and a safe environment showed more positive effects on citizens' mental, physical, and social health. These findings provide a scientific foundation for

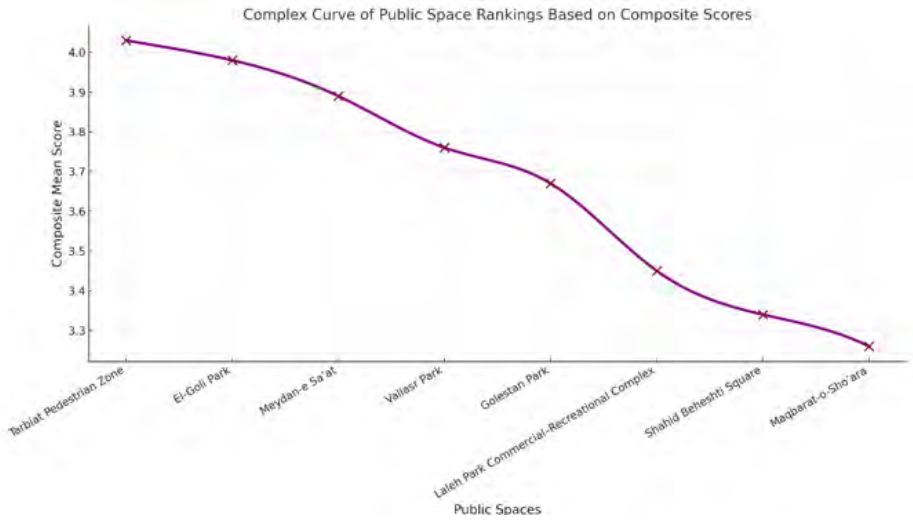

Fig. 2: Visual Analysis of the Ranking Differences among Evaluated Public Spaces

rethinking urban public space policy and design in Iran's metropolitan areas, particularly through a health-oriented lens.

CONCLUSION

This study aimed to investigate the role and impact of urban public spaces on public health promotion in the metropolis of Tabriz by evaluating eight selected public spaces—El-Goli Park, Saat Square, Tarbiat Street, Laleh Park, Mashrouteh Park, Emam Street, Valiasr Park, and Shahid Beheshti Square—across five core dimensions: accessibility, safety, environmental design quality, social vitality, and physical activity capacity. The findings revealed that Tarbiat Street, with an overall score of 87.5 out of 100, ranked first in its positive contribution to public health indicators. El-Goli Park (84.2) and Laleh Park (79.7) followed in second and third place, respectively. In contrast, Shahid Beheshti Square, with a score of 62.3, was the least effective in promoting public health. Among the five assessed indicators, social vitality demonstrated the strongest correlation with public health outcomes (r = 0.78), followed by environmental design quality (r = 0.71) and physical activity capacity (r = 0.66). Lower safety scores in areas such as Emam Street and Shahid Beheshti Square were found to negatively impact both the physical and psychological aspects of well-being negatively. Spatial analysis also indicated an imbalance in the distribution of health-oriented public spaces, with a concentration in central urban areas and relative deprivation in peripheral neighborhoods. This underscores the need for urban policies grounded in spatial justice.

Furthermore, community participation in the maintenance and management of public spaces was found to enhance social cohesion, perceived safety, and psychological resilience. In summary, this research confirms that high-quality, inclusive, and interactive public spaces can serve as strategic infrastructures for enhancing both physical and mental well-being. It is recommended that health-centered urban design be institutionalized within the broader framework of urban development and governance in Tabriz and other Iranian metropolises.

Based on the findings of this study, the following actionable recommendations are proposed for urban managers, planners, and policymakers aiming to promote public health through the optimization of public spaces:

1. Adopt a Health-Oriented Urban Design Framework

Embed health promotion goals explicitly into the design guidelines of public spaces, focusing on walkability, environmental comfort, social inclusivity, and support for physical activity across all age groups.

2. Enhance Safety and Social Trust in Underperforming Areas

Enhance lighting, visibility, and passive surveillance in low-performing areas, such as Emam Street and Shahid Beheshti Square, alongside community-led programs to foster social trust and mitigate perceived risk.

3. Promote Spatial Equity in the Distribution of Public Spaces

Prioritize the development and revitalization of public spaces in peripheral and underserved neighborhoods to ensure equitable access to health-supportive environments for all citizens.

4. Incorporate Community Participation in Design and Management

Foster citizen involvement through participatory design workshops and localized stewardship programs to improve social cohesion and a sense of ownership toward public spaces.

5. Develop Monitoring and Evaluation Tools

Implement integrated monitoring systems to continuously assess the performance of public spaces based on health-related indicators, and use these metrics to guide future planning and resource allocation.

6. Interdisciplinary Collaboration in Urban Governance

Encourage cooperation between urban planners, public health experts, environmental psychologists, and local authorities to develop holistic and adaptive strategies for healthier urban living.

AUTHOR CONTRIBUTIONS

M. Sami: Literature review, conceptualization, data curation, model training, validation, preparation of main manuscript, and editing. A. Saghafi Asl, M. Haghlesan, and H. Sattari Sarbangholi: Supervision, Project administration, Formal analysis.

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CONFLICT OF INTERESt

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the authors have acknowledged the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancy.

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