

Enhancing social interaction through urban open spaces design: A study of Quality, Quantity, and Accessibility in Duhok City

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ABSTRACT: This study examines the impact of urban open spaces on social interactions in Duhok City, emphasizing the aspects of quality, quantity, and accessibility. The research employs a mixed-method approach, incorporating field visits to four principal parks – Azadi Park, Barzani Park, Tahseen Taha Park, and Dilshad M. Saeed Park – alongside quantitative questionnaires and qualitative interviews conducted in 41 neighborhoods of Duhok City. Data indicates that well-maintained, accessible, and fairly distributed open spaces significantly improve relationships and cultivate a sense of community. Still, their potential is limited by factors like as inadequate maintenance, inequitable distribution, restricted accessibility, and insufficient public transportation, which notably affects vulnerable people, including the disabled and elderly. The paper provides empirically-supported recommendations for politicians and urban planners to tackle these difficulties, such as improving maintenance standards, enhancing accessible infrastructure, and guaranteeing equitable allocation of open spaces. The objective of these actions is to promote inclusive, socially dynamic urban spaces, hence enhancing sustainable urban development and encouraging social interaction in Duhok City.

Keywords: Urban open spaces, social interaction, Quality, Quantity, Accessibility.

1. Introduction

1.1. Impacts of Urbanization

Urbanization has caused a rapid and significant transformation of cities in recent years, resulting in notable changes to the social, economic, and physical aspects of metropolitan areas. A pattern driven by the desire for improved living standards and economic prospects, has led to the migration of populations from rural regions to urban centers. Duhok City, situated in the Kurdistan region of Iraq, With the growth of the city, the need for carefully planned urban open spaces becomes more crucial, especially in promoting social connections among inhabitants. Urban open spaces, such as parks, plazas, and gardens, are essential for improving the quality of life by offering opportunities for recreation, relaxation, and social interaction. Still, the ability of these areas to encourage interaction with others is mostly dependent upon their quality, quantity, and accessibility (Kellenberg, Welz et al. 2017).

1.2. Urban Open Spaces in Duhok City

The urban open areas in Duhok City are experiencing various issues concerning their quality, quantity, and accessibility. The current parks and recreational areas suffer from insufficient maintenance, inadequate design, and an unbalanced distribution throughout the city. The inequitable allocation and limited availability of easily accessible green spaces have limited the capacity of these areas to successfully encourage interaction among citizens. In addition, the absence of adequate public transportation and limited amenities worsen these problems, especially for vulnerable populations including the elderly, children, and those with disabilities. This study seeks to tackle these difficulties by examining the existing constraints of urban open spaces in Duhok and suggesting solutions to improve their capacity to promote social interaction and community participation.

1.3. Research Question

This study will answer the following question:

How do the quality, quantity, and accessibility of urban open spaces in Duhok City impact social interactions among inhabitants, and what specific methods may be used to enhance these places for better social connectivity?

Studying this research question through close-ended questionnaire and open-ended interviews by analyzing quality, quantity and accessibility in Duhok city to better understand their impact on social interaction.

1.4. Historical Background

Duhok City, located in the northern area of Kurdistan, has experienced significant urban expansion, particularly following the arrival of refugees in 2014. The city's unique geography, surrounded by mountains, constrains its growth, forcing urban development to spread in a linear manner towards the east and west. According to (Hamo, Malaika et al. 2018), this expansion has occurred at the cost of agricultural land, highlighting the importance of carefully designed urban green areas. In the past, the urban planning of Duhok faced difficulties in ensuring fair and equal access to open spaces. A significant number of residential areas suffer from a lack of adequate parks, and the existing ones frequently have poor upkeep and design, which limits their ability to function as centers for social interaction. The parks in the city, including as Azadi Park, Barzani Park, Tahseen Taha Park, and Dilshad M. Saeed Park, provide different levels of facilities and simple access, which demonstrate the overall difficulties in planning urban open spaces in Duhok (Hammo & Mohammed 2023).

The main objective of this study is to assess the influence of urban open spaces on social interactions in Duhok City, specifically examining the quality, quantity, and accessibility of these areas. The study aims to evaluate the present condition of urban open spaces, understand their impact on social interactions, and suggest practical measures to improve these locations for enhanced interaction with others. The study seeks to make a contribution to the wider discussion on sustainable urban development, social fairness, and community resilience in Duhok City by examining these factors.

2. Literature Review

Urban open spaces have been thoroughly examined for their ability to improve social interaction, community welfare, and the overall quality of urban living. Experts agree that urban spaces that are well planned and easily accessible play a crucial role in promoting social unity, offering venues where individuals may congregate, engage with one another, and take part in common activities. Francis et al. (2012) highlight the significance of urban open spaces in encouraging social inclusion, especially in diverse urban settings. These places serve both recreational objectives and operate as social centers that facilitate informal social contact and cultural exchange (Francis et al. (2012).

2.1 Quality of Urban Open Spaces

The literature on urban open spaces frequently deals with the concepts of quality, quantity, and accessibility. Quality refers to the characteristics of these spaces, including their design, maintenance, and amenities, which have a direct influence on their usage and appeal. Jennings and Bamkole (2019) define high-quality urban spaces as those that have attributes such as safety, aesthetic appeal, and essential facilities, which collectively promote regular and extended utilization by the general public. In contrast, inadequate upkeep and poor design can discourage individuals from utilizing these areas, so restricting their capacity to facilitate social interaction (Jennings and Bamkole, 2019).

2.2 Quantity of Urban Open Spaces

The quantity and spatial arrangement of urban open areas are equally significant. Enssle and Kabisch (2020) claim that a fair allocation of open spaces throughout cities guarantees that all inhabitants, regardless of their socio-economic standing, enjoy themselves of these essential common areas. The uneven allocation, as emphasized by Byrne and Wolch (2009), frequently results in differences in availability, particularly in vulnerable populations, thereby increasing socioeconomic inequality.

2.3 Accessibility of Urban Open Spaces

Urban open areas' efficiency in facilitating interactions between people is heavily influenced by accessibility, which is a crucial aspect. The literature highlights that accessibility includes not only physical proximity but also the presence of secure and convenient transportation choices, as well as the inclusiveness of space design for all user groups, such as children, the elderly, and individuals with disabilities (Krenichyn, 2006). Urban places that are easily reachable are more open to being utilized by a wide range of people, which consequently promotes more social interaction and involvement in the community.

Within the overall context of Duhok City, the current body of literature indicates that it is crucial to focus on three main factors – quality, quantity, and accessibility – in order to improve the social effectiveness of urban open spaces. Nevertheless, Duhok experiences specific obstacles, including fast urbanization, insufficient urban planning, and socio-political limitations, requiring a customized strategy that takes into account the city's specific cultural and environmental circumstances. The article aims to build upon the current body of literature by analyzing these aspects in Duhok City and suggesting realistic measures to improve the city's urban open spaces in order to promote enhanced social interaction.

2.4 Social Interaction & Urban Open Spaces

Urban open spaces, including parks, plazas, and gardens, function as crucial communal areas in cities, where individuals from many backgrounds unite to interact, calm down and participate in communal activities. These areas give relief from the urban landscape and facilitate both unexpected and structured interactions with others. Urban open spaces facilitate relationship building and enhance communal bonds, whether through families picnicking, friends jogging together or neighbors conversing at community events. Urban open spaces are essential for fostering inclusion, enhancing mental and physical well-being, and improving the general living conditions of a city by providing accessible and well-designed areas that accommodate varied requirements.

Social interaction in these environments is crucial for shaping the social structure of urban communities. Individuals establish connections, exchange ideas, and cultivate a sense of belonging through daily interactions in parks or at public events. These relationships enhance individual satisfaction and cultivate a feeling of community, wherein individuals feel supported and engaged. Well-maintained and accessible urban open spaces serve as social hubs that foster diversity, enhance social cohesiveness, and cultivate a feeling of shared identity among city inhabitants. In an increasingly developed world, promoting the establishment and maintenance of such places is crucial for fostering more interconnected, resilient, and inclusive urban communities.

2.5 Theoretical Framework

Using the graph below and earlier data, the following procedure is proposed for assessing the quality, quantity, and accessibility of parks, integrating particular criteria: presenting the result of combination of urban open spaces and social interaction using three main variables quality, quantity and accessibility including their sub-variables.

- **Quality Criteria's**

- **Maintenance**

Continuous maintenance, preservation, and repairs guarantee that parks remain attractive and functional.

Effective garbage management, trash elimination, and overall aesthetics are essential.

- **Design**

Design that is practical that promotes mobility and social engagement (e.g., seating layouts, circulation routes).

Aesthetic components such as gardening, art, or water features. Safety is ensured by clear view and expansive areas devoid of concealed corners.

- **Amenities**

Providing of relaxing areas, seats, water fountains, playgrounds, and sports facilities. Shaded zones, lavatories, and picnic places improve visitors comfort. Infrastructure for physical activity, such as exercise machines or running trails.

- Quantities Criteria's

- **Availability of different parks**

An adequate quantity of parks to accommodate all age demographics and functions (playgrounds for children, peaceful areas for leisure, athletic fields).

The dimensions of the parks have to differ in order to adapt to both extensive meetings and smaller collectives or individuals.

- **Equitable distribution of urban open spaces**

Equitable distribution of parks across cities, guaranteeing access to green spaces for all neighborhoods. Parks must correspond to population density, ensuring sufficient space for residents to participate in activities without congestion.

- **Accessibility Criteria**

- **Access for all**

Parks must be built inclusively, ensuring accessibility for individuals with disabilities (e.g., ramps, wide pathways).

Accessible entry and exit points, along with obvious signs, must be provided.

- **Parking facilities**

Parking spaces or nearby public transportation stations improve accessibility. Secure pedestrian crossings and bicycle lanes enhance accessibility to the park.

- **Access for pedestrian**

Parks need to be located within walking or brief commuting distance from residential zones. Assessment of accessibility for the elderly, children, and anyone with limited mobility to parks.

Adopting these specific needs allows for a thorough evaluation of parks, ensuring their effective service to the community.

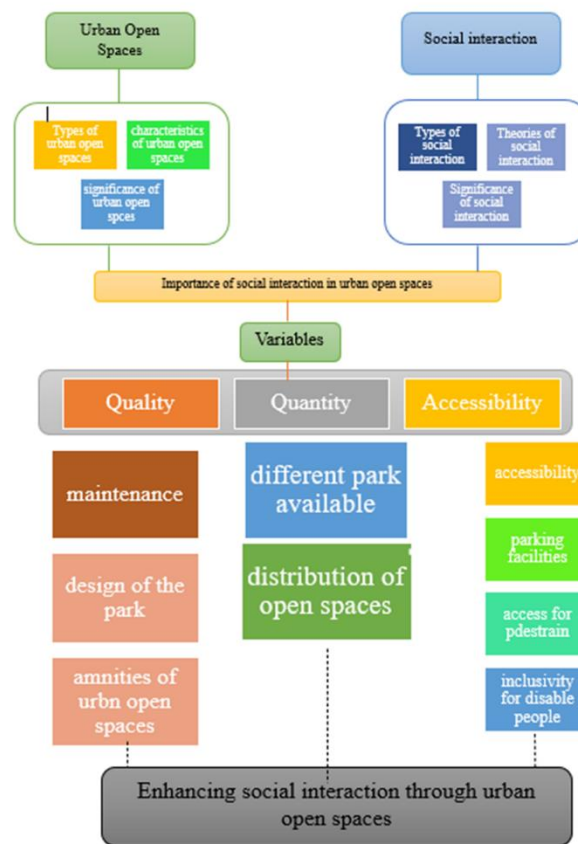


Figure 1: Theoretical Framework. Source: Made by the researcher

3. Materials & methods

The study utilizes a mixed-methods approach, combining qualitative and quantitative research tools to fully investigate the impact of urban open spaces on social interaction in Duhok City. The research focuses mainly on the aspects of quality, quantity, and accessibility.

3.1 Data Collection

The collection of qualitative data involved conducting semi-structured interviews with important municipal stakeholders and making thorough field observations in four major parks. These methodologies provide detailed and subtle insights regarding the design, maintenance, and overall usage of these places. Structured surveys were used to collect quantitative data from a representative sample of 120 residents in 41 neighborhoods. This approach provided a comprehensive understanding of how the public uses and perceives urban open spaces.

3.2 Sampling and Analysis

A proportional stratified sampling technique was employed to provide a varied representation throughout various parts of the city. The data analysis employed thematic coding to extract qualitative insights and utilized statistical analysis using Excel to analyze quantitative data, enabling a full comprehension of the components that impact social interactions.

This method, which combines comprehensive interviews and field visits with extensive surveys, enables us to gain a comprehensive understanding of the extent to which urban open spaces in Duhok City facilitate or restrict social interactions.

3.2.1 Interview Data: Thematic Coding

A thematic coding approach was utilized in the examination of interview data. Initially, transcripts were carefully analyzed to get familiarity with the data. Significant parts were subsequently allocated descriptive codes that contained significant points stated by participants. The codes were further classified into overarching themes, reflecting patterns and reoccurring findings from the interviews. The analysis transformed detailed qualitative data into significant themes that corresponded with the study's aims. This method offered a systematic framework for comprehending participants' viewpoints and deriving essential insights.

3.3 Case Studies

According to (Directorate of parks engineering in Duhok city, 2024), Duhok City has established a variety of parks, including both green and non-green areas, to offer recreational opportunities for its citizens. These parks also have an additional advantage of contributing to environmental improvements, such as enhanced climate conditions and decreased heat intensity. Presently, the city has a total of eight officially recognized parks, namely Azadi, Barzani, and Dilshad M. Saeed. Furthermore, there are two more parks currently being built in the Gre Sor and Dabin Apartments regions.

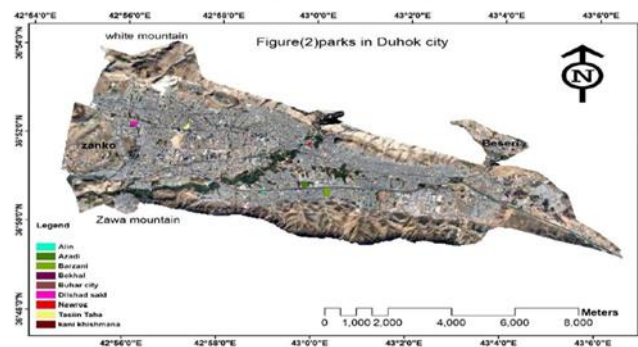


Figure 2: location of parks in Duhok city.

The research conducted on urban parks in Duhok City involved a selection procedure that was carefully connected with the city's linear development and urban expansion trends. According to the (Directorate of municipality, 2024) The city was divided into eastern and western sectors in 2010, representing its inherent geography and organizational divisions, with the aim of performing a comprehensive examination of its green areas.

Barzani Park and Azadi Park in the eastern part of Duhok were chosen for their expansive size and considerable impact on the city's green infrastructure. Barzani Park, situated in close proximity to a prominent highway, serves as an important intersection in urban existence, while Azadi Park is renowned for its central positioning and expansive green spaces, rendering both parks indispensable recreational locations for the inhabitants of East Duhok, as shown in Figure (3) below.

Tahseen Taha Park and Dilshad M. Saeed Park were selected on the west side of the city. The parks in West Duhok are representative of the accessible green spaces in the area, which is characterized by its urban environment and the presence of residential, educational, and public services. Tahseen Taha Park, characterized by its extensive green areas and pedestrian paths, and Dilshad M. Saeed Park, known for its beautiful vegetation and points of interest, provide unique viewpoints on the incorporation of green spaces in the western section of the city, as shown in Figure (2) above.

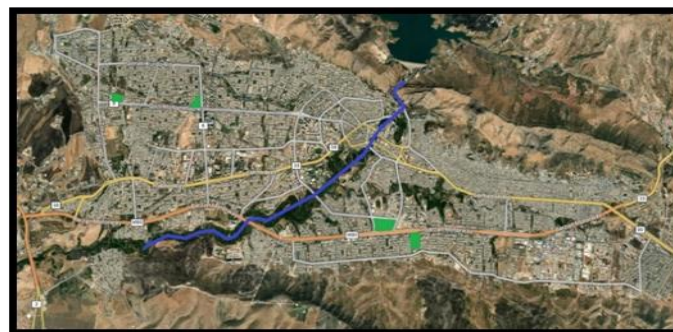


Figure 3: Duhok city map. The location of four case studies.

The study guarantees a varied selection of parks, ensuring a full comprehension of how these places impact social interaction and urban dynamics in different regions of Duhok City. The GIS map highlights the strategic positioning of these parks, promoting the city's objective of fair urban growth and guaranteeing that green areas are easily reachable to people in all parts of the city.

It's important to mention that, The Directorate of Parks Engineering in Duhok city oversees the management, building, and maintenance of parks. The directorate supervises the creation of new parks and the maintenance of existing ones. As of 2024, there are eight officially registered parks under management, with two more parks in the building phase. Completion is anticipated by 2026. but it's important to mention that Azadi and Barzani park are under the supervision of private contractor that take care of it.

4. Results

The study of urban parks in Duhok City focused on the crucial aspects of quality, quantity, and accessibility in order to comprehend their influence on social interaction.

4.1 Quality

parks in East Duhok, such as Azadi and Barzani, are carefully maintained, offering a wide range of amenities and following to strict safety protocols, and consider lighting, design, safety, as a result, they are highly appealing for social events. On the other hand, the parks located in West Duhok, namely Tahseen Taha and Dilshad M. Saeed, experience inadequate maintenance, a lack of facilities, and safety issues especially Dilshad M. Saeed have problem regarding lighting, which limits their ability to promote social interaction.

Below chart comparing maintenance, design, and amenities across the parks are presented here. These graphics show the differences, indicating that Azadi Park exceeds in both maintenance and design, although Barzani Park offers somewhat more amenities.



Figure 4: comparison between quality criteria

4.2 Quantity

There is an obvious difference in the distribution of parks, as East Duhok shows an increasing number of larger green areas, but West Duhok possesses more and smaller parks. The difference results in an overpopulation of the existing parks in the western part of the city and restricts the chances for residents in these locations to participate in social activities.

4.3 Accessibility

Azadi Park and Barzani Park are easily reachable as they are located close to residential areas. These parks have well-planned pathways, ensuring that they are easily accessible to all inhabitants, especially vulnerable populations such as the elderly, children, and individuals with disabilities. Additionally, Tahseen Taha and Dilshad M. Saeed parks are accessible and have good pathways, but it's important to mention that in Dilshad M. Saeed Park there are some spots that have paths in not a good condition

4.4 Comparison Between the Four Case Studies

Table 1: Comparison between four case studies Source: Made by the researcher

Criteria's	Barzani park	Azadi park	Tahseen taha park	Dilshad M.Saeed park
Maintenance	Concerns of management of private contractors, the seasonal importance, and challenges related to waste management and toilet facilities.	Private contractors are responsible for managing the budget and ensuring efficiency. However, there may be occasional challenges with waste management.	Frequent watering, irrigation budget-focused, waste and lighting concerns	Frequent irrigation, neglected maintenance, problems with waste management, and lighting
Design	Beautiful landscaping, easily accessible routes, common areas, and cultural components	Cultural features, communal areas, accessible walkways, and diverse landscape	Rich vegetation, easily accessible, absent of important communal areas and heritage site	Accessible walkways, an attractive social areas, well-kept plants, and a cultural symbol

Amenities of urban open spaces	Few recreational spaces, a range of seating options, one public restroom, and a variety of food options	a range of entertainment options, different types of seating, clean restrooms, and a variety of food selections	A single playground, a small number of sports courts, enough seating, no restrooms, and informal food choices	Absence of playgrounds, sports courts, insufficient seating, bathrooms, and a restricted selection of foods
Accessibility	plenty of parking spaces, secure walkways, and a ramp for the disabled people, that disabled people will need help when using that ramp	lots of parking spaces, concerns about pedestrian safety, and ramps for the disabled	surface parking, concerns about pedestrian safety, and a ramp for the disabled people when entering the park	poor parking, concerns about pedestrian safety, and a ramp for the disabled people for the easiness of walking in the park

5. Discussion

This study emphasizes the crucial significance of urban open spaces in promoting social interaction and community cohesiveness in Duhok City. The study shows that the ability of these areas to enhance relationships is significantly affected by their level of quality, quantity, and accessibility.

The study shows that urban open spaces of excellent quality, which are properly maintained, secure, and provided with essential utilities, are crucial for promoting social interaction. Nevertheless, differences in the allocation of these areas throughout the city result in inequities in accessibility, especially for inhabitants in densely populated districts. In addition, accessibility presents a significant obstacle, particularly for vulnerable demographics such as the elderly and individuals with disabilities, who might face difficulties in accessing these areas due to insufficient transportation choices or a lack of accessible infrastructure.

The study's findings highlight the importance of inclusive and fair urban planning in order to ensure that all citizens can take advantage of public areas. The findings indicate that by strengthening the quality, equitable distribution, and accessibility of urban open spaces, their function as social centers can be greatly enhanced, consequently contributing to a more interconnected and inclusive urban environment.

The study highlights the crucial impact that urban open spaces have in influencing social interactions inside Duhok City. These areas play a vital role in developing relationships, encouraging inclusiveness, and improving the general quality of urban life. The difficulties found in Duhok City, including the uneven distribution of parks, inadequate upkeep, and limited accessibility, emphasize the necessity for urgent and planned measures.

Solving these difficulties requires a collaborative effort involving politicians, urban planners, and the community. Implementing regular maintenance, ensuring equal distribution, and enhancing accessibility are practical measures that can be taken to optimize the social advantages of urban open spaces. By prioritizing these specific areas, Duhok City has the potential to develop public spaces that effectively respond to the requirements of its inhabitants, thereby creating a feeling of inclusion and enhancing the overall social structure of the city.

In addition, this study adds to the wider conversation on urban planning by highlighting the significance of taking social elements into account when creating and overseeing public places. It is crucial to prioritize the creation of socially inclusive and vibrant urban settings as cities like Duhok continue to expand. The knowledge obtained from this research can function as a blueprint for other quickly urbanizing cities experiencing comparable obstacles, thereby promoting more sustainable and socially integrated urban advancement on a global scale.

5.1 Recommendations

According to the results of this study, there are numerous important suggestions to improve the social aspects of urban open spaces in Duhok City:

- Enhance Maintenance and Amenities: Consistently maintaining parks and offering necessary amenities, such as

seats, lighting, and recreational facilities, are vital for enhancing the appeal and usability of these areas for social activities. Promoting cleanliness, safety, and adequate amenities in parks may encourage more regular utilization and promote greater community engagement.

- Urban planners must prioritize the fair allocation of open spaces across all neighborhoods, especially in densely populated areas. This will help in reducing overcrowding in current parks and guaranteeing that all inhabitants have proximity to local public areas for social interaction.

- Enhancing accessibility is crucial by improving transit connections and ensuring that parks are easily accessible to everyone, including the elderly, children, and those with disabilities. This can be accomplished by offering improved public transportation alternatives, such as scheduled bus all over Duhok city. establishing pedestrian-friendly routes, and integrating universal design concepts to enhance the inclusivity of parks.

- Community engagement: Incorporate local communities in the process of creating and overseeing urban open spaces to guarantee that these areas respond to the different needs and preferences of the population. Community engagement may encourage a sense of ownership and accountability, resulting in improved utilization and maintenance of these areas.

- Advocacy for Inclusive Design: Create urban open spaces with the intention of inclusion, guaranteeing that they accommodate an extensive variety of people. This entails establishing environments that are secure and inviting for individuals of diverse backgrounds, ages, and abilities.

By applying these suggestions, Duhok City can improve the function of urban open spaces in encouraging social interaction and constructing a more interconnected and inclusive community. These measures can also serve as an example for other cities confronting comparable urban growth difficulties.

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