

# The Role of Community Gardens in Improving Mental Health and Intergenerational Bonding: Evidence from Ekbatan Town, Tehran

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## Abstract

Rapid urbanization in Iran's metropolises, particularly in dense residential complexes such as Tehran's Ekbatan Town, has resulted in social isolation, weakened intergenerational bonds, and mental health challenges. This study aimed to investigate the role of spontaneous community gardens as a low-cost tool for enhancing psychological well-being and intergenerational cohesion, providing policy implications for sustainable urban planning. A mixed-methods (quantitative-qualitative) approach was employed, with the study population consisting of active residents in Ekbatan's community gardens. A standard questionnaire (including the WHO-5 scale, 9 Likert items, and open-ended questions) was distributed among 88 participants (selected via purposive-snowball sampling). Instrument reliability was confirmed with Cronbach's alpha coefficients of 0.91 and 0.85. Data were analyzed using SPSS (descriptive statistics, Pearson correlation, t-test) and thematic analysis. Findings indicated an average mental well-being score of 19.12 out of 25 and an intergenerational bonds score of 3.83 out of 5. The highest score belonged to "feeling useful through mutual learning" (4.33). Age group differences were not significant ( $p > 0.05$ ), but a significant positive correlation was observed between weekly activity hours and both variables ( $r \approx 0.30$ ,  $p < 0.01$ ). Qualitative analysis highlighted the main themes of "tranquility derived from connection with nature," "intergenerational mutual learning," and "strengthened civic participation." These gardens can be integrated into urban regeneration policies and social health programs, shifting the planning paradigm from merely providing green space towards creating opportunities for participation within it.

**Keywords:** Citizen Presence and Participation, Community Gardens, Mental Health, Intergenerational Bonds, Sustainable Urban Development.

## 1. Introduction

Rapid urbanization in developing countries, particularly Iran, has led to the expansion of large residential complexes in metropolises. These complexes, characterized by high population density, a shortage of public green spaces, and diverse age composition, have become epicenters for increased social isolation and mental health issues (Mahmoudi et al., 2022). The Ekbatan residential complex in Tehran is a prominent example of this phenomenon, where high density and limited social interactions have contributed to increased stress and reduced intergenerational cohesion (Mansour Hosseini et al., 2023; Rismanchian & Bell, 2014). In such environments, not only is the mental health of residents affected, but the social sustainability of the entire city also faces challenges (Alderton et al., 2022; Xue et al., 2019).

In this context, neighborhood community gardens can be an effective solution. These gardens, which are managed autonomously and collectively, provide a space for communal gardening activities. By increasing citizen participation and presence, these spaces contribute to improved mental health and strengthened social connections (Soga et al., 2017). The positive impacts of such spaces can be analyzed using the theoretical frameworks of Biophilia (the innate human connection with nature) and Social Capital (strengthening networks of trust and mutual support), which explain the fundamental role of gardens in reducing isolation, enhancing psycho-social resilience, and encouraging sustained citizen presence (Kingsley et al., 2020; Zutter & Stoltz, 2023).

In Iran, although the development of green spaces has been emphasized, the main focus has largely been on the construction of large public parks, with little attention paid to spontaneous community gardens (Dadvand et al., 2016; Naghibi et al., 2024). In complexes such as Ekbatan, these gardens have emerged spontaneously, but there is scant empirical evidence regarding their direct impact on mental health and intergenerational bonds (Rismanchian & Bell, 2014). This research gap, especially in the context of Iran's metropolises facing an aging population and internal migration, highlights the necessity of investigating local interventions such as community gardens.

This research examines the impact of community gardens on the mental health and intergenerational bonds of Ekbatan residents. The aim of this study is to move beyond a descriptive approach and provide a critical analysis of the role of spontaneous gardens as a socio-spatial mechanism that simultaneously enhances residents' psychological resilience and reproduces intergenerational social capital in a dense urban context.

## 2. Literature Review and Theoretical Foundations

Neighborhood community gardens, recognized as models of community-based greening, are tools for enhancing citizen presence and participation. Studies show that these gardens increase social interactions and strengthen the sense of place attachment (Nelischer & Loukaitou-Sideris, 2023; Teig et al., 2009). Systematic reviews also emphasize that community gardens improve mental health and reduce social isolation by creating social networks and intergenerational bonds (Spano et al., 2020). However, the sustainability of such interventions is dependent on the local context

and institutional support, highlighting the need for context-specific investigations (Caputo et al., 2023).

In the realm of mental health and intergenerational bonds, community gardens provide spaces for reciprocal interactions between generations, where the elderly transfer their indigenous knowledge and the youth introduce modern innovations. This process helps reduce the generational gap, increase feelings of usefulness, and improve the psychological well-being of both groups (Brandt, 2021). These effects are explained through the mechanisms of Biophilia (the innate human connection with nature) and Social Capital (strengthening networks of trust and mutual support). This enhancement of social capital, especially the bridging type between age groups, provides a necessary foundation for collective mobilization and sustained participation in the management of common spaces. This plays a key role in combating isolation and increasing citizen presence in large, high-density residential complexes (Kingsley et al., 2020).

In Iran, previous studies have mostly focused on the role of green spaces in urban sustainability and social welfare, primarily examining large public parks, while small-scale community gardens have received less attention. Recent research findings in Iran's metropolises indicate that participatory green spaces in dense areas enhance the sense of place attachment and strengthen citizen participation in neighborhood management (Dadvand et al., 2016; Naghibi et al., 2024). In large residential complexes like Ekbatan, which face issues of social isolation and reduced interactions, spontaneous gardens have high potential for the regeneration of public spaces and encouraging resident presence and participation; however, few field studies have been conducted in this area (Rismanchian & Bell, 2014).

The theoretical foundation of this research is based on the theory of Biophilia (Wilson, 1986) and Social Capital (Putnam, 2000), which justify community gardens as a solution for strengthening the connection with nature, reducing isolation, and increasing citizen presence and participation in public spaces. These frameworks highlight the existing gap in Iranian literature, where the focus has largely been on state-led greening, and community-based models for activating citizen presence have been less examined (Ahmadi et al., 2021). Despite global evidence, there is a significant gap in analytical research that comprehensively studies the environmental and social dimensions of these spaces in the dense context of Iran's metropolises. By employing such an approach, the present study seeks to fill these gaps. Table (1) provides a summary of key global and Iranian studies along with their findings and research gaps, to which the present study responds by focusing on the Ekbatan context and using a mixed-methods approach.

**Table 1: Summary of Key Studies and Related Research Gaps on the Impact of Community Gardens**

Row	Author(s) and Year	Context of Study	Main Findings	Research Gap and Distinction from Present Study
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1	Soga et al. (2017)	Global (Meta-analysis)	Gardening improves mental health (reduces stress, increases well-being).	Global focus, lack of case studies in large Iranian complexes; the present study fills this gap with empirical data from Ekbatan.
2	Brandt (2021)	Asian Urban	Gardens strengthen intergenerational bonds.	More qualitative, less quantitative; the present study examines the quantitative impact in the Iranian context using the WHO-5 scale and Likert items.
3	Kingsley et al. (2020)	Urban (Social Capital)	Social capital increases through gardens.	Global context, not Iran; the present study is distinguished by its focus on the resident-driven, spontaneous model in dense Tehran complexes.
4	Xue et al. (2019)	Metropolises	Biophilia and green spaces enhance psychological well-being.	General focus, without a direct link to citizen participation; the present study expands on this by linking it to presence and participation.
5	Rismanchian & Bell (2014)	Tehran (Ekbatan)	Spontaneous gardens create social resilience.	The closest study, but less focused on quantitative mental health; the present study fills this gap using the standardized WHO-5 tool.
6	Naghbi et al. (2024)	Tehran	Small green spaces increase sense of belonging and participation.	Focus on place attachment, without intergenerational bonds; the present study complements this by examining intergenerational interaction and psychological well-being.
7	Teig et al. (2009)	Urban America	Gardens strengthen citizen participation in public spaces.	Focus on participation, less on mental health; the present study expands this by linking it to well-being and intergenerational bonds in the Iranian context.



interaction with other generations, mutual learning and teaching, feeling useful, garden layout, and barriers to interaction), five items from the WHO-5 Well-Being Index (including feelings of happiness, calmness, energy, life attractiveness, and waking up feeling good), and three open-ended questions (best learning experience, suggestions for increased interaction, and willingness to be interviewed). The content validity of the questionnaire was confirmed by five experts in urban planning and environmental psychology. The construct validity of the intergenerational bonds scale is supported by the theoretical framework of prior studies on intergenerational contact and common spaces (Brandt, 2021) and its conceptual alignment with dimensions of social capital (such as trust and mutual support). Reliability was calculated using Cronbach's alpha, which yielded values of 0.85 for the intergenerational bonds items and 0.91 for the WHO-5. The WHO-5 score was transformed to a 0-25 scale. This research was designed as an in-depth, exploratory case study within the Ekbatan complex. Its primary objective was to gain preliminary insight into the mechanisms through which spontaneous community gardens affect mental health and intergenerational bonds, not to extensively generalize to the entire urban population. Table (2), titled "Reliability of Research Instruments (Cronbach's Alpha)," shows the reliability of the measurement tools used in the study. This table includes three rows, each examining one section of the questionnaire.

**Table 2: Reliability of Research Instruments (Cronbach's Alpha)**

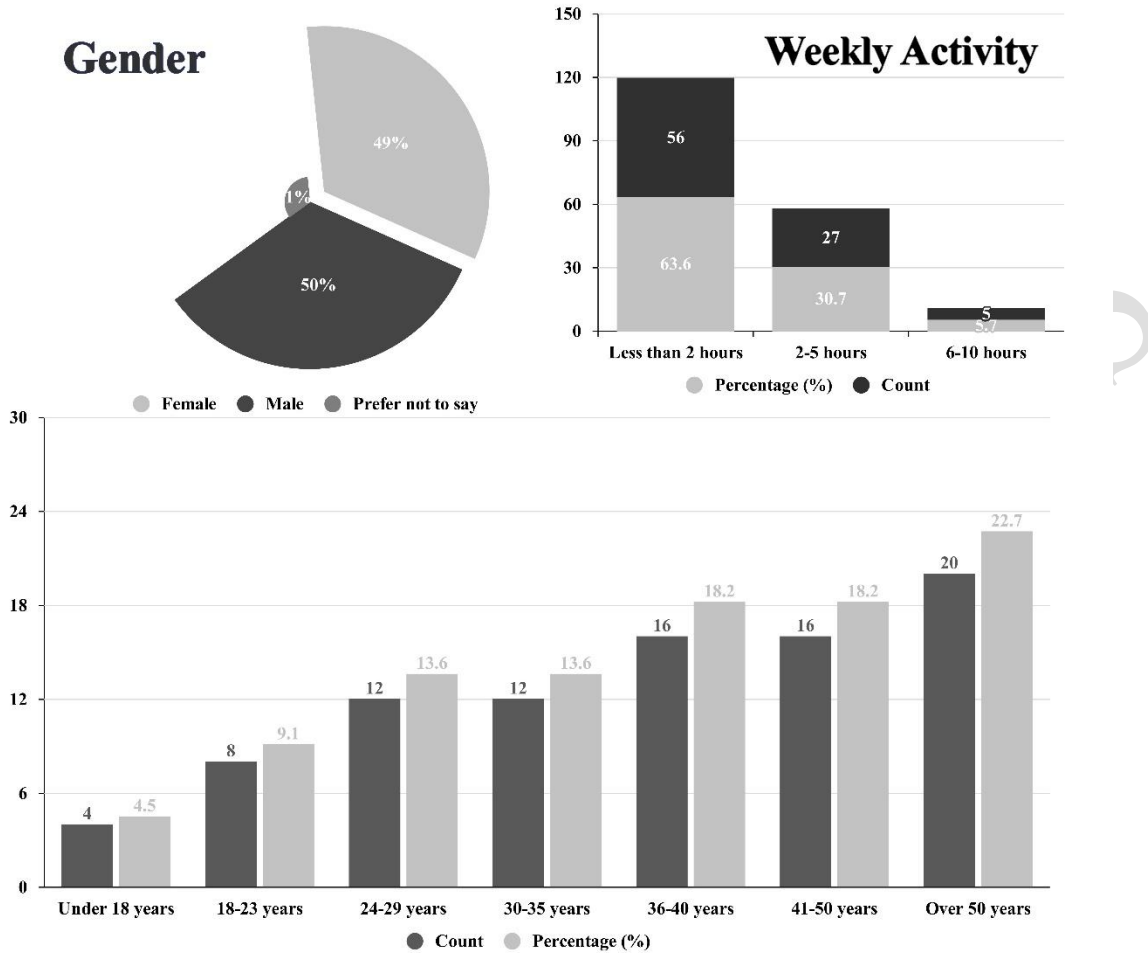
Variable / Construct	Number of Items	Cronbach's Alpha ( $\alpha$ )	Explanation
<b>Intergenerational Bonds</b>	9	0.85	9 five-point Likert items
<b>Mental Health (WHO-5)</b>	5	0.91	Standard WHO-5 Well-Being Index
<b>Total Questionnaire</b>	14	0.89	Combination of two main sections

This study focused on residents of the Ekbatan complex interested in activities related to shared green space and local interactions (based on field observations by the authors and access through local networks). Due to the exploratory nature of the study and limitations in accessing the hidden population, an accurate estimation of the statistical population was not feasible; therefore, purposive-snowball sampling was used. Sampling was performed via the purposive-snowball method, and 88 valid questionnaires (after removing incomplete ones) were collected. The sample size of 88 was calculated using G\*Power software (version 3.1). This size, considering the expected medium effect size ( $r \approx 0.30$ ) and a significance level of 0.05, provides a statistical power of over 0.80 for Pearson's correlation test and independent t-test (with  $\beta < 0.20$  to control for Type II error). Therefore, the sample has sufficient statistical power to detect significant relationships and potential differences between groups. However, the snowball sampling method may have introduced a bias toward more active and interested individuals, a limitation discussed in the conclusion section. Data were collected in 2024 through in-person distribution and an online link

via Porsline. Data processing and analysis were performed using SPSS version 26; descriptive statistics (mean, standard deviation, percentage) were used to describe the variables, independent t-test to compare age groups (under 35 and over 35 years), Pearson's correlation to examine the relationship between weekly activity hours and the main variables, and thematic analysis for open-ended responses. For future studies, it is suggested to use multivariate regression models to control for confounding variables (such as income and education). All mathematical relationships and indices were calculated based on the standards of valid instruments, and no additional mathematical models required numbering. The distribution of the sample's demographic characteristics (gender, age group, weekly activity hours) is presented in Table (3) and Figure (2). Overall, Table (3) provides a comprehensive picture of the sample composition, confirming that respondents were primarily from middle-aged and elderly age groups, with good gender balance and low to moderate activity levels. These characteristics make the sample suitable for investigating the impact of community gardens on intergenerational bonds and mental health.

**Table 3: Distribution of the Sample Based on Demographic Characteristics**

<b>Variable</b>	<b>Group</b>	<b>Count</b>	<b>Percentage (%)</b>
<b>Gender</b>	Female	43	48.9
	Male	44	50.0
	Prefer not to say	1	1.1
<b>Age Group</b>	Under 18 years	4	4.5
	18-23 years	8	9.1
	24-29 years	12	13.6
	30-35 years	12	13.6
	36-40 years	16	18.2
	41-50 years	16	18.2
	Over 50 years	20	22.7
<b>Weekly Activity</b>	Less than 2 hours	56	63.6
	2-5 hours	27	30.7
	6-10 hours	5	5.7



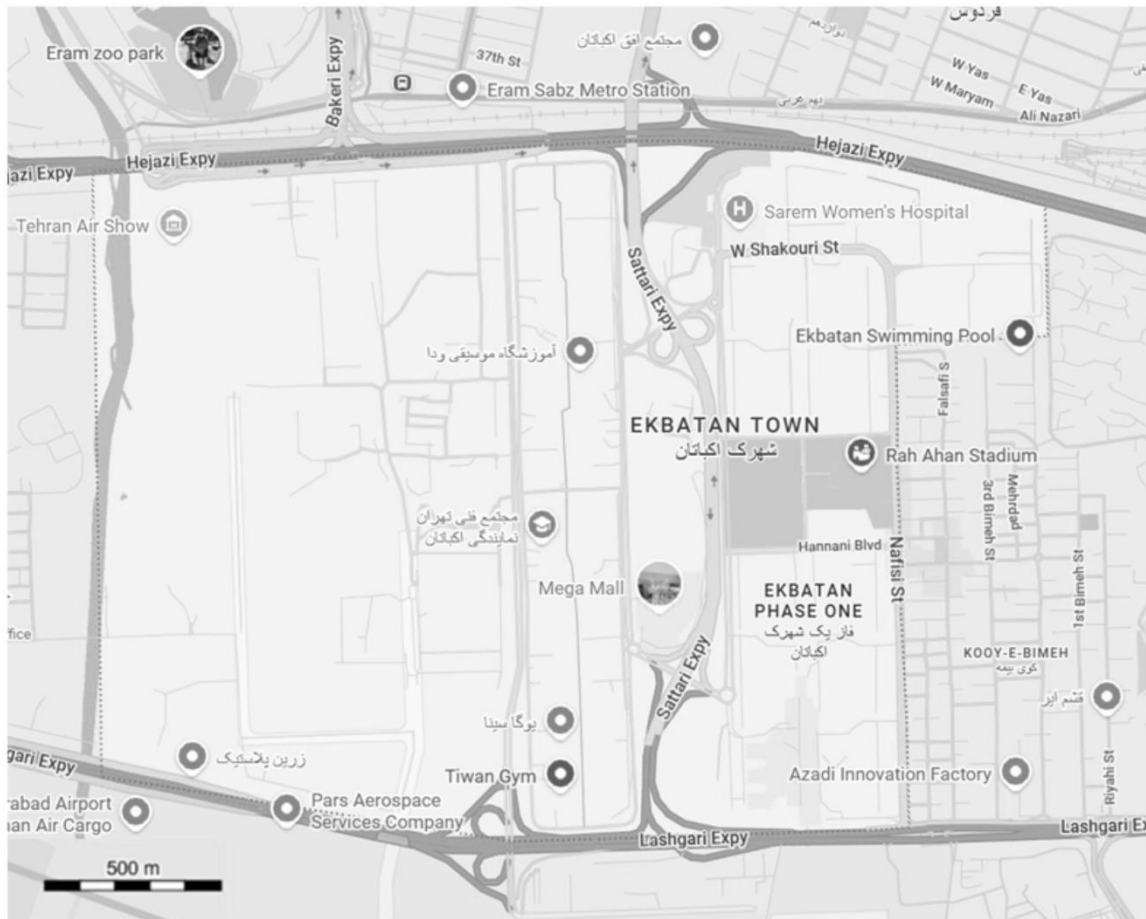
**Figure 2: Demographic Distribution of Respondents by Gender, Age Group, and Weekly Activity Hours**

Figure (2) provides a comprehensive visual of the research sample composition, showing that respondents were primarily from middle-aged and elderly groups, with good gender balance and low to moderate activity levels. This distribution confirms suitable generational diversity for examining intergenerational bonds, although the majority reported limited weekly activity.

### 3.1. Study Area

The Ekbatan residential complex is located in western Tehran and is one of the largest residential complexes in Iran, built in the 1970s. It comprises over 15,675 residential units with an approximate population of 45,000 people (based on official statistics from Tehran's District 5 Municipality and reliable sources). This complex faces challenges of social isolation and a lack of interactive green spaces due to its high building density and diverse demographic composition

(from youth to elderly). The community gardens studied are small, spontaneous spaces within different blocks, managed by residents for cultivating plants and providing a context for daily interactions. The geographical location of the Ekbatan residential complex within Tehran is shown in Figure (3).



**Figure 3: Location of Ekbatan Town in Relation to Surrounding Residential Areas**

#### 4. Findings

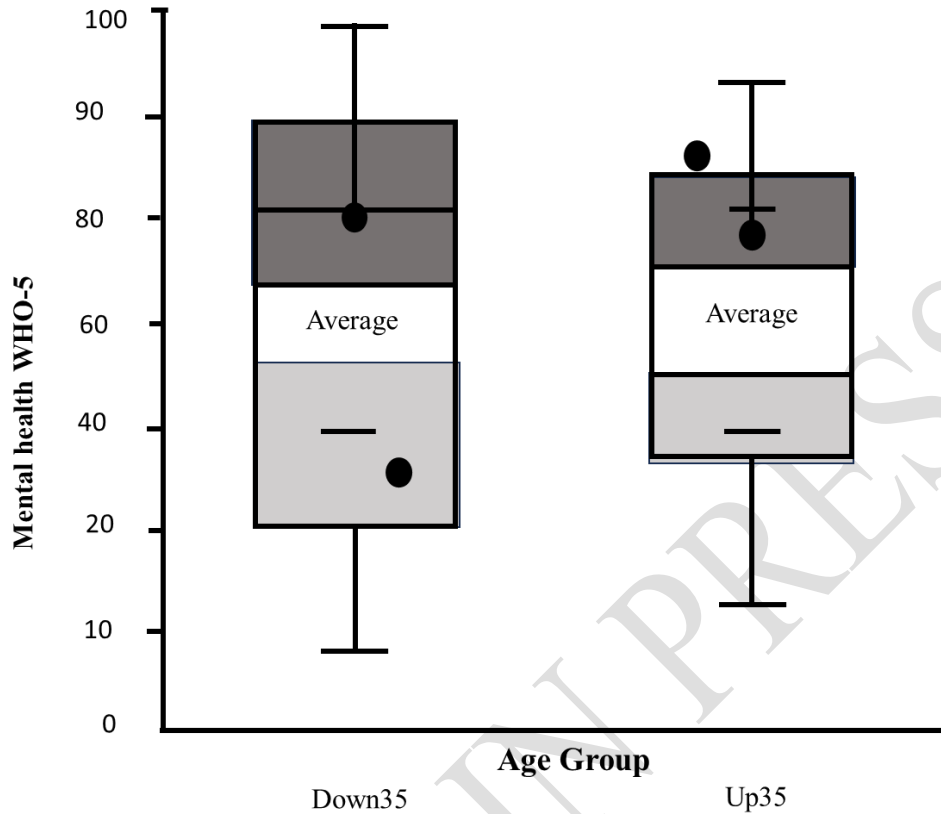
The data collected from 88 active residents of the community gardens in Ekbatan complex showed that the gender distribution of the sample was 48.9% female, 50.0% male, and 1.1% preferring not to say. Age groups ranged from under 18 years (4.5%) to over 50 years (22.7%), and 63.6% of respondents were active in the garden for less than two hours per week (see Table 3 and Figure 2 in the Methodology section).

The mean mental health score (WHO-5) for the entire sample was 19.12 (SD: 3.44), indicating a high level of psychological well-being, considering this scale is scored from 0 to 25. The age group over 35 years (Mean: 19.60, SD: 3.20) achieved a higher score than the group under 35 years (Mean: 18.45, SD: 3.68) (Table 4, Figure 4).

For intergenerational bonds, the overall mean of the Likert items was 3.83 (SD: 0.76). Notably, the item "This learning and teaching has made me feel useful" had a significantly higher mean of 4.33 (SD: 0.81), indicating the positive impact of community gardens on residents' sense of worth (Table 4, Figure 5). Overall, Table (4) clearly confirms that the positive impact of community gardens on mental health and intergenerational bonds is independent of age, with no significant difference between younger and middle-aged/elderly age groups. This finding emphasizes the inclusive and universal potential of this community-based intervention in dense residential complexes, suggesting that community gardens can act as an effective tool for all residents, regardless of age.

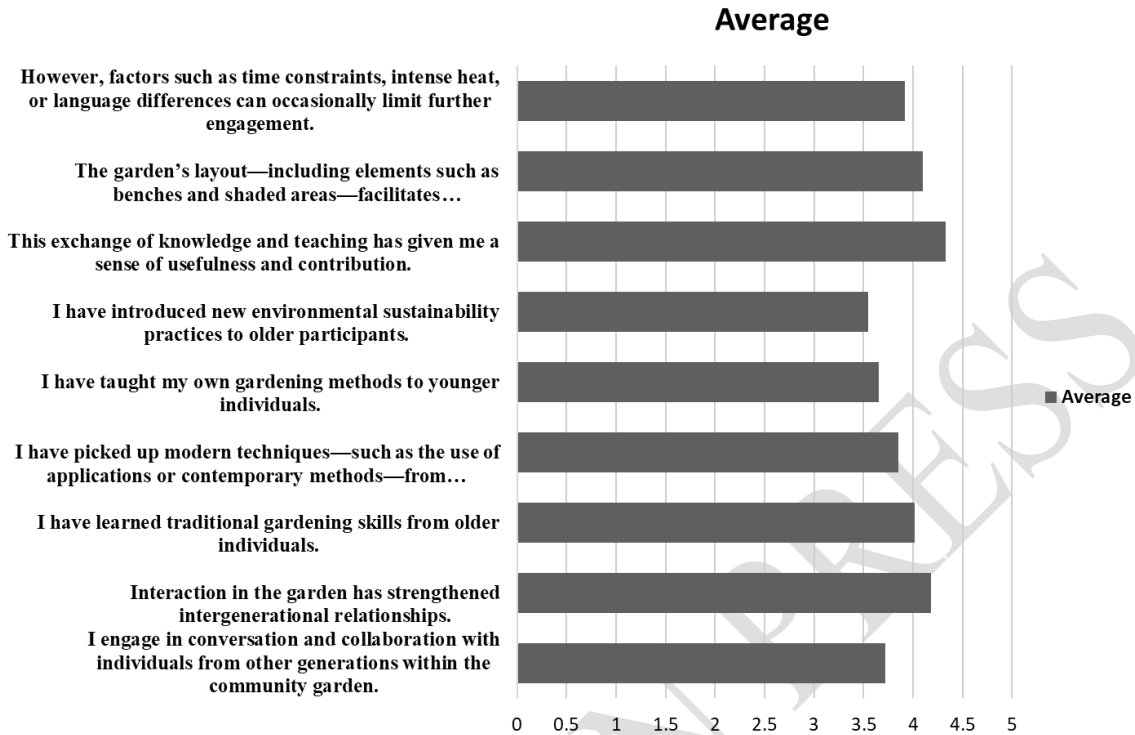
**Table 4: Mean, Standard Deviation, and t-test Results for Mental Health and Intergenerational Bonds**

Variable	Age Group	Mean	Standard Deviation	t	p
<b>Mental Health (WHO-5)</b>	Under 35 years	18.45	3.68	-1.54	0.12
	Over 35 years	19.60	3.20		
<b>Intergenerational Bonds (Likert)</b>	Under 35 years	3.71	0.82	-1.27	0.20
	Over 35 years	3.92	0.71		



**Figure 4: Box Plot Distribution of Mental Health (WHO-5) Scores by Age Group**

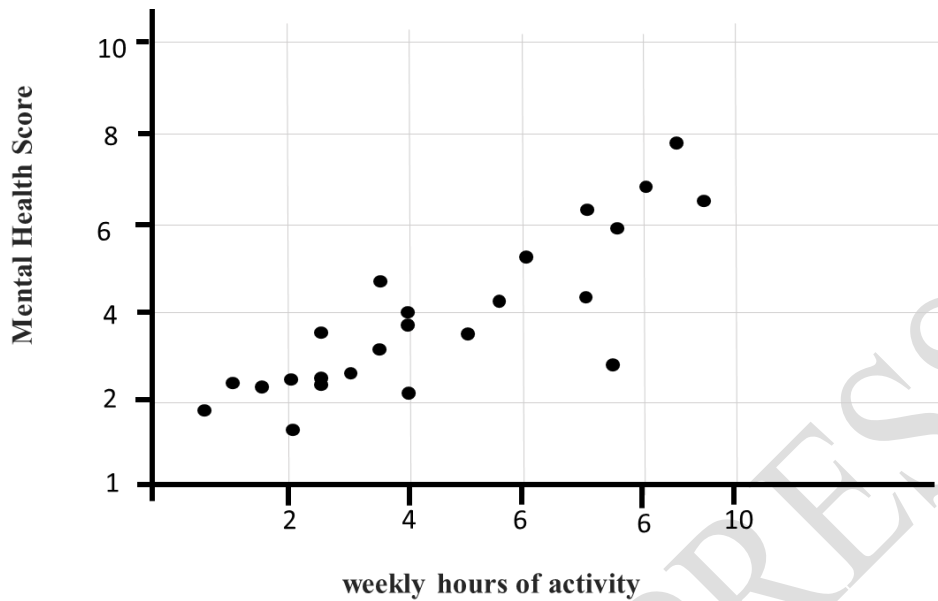
Figure (4) clearly confirms that community gardens have a similarly positive impact on psychological well-being, and this impact is independent of age; both age groups (younger and middle-aged/elderly) benefit equally from participation in the garden. This finding highlights the inclusive and universal capacity of community gardens as a community-based intervention for improving mental health in dense complexes.



**Figure 5: Bar Chart of Mean Scores for Intergenerational Bond Items, Highlighting the Feeling of Usefulness**

Figure (5) visually emphasizes that community gardens have the strongest impact on creating a "feeling of usefulness" through mutual learning and teaching between generations (mean 4.33). This item stands out as the strongest indicator of intergenerational bonds, showing that shared gardening activity not only creates interaction but also enhances individual worth (especially for the elderly and the young). This finding aligns perfectly with social capital theory and the role of common spaces in reducing the generational gap.)

An independent t-test showed a non-significant difference in the mental health score (WHO-5) between age groups under 35 and over 35 years ( $t = -1.54$ ,  $p = 0.12$ ), indicating a similar impact of community gardens on the well-being of both age groups. Similarly, the difference in intergenerational bonds between age groups was also non-significant ( $t = -1.27$ ,  $p = 0.20$ ). However, Pearson's correlation analysis revealed a significant positive relationship between weekly hours of activity in the garden and both mental health ( $r = 0.31$ ,  $p = 0.005$ ) and intergenerational bonds ( $r = 0.26$ ,  $p = 0.02$ ). These findings suggest that increased time spent on garden activity is associated with improved psychological well-being and strengthened intergenerational interactions.



**Figure 6: Scatter Plot of Weekly Activity Hours in the Garden and Mental Health Score**

Figure (6) graphically shows the positive relationship between weekly hours of activity in the garden and psychological well-being score, where increased participation time corresponds to a noticeable improvement in well-being. It visually demonstrates that the more time spent in shared gardening activities, the higher the level of residents' psychological well-being. This finding is one of the most important results of the research, indicating that even a moderate increase in participation time (from less than 2 hours to 2-5 hours) can have a significant impact on mental health. This positive relationship is fully consistent with the theory of Biophilia (contact with nature) and social capital (social interactions in shared activity).

Thematic analysis of open-ended responses identified three main themes: 1) A sense of tranquility and vitality, 2) Intergenerational mutual learning, and 3) Strengthened generational cooperation. Residents mentioned experiences such as "a feeling of life and growth" and "tranquility derived from the garden" as psychological benefits of gardening. Learning skills like "rose cutting," "planting aloe vera," and "drip irrigation" were common between generations. One respondent stated, "Plant growth requires care, time, and cooperation," which aligns with the theory of Biophilia (the innate human connection with nature) (Xue et al., 2019). Generational cooperation was strengthened through "hearing the opinions of different generations" and "interaction and participation." Residents' suggestions included "creating participatory programs," "using technology and media for education," and "promoting mutual respect between generations."



**Figure 7: A View of the Shared Space Between Blocks in Ekbatan Town, Featuring Gardens**

## 5. Discussion and Conclusion

This research, using an analytical framework positioned at the intersection of "environmental health" and "urban social studies," examines the role of spontaneous community gardens. These gardens are considered an integrated intervention that simultaneously affects neighborhood environmental quality and the social cohesion of residents.

The study's findings, aligned with previous research such as (Soga et al., 2017), indicate that spontaneous community gardens in Ekbatan, Tehran, have had significant positive effects on residents' mental health and intergenerational bonds. The average psychological well-being score (19.12 out of 25) and intergenerational bonds score (3.83 out of 5) were at desirable levels. The highest score belonged to the "feeling of usefulness derived from mutual learning" (4.33). These results, along with the significant positive correlation with weekly activity hours and the lack of substantial difference between age groups, demonstrate that this community-based intervention has a universal and inclusive capacity for dense urban contexts.

From the perspective of ecological validity, conducting the research in the real-world setting of Ekbatan increases the generalizability of the findings to similar contexts. The positive relationship between weekly activity hours and improvements in psycho-social indicators emphasizes the key role of "active participation" and "continued interaction." This finding, consistent with the theoretical frameworks of social capital and Biophilia, shifts the urban planning paradigm from merely "providing green space" towards "creating opportunities for participation within green spaces." In other words, psycho-social benefits directly depend on the level of activation of the shared space.

A comparison with successful Asian models such as Singapore and similar complexes in Tehran reveals structural similarities, but also a significant difference in the level of institutional support and the degree of grassroots spontaneity. Specifically, the COVID-19 pandemic proved that

participatory green spaces can be a more sustainable and popular alternative to private green spaces during crises. These differences highlight the necessity of localizing policies and strengthening participatory models based on local capacities. The findings of this research align with the macro objectives of upstream documents such as the Tehran Comprehensive Plan and the Sixth Development Plan, as well as Sustainable Development Goal 11 (SDG 11), representing a step toward realizing resilient and people-centered cities.

### ***5.1. Policy Recommendations***

Considering the emphasis of this study's findings on the pivotal role of active participation and intergenerational social capital in the success of spontaneous gardens, the following recommendations are proposed at various levels of urban planning and management:

**At the Physical-Legal Level:** Urban planning institutions, such as the Deputy of Urban Planning and Architecture in the Municipality, should provide the necessary physical foundation for the development of these spaces by identifying and officially allocating unmanaged or underutilized lands to local committees. This should be accompanied by the development of supportive bylaws and regulations to define the legal status of community gardens in detailed plans and urban regeneration programs and to prevent future conflicts.

**At the Managerial-Institutional Level:** The municipality, as the local governing body, can ensure the operational sustainability of these projects by providing basic infrastructure such as water, electricity, safety fencing, and initial maintenance, as well as by establishing participatory governance mechanisms. Forming joint management committees with representatives from residents, local institutions, and technical experts is a suitable model for shared responsibility and strengthening the sense of belonging.

**At the Socio-Cultural Level:** To strengthen the educational and promotional aspects of this model, it is suggested to create and enhance intergenerational and inter-institutional knowledge networks. These networks can provide a platform for sharing successful experiences (both domestic and international), teaching sustainable gardening skills, and promoting a culture of collective participation in the management of public spaces.

These recommendations fit within the framework of a "community-based urban regeneration" approach. If implemented, this plan can transform the model of community gardens from a spontaneous, temporary movement into a sustainable component of neighborhood management systems, serving as a tool for simultaneously achieving public health and social cohesion goals in Iran's metropolises.

### ***5.2. Limitations and Suggestions for Future Research***

This study faced limitations that necessitate cautious generalization of the results. These include the limited sample size (88 participants), the snowball sampling method which may have introduced bias toward highly active individuals, and its focus solely on Phase 1 of the Ekbatan

complex. The cross-sectional design also limits the ability to infer direct causal relationships. Furthermore, due to the local, informal, and largely offline nature of shared greening activities, public digital evidence (such as social media posts or official reports) was scarce, leading this study to base its analysis primarily on primary data collected through local networks.

To address these limitations and deepen the findings, future research is recommended to employ methods such as stratified random sampling with a larger sample size, longitudinal designs, and direct collaboration with official institutions (e.g., municipalities) for broader access. Utilizing multivariate regression models to control for confounding variables (like income and education level) could also be beneficial. Additionally, longitudinal studies measuring changes in more objective indicators, such as residents' stress hormone (cortisol) levels before and after participation in the gardens, could more precisely elucidate the bio-psychological mechanisms of these effects.

In summary, spontaneous community gardens demonstrate that sustainable solutions to complex urban challenges—from social isolation to psychological distress—are not necessarily found in large, expensive projects, but rather in small-scale, intelligent initiatives rooted within the community. This model can serve as an effective blueprint for urban policymaking in Iran's metropolises to simultaneously achieve environmental health, social cohesion, and urban resilience goals. To operationalize the above policy recommendations in a concrete, step-by-step manner, a proposed operational framework is presented in Table (5), serving as a guide for local decision-makers and managers.

**Table 5: Executive Steps for Supporting the Development of Community Gardens in Dense Residential Complexes**

Stage	Main Executive Action	Responsible Institution/Organization	Suggested Timeline	Suggested Funding Source
1	Identifying and registering unmanaged plots suitable for gardens	Deputy of Urban Planning and Architecture, Tehran Municipality + District Municipalities	0-6 months	Municipal districts' current budget
2	Providing primary infrastructure (water, soil, gardening tools, safe fencing)	District 5 Municipality + Tehran Water and Wastewater Company	6-12 months	Urban renovation and improvement levies
3	Forming and training local participatory committees (residents +	District 5 Municipality + NGOs	3-9 months	Public participation budget & corporate social responsibility

	municipality representative + expert)			
4	Developing bylaws and legal support (official registration in detailed plans)	Deputy of Urban Planning + Ministry of Roads and Urban Development	12-24 months	Sixth Development Plan + National Regeneration Budget
5	Launching a digital platform (garden management app, knowledge sharing)	Municipality's IT Organization + Universities	12-18 months	Municipal innovation and technology budget

### Author Contributions

Conceptualization, data curation, formal analysis, investigation, methodology, project administration, resources, software, supervision, validation, visualization, writing – original draft, writing – review & editing: [To be completed by the authors with percentages, e.g., A: 50%, B: 30%, C: 20%].

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### Declaration of Competing Interest

Participation in this research was entirely voluntary and based on informed consent. All participants were assured that data would be processed anonymously and used solely for scientific research purposes. This research was conducted in accordance with the principles of the Helsinki Declaration involving human subjects. The authors declare that there is no conflict of interest regarding this research.

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