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# A Comparative Study of Open Spaces in Mixed and Linear Residential Complexes and Their Impact on Elderly Mental Health in Isfahan

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**ABSTRACT:** Open spaces play a crucial role in enhancing the quality of life and supporting the mental well-being of older adults. This study examines both physical and non-physical differences in the open spaces of residential complexes designed according to two distinct patterns—mixed and linear—and investigates how these differences relate to the mental health of elderly residents. A mixed-methods approach was used, combining qualitative interviews with quantitative surveys. The study focused on two case examples in Isfahan: the Moshtagh Farhangian Residential Complex (a mixed pattern) and the Aftab Twin Towers (a linear pattern). The results show that several physical factors—such as accessibility to pedestrian and bicycle paths, environmental quality, safety of open spaces, and the presence of natural elements like greenery and water features—and non-physical factors—such as social interaction, individual and group participation, physical activity, and perceived security—have a significant impact on the mental health of elderly residents. However, the importance and effect of these factors differ between the two design patterns. Mixed-layout complexes offer better access, stronger social ties, and superior environmental quality than linear designs, which often suffer from repetitive layouts and poor indoor-outdoor integration, despite their visual appeal. Effectiveness depends on open space placement. These insights can help architects and urban planners design residential complexes that are more functional and supportive of the well-being of older adults.

**Keywords:** *Open space, residential complexes, mixed pattern, linear pattern, elderly mental health, Isfahan.*

## INTRODUCTION

The global rise in the elderly population has increased the focus on urban design, particularly in the planning of residential complexes, as a key factor in supporting the mental health of older adults. Research has consistently shown that open spaces—by facilitating social interaction and physical activity—play a crucial role in reducing stress and depression, while promoting overall psychological well-being. Traditionally, such spaces often took the form of courtyards, providing immediate and accessible environments in which people could connect with nature and enjoy leisure time.

However, over time, factors such as land scarcity, high costs, and the rapid expansion of large-scale residential developments have led to the gradual shrinking—and in some cases, complete elimination—of these open areas. Although the importance of the spaces between buildings is now widely recognized, their full potential remains largely untapped.

To address this issue, the present study compares the physical and non-physical features of open spaces in residential complexes designed in two distinct patterns—mixed and linear—and examines how these features relate to the mental health of elderly residents. The research aims to answer two key questions: (1) Which physical characteristics of open spaces in Isfahan's residential complexes most effectively support elderly mental health? (2) Which non-physical factors have the strongest impact on elderly mental health within mixed and linear design patterns?

Isfahan, as a major metropolitan center, was chosen to enhance the generalizability of the findings. The theoretical framework guiding this research is illustrated in Figure 1.

### Research Background

Previous research consistently highlights the beneficial effects of open and green spaces in residential complexes on the

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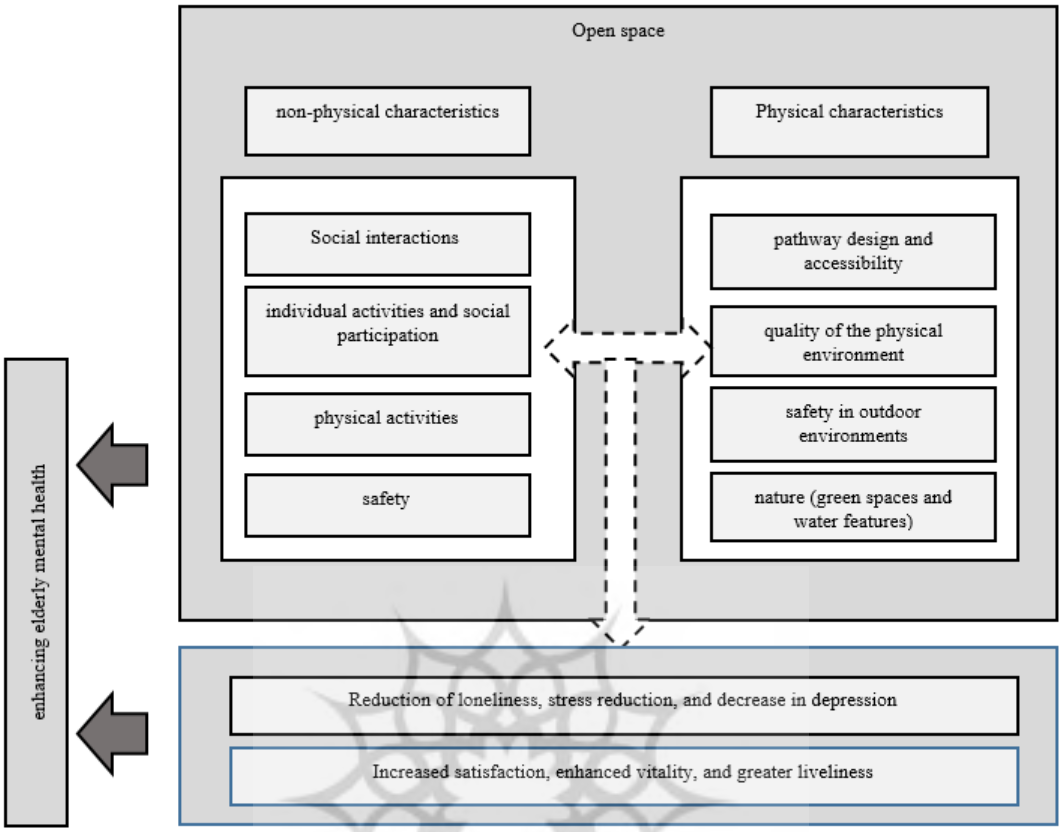


Fig. 1: Theoretical framework of the research

mental health of older adults. Ulrich's Stress Reduction Theory (1991) and Kaplan's Attention Restoration Theory (1995) suggest that environmental perception and its attributes have a direct influence on individuals' psychological state and mental stress. These environmental effects are closely associated with the prevalence of depression.

Spending time in natural settings—or even viewing greenery from a distance as part of daily life—has been shown to reduce stress and evoke positive emotional responses. People who live for extended periods in green environments often report higher levels of happiness, greater tolerance, and reduced aggression, making them less prone to depression and other psychological disorders (Toms, 2017). In other words, residents of areas rich in natural elements tend to experience less stress, recover more quickly from psychological fatigue, and maintain better overall mental health. Environmental characteristics can also influence depression indirectly. Studies have shown that supportive environments encourage health-promoting activities, such as social interaction and physical exercise, which contribute to improved mental well-being and lower rates of depression (Bond, 2018; Peen et al., 2010). Positive environmental qualities further promote the use of shared spaces, increase social participation, and foster interpersonal connections (Weimann et al., 2017), which, in turn, help to reduce depression and other mental health issues (Saarloos et al., 2011).

In line with these findings, Liu et al. (2025) reported that architectural features can significantly influence mental health, with larger courtyards contributing to stronger social support networks. Xiong et al. (2024) found that perceptions of park environments indirectly affect health by fostering social interaction. Research by Lahuti et al. (2024) indicated that well-planned open spaces can reduce depression and enhance the vitality of older adults, although the extent of these benefits varies depending on the residential complex's design pattern. In another study, Lahuti et al. (2024) identified a positive, significant relationship between non-physical factors—such as social interaction, comfort, safety, and participation in activities—and the mental health of elderly residents in three different housing complexes. There is also evidence that the layout of open spaces in residential complexes influences opportunities for interaction and the development of closer relationships among residents. Klemenčič and Leskovar (2023) demonstrated that access to open and green spaces reduced the risk of SARS-CoV-2 infection in nursing homes at three different scales, suggesting that outdoor space design can also

contribute to controlling the spread of viral diseases. Afifian et al. (2023) observed that higher-quality environments encourage older adults to participate in biophilic activities, such as exercise, walking, and gardening, while also promoting greater social interaction in open communal areas. Vahabi Qeshlaqi et al. (2023) identified three main categories of factors affecting elderly mental health in the city of Qazvin: individual, spatial, and socio-cultural. Among these, spatial factors, including land use, housing quality, safety, walkability, and green space, emerged as the most influential. Similarly, Naeimi Frootani Nejad et al. (2022) found correlations between all physical attributes of residential complexes—whether dispersed, linear, or centralized—and levels of stress and depression. Among these, dispersed layouts were most effective in reducing stress and depression compared to linear or centralized designs. Azadeh et al. (2020) demonstrated that the physical quality of the urban environment directly impacts perceived stress among Isfahan residents, emphasizing that mental health–oriented urban design should prioritize reducing density and expanding green spaces. Dehnad et al. (2019) highlighted the combined influence of physical, social, and perceptual components in residential complex design, noting that high-quality communal open spaces strengthen social interaction and increase their use. Likewise, Wengjun et al. (2015) found that the enjoyment of nature and the visual appeal of natural environments significantly enhance the vitality of older adults, and that greater access to green spaces improves residential satisfaction, especially among the elderly.

Recent research indicates that most studies on mental health have examined the quality of public urban open spaces—such as green areas, parks, and senior community centers—while only a limited number have compared open spaces in residential complexes with mixed and linear design patterns. Despite the clear differences between these patterns and their potential effects on the mental health of older adults, such comparisons have received little scholarly attention. This study aims to address this gap by examining and comparing the open space characteristics of residential complexes in mixed and linear layouts, and analyzing how these features relate to the mental health of elderly residents.

## MATERIALS AND METHODS

This study examines, through a comparative approach, the relationship between the characteristics of residential open

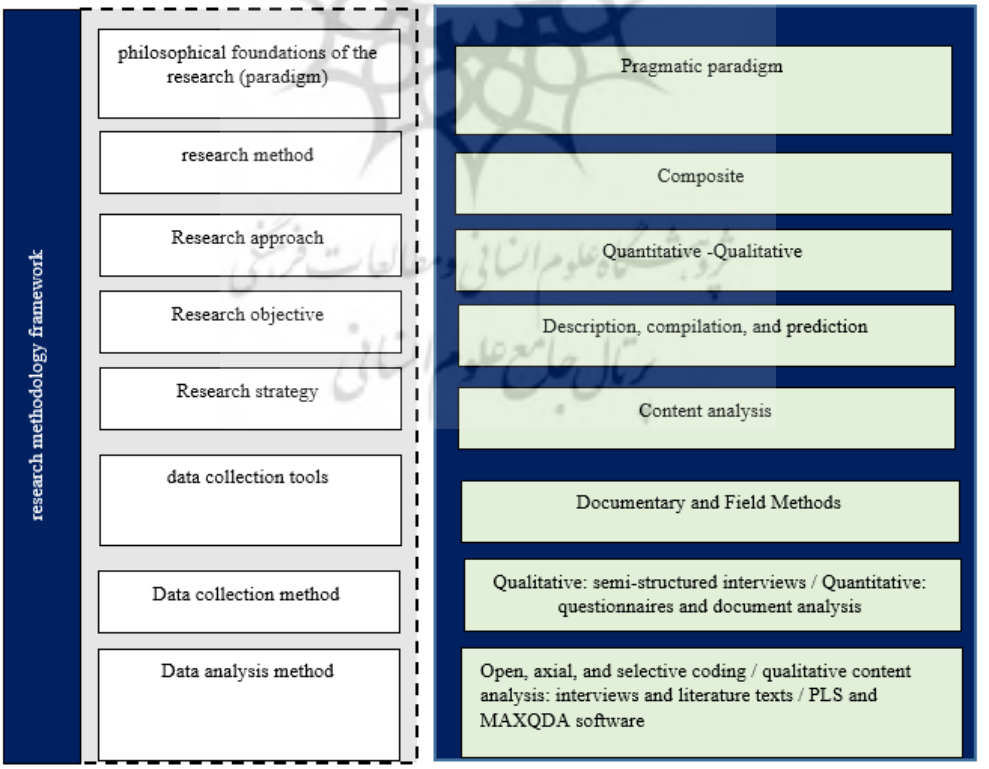


Fig. 2: Research methods and approaches

spaces and the mental health of elderly individuals within two distinct design patterns: mixed and linear. The research is grounded in a pragmatic paradigm and utilizes a mixed-methods approach, integrating both qualitative and quantitative methods to capture the strengths of positivist and interpretivist perspectives. In terms of its objectives, this research is considered fundamental, aiming to assess how different open space design approaches influence the mental well-being of older adults by directly comparing the mixed and linear patterns. The method and research approach are presented in Figure 2.

## Study Area

This study was conducted in two residential complexes in Isfahan: the Moshtagh Farhangian Complex and the Aftab Twin Towers, each representing distinct design patterns. The Aftab Twin Towers comprise five blocks, constructed in two phases, following a linear layout. Phase one includes complexes 1, 2, and 3, while phase two comprises complexes 4 and 5. A shared feature of the open spaces in both complexes is their location behind the buildings, making them not visible from the main entrances. Although the open spaces in Phase Two have recently been completed with distinct design elements, they, like those in Phase One, have not been widely embraced or frequently used by residents. This appears to be the result of poor site planning and the positioning of open spaces behind the buildings, which limits easy access from the entrances. As a result, elderly residents often prefer the building lobbies or the green spaces and boulevard areas in front of the complexes over the internal open spaces.

The open space of the Moshtagh Farhangian residential complex lacks a defined design, with no clear separation between pedestrian and vehicular pathways. A large portion of the area is dedicated to vehicle traffic, which significantly compromises safety. Seating is scarce, and green spaces are limited. Moreover, the paving materials used are unsafe. Despite these shortcomings, the open space is notable for the strong social interactions among residents, likely due to the social homogeneity within the community. Lighting in the area is fairly adequate, and recently, the fountains and pools have been equipped with water and lighting, enhancing the overall atmosphere. The summarized findings are presented in Table 1.

Table 1: Characteristics of researched residential complexes

| Aftab Complex | Moshtagh Farhangian Complex |
|---|---|
| The open space area is 3.9%. The open space features a strip pattern, located behind the complexes, with no access to the open space from the entrance. The residents use the courtyard very little due to its location. | The open space area is 25%. The open space has a mixed pattern—lacking defined open spaces, with no separation of land uses, low safety, unclear vehicular and pedestrian pathways, but a high level of social interactions due to social homogeneity. It lacks an optimal open space design. |
|  |  |
|  |  |

### Data Collection and Analysis

To identify the physical and non-physical elements of open spaces in residential complexes, document review and content analysis methods were used. To investigate the relationship between these features and the mental health of elderly residents, a survey approach was applied. The data collection employed a combination of qualitative and quantitative methods: qualitative data were collected through interviews, while quantitative data were obtained from document reviews, the 28-item Goldberg General Health Questionnaire, and a researcher-developed questionnaire. During the fieldwork phase, after conducting interviews and coding the data, the key influencing factors were assessed using the researcher-developed questionnaire. The validity and reliability of this questionnaire were confirmed by a panel of 15 experts, including university faculty members and professionals in the relevant field. The collected data and questionnaires were then analyzed and interpreted. For documentary research, the sample consisted of articles published in reputable journals during 2024, while purposive sampling was employed for field data collection.

Given the study's constraints, fieldwork was limited to areas where the results could be generalized. The initial selection of residential complexes was based on two open space design patterns: mixed and linear. These complexes were then visited for on-site investigation, during which the researcher engaged with the community. After explaining the study's objectives, the researcher identified and selected elderly residents willing to participate. The analysis of survey questions, along with reliability and validity testing, was performed using PLS software.

Throughout all phases of fieldwork and during the researcher's presence in the open spaces of the residential complexes, strict attention was paid to ethical guidelines and professional standards. Respect for the dignity and privacy of the elderly participants was prioritized, and assurances were given that their personal information would be kept confidential, thereby fostering a trusting environment. Additionally, by participating in social activities such as poetry gatherings, the researcher established rapport and familiarity with the elderly residents, which helped gain their consent and cooperation in the study.

## RESULTS AND DISCUSSION

This section presents the findings derived from both descriptive and inferential data analyses, including qualitative and quantitative results. The qualitative analysis begins with an overview of the demographic characteristics of the interviewees. The researcher conducted a total of 23 interviews, reaching theoretical saturation.

### Descriptive Findings

This section outlines the demographic characteristics and descriptive results of the study participants. Of the respondents, 48% were male and 52% female. Age-wise, 47.8% were between 60 and 65 years old, 26.1% were aged 66 to 70, and another 26.1% were over 70 years old. Regarding the length of residence, 21.7% had lived in their residential complex for less than two years, 47.8% for between two and five years, 26.1% for between six and ten years, and 3.4% for more than ten years. Following initial and axial coding of responses to the research questions, key variables related to the design of open spaces in residential complexes were identified. The characteristics of the selected residential complexes are presented in Table 1.

### Data Collection and Analysis

Table 2 highlights a set of physical and non-physical factors that affect the mental well-being of the elderly. Residents within the open spaces of residential complexes. Social interaction helps reduce feelings of loneliness while enhancing a sense of community belonging and fostering healthy social connections. Additionally, regular contact and visits with neighbors enable older adults to participate in group activities and maintain an active role in their community's social life.

On the other hand, participating in religious ceremonies, festivals, celebrations, and mourning rituals helps older adults maintain their spiritual and social connections, reducing feelings of isolation. Outdoor exercise programs and walking activities also offer valuable opportunities to improve both physical and mental health, allowing seniors to engage in physical activity while enjoying their surrounding environment.

In terms of access to pedestrian and bicycle paths, providing safe and well-designed routes in open spaces is essential for supporting the physical and mental health of elderly individuals. The quality of the built environment has a significant impact on how comfortable and relaxed seniors feel when outdoors. Furthermore, the design of sightlines and accessibility to public spaces should enable older residents to move from their homes to communal areas easily. Natural elements play a vital role in enhancing the quality of life for the elderly; features such as fountains, pools, and ponds, along with trees, plants, and green spaces, contribute to creating a peaceful and restorative atmosphere. The initial and axial coding pertaining to the design of a residential complex's open space is presented in Table 2.

Lastly, the safety and security of open spaces are of critical importance. Elderly individuals should be able to use these areas with ease and confidence. This involves ensuring their physical safety by eliminating uneven surfaces, slopes, and holes, and by using appropriate, non-slip materials for paving public spaces. Together, these factors have a direct impact on the mental well-being of older adults and must be considered when designing open spaces in residential complexes.

Addressing the question of which physical features of open spaces in Isfahan's residential complexes—specifically in mixed and linear patterns—can enhance the mental health of

Table 2: Initial and axial coding related to the design of the open space of a residential complex

| category names | Common Detailed Factors |
|---|---|
| Social interactions | Gathering and socializing with neighbors, group conversations, and participation in social activities (celebrations, mourning ceremonies, etc.), communication with neighbors |
| Individual activities and social participation | Visiting and interacting with neighbors |
| Access to pedestrian paths and cycling capability | Presence and participation in religious ceremonies, festivals, celebrations, and mourning events, among others. |
| Physical activities | Sports programs, walking, and so on |
| Physical quality of the environment | Gatherings, birthday parties, meetings related to building management, solitude, resting, and spending leisure time in open spaces, etc. |
| Nature | Walkability in open spaces |
| Security | Availability of safe cycling areas in open spaces |
| Safety | Sports activities (such as running and walking in the courtyard, outdoor exercise, and use of outdoor sports equipment) |

the elderly, the following results were found:

**• Mixed Pattern (Moshtagh Farhangian Complex):**

Due to limited open space and challenges in physical design, regression analysis for this complex, which is presented in Table 3 and Figure 3, revealed the following outcomes:

The results show that access to pedestrian and bicycle paths in the Moshtagh complex is poorly designed, with a coefficient of 0.50, indicating a lower positive effect on the mental health of elderly residents. The physical quality of the environment, with a coefficient of 0.48, reflects the presence of narrow and heavily crowded open spaces, leading many residents—particularly seniors—to express dissatisfaction with the low quality of these areas.

This lack of comfort reduces their sense of tranquility and harms their mental well-being. Safety in the open spaces, with a coefficient of 0.42, indicates inadequate security, as the lack of separation between vehicle and pedestrian routes poses particular dangers for older adults. This deficiency significantly affects their mental health. Despite the limited green space, natural features such as greenery and water, with a coefficient of 0.38, have a positive effect on the mood of elderly residents. However, to achieve meaningful environmental improvement, further expansion of green areas and water elements is needed.

**•Linear Pattern (Aftab Twin Towers):**

Due to the limited open space and design constraints, regression analysis for the Aftab complex, which is presented in Table 4 and Figure 4, produced the following findings:

Access to pedestrian and bicycle paths in the Aftab complex has a lower score (coefficient 0.45) compared to the Moshtagh Farhangian complex. Despite this, these pathways remain important for elderly residents who wish to stay active. The physical quality of the environment, with a coefficient

Table 3: Regression coefficients of physical characteristics of open space in a mixed model (Mushtaq Farhangian Complex) on mental health

| Independent variable | Standardized coefficient | Significance level | $R^2$ |
|---|---|---|---|
| Access to pedestrian and bicycle paths | 0.50 | 0.012 | 0.37 |
| Physical quality of the environment | 0.48 | 0.018 | 0.35 |
| Safety of open space | 0.42 | 0.04 | 0.32 |
| Nature (green space and water) | 0.28 | 0.06 | 0.30 |

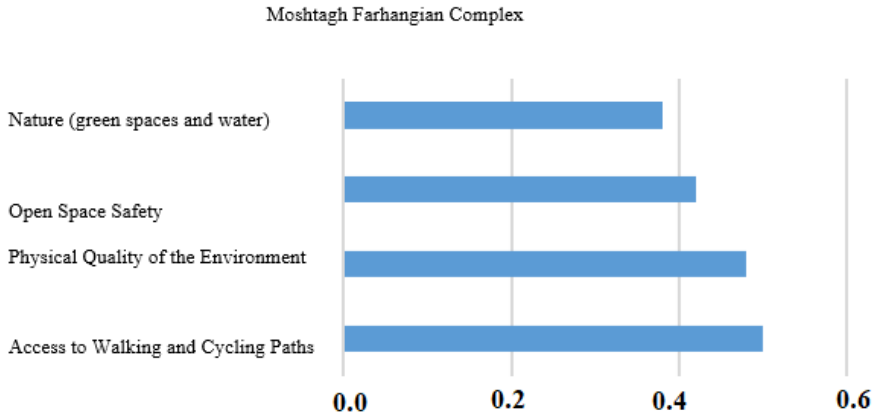


Fig. 3: Regression coefficient diagram of physical characteristics of open space in a mixed model (Mushtaq Farhangian Complex) on mental health

of 0.40, is low due to limited open spaces and poor design, which negatively impacts the mental health of seniors. Safety within the open areas, with a coefficient of 0.37, also presents challenges, diminishing the sense of security among elderly residents. Additionally, natural features such as green spaces and water elements are limited (coefficient 0.35), reducing their beneficial effects on mental well-being.

Regarding the third research question, which non-physical aspects of open spaces in Isfahan's residential complexes improve the mental health of the elderly, the results are presented in Table 4.

Regarding the third research question, which explores the non-physical aspects of open spaces in Isfahan's residential complexes that improve the mental health of the elderly, the results are presented in Table 5 and Figure 5.

Social interaction holds a crucial role in the Moshtagh complex, with a strong coefficient of 0.75. The social homogeneity among residents encourages elderly individuals to participate more actively in social and cultural activities, which boosts their sense of well-being and mental health. Individual activities and social engagement also show a significant impact (coefficient 0.65), reflecting seniors' frequent involvement in events such as celebrations and religious gatherings that support their psychological health. Physical activity, with a coefficient of 0.59, suggests that despite limited open spaces and poor design, elderly residents still engage in physical exercise, albeit less frequently. This factor maintains a positive but comparatively smaller effect. Security, with a coefficient of 0.50, has a moderate influence on the mental well-being of the elderly in this complex. The regression coefficient chart for non-physical characteristics of open space in the strip pattern (Aftab complex) and their impact on mental health is presented in Figure 6.

As indicated in Figure 6, within the Aftab complex, social

Table 4: Regression coefficients of physical spatial characteristics of open space, strip pattern (Aftab complex) on mental health

| Independent variable | Standardized coefficient (β) | Significance level | $R^2$ |
|---|---|---|---|
| Access to pedestrian and bicycle paths | 0.45 | 0.02 | 0.32 |
| Physical quality of the environment | 0.40 | 0.03 | 0.35 |
| Safety of open space | 0.037 | 0.05 | 0.30 |
| (Nature (green space and water | 0.35 | 0.06 | 0.28 |

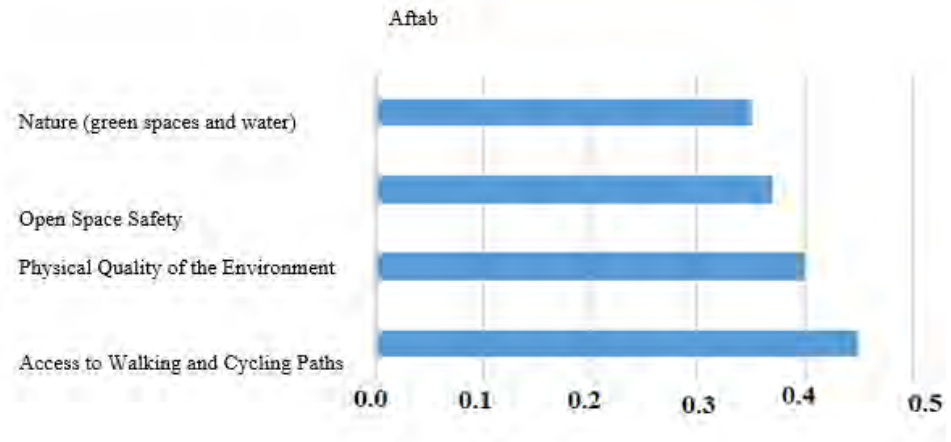


Fig. 4: Regression coefficient diagram of physical spatial characteristics of open space, strip pattern (Aftab complex) on mental health

Table 5: Regression coefficients of non-physical characteristics of open space in selected residential complexes

| Independent variable | Moshtagh Farhangian | | Sun | | Overall ranking |
|---|---|---|---|---|---|
| | Standardized coefficient (β) | Significance level | Standardized coefficient (β) | Significance level | |
| Social interactions | 0.75 | 0.002 | 0.40 | 0.03 | 1 |
| Individual activities and social participation | **0.65** | **0.004** | 0.30 | 0.05 | 4 |
| Physical activities | 0.59 | 0.006 | 0.50 | 0.04 | 2 |
| Security | **0.50** | **0.010** | 0.55 | 0.02 | 3 |



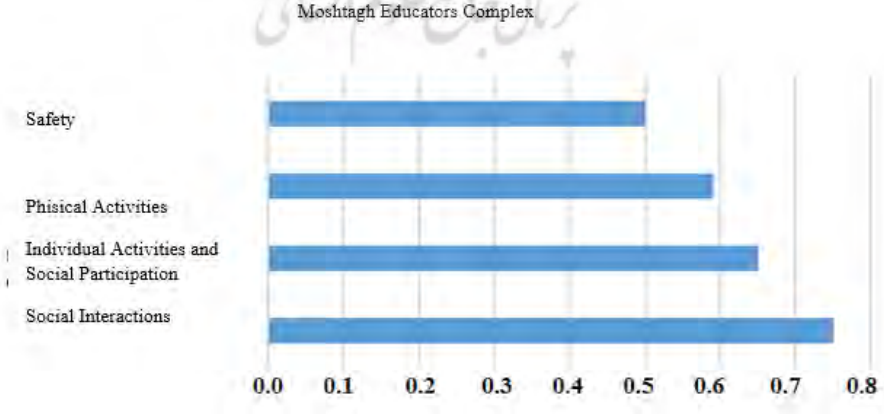


Fig. 5: Regression coefficient diagram of non-physical characteristics of open space in a mixed model (Mushtaq Farhangian Complex) on mental health

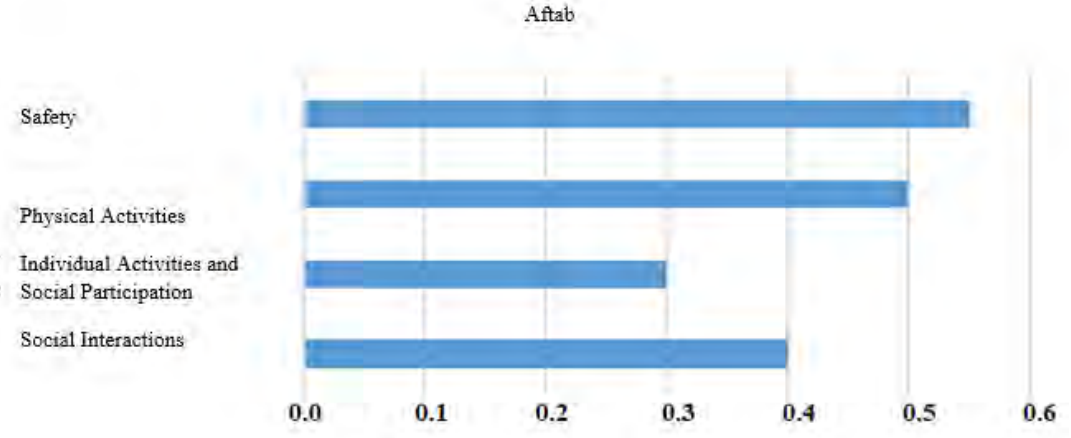


Fig. 6: Regression coefficient chart of non-physical characteristics of open space in the strip pattern (Aftab complex) on mental health

interaction has a coefficient of 0.40. The limited access and poor design of open spaces reduce social engagement among elderly residents, negatively impacting their mental health. Individual activities and social participation score 0.30, reflecting low involvement in social events due to restricted social spaces and difficult access. Physical activity has a stronger influence, with a coefficient of 0.50; however, the limited available space restricts its full potential. Safety, scoring 0.55, is a significant factor contributing positively to the mental well-being of seniors in this community. When comparing the effects of physical features of open spaces in residential complexes on elderly mental health, which is presented in Figure 7, the factors with the greatest impact are, in descending order: access to pedestrian and bicycle paths, the quality of the built environment, safety in open spaces, and natural elements like green areas and water features.

Additionally, the comparison of the impact of non-physical factors in the open spaces of residential complexes on the mental health of elderly residents, which is presented in Figure 8, revealed that social interactions, physical activities, and safety have the greatest influence. In contrast, individual activities and social participation have the least impact.

## CONCLUSION

This study employed both descriptive and inferential methods, including regression analysis and qualitative interviews, to investigate how the physical and non-physical characteristics of open spaces in residential complexes affect the mental health of elderly residents in Isfahan. The findings suggest that the design of these open spaces plays a significant role in the mental

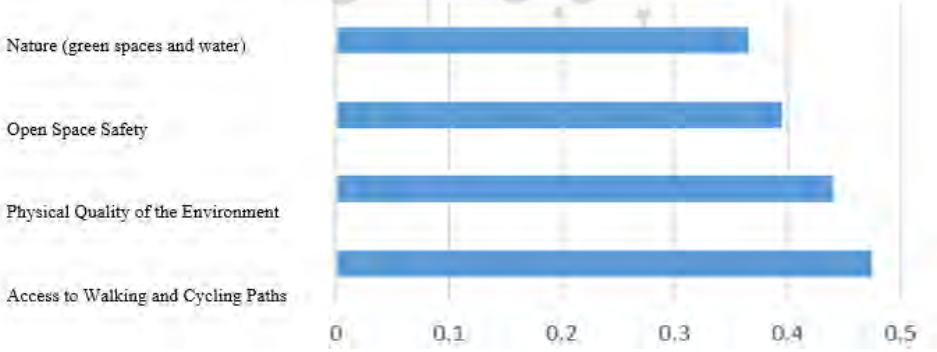


Fig. 7: Chart comparing the impact of physical factors in open space in residential complexes on the mental health of the elderly

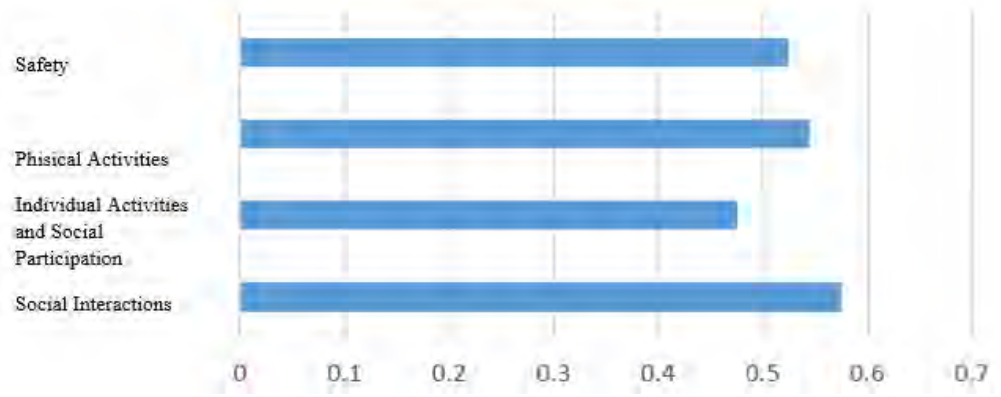


Fig. 8: Chart comparing the impact of non-physical factors in the open space of residential complexes on the mental health of the elderly

well-being of seniors, although the effects vary depending on the design pattern (mixed vs. linear). The open spaces in the Moshtagh Farhangian complex (mixed pattern) demonstrated better outcomes in both physical and non-physical aspects compared to those in the Aftab complex (linear pattern).

- Social interaction emerged as the strongest predictor of mental health in both complexes. However, it was considerably more effective in Moshtagh Farhangian (coefficient 0.75) than in Aftab (coefficient 0.40), suggesting that the mixed pattern better supports social engagement.
- Physical activity and access to pedestrian paths positively influenced mental health in both complexes, though the impact was lower in Aftab (0.50) due to limited and poorly designed open spaces, compared to 0.59 in Moshtagh Farhangian.
- Environmental quality—such as lighting, furniture, colors, and materials—and safety were important factors in both complexes, but had a stronger effect on elderly mental health in Moshtagh Farhangian, thanks to its higher-quality open spaces.
- Although natural elements like green spaces and water features were limited in both complexes, even small amounts positively affected mental health (coefficients of 0.38 in Moshtagh and 0.35 in Aftab). This underlines the importance of incorporating nature into open space design, even on a small scale.

The mixed pattern observed in Moshtagh Farhangian promotes greater social interaction and participation among the elderly, resulting in improved mental health outcomes. Conversely, the linear pattern in Aftab, due to spatial constraints and poor location of open spaces, reduces opportunities for socializing and physical activity, adversely affecting seniors' mental health. To enhance social connections, it is recommended to design communal areas such as group seating and gazebos, and allocate spaces for religious ceremonies and celebrations within residential complexes. Improving accessibility and safety requires wide, unobstructed pedestrian pathways with non-slip surfaces and the separation of pedestrian and vehicle routes to protect seniors. Additionally, adding small water features, vertical gardens, and shade trees in limited spaces can encourage elderly residents to spend more time outdoors.

Overall, this research demonstrates that open spaces, particularly in mixed-pattern complexes, can enhance the mental health of the elderly by promoting social interactions, physical activity, and contact with nature. Enhancing physical design can boost mental well- being in both design patterns, but mixed patterns offer greater potential for creating age-friendly environments. The findings highlight the need to rethink linear complex designs and prioritize human-centered, flexible planning in Isfahan. Future studies may explore how sustainable architecture and smart technologies can further enhance the quality of open spaces. Table 6 presents further design strategies for creating senior-friendly outdoor spaces for architects and urban planners.

## AUTHOR CONTRIBUTIONS

Z. Lahuti: collected the data, analyzed and interpreted the data, prepared the draft of the article, and wrote the manuscript text. S.M. Tabaeian and S. Haghighi Brojeni contributed to the literature review, data analysis and interpretation, and article editing.

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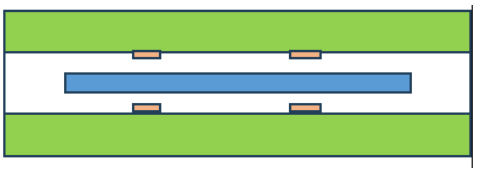
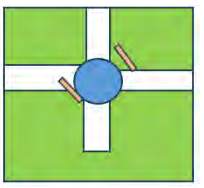
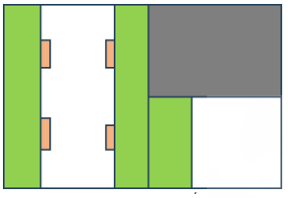
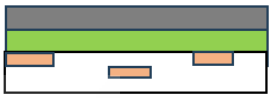
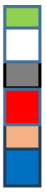
This study was supported by the Department of Architecture, Institute of Society and Media, ISF.C., Islamic Azad University.

## CONFLICT OF INTERESt

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the authors have

Table 6: Design Guide for Architects and Urban Planners

| |
|---|
| Observations and findings indicated that the elderly tend to gather more in green spaces and areas with water features (fountains, water elements, pools, etc.). Therefore, placing benches amidst green spaces and water features (following the Chaharbagh pattern) and around ponds, water features, and pools, or along and at the beginning and end of the longitudinal axis of green spaces and ponds, is a desirable pattern for locating and designing the placement of furniture and benches, as well as creating small social spaces for the elderly. Additionally, encountering green spaces upon entering the premises increases the elderly's satisfaction with the outdoor environment. |
|   |
| Separating vehicle and pedestrian paths through the distinct placement of parking and open spaces in the site plan, or at the very least, using barriers and dividers such as railings, green spaces, or water features to distinguish these two paths from each other, is essential for ensuring both physical safety and psychological security. |
|   |
| Determining a minimum percentage of green space and water based on the findings of the present study is not feasible. However, the significant importance of these two factors, considering the results of previous studies and the current research, appears essential. Water can be utilized in static forms, such as ponds and pools, as well as in dynamic forms, like fountains and water features. |
| In linear residential complexes, access to outdoor spaces should ideally be located immediately after the complex entrance (not behind the complex) so that the elderly are connected to the outdoor environment upon entry, and access to the open space is easier. In mixed-use residential complexes, access to outdoor spaces located within the complexes and connected to the main entrance is considerably more convenient for the elderly, encouraging them to use the outdoor areas. |
|    Green Space<br>Pedestrian Area<br>Parking Space / Parking Spot<br>Residential Blocks<br>Entrance to the Complex<br>Bench<br>Fountain/ Water Feature/ Pool |



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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