

Original Article

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Abstract

Background: Nowadays, in the evaluation of urban quality, urbanization is considered as one of the key factors affecting individual and social health. In this regard, just as human health is largely influenced by city programs and goals, urban life also depends on improving the overall quality of health. Therefore, attention must be paid to environmental quality and the enhancement of social health within residential complexes.

Methods: This study examined the impact of environmental quality components on improving social health in residential complexes in Ardabil City, specifically in the Laleh Sabalan and Honarmandan complexes. This research employed a mixed-methods approach. In the qualitative phase, data were collected through interviews and focus group discussions, while in the quantitative phase, survey methods using both standardized and researcher-made questionnaires were utilized. Participants in the qualitative phase were selected through purposive sampling among architecture experts and academics. In the quantitative phase, stratified random sampling was used, with a sample size of 271 residents from the mentioned residential complexes. For data analysis, SPSS and LISREL software were employed, along with regression analysis, Pearson tests, and structural equation modeling.

Results: The findings revealed that environmental quality components—such as economic factors, socio-human aspects, environmental dimensions, functional and physical characteristics of residential units, aesthetics, visual appeal, use of natural elements, lighting, safety, and perceptual meanings—significantly impact social health enhancement. Notably, components like the use of natural elements, economic dimension, and safety had the most substantial effects on residents' social health. Overall, each dimension of environmental quality was found to meaningfully contribute to improved social health in residential complexes.

Conclusion: Based on these findings, it can be concluded that to increase social health within residential areas, greater attention must be paid to environmental quality indicators.

Keywords: Ardabil; Environmental Indicators; Residence Characteristics; Social Health.

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Introduction

Residents' evaluations of their residential environments influence population retention and attraction in urban areas, as well as their perception and assessment of social health. In fact, individuals' social health is

a principal aim of development, with humans regarded as both the agents and the main resources of development. From the perspective of the human development approach, people are the true wealth of a nation, and the primary goal of

development is to create an enabling environment that allows individuals to lead long, healthy, and creative lives (17).

The quality of a place at different scales (region, city, neighborhood, residence) is inherently a subjective phenomenon; each individual inhabiting a space may perceive it differently. Each person's interpretation and evaluation of environmental features reflect how environmental quality can be influenced by residents' specific characteristics, including their personal experiences. Urban growth in the 20th century has dramatically increased the share of urban populations, making urbanization the dominant lifestyle. For the first time in human history, the majority of the world's population now lives in urban areas. It is projected that by 2050, about two-thirds of the global population will reside in cities (10).

The term "health" is multifaceted and widely debated. Over the years, its definition has evolved. Initially, health was understood primarily as the absence of disease, focusing on physical well-being. However, after World War II and the establishment of the United Nations and the World Health Organization (WHO), the definition of health evolved into a dynamic concept. According to WHO, health is not merely the absence of disease or infirmity, but a state of complete physical, mental, and social well-being (15).

The concept of social health, in the context of social security, support, welfare, comfort, justice, equal opportunities, and the formulation of social policies and quality of life, encompasses distinct meanings that are shaped by a society's cultural context. Citizens must align themselves with the values and social norms that structure the society in which they live (3). Two common approaches to social health are found in the literature. The first approach situates social health within the broader framework of physical and mental health and primarily defines it in terms of individual traits and

characteristics. In this view, the individual is the unit of analysis, and special emphasis is placed on social cohesion and interpersonal interactions (16). The second approach is society-centered, viewing social health as a characteristic of the community. In this perspective, a socially healthy society is one free from major social hardships and endowed with favorable conditions for its members. A society's level of social health can be seen in how well it fosters supportive social environments and reduces societal harm.

Currently, evaluating the quality of cities, as the primary living spaces for citizens, has become a foundational issue approached from multiple dimensions, including social, environmental, economic, and ecological aspects. Urbanization plays a pivotal role in shaping individual and collective health. Just as human health is influenced by the goals and programs designed by a city, urban life itself depends on the improvement of public health. A healthy city is characterized by healthy citizens, and the dynamic interaction between urban environments and human health leads to the formation of vibrant and healthy societies. Health promotion is increasingly recognized as a cornerstone of development and, according to the Ottawa Charter, it represents a core objective for governments globally (13).

A healthy city is one in which citizens identify the determinants of their own health and take actions to maximize both personal and community well-being. In such cities, residents are continuously engaged in the enhancement of their physical and social environments and support each other in realizing their full potential across all areas of life. Healthy cities are committed to protecting residents' health by ensuring safe, productive, and enabling living conditions. Social connections in these cities promote progress and reform, aligning closely with the concept of enhancing environmental

quality in relation to social health, a core concern of this study.

The term “quality” refers to the “degree of excellence” of objects or phenomena (5). Different places possess distinct qualities and serve diverse needs. While most spaces fulfill multiple human needs, no single place can fully satisfy everyone. Additionally, studies have shown a significant link between housing quality and both physical and psychological health. As one of humanity’s basic needs, housing profoundly influences individual health, social attitudes, and economic productivity (4). The quality of residential environments—a critical health determinant—affects people’s well-being, productivity, and overall quality of life (2).

Environmental quality is a multidimensional concept with strong connections to notions such as quality of life, place quality, perception, satisfaction, and livability. In many cases, these terms are used interchangeably (18). Given the importance of both "social health" and "environmental quality"—and amidst profound changes in urban planning approaches, especially the shift from purely physical planning to more holistic, multi-dimensional models—there is a growing need to assess social and cultural dimensions and their influence.

These shifts have created a research gap, particularly in understanding how components of architectural design, especially in shared and open spaces within residential complexes, affect social health. This study thus seeks to identify the environmental quality components influencing social health, drawing on theoretical and empirical perspectives to better inform the design of socially-oriented housing. Ultimately, quality design decisions by architects require a deep awareness of the many roles that shape the product (architecture) in various production phases. This study aims to identify quality components that can enhance social health and interpersonal interactions in residential

complexes. It posits that physical and functional elements of environmental quality may significantly influence social health within these complexes.

Accordingly, the primary research question is: How do components of environmental quality affect the promotion of social health in residential complexes in Ardabil City?

Research Hypothesis: The components of environmental quality have a significant impact on enhancing social health in residential complexes in Ardabil City.

Methods

In general, given the nature of the research topic, the present study employed a mixed-methods design. This approach was adopted because the research questions necessitate the use of both qualitative and quantitative methods. The study seeks both discovery (through qualitative research) and validation (through quantitative analysis), making the exploratory mixed-methods design the most appropriate choice. This design begins with qualitative data collection and was recognized as the best approach for examining complex phenomena (1).

To develop a model for enhancing social health based on the impact of environmental quality components in residential complexes, the qualitative phase was conducted using Focused Group Discussions (FGD) in four stages: Planning and goal-setting, Selection of group members, Managing and conducting the sessions, Data analysis and conclusion.

In three 60-minute sessions, participants freely shared their analyses and viewpoints. After coordinating and inviting the target community, the researchers initially introduced themselves and explained the general objective of the focus group. Participants were then asked to introduce themselves and mention their skills so that the members could become acquainted with each other.

The quantitative phase was carried out via a survey method.

In the qualitative phase, the target population consisted of experts. The sample included seven faculty members and professionals in architecture, selected through purposive sampling using the snowball technique, and semi-structured field interviews were conducted. Interviews continued until theoretical saturation was reached. In the quantitative phase, the statistical population included residents of the Laleh Sabalan and Honarmandan residential complexes in Ardabil city. These complexes comprise approximately 912 residents. Using the Cochran formula, a sample size of 272 individuals was determined. Sampling was done via stratified random sampling.

The data collection tools included:

- In the qualitative phase: semi-structured interviews, were used to identify the study's key variables.
- In the quantitative phase: a researcher-made questionnaire with 73 items (Cronbach's alpha = 0.84) and a standardized 20-item Keyes (1998) Social Well-being Questionnaire (Cronbach's alpha = 0.88), both measured using a five-point Likert scale.

Data analysis in the qualitative section followed a four-stage process as previously mentioned. In the quantitative section, the research hypotheses were tested using Pearson correlation, regression analysis, and structural equation modeling, with the help of SPSS and LISREL software.

Statistical Population

The statistical population for the quantitative section consists of the residents of residential complexes in Ardabil. The Laleh Seflan and Honarmandan residential complexes in Ardabil are considered case samples. The Laleh Seflan complex was constructed in 1393 (2014) by the Northwest Housing Investment Company and is located in Ardabil, opposite the

Shorabil Lake. This complex has 192 residential units in 15 four-story blocks. The Honarmandan residential complex, built in 1388 (2009) by the Honarmandan Cooperative of Ardabil, consists of 14 blocks, each with 8 units, totaling 112 residential units. It is worth mentioning that a large residential complex is defined as having at least 100 residential units and public space in the city of Ardabil. The total number of units in both complexes is 304, and if we assume an average of 3 residents per unit, the total population is approximately 912, which forms our statistical population.

Laleh Sablan and Honarmandan Residential Complexes in Ardabil

- **Laleh Sablan Residential Complex:**
 - Location: Ardabil
 - Total Area: 13,510 square meters
 - Gross Floor Area: 10,175 square meters
 - Number of Units: 192
 - Number of Floors: Four floors above ground with a basement (table 1).

Table 1. Blocks in the Laleh Sablan residential complex

Block No.	Number of Units (Type of Units)
Block 1	16 units (8 two-bedroom, 8 one-bedroom)
Block 9	12 units (4 two-bedroom, 8 one-bedroom)
Block 2	16 units (8 two-bedroom, 8 one-bedroom)
Block 10	16 units (8 two-bedroom, 8 one-bedroom)
Block 3	12 units (4 two-bedroom, 8 one-bedroom)
Block 11	12 units (4 two-bedroom, 8 one-bedroom)
Block 4	16 units (8 two-bedroom, 8 one-bedroom)
Block 12	8 units (8 two-bedroom)
Block 5	16 units (8 two-bedroom, 8 one-bedroom)
Block 13	8 units (8 two-bedroom)
Block 6	12 units (4 two-bedroom, 8 one-bedroom)
Block 14	16 units (8 two-bedroom, 8 one-bedroom)
Block 7	8 units (8 two-bedroom)
Block 15	16 units (8 two-bedroom, 8 one-bedroom)
Block 8	8 units (8 two-bedroom)



Figure 1. Laleh Seflan Residential Complex



Figure 2. Honarmandan residential complex

- Honarmandan Residential Complex:**
 The Honarmandan residential complex was also built in 1388 (2009) by the Honarmandan Cooperative of Ardabil. This complex consists of 14 blocks with four floors, totaling 112 residential units.

In the Partial Least Squares (PLS) analysis, the Fornell-Larcker criterion was used to assess discriminant validity (table 2).

Table 2. Blocks in the Honarmandan residential complex

Block No.	Number of Units (Type of Units)
Block 1	8 units - One-bedroom - 65 sq.m
Block 8	8 units - One-bedroom - 65 sq.m
Block 2	8 units - One-bedroom - 65 sq.m
Block 9	8 units - One-bedroom - 65 sq.m
Block 3	8 units - One-bedroom - 65 sq.m
Block 10	8 units - Two-bedroom - 80 sq.m
Block 4	8 units - Two-bedroom - 100 sq.m
Block 11	8 units - Two-bedroom - 80 sq.m
Block 5	8 units - Two-bedroom - 100 sq.m
Block 12	8 units - Two-bedroom - 80 sq.m
Block 6	8 units - Two-bedroom - 100 sq.m
Block 13	8 units - Two-bedroom - 80 sq.m
Block 7	8 units - Two-bedroom - 100 sq.m
Block 14	8 units - Two-bedroom - 80 sq.m

Results

The participants' information was as follows (table 3):

Table 3. Demographic characteristics of interview participants

No.	Age	Sex	Education	Experience
1	44	Male	PhD	14 years
2	45	Female	PhD	16 years
3	35	Male	Master's	12 years
4	38	Female	Master's	12 years
5	32	Female	PhD	8 years
6	30	Male	PhD	6 years
7	30	Female	PhD	7 years

The average age of the participants was 36.28 years, and 42.71% had more than 10 years of experience. After conducting the

interviews, the discussed components were reviewed multiple times and categorized under the following headings: criteria and indicators related to the components of environmental quality and social health as described in Table 4.

In the following section, the dependent variable of the research is quantitatively examined, along with its relationship to the physical components of environmental quality. The degree of influence of each factor is analyzed, which will be discussed in detail below.

In the Partial Least Squares (PLS) analysis, the Fornell-Larcker criterion was used to assess discriminant validity, which indicates the presence of partial correlations between the indicators of one construct and those of other constructs. According to the Fornell-Larcker criterion, the square root of the Average Variance Extracted (AVE) for each construct should be greater than its correlations with other constructs. In other words, the values on the diagonal of the matrix must be greater than all values in the corresponding columns.

Table 5 presents the Fornell-Larcker matrix for the physical and functional components of environmental quality and social health in the residential complexes under study.

As shown, the values along the main diagonal of the matrix are greater than all other values in the respective column, indicating that the model has appropriate discriminant validity. These findings indicate that all factors align with the questionnaire's objective to assess the physical and functional components of environmental quality and social health in residential complexes (convergent validity). Furthermore, the results suggest that the sub-scales do not have such a high correlation that they would merge into one construct, indicating that the components are not redundant (divergent validity).

Table 4. Components of Environmental Quality

Main Component	Dimensions	Indicators
Socio-Economic Component	Economic Dimension	<ul style="list-style-type: none"> - Off-site facilities - Satisfaction with daily living expenses - Satisfaction with land and housing costs - Economic compatibility with neighbors - Maintenance and repair costs of the building - Cost of access to services and employment centers - Rental costs
	Socio-Human Aspects	<ul style="list-style-type: none"> - Sense of belonging and ownership of the residential unit - Social interactions - Social identity - Social security - Citizenship rights - Demographic indicators (household size, age, education, occupation, length of stay) - Neighborhood relations and social life
Environmental Component	Environmental Aspect	<ul style="list-style-type: none"> - Desirability of energy consumption - Motivation to protect natural resources - Noise pollution (external noise and neighbor disturbances) - Sewage system quality - Neighborhood view desirability - Satisfaction with green spaces - Adaptation to climatic conditions (sun orientation, temperature, weather) - Environmental hygiene
Functional–Activity Components	Functional Aspects	<ul style="list-style-type: none"> - Spatial hierarchy - Access to public services and facilities - Availability of multifunctional spaces - Services and amenities - Compliance with safety standards - Separation of pedestrian and vehicular paths - Surface area, per capita, and percentage of parking spaces - Building cleanliness and hygiene
Spatial–Physical Environment Components	Physical Aspects of the Residential Unit	<ul style="list-style-type: none"> - Quality of access to units - Quality of the housing unit - Structural strength of the housing unit - Area of the residential unit - Aesthetics and design of the unit - Number of rooms - Quality of the heating and cooling systems
	Aesthetic–Formal Quality	<ul style="list-style-type: none"> - Balance of open and closed spaces - Spatial proportions - Building form and shape - Distance and height between buildings - Quality and color of materials - Sense of security
	Visual Attractiveness	<ul style="list-style-type: none"> - Aesthetic layout of buildings - Beauty of building facades - Harmony in colors and walls - Aesthetics of street corners and sidewalks - Presence of attractive and memorable statues - Attractiveness of communal spaces - Presence of historical elements
	Use of Natural Elements	<ul style="list-style-type: none"> - Cultivation of flowers and plants - Presence of designed green spaces - Consideration of local trees - Use of water elements in pedestrian pathways - Attractive and diverse vegetation - Natural lighting in residential units
	Appropriate Lighting	<ul style="list-style-type: none"> - Lighting in green spaces and pathways - Indoor lighting of buildings - Adequate lighting of building facades
	Safety	<ul style="list-style-type: none"> - Proper signage for pedestrians and vehicles - Availability of ramps for people with disabilities - Use of protective railings - Use of soft and safe materials in parks
Semantic–Perceptual Quality	Semantic–Perceptual Aspects	<ul style="list-style-type: none"> - Compatibility - Dynamism - Identity - Intimacy and vibrancy - Preservation of local authenticity - Sense of belonging and attachment - Attractiveness of spaces - Calmness - Order , - Legibility, - Trust in neighbors

Table 5. Social health components

Main Component	Dimensions	Indicators
Emotional Well-being	- Self-satisfaction	- Life satisfaction
	- Hope for the future	- Satisfaction with emotional states
	- Peace of mind	- Psychological security
Social Functioning	- Acceptance of social roles	- Participation in public affairs
	- Capability in daily tasks	- Interpersonal relationships
	- Communication with neighbors	- Social support
	- Ability to solve problems	- Sense of usefulness in society
	- Trust in others	- Tendency to form relationships
Physical Functioning	- Feeling of solidarity	- Belief in societal fairness
	- Physical energy	- Daily health status
	- Ability to perform daily activities	- Absence of illness symptoms
Spiritual and Psychological Well-being	- Access to medical and health services	
	- Meaning in life	- Sense of purpose
	- Moral values	- Positive attitude toward life
	- Self-esteem	- Religious and spiritual beliefs

Table 6. Fornell and Larcker matrix of physical and functional components of environmental quality

Variable	Economic Dimension	Human-Social Aspects	Environmental Aspects	Functional Aspects	Physical Components	Aesthetic-Form Quality	Semantic-Perceptual Quality	Visual Attractiveness	Use of Natural Elements	Proper Lighting	Safety
Economic Dimension	0.68										
Human-Social Aspects	0.65	0.78									
Environmental Aspects	0.64	0.67	0.80								
Functional Aspects	0.61	0.40	0.59	0.67							
Physical Components	0.56	0.67	0.62	0.58	0.77						
Aesthetic-Form Quality	0.44	0.57	0.38	0.77	0.52	0.54					
Semantic-Perceptual Quality	0.70	0.40	0.49	0.66	0.49	0.66	0.45				
Visual Attractiveness	0.72	0.67	0.63	0.54	0.62	0.49	0.66	0.49			
Use of Natural Elements	0.65	0.63	0.66	0.45	0.49	0.66	0.45	0.63	0.86		
Proper Lighting	0.67	0.56	0.56	0.57	0.49	0.58	0.67	0.63	0.78	0.65	
Safety	0.62	0.55	0.45	0.45	0.43	0.66	0.58	0.65	0.75	0.76	0.79

As shown in Fig (3), the path coefficient for the effect of physical and functional components of environmental quality on the enhancement of social health in residential complexes is calculated to be 59%. The t-value for this parameter is estimated at 3.98. Therefore, the null hypothesis is rejected with 99% confidence, and given the significance and positive value of this coefficient, it can be concluded that physical and functional components of environmental quality enhance social health in residential complexes. This finding indicates a positive and significant relationship between the physical and

functional components of environmental quality and social health. With the strengthening of these components, social health improves, while weakening them results in a decline in social health. Thus, the research hypothesis is accepted, and the order of factor impact is as follows: (Use of Natural Elements 0.73, Economic Dimension 0.70, Safety 0.65, Visual Appeal 0.59, Aesthetic-Form Quality 0.53, Environmental Aspect 0.48, Human-Social Aspect 0.47, Functional Aspect and Lighting 0.46, Physical Components 0.42).

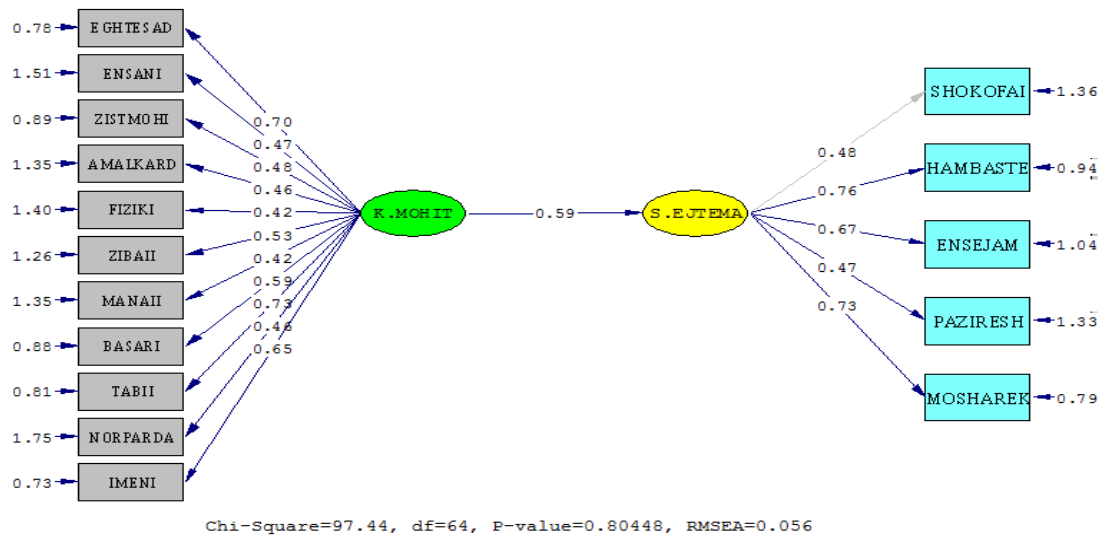


Figure 3. Factor loadings related to the structural equation modeling of the research hypothesis

Table 7. Results of the Pearson Correlation Coefficient Test between components of environmental quality and social health

Variables	Social Health	Environmental Quality	Economic Dimension	Human-Social Aspects	Environmental Aspects	Functional Aspects	Residential Physical	Aesthetic-Form Quality	Visual Attractiveness	Use of Natural Elements	Lighting	Safety	Semantic-Perceptual Quality
Social Health	1												
Environmental Quality	0.62	1											
Economic Dimension	0.61	0.96	1										
Human-Social Aspects	0.68	0.66	0.51	1									
Environmental Aspects	0.51	0.42	0.43	0.54	1								
Functional Aspects	0.60	0.38	0.37	0.46	0.57	1							
Residential Physical Component	0.46	0.41	0.43	0.45	0.80	0.75	1						
Aesthetic-Form Quality	0.73	0.18	0.17	0.37	0.67	0.55	0.75	1					
Visual Attractiveness	0.80	0.26	0.27	0.40	0.78	0.32	0.74	0.72	1				
Use of Natural Elements	0.86	0.15	0.16	0.09	0.19	0.06	0.19	0.17	0.22	1			
Lighting	0.36	0.07	0.09	*0.12	0.35	0.13	0.24	0.24	*0.12	0.15	1		
Safety	0.71	0.24	0.25	0.24	0.33	0.09	0.24	0.27	0.49	0.15	0.25	1	
Semantic-Perceptual Quality	0.52	0.27	0.26	0.35	0.55	0.22	0.18	0.11	0.52	0.20	0.41	0.37	1

As shown in Fig (3), the results of the study show that all relationships between the research constructs are valid. Additionally, the fit indices are presented in Table 5, demonstrating an adequate model fit.

As per the results in Table 7, and considering that the significance level for the test error is less than 0.01 at a 99% confidence level, it can be concluded that this hypothesis is confirmed, and there is a direct, significant relationship between environmental quality components and social health in the residential complexes of Ardabil. The correlation coefficient

between social health and environmental quality is 0.62, Economic Dimension 0.61, Human-Social Aspects 0.68, Environmental Aspects 0.51, Functional Aspects 0.60, Physical Components 0.46, Aesthetic-Form Quality 0.73, Visual Appeal 0.80, Use of Natural Elements 0.86, Lighting 0.36, Safety 0.71, and Perceptual-Semantic 0.52. According to the results: Correlation Coefficient (0.98), Coefficient of Determination (0.97), Adjusted Coefficient of Determination (0.97), the correlation coefficient between the dimensions of improving environmental quality in

Table 8. Results of multiple regression analysis between the role of dimensions of improving environmental quality in residential complexes on enhancing social health

Component	Unstandardized Coefficients (B)	Standard Error	Standardized Coefficient (Beta)	t	Sig. (p-value)
Constant	0.162	0.106	—	1.528	0.028
Economic Dimension	0.832	0.012	0.86	9.487	0.000
Human-Social Aspects	0.292	0.016	0.26	3.423	0.000
Environmental Aspect	0.269	0.038	0.35	4.827	0.000
Functional Aspects	0.021	0.035	0.11	0.607	0.044
Physical Attributes of Housing	0.225	0.035	0.32	4.705	0.000
Aesthetic-Formal Quality	0.057	0.033	0.14	1.723	0.036
Visual Attractiveness	0.498	0.037	0.59	6.617	0.000
Use of Natural Elements	0.651	0.026	0.72	8.925	0.000
Lighting	0.043	0.021	0.13	2.101	0.037
Safety	0.465	0.024	0.56	6.698	0.001
Semantic-Perceptual Quality	0.067	0.033	0.15	2.034	0.043

residential complexes and the enhancement of social health is 0.98, and the determination coefficient is 0.97.

This means that 97% of the changes in social health are determined by the dimensions of environmental quality improvement in residential complexes, and 3% are determined by other variables.

To determine the impact of environmental quality dimensions in residential complexes (economic dimension, human-social aspects, environmental aspects, functional aspects, physical characteristics of housing, aesthetic-formal quality, visual attractiveness, use of natural elements, lighting, safety, and semantic-perceptual quality) as predictor variables and social health as the criterion variable, multiple regression analysis using the Enter method was performed.

As shown in Table 8, the observed p-values are significant, and the results indicate that the economic dimension has the highest impact with a standardized beta coefficient ($\beta = 0.86$), followed by human-social aspects ($\beta = 0.26$), environmental aspect ($\beta = 0.35$), functional aspects with the lowest impact ($\beta = 0.11$), physical attributes of housing ($\beta = 0.32$), aesthetic-formal quality ($\beta = 0.14$), visual attractiveness ($\beta = 0.59$), use of natural elements ($\beta = 0.72$), lighting ($\beta = 0.13$), safety ($\beta = 0.56$), and semantic-perceptual quality ($\beta = 0.15$), all predicting the social health variable.

Discussion

Urban growth and development in the 20th century, along with the increase in urban population, have unprecedentedly transformed urbanization into the dominant mode of living. According to projections, by 2050, two-thirds of the world's population will reside in urban areas. These profound lifestyle changes necessitate special attention to the social dimension of urban life, particularly social health alongside physical health. This issue has become one of the main topics in social domains and urban planning. Social health, as a measure for evaluating quality of life, is influenced by numerous social, economic, and cultural factors and plays a fundamental role in the development process of societies. Especially in urban communities, where residential environments and their physical characteristics are of great importance, improving the quality of these environments can have a direct impact on enhancing residents' social health.

The findings of this study demonstrated that various components of residential environment quality—including socio-economic, environmental, functional, spatial-physical, and semantic-perceptual dimensions—significantly affect social health. Among these components, elements such as the use of natural features, the economic dimension, and safety had the

greatest impact on social health. Among them, the economic dimension, with the highest factor loading, indicates the significant role of economic factors in improving quality of life and social well-being.

The factor loading values, in descending order, are as follows: natural (0.73), economic (0.70), safety (0.65), visual (0.59), aesthetic (0.53), ecological (0.48), human (0.47), functional and lighting (0.46), and physical and semantic (0.42). The results of this hypothesis are consistent with the findings of (14), (11), (12), (6), (7), and (9). In explaining this hypothesis, it can be stated that since the early formation of societies and residential communities, human beings have sought to control their built environment in response to one of their fundamental natural and innate needs. This control has manifested itself through order, patterns, and the creation of man-made environments. These findings illustrate the alignment between residential environment quality and social health in residential complexes in Ardabil city.

Therefore, this study emphasizes the importance of considering various components of residential environment quality in the design and planning of residential complexes. Particularly, attention to the design of public spaces and social environments that promote interaction and social relationships among residents can significantly contribute to improving social health. For example, creating communal spaces, fostering a sense of social belonging among residents, enhancing social participation, and improving social safety through the design of secure and user-friendly environments can positively influence quality of life and social well-being.

In line with these findings, several recommendations are proposed to improve social and environmental conditions in residential complexes. First, strengthening local cultural structures and enhancing cultural spaces at the level of residential

complexes can contribute to increasing social interactions and a sense of place attachment. Additionally, establishing local social organizations and enhancing social capital, especially in urban neighborhoods, can increase residents' trust in one another and improve their social welfare and well-being. Second, designing public and communal spaces in a way that facilitates face-to-face interactions and social collaborations can lead to stronger social cohesion and more effective social control within neighborhoods.

Finally, attention to factors such as the integration of green spaces, appropriate lighting, the design of safe environments, and aesthetic detailing not only improves environmental quality but also enhances residents' morale and sense of comfort. These measures can play a significant role in improving the social health and quality of life of residents in residential complexes. As a result, focusing on environmental quality components in urban design and planning will affect not only physical health but also directly influence social health.

Authors' contribution

Maleka Negari, Javad Javan Majidi, Elham Alavizadeh developed the study concept and design. All of them analyzed and interpreted the data, and wrote the first draft of the manuscript. All authors contributed to the intellectual content, manuscript editing and read and approved the final manuscript.

Informed consent

Questionnaires were filled with the participants' satisfaction and written consent was obtained from the participants in this study.

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Conflict of interest

The authors declare that they have no conflict of interests.

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