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Designing nursing homes using sense of attachment to place approach

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Abstract--Aging refers to a normal, natural and changing process that causes inabilitys and specific needs in the elderly. Many of the elderly believe that environmental factors contribute to these problems. One of the most significant indicators that link humans with the environment is the sense of attachment to a place that has a determining role in the direction of the human's continued presence in the place. In this regard, considering the selected approach, theories of the sense of attachment to place and factors creating it in traditional houses were examined. Then, domestic and foreign cases based on the approach were investigated. In the end, after presenting to nursing homes, distributing the questionnaires via random blocking of the city of Tehran, and distributing and gathering 120 questionnaires, the results were analyzed by the SPSS software. Later, the Ozgol region of Tehran was referred to, and the appropriate site to construct the nursing home was selected, considering matrices and assessments for the site location. Finally, a review of guidelines and standards set out by the Ministry of Health and Rehabilitation Organization led to the determination of per capita and design standards required for the elderly. In sum, all data obtained helped achieve a nursing home design based on a sense of attachment to place approach, as this could remove some of the problems with the older adults. Findings revealed that the use of factors creating a sense of place could help create a space with identity, like a home, and a home, that would relieve undesirable psychological conditions and increase the mental quality and satisfaction of the elderly; thus, establishing a space that encourages the movement activities of the elderly.

Keywords---nursing home, sense of attachment to place, space with identity, Ozgol region of Tehran.

Introduction

The elderly refers to a group of the society who need special care; thus, appropriate economic, social, political, cultural, and health criteria and mechanisms should be adopted to meet their needs. In the past, children paid more attention to their parents, as the younger generation cared more for the elders. As said, in the past, morality ruled that the elderly should be respected much more. Today, however, most elderly spend their lives alone at home; even though they are in a good state of life, they suffer from a lack of emotional attention and societal measures (Me'marian, 1999). The elderly who, despite their higher ages, are present in social activities and enjoy relatively good social relations are less likely to suffer from various psychological diseases. Meantime, the elderly suffer from a sense of idleness and exclusion from life and social relations. To meet these feelings, collective measures should be taken for these people, as the elderly should be allowed to study newspapers and books, make short trips collectively and be consulted. The important point is, however, work. Light work is the best means to spend life in the aging process. Work not only accounts for the real needs of the elderly; but also meets many of the social needs if properly managed. The elderly need love, which may create common feelings (Breuner & Sodarth, 2004). The elderly needs psychological and somatic care and security, which should be focused attention in designing spaces related to the elderly. The elderly should ensure they receive on-time assistance and are treated on time; they should also feel safe and secure to not be harassed where they step in (Breuner & Sodarth, 2004).

Sense of place denotes peoples' mental perception of the environment and their conscious feelings that subject them to internal communication with the environment. People's perceptions and feelings of this kind are integrated into and closely related to the semantic context of the environment. This feeling helps convert a space into a place, characterized by specific sensory and behavioral characters for specific people. Sense of place not only helps one feel comfortable with the environment, but it also supports the cultural concepts adopted by the public, social relations, and cultural relations of a society in a specific place; thus, reminding of past experiences and helping people achieve identity (Falahat, 2006). The idea of successful aging is a good solution to reduce relevant problems. Aging refers to gaining potential individual abilities and desirable levels of physical and social abilities, as well as mental health, which makes the individual enjoy themselves and others. In other words, successful aging is a combination of longer life, health, and happiness that expand comfort and peace of mind throughout the end of life, thereby increasing mental comfort for the individual.

This innovative research refers to two components of privacy and intimacy, which greatly contribute to creating and increasing a sense of attachment to a place in the elderly's residential spaces. Complete knowledge and understanding of the elderly's needs and attempts to meet them can leave a desirable effect on creating a good elderly life and improving life expectancy among them. On the other hand,

because one of the critical needs of the age group is comfort and mental security, one would say that privacy and intimacy can largely contribute to the mental comfort of the elderly, thus expanding their social relations and interactions.

This research aimed to investigate the components creating a sense of attachment to place at traditional homes so that a proper design of nursing homes is achieved, which would help increase the mental quality and satisfaction of the elderly (Eskander, H. G., et. al., 2021; Raeisi, M., et. al., 2020). By considering the reciprocal human-space effects, the question is: How is the sense of attachment to a place at a nursing home increased in a way that provides a sense of security and comfort, brings back lost feelings, and the individual's changing perception of the society? Thus, this research aimed to design a nursing home using the sense of attachment to place approach.

Theoretical Foundations of the Research

Sense of Attachment to Place

The Empiricism perspective suggests that a sense of attachment to place is a basic human need, which Maslow's Hierarchy of Needs emphasizes. Also, for Canter, a theorist of this approach, every place is explained by three components: structural characteristics, activities and perceptions (Canter, 1977). Some maintain that sense of attachment to a place arises from social reactions and interactions that exist in the place, considering it to be the main factor for the formation of this sense. From the angle of this viewpoint, a sense of attachment refers to the outcome of several factors that arise from social interactions that unfold in the environment. Using this approach, an environment contains common social signs and codes which help humans interact with each other through perception and understanding of these codes. A sense of attachment to place is also a strong factor based on an individual's social capital source. Here, there are signs belonging to people who share a place rather than a place with physical existence.

Factors forming a sense of attachment to a place

- 1. Perceptual-Cognitive Factors:** As stated, a sense of attachment is a complicated combination of meanings, symbols and environmental qualities that helps individuals consciously or unconsciously perceive it in a specific place. This meaning, mainly based on the individual-environment emotional bond, is revealed in design as a structural representation. The individual's knowledge of a place is a basic requirement for creating a sense of attachment to a place. For this, environments with distinct structure and readability for users fall under desirable environments where people can better perceive the place. Structural factors such as determination of the limits, ownership and closeness are the most critical factors for the human perception of the environment, as the individual delves into and experiences the environment based on his qualities and motivations (Motallebi, 2011).

2. **Social Factors:** Researchers such as Rapaport, Proshansky, Rieger and Lavarocs did much research until 2022 on the role of social factors contributing to forming a sense of attachment to a place. They have concluded that what characterizes a structural environment as a ground for social interaction are essentially socially-prevalent environmental symbols, on the one hand, and environmental capability of securing and expanding human needs, on the other hand. Here, humans collectively decipher the environmental and structural elements. Social layers of the environment communicate with the users, with each layer based on cultural data throughout the history of environmental architecture, as they contain their specific meanings (Forouzandeh, 2011).
3. **Structural-Environmental Factors:** Using the theory of place-behavior in environmental psychology, this category of factors divides the environment into two major groups of activities and structures. The activities prevailing in an environment are based on social factors, actions and general human interactions. Structure (fabric) is assessed with a set of form and component organizing variables as the most important factors forming a sense of attachment to a place. Structural elements concern the sense of attachment through creating an environmental distinction and inside-outside relationship in the spaces. Form, size, color, fabric, and scale are the formative characteristics, each contributing to the sense of attachment, with the type of organization, syntax and structural components being other effective factors. On the other hand, structural elements help create a sense of attachment through compatibility and meeting human needs. In design, each of the variables of color, form, scale and type of organization enjoy special importance, as based on human needs and meeting of the type of activities in the space, suggesting the capacity of the environment that flourishes the functional forms (Motallebi, 2006).

Sense of Attachment at Nursing Homes: At the first level, the environmental and structural components, in line with the activities, create a sense of attachment in the elderly through providing the intended activities, and satisfying the personal needs of the elderly, on the one hand, and meeting their social needs arising from group activities, on the other hand. At this level, the structural characteristics of the environment facilitate the activities, consistent with the peoples' behavioral patterns, and meet the needs of the place users, to establish a sense of social attachment with the environment, thereby creating and improving social links with the elderly in the environment. At the second level, structural elements, serving as cultural symbols and norms, link the individual's perception with the sense of attachment to place.

Effects of privacy and intimacy on the sense of attachment in elderly's residential spaces

Privacy is divided into four types of functions (Westin, 1970).

1. **Solitude:** In this state, the individual enjoys the ultimate loneliness alone and free from the eye of others.

2. **Closeness and Intimacy:** This state is achieved only when a small group (e.g., couples) distances from strangers to remain alone.
3. **Anonymity** arises when the individual “gets lost in a group.” S/he is present in a public place and the congregation, but no one knows them. The person only has a physical presence in the crowd, and since s/he has just a random and superficial interaction with others, s/he has their privacy not harmed. Examples of this case include when the individual goes to the cinema alone or takes a walk in crowded areas.
4. **Reserve** denotes the “creation of an obstacle against an unwanted event.” In this state, the individual “gets others out of his/her sphere of life.”

Westin’s analysis indicates that various social units (groups or units) deal with the issue of privacy and use different factors to achieve various degrees.

The concept of intimacy emphasizes the originality of maintaining privacy in conceptual and structural domains, where scholars of different disciplines such as psychology, sociology and architecture have assigned more focus to this category. To Altman, intimacy (private privacy) is an individual's choice towards others' access to themselves. This constitutes a part of the privacy formation system that affects the expansion of human behaviors and actions against the environment. Two components of privacy and intimacy greatly contribute to creating an increasing sense of attachment to place in the elderly's residential spaces. Complete knowledge and understanding of the elderly's needs and attempts to meet them can leave a desirable effect on creating a good elderly life and improving life expectancy among them.

Architecture for the Elderly

As for the establishment of the special nursing home, it is required to provide some regulations, which are as follows:

1. The nursing facility should be a one-story building; if more stories are required, few stairs should be in place, with the stories separated from each other with just three to four stairs. Also, a protective fence should be erected. If the number of stories is higher, an elevator should be used. At the same time, necessary measures and safety precautions, especially installing a direct wide fire exit, should be taken into account.
2. The facility should be close to a hospital or a service center (hospice) so that the emergency interventions are taken and the elderly receive treatment and medical care on time.
3. Equipped dining rooms, living rooms, and centers for recreational spending leisure time should be available. Very comfortable chairs, study lights, TV, etc., are also required. These amenities can lay the ground for the satisfaction of the residents of the facility, thus, giving them a feeling of being at home.

4. There should be centers to deal with professional and specialty domains at the facility, such as a small but equipped industrial workshop, etc.
5. The space assigned to each elder should provide privacy for their life and allow them to move and do their affairs. If there are no individual rooms, curtains can be placed to create individual and independent units. Also, there should be places for the visitors.
6. Sufficient rooms should be considered for practice rehearsals, sports movements, rehabilitation programs, etc.
7. All rooms and toilets should be large enough for the elderly to move the chairs around easily.
8. Measures such as installment of fire extinguishing tools, appropriate and emergency doors, fire exit doors, safe wiring, exit doors under emergencies, constant transfer of the trash, protective bars across the aisles and corridors, stairways with slow slopes for the transfer of the chairs (ramps), the appropriate temperature in the building, presence of non-slippery flooring (matting) in the facility are required to provide a comfortable pace for the elderly and their satisfaction.
9. The nursing home should enjoy a medical services center.
10. Some programs run at the facility include sewing, flower decoration, cooking, painting, handicrafts, gardening, book reading, listening and composing music, theater, cinema, discussion, walking, etc. (Shamlou, 1995:90-94).

Architecture Based on Sense of Attachment to Place

1. **Architecture:** To Madanipour (1999:32), place refers to a part of the space with a “semantic and value” load. Afsharnaderi (1999:4) considers the place to be the result of the interaction of three components 1. Human behavior, 2. Concepts, and 3. Physical characteristics. Heidegger (1958) maintained that “place puts man on a path that reveals to him/her external relation and coherence of his/her being while representing the depth of his original existential freedom.” The term place against space entails an emotionally strong and provisionally long relation between an individual and a specific physical place, with the physical environment more focused attention (Ralph, 1976).
2. **Sense of place:** The environment creates messages and meanings to facilitate some behaviors or hinders other behaviors. This general sense, created in the individual after perception of the specific environment, that which cannot be accurately defined, either, is called the sense of place of sense towards the place. Sense of place denotes peoples’ subjective meaning of the environment and the more or less conscious feelings of their surroundings that places them in an internal connection with the environment. This feeling is also tied to and integrated with the semantic

context of the environment. Cultural concepts, as intended by the people, protect the society's social and cultural relations at a specific place, thus reminding of past experiences and achievement of identity for meeting goals. This sense is a factor that converts space into a place with sensory and behavioral characteristics for certain people.

3. Sense of Attachment: This sense is examined in two respects: phenomenology and empiricism. In the former, a sense of attachment is called the place of friendship, which is a sense filled with emotional perception and pleasure at a place. To phenomenologists, this sense creates a psychological and mental feeling in the individual about the environment, thus examining the effects of various social and cultural layers of the environment on the individual's internal feelings. The Empiricism perspective suggests that a sense of attachment to place is a basic human need, which Maslow's Hierarchy of Needs emphasizes. Also, for Canter, a theorist of this approach, every place is explained by three components: structural characteristics, activities and perceptions (Canter, 1977).

Table 1: Case studies

Row	Facility name	Design
1	Metlifecare Gulf Rise Nursing home (New Zealand)	
2	Orbec Nursing home (France)	

3	Huningue nursing home (France)	
4	Andritz nursing home (Australia)	
5	Saray-e-Pedari nursing home (Esfahan-Khansar)	

Research Methodology

The present research is applied in terms of goal and falls under descriptive-analytical categories. The statistical population of this study consists of all elderly living in Tehran who are divided into a residing and a non-residing group in a nursing home. In practice, the research should have selected a statistical sample from among the elderly in Tehran's nursing home. Still, since these people were limited, another 100 elderly residing in Tehran were randomly selected using the blocking of Tehran's neighborhoods and physically visiting four blocks of houses with an elderly population. This figure was in addition to the 20 elderly who could not answer the questionnaire items, as the results were supposed to be made more real. In sum, the actual number of the statistical sample was 120 people. A 41-item questionnaire which questioned the factors affecting the sense of place and desirable space conditions was used to gather data. The SPSS software estimated the Cronbach's alpha coefficient to be 0.95. Thus, the questionnaire is said to enjoy sufficient validity. This research used a student's t-test to test the hypotheses in the inferential section.

Findings

This research devised 41 items, and 120 questionnaires were given out among 20 people residing in a nursing home, as 100 people were randomly selected from different blockings of Tehran. SPSS method was used to analyze the answers, producing an error rate of 0.95%. The hypotheses investigated the interest of the elderly in secondary spaces, including planting, gardening, fairs, and handicrafts spaces. As the results suggested, out of the 120 elderly, 57 (47.5%) were females, while 63 (52.5%) were males. The education levels of the elderly under study showed that out of the 120 people, 65 (51.4%) held diploma degrees which constituted the highest frequency.

In contrast, five (4.1%) and 4 (3.3%) held junior school, and B.A. and higher levels, respectively, made up the least frequency. The minimum and maximum ages of the female elderly were 51 and 74 years. The mean and standard deviation of the age criterion of the male elderly were 69 years and 7.851, respectively. Also, the minimum and maximum age of the male elderly were 48 and 75 years, respectively, with the total age mean of the whole sample was 67.27 years. Also, the mean and standard deviation of the interest of female elderly were 4.55 and 0.618, respectively, out of score 5, as the mean and standard deviation of the interest of male elderly were 4.085 and 0.585, respectively, indicating that female elderly had a greater mean interest in living in spaces with links with the nature. The mean and standard deviation of satisfaction of female elderly were 4.60 and 0.383, respectively, out of score 5, as the mean and standard deviation of satisfaction of male elderly were 3.741 and 0.360, respectively, indicating that female elderly was more satisfied with secondary spaces such as fair, flowering and gardening spaces.

Regarding the number of facility stories in the nursing home, two-story spaces accounted for the highest share (42.7%), while the four-story spaces accounted for the least share (6.5%). Fifty-five percent of the elderly were interested in their room windows facing southwards, while 37.1% said window direction made no difference. The elderly saw no difference between traditional and modern spaces, as 73% of whom were indifferent to it. 73.4% of the elderly preferred three-people suites, 66.1% accommodation the downtown, 77% diverse spaces, 62.2% selected colorful spaces, while 32.3% saw no difference.

Hypothesis 1: Green spaces improve the elderly's sense of attachment to place.

Table 2: One-way T-test results of the relationship between the nature and the male people

Variables	Number	Mean	SD	Freedom degree	T	Sig.
Interest	63	4.0851	0.585	62	12.843	0.000

Table 2 indicates that the males' mean score for item "interest in living spaces with natural relations" was 4.0851 (score 1-5 and higher indicates greater interest), which is greater than the average rate. The table also tests the assumption that the males' interest is equal to the expected value, as the t value of the test is 12.483, and the significance level is 0.00, being statistically significant. This denotes that the male elderly are interested in living in spaces with natural forms. In other words, at the confidence level of 99%, one would say that the males' interest in living in such places is greater than the average rate.

Hypothesis 2: Creation of walking and sports space seems to affect the elderly's sense of attachment to residential spaces.

Table 3: One-way t-test results of the creation of walking and sports spaces among female elderly

Variables	Number	Mean	SD	Freedom degree	T	Sig.
Interest	57	4.55	0.618	56	21.349	0.000

Table 3 indicates that the females' mean score for item "creation of walking and sports space" was 4.55 (a score 1-5 and higher indicates greater interest), which is greater than the average rate. The table also tests the assumption that the females' interest is equal to the expected value, as the t value of the test is 21.349, and the significance level is 0.00, being statistically significant. This denotes that the female elderly is interested in the creation of walking and sports space. In other words, at the confidence level of 99%, one would say that the males' interest in the creation of walking and sports space is greater than the average rates.

Hypothesis 3: Creating a training and entrepreneurial space (fair, gardening, flowering, worship space) seems to increase the elderly's sense of attachment to a place.

Table 3: One-way t-test results of the creation of a training place for the male elderly

Variables	Number	Mean	SD	Freedom degree	T	Sig.
Interest	63	3.741	0.360	62	14.259	0.000

Table 4 indicates that the males' mean score for item "creation of a training and entrepreneurial space" was 3.741 (score 1-5 and higher indicates greater interest), which is greater than the average rate. The table also tests the assumption that the females' interest is equal to the expected value, as the t value of the test is 14.259, and the significance level is 0.00, being statistically significant. This denotes that the design of training and entrepreneurial spaces increases the sense of attachment to place among the elderly.

Hypothesis 4: Simulation of the nursing home to the real home seems to increase the sense of attachment to the place.

Table 5: One-way t-test results of designing the space to serve as females' home

Variables	Number	Mean	SD	Freedom degree	T	Sig.
Interest	57	3.927	0.3831	56	20.545	0.000

Table 5 indicates that the males' mean score for item "simulation of the nursing home to the real home" was 3.927 (a score 1-5 and higher indicates greater interest), which is greater than the average rate. The table also tests the assumption that the females' interest is equal to the expected value, as the t value of the test is 20.545, and the significance level is 0.00, being statistically significant. This denotes that the design of spaces like the real home increases the sense of attachment to place among the female elderly.

Site location

The project's land is in district 1 of Tehran, area 9, west of Babaei Highway and east of Imam Ali Highway.

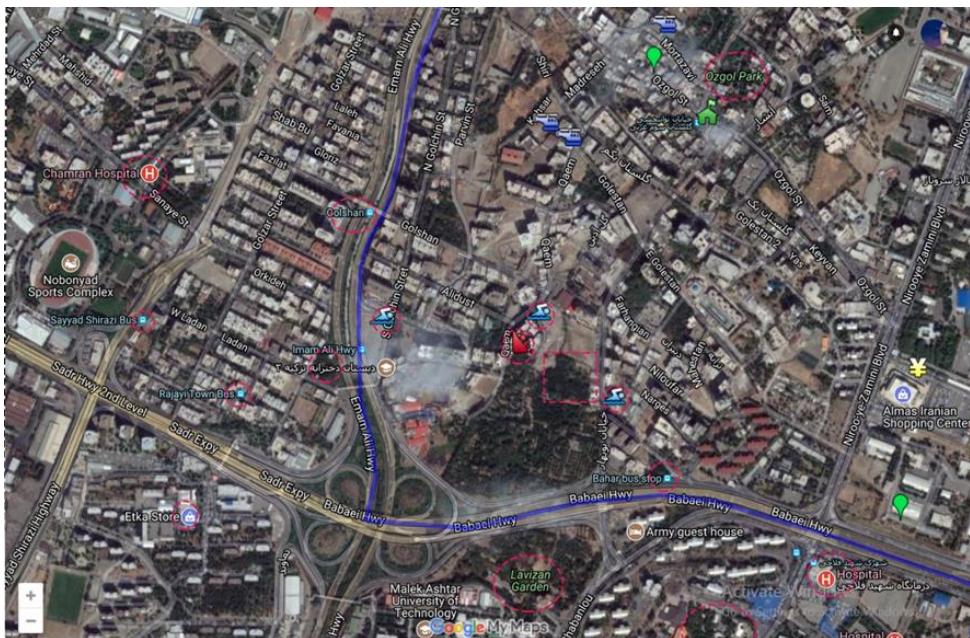


Figure 1: Location of the site

There are two walking access points east of the site, each with a one-meter distance, and in the west of the site at the beginning of the Eastern Golshan

Street and Tehrani Alley. The site has an area of 8748 m² which has a western-eastern direction with a 20 ° angle northward rotation.



Figure 2: Site dimensions

Considering the site analysis and the current land conditions, due to the abundant vegetation in the southern part of the site, measures to prevent cutting the trees, and also considering the blowing of the desirable and undesirable wind, sunlight, and sound pollution around the site, the building volume is directed towards northern and northeastern sides.



Figure 3: View and landscape from outside to the inside of the site

From a view perspective, considering the research's approach, the most suitable building direction for more landscape and the placement of more openings to receive sunlight, the length of the volume should be in the southern part, with an astern-western direction.

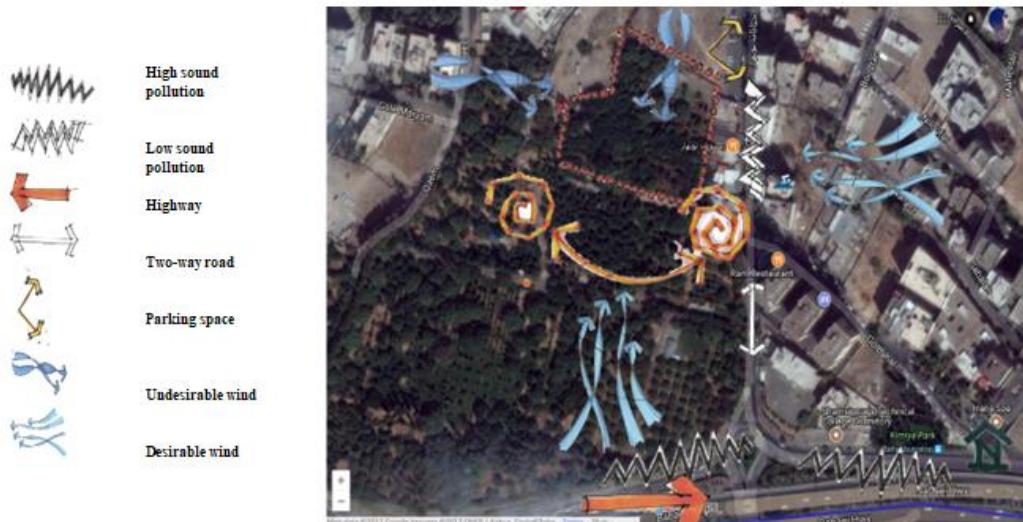


Figure 4: site analysis

Reasons to choose the site

- Proper access to highways (Babaei and Imam Ali Highways)
- Air desirability
- Closeness to hospitals and clinics (Chamran and Nikan hospitals)
- Closeness to green spaces and parks
- Good slope (4.5%)
- Easy access to bus stations (the nearest station is 500 meters away)
- Distance from school, children's playground or active production environment used by young people or adults
- Closeness to daily shopping malls and urban affairs such as ATMs, supermarkets, fruits and vegetables, restaurants, etc.
- Distance from busy main streets, intersections, squares, garbage dump centers, animal slaughterhouses, factories, etc.

Conclusion

According to available statistics on the total number of the elderly in the country, 15% live alone in Tehran. Also, the Tehran-to-the whole country ratio is 11%. Thus, Tehran is said to have a more aging population than the entire nation and the province itself, with age mean in the city equaling 31.2 years. On the other

hand, the national mean age has been estimated to be 27.9 years. Thus, this issue requires serious attention to this group and their social needs. There are 250 nursing homes for the elderly, which house 10-15000 people. This figure suggests that the nursing situation under current conditions is not bad because out of the 6-7 million elderly in the country, a small percentage has been sent to nursing homes, with the remaining being either able to do their affairs or cared for by the families. Seventy round-the-clock centers in Tehran are homes to 4.810 elderly (accounting for 40% of the total elderly population of Tehran).

On the other hand, other problems face the elderly. Half of the elderly don't have an income, as out of every 100 elderly, 13 live alone. However, as for the future twenty-year vision, this station cannot sustain itself because the current generation tends to be single-child, and the culture of venerating and respecting the elderly no longer exists as in the past, and as the time passes, the situation gets worse. This causes concerns about the increased age of the elderly, as more and more care and nursing measures need to be taken for them. Thus, it is pivotal to meet this aging population's physical, psychological, social and spiritual needs. Since the number of the elderly population in Iran is constantly on the rise, with this rate overtaking the birth rate, it is thus imperative to focus more on the satisfaction and needs of this population. A literature review suggested that aging life is associated with physical and psychological needs. In this period, people are more exposed to developing diseases. According to studies, most diseases the elderly suffer from are forgetfulness, direction dysfunction, sleeping, imbalance, and lack of concentration in the environment. These diseases will certainly reduce the elderly's self-confidence and bar them from engagement in the community. Thus, it is required to design nursing home spaces that are readable, compatible with their needs, and consistent with their specific needs.

As people's psychological conditions change at higher ages, the living environment should change in line with their states. As stated, the presence of spaces for making artistic handicrafts can help meet the elderly's satisfaction. When man ages, the number of new events is reduced, and if an event unfolds, they are most shocking, such as the wife of the spouse or a friend or being forced to go to a nursing home. Spaces can be designed to provide positive new events for the elderly, such as music, painting, and theatre spaces which can increase the elderly's satisfaction. The elderly are more interested in nature and plants due to their sensitive and fragile spirits. Thus, design should take into account relationships with the environment. Self-efficacy is a major factor that contributes to the elderly's satisfaction. Thus, the sense of social collaboration among the elderly should be strengthened by making designs more compatible with nature. Consistent with the questionnaire analysis, the elderly is satisfied with the residents in two- and three-story accommodations. Also, diverse, readable and colorful spaces are more appealing to the elderly. Most elderly tend to the downtown. They prefer to spend their time living in groups. They consider three-people suites appropriate, as most believe that window orientation does not make any difference to their living conditions. However, most males want their room windows to be southwards. Out of the variables for an appropriate elderly environment are intimacy and dominance. Most elderly called for the setting up shared public and service spaces between men and women. Dominance over rooms did not make any difference for the elderly. They did consider control of

heat and cold to be essential while discarding the sound pollution as a factor, especially from the view of the ladies. Consistent with the findings and test of the hypotheses, a high percentage of the elderly considered the relationship with nature essential for their accommodations. In the hypotheses, the level of interest of the elderly in secondary spaces such as gardening, exhibition, handicraft making, etc., were examined. A sense of usefulness and belonging to the place among the elderly were also found to be effective.

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