

**Preliminary report**

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## ARCHITECTURAL DESIGNING THE NURSING HOMES IN TEHRAN CITY (AS A SAMPLE)

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### ABSTRACT

In recent years, there has been an increasing trend of entrusting the elderly to nursing homes, thus providing a suitable space that meets their physical, psychological, social, and spiritual needs has become necessary. The nursing homes is the first and simplest solution that can be considered for such individuals. However, considering the characteristics and temperament of this group, it is necessary to define a model that can meet the elderly's spiritual and physical needs, alongside maintaining their normal life, in the home of their hopes and memories. Therefore, there is a need for a model that defines a new space in accordance with the psychological and physical conditions of the elderly and can replace previous methods in order to improve the mood of the elderly.

The design of elderly homes, and certainly the creation of suitable decoration for them, should match the global standards. The concept of an elderly village is another model that has been introduced and implemented for the elderly in the West. In this model, housing units have been designed for the elderly to live alone or with their families. Basic and necessary services for the elderly are available in proximity and neighboring the housing units. These places will have a positive impact on creating a sense of usefulness, increasing hope in life, and uplifting the mood of the elderly.

The elderly have the autonomy to use these facilities and they fulfill their needs, such as suitable spaces for exercise and recreation, socializing with peers, preserving their dignity, and creating conditions for their independence during leisure time. They also provide counseling, teach necessary techniques for the elderly's lives and more.

*Keywords: The elderly, nursing home, day care center, life expectancy, improving quality of life*

### INTRODUCTION

The United Nations in 2006 estimated the global elderly population to be 687 million and 923 thousand individuals, and projected that this number would reach 1 billion and 968 million and 153 thousand individuals by 2050 [1,2]. This would make up approximately 21.4% of the population at that time. Iran has not also been exempt from the phenomenon of an aging population, as the average lifespan of Iranians increased by about 10 years between 1986 and 1996. According to the 2011 census, Iran has 6.2 million elderly people aged 60 and above, equivalent to 8.2% of the country's total population [3]. Based on population projections until 2049, the number of Iranians aged 60 and above will increase to 28 million, making up approximately 28% of the population. Old age is a period in which an individual gains experience, maturity, and wisdom after spending several years. They can take measured steps to navigate through future years and share their experiences with others.

In Iran and most Asian countries, the majority of elderly individuals live with their families, and those who are separated from their families for various reasons receive financial and emotional support from younger family members [4]. However, changes in the family structure, influenced by the development of modern lifestyles, increasing migration, and the movement of families, have led to the abandonment of the elderly and their social isolation [5]. Sometimes, this results in the elderly seeking refuge in elderly homes. Considering that many elderly individuals are capable of performing many tasks, there is a need for temporary residential centers that cater to their daily needs, providing recreational, welfare, and sports facilities. The elderly prefer to be independent and usually prefer to live in close proximity to their children. On the other hand, elderly individuals who live in warm and emotionally connected family environments have higher well-being compared to those who live alone. The elderly require spaces that suit their physical and emotional needs. If such spaces are not provided and they will not receive appropriate responses to their needs from the environment and they may also experience depression [6,7].

In recent years, there has been an increasing trend of older adults being placed in nursing homes and the number of such facilities is rising [8]. In addition, the physical and social conditions of the elderly's living environment affect their well-being. Studies have shown that there is a higher disruption in some aspects of life for residents of nursing homes compared to elderly individuals living at home [9,10]. Additionally, the belief in the necessity of adapting the living environment of the elderly in these facilities is undeniable. Therefore, conducting research to evaluate the prevailing design conditions in elderly care homes in Tehran is highly necessary. According to the aforementioned information, this research was conducted in 2014-2015 with the aim of evaluating the conditions of elderly care facilities in Tehran in accordance with globally defined standards for the suitability of the physical environment of these facilities.

## RESEARCH METHODOLOGY

This research was conducted based on theoretical studies and fieldwork. In the theoretical studies section, existing literature, internet sources, and interviews with experts were utilized to review and understand the regulations and standards. In the fieldwork section, site analysis, analysis of existing samples, and examination of current regulations were carried out.

### Theoretical Section

In this section, the existing regulations and standards for designing elderly care homes were initially addressed. Then, based on these regulations, the design of the required spaces for the target site and its analysis were performed.

### Fieldwork Section

In this part, the design of an elderly care home in District 10 of Tehran was addressed.

1. Geographical and Climatic characteristics of the Target City:

The city of Tehran is located between 51 degrees 2 minutes to 51 degrees 36 minutes east longitude and 35 degrees 34 minutes to 35 degrees 50 minutes north latitude. Its elevation varies from approximately 1800 meters in the north to 1200 meters in the central area and 1050 meters in the south, measured from the level of open waters. The climate of Tehran is moderately temperate and humid to some extent. The remaining parts of the city have a warm and dry climate, with slightly cold winters. The amount of precipitation in Tehran is generally low, measuring approximately 245.8 millimeters per year, and the number of frost days (with temperatures below freezing) is recorded as 36 days per year.

2. Characteristics of the Desired Site:

The selected site is located in District 10. District 10 is situated in the western part of Tehran and shares borders with Districts 17, 11, 9, and 2. On the right side of this site, there is Jeyhoon Street, which runs north to south. At the top of the site, there is Hashemi Street, intersecting with Jeyhoon

Street. The hierarchy of the access network around the site is indicated on the map, including main streets and side streets. The land use of this site includes medical, educational, and commercial purposes (Figure 1). Environmental pollution in this area includes noise and air pollution.



Figure 1. Surrounding Land Uses

## FINDINGS AND DISCUSSION

### Existing Regulations and Standards for Designing Nursing Homes:

#### Suitable Location for Nursing Homes

Experts believe that providing mental health care and creating a peaceful environment free from stressors can encourage the elderly to continue living and create a vibrant and self-sufficient life for them. It is also necessary to provide social interactions for the elderly and ensure a sense of security and protection in their external spaces. Therefore, recommendations have been made for the design of such places. For example, nursing homes should not be located near busy main streets, intersections, squares, waste disposal sites, places where animals are kept, slaughterhouses, factories, and the like. Additionally, the construction site should be away from pollutants and abnormal noises.

Nursing homes should be in direct proximity to chain stores, banks, mosques, libraries, healthcare centers such as clinics, hospitals, pharmacies, post offices, cinemas, parks, and the like, within a short distance that is within the maximum walking radius for the elderly. In other words, the accessible paths should be shorter than usual, with a maximum distance of 1000 meters. It is preferable for nursing homes to be within a 500-meter distance from a bus station, with a safe, flat, well-lit route, and the bus station itself should have shelter and seating areas.

The surrounding environment of nursing homes should be reasonably flat, with safe and secluded communication routes, surrounded by suitable trees and green spaces. The size of the building should be small, and the number of residents should be limited to provide comfort and allow better care. In terms of ensuring maximum safety, it is necessary for the nursing home building to be fire resistant.

#### Main Entrance

The main entrance of any building is of great importance and requires careful design consideration. It should be treated as a distinct space because part of it belongs to the interior and part to the exterior of the building. The main entrance of a nursing home is significant both in terms of accessibility for the elderly and visitors and in presenting an overall image of the facility. Therefore, creating security and easy access are fundamental design considerations that must be taken into account. The main entrance should provide direct access to the main elevator, staircase, as well as the common areas such as the living room and dining room [11,12,13].

**Living Room**

In a nursing home, the living room should be designed in a way that allows the elderly to gather and rest after daily activities. The architectural design of this space should be based on the specific needs of the residents and should be able to adapt to the mood of all the elderly individuals residing there. It should also provide easy communication and access to the bedrooms. It has been observed that large living rooms that give an office-like feel are less utilized by the elderly. Such rooms are only suitable for special purposes and limited times, such as meetings, discussions, concerts, and parties, while various activities should take place in the communal areas of nursing homes, such as watching television, playing intellectual games, reading, and sewing.

Therefore, it is recommended to use multiple smaller spaces clustered around a more public area to make it more desirable for the elderly. Each of these spaces should have a familial atmosphere and be capable of accommodating groups of more than 8 people engaging in specific activities comfortably. Hence, the minimum dimensions for such spaces are around 4.5×5.3 meters, and a standard area of 5.1 square meters per person is recommended for communal rooms. If the living room is separate from the main kitchen, a small kitchenette can be considered for the residents to make tea or coffee. Additionally, if the living room and dining room are adjacent, movable and foldable partitions can be used between the two spaces. Since living rooms in nursing homes should create a cheerful and exciting atmosphere for the elderly, bright and warm colors should be used, while libraries and study rooms should be painted with soothing and gentle colors [14].

The windows in the living room should be short so that individuals sitting on comfortable chairs can have a view of the outside. Therefore, the height of the window sill from the ground should be between 30-90 centimeters, and the height of the window frame should be 1.8 meters for easy opening [15]. To create uniform and suitable lighting conditions for the special visual needs of the elderly, parallel lighting fixtures should be used. It is also recommended to provide lighting equivalent to 200 watts in the living room. The space, which is continuously used by groups of two or three people for relaxation and conversation, should be suitable for seating and watching television. Quiet spaces suited for intellectual games and reading should be included, as well as spaces for group activities, sewing groups, and art classes. A small room should be designed as a prayer room.

It is recommended to separate the smoking area from the non-smoking area. The furniture in the living rooms and common areas should be lightweight and easily movable, and fabrics should be used that can hide stains and dirt and can be easily cleaned, providing comfort and tranquility to the elderly when sitting on them. Additionally, the total surface area of furniture and objects in the living room should be such that the sound reflection time is relatively short to prevent noise disturbance. It is recommended to establish visual connection to the green and open outdoor space, which is desirable for the elderly, through the creation of covered terraces and balconies in front of the living rooms.

**Library**

If creating a separate space for reading is economically challenging, a dedicated space for this purpose can be considered alongside the living room. This space is considered quieter than other areas of the nursing home and should be equipped with comfortable chairs, temporary tables, and shelves for storing magazines and newspapers [16].

**Dining Rooms**

Elderly individuals who live alone do not fully understand the social importance of shared meals. Therefore, they may experience less favorable emotional and social conditions compared to those living in communal elderly care centers or those who have not yet separated themselves socially. It is better for these spaces to have connections to terraces or outdoor green spaces so that the elderly can enjoy open air while having their meals in the summer. The flooring of the dining rooms should be selected in a way that prevents slipping and reflects light, and it should be easy to clean. It should also have sound-absorbing properties. Additionally, the lighting should be more intense and individualized on the dining table surfaces. It is recommended to have windows with a height of 70 centimeters from the floor so that individuals can enjoy the outdoor view while eating. Dining tables should be designed in various sizes for 2, 4, or 6 people, in square or rectangular shapes with rounded corners. The height of the dining

table depends on the height of the seating area, but it is suggested to be 70 centimeters to provide enough space for leg movement and accommodate wheelchairs. The surface area of the dining table should preferably be 90×90 centimeters (minimum absolute size is 75×75 centimeters), as smaller sizes are usually insufficient. Lightweight, easily cleanable chairs with non-slippery bases are recommended. According to the design recommendations, a standard space for dining for 4 to 6 people, considering the needs of the elderly with disabilities and wheelchair users, would be around 2.2 square meters (Figure 2) [17].

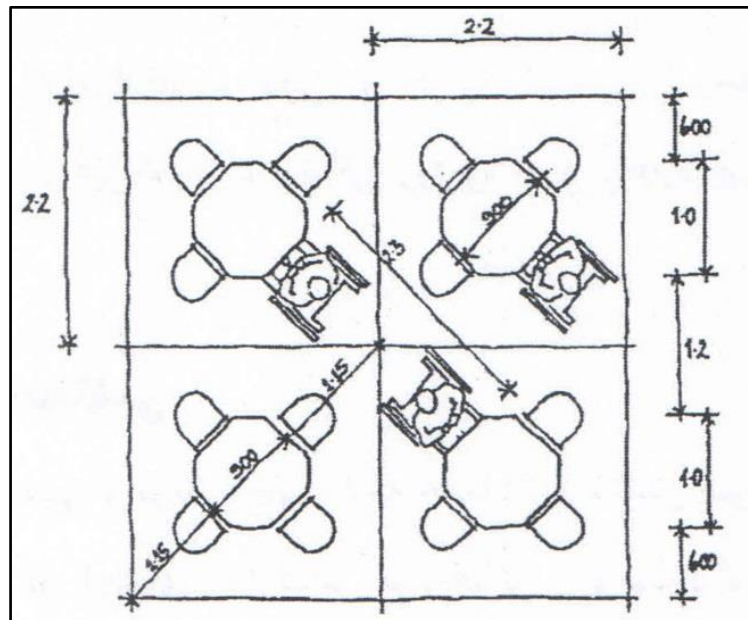


Figure 2. Dining Area for Suitable 4 to 6 People

### Staff Room

The employees of the nursing home should have suitable facilities for sleeping and resting. Additionally, a separate room for rest and dining should be provided for them so that they can relax during non-working hours. Therefore, for each employee, a room with an area of 8 square meters with bathroom and toilet facilities can be considered [17].

### Management Room

For administrative purposes, a space of approximately 9 square meters should be designated. The room should be located near the entrance and include an area for storing residents' files, comfortable seating, and a reception desk for receiving and making payments. The facility manager should also have welfare facilities such as sleeping area, sitting area, kitchen, toilet, and bathroom to attend to their daily needs even during non-office hours [18].

### Therapy and Rehabilitation Rooms

In nursing homes, rehabilitation and therapy measures are necessary to provide services to residents. The presence of a physician, physiotherapist, social worker, nutritionist, and nurses is essential for the elderly throughout the whole time. Therefore, the existence of suitable spaces for providing these services on the ground floor of nursing homes is necessary. The purpose of the rehabilitation program is to assist the individual in need of rehabilitation to maximize their abilities, adapt to society, and prepare them physically, mentally, and socially for a type of life that is within their capacity. In the rehabilitation section, efforts should be made to strengthen the elderly's muscle forces and provide guidance on the correct use of walking sticks, crutches, or wheelchairs if they use them. If physiotherapy is performed along with the assistance of social workers or psychiatrists and continues throughout the treatment, the elderly will achieve results more quickly and easily and regain their abilities [19,20]. The examination and treatment room should be equipped to facilitate the following activities: 1) Examination of the elderly by a physician, even if it is performed once; 2) Injection and medication. It is suggested that the examination and treatment room have double doors with a total width of 120 centimeters, and the recommended area for the room is approximately 18 square meters.

### **Storage Room**

For storing cleaning items such as blankets, sheets, towels, etc., a storage area of about 1 square meter per resident is necessary. This space can often be located next to the bathroom, and it is recommended to have tiled flooring for easier cleaning. For storing equipment and items such as wheelchairs, walkers, etc., a room with an approximate area of 4-10 square meters is recommended, and it is preferable to have such rooms on each floor of the nursing home [12].

### **Sanitary Facilities and Toilets**

Since the elderly need access to toilets during the night, it is necessary to have toilet facilities adjacent to their bedrooms. The minimum suitable dimensions for toilets used by elderly individuals in wheelchairs should be 170×170 centimeters. The height of the toilet bowl (referring to Western-style toilets as the use of squat toilets is not suitable for the elderly, even if they are capable of using them) should not exceed 38 centimeters from the floor, and grab bars should be installed on the walls on each side, with a distance of 70 centimeters from the floor, to assist with sitting down and standing up [12].

The toilet used in nursing homes should be without a pedestal and installed at a height of 85 centimeters, but for individuals using wheelchairs, this height can be reduced to 75 centimeters. A minimum width of 80 centimeters is recommended for sanitary facilities. The floor, walls, toilet, and bathroom should be covered with suitable tiles. The water faucets should be lever-style and easy to open and close, so that elderly individuals suffering from arthritis and joint swelling can use them comfortably. The minimum dimensions for the toilet bowl should be 65×40 centimeters, and the rim should be at the height of the forearm and at least 85 centimeters above the floor. In countries with cold climates, it is preferable not to have the toilet against an external wall (empty space behind it) [18].

### **Communication Spaces in Nursing Homes**

Considering the physical conditions of the elderly, it is preferable for nursing homes to have a single floor, and if necessary for buildings with more than two floors, the use of an elevator is mandatory. The elevator should be placed near the main entrance of the building and accessible on each floor without the need to go up or down stairs. Since the elderly move very slowly, the automatic doors of the elevators should be adjusted to allow sufficient time for individuals to enter and exit the elevator. Additionally, the elevator stops should be relatively longer than usual.

The minimum dimensions of the elevator cabin should be 1.1×1.4 meters, and it should have an opening width of 80-90 centimeters. Inside the elevator cabin, a railing should be installed 90 centimeters above the floor to maintain the balance of the elderly. It is necessary to use a fixed folding seat inside the elevator. The elevator cabin should be equipped with an emergency bell, a telephone line for external communication, control buttons, and other auxiliary equipment installed on the cabin wall for use inside the elevator, which should be placed between 90 and 130 centimeters.

### **Hallways**

In nursing homes, hallways should have sufficient width and appropriate lighting to allow individuals in wheelchairs, individuals with walking canes, and pedestrians with companions to move in both directions. The width should be 70 centimeters for individuals using a cane and between 100 to 120 centimeters for individuals using a wheelchair. If the width of the hallway is considered as 180 centimeters, it will allow two wheelchairs to move side by side. Therefore, it is recommended that the width of hallways in nursing homes be a minimum of 150 centimeters, and it is always advisable to avoid narrow and winding corridors that may confuse the elderly.

### **Garden Area**

One of the most valuable activities that can be considered for the elderly is gardening, even if only a few of them are interested in this activity. Gardening can be seen as a tool to showcase the abilities and achievements of the elderly. Two types of gardens exist in most elderly homes: 1) Private patios and balconies, and 2) Yards and designated areas. Elderly individuals should be given the opportunity to engage in gardening and flower cultivation in their own environment and bring their favorite flowers to the garden assigned to them.



## Bathroom

For the elderly and individuals with disabilities, the bathroom becomes more important and should be designed for maximum comfort. The bathrooms should be fully accessible for wheelchair users, either without handrails or with one or even two handrails for assistance. It is advisable to have a small number of bathtubs in nursing homes. The essential and necessary fixtures in the bathroom include a bathtub or shower, toilet, bidet, first aid cabinet, and mirror. These fixtures should be arranged in a way that individuals with full mobility, users without assistance, and users with assistance from individuals in wheelchairs can easily access them.

However, regardless, individuals with severe disabilities who are unable to bathe even with assistance, as well as those with skin problems who find relief by immersing in water, require a bathtub for bathing. Therefore, a small number of bathtubs should be designed in nursing homes.

The essential and necessary fixtures in the bathroom include a bathtub or shower, toilet, bidet, first aid cabinet, and mirror. These fixtures should be arranged in a way that individuals with full mobility, users without assistance, and users with assistance from individuals in wheelchairs can easily access them, Figure 3.

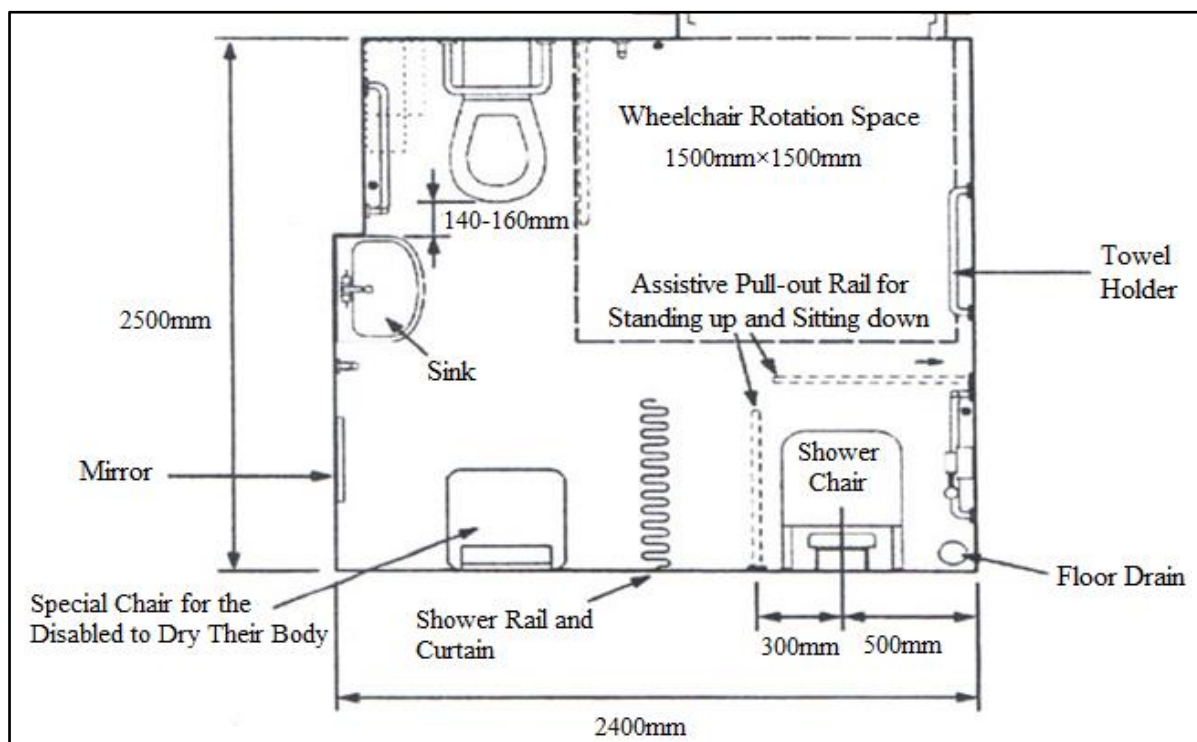


Figure 3. Appropriate Dimensions for Accessible Restroom and Shower for Disabled Individuals

## Doors and Windows

Usually, doors create difficulties for the elderly, as most of them have joint swellings and may have trouble bending their fingers. Therefore, the door handles should not be round-shaped; instead, "D"-shaped handles are recommended. It is advisable for the handle to be approximately 90 centimeters above the floor of the hallway to allow for easy movement in both sitting and standing positions. Since most elderly individuals lower their feet while walking, there should be no protrusions on the threshold of the door that could cause them to fall.

In the bedroom, the height of the window should be low enough for a person lying on the bed to easily see outside. This height should be considered between 30-60 centimeters from the floor. For dining rooms, a height of 70 centimeters is recommended for windows so that elderly individuals in a seated position can comfortably enjoy the view outside. The window sills should be at a suitable height to accommodate small decorations and flower pots. Window handles should be designed to operate with minimal force and be easily accessible at a lower level, preferably between 90 to 120 centimeters from the floor.

### Staircases

The design of staircases should ensure safety and have appropriate dimensions, sufficient lighting, and suitable handrails. Straight flights of stairs may appear more economical, but they are usually intimidating for the elderly and individuals with reduced mobility due to the long flight of stairs. It is better to divide them into two half-flights, although this increases the number of steps, it is more suitable for the safety and better balance of the elderly.

The maximum recommended number of steps for each flight is nine steps, and for a greater number of steps, the creation of landings for resting is necessary. For the elderly, an appropriate step surface should have sufficient width for them to stand on with some safety and catch their breath (Figure 4).

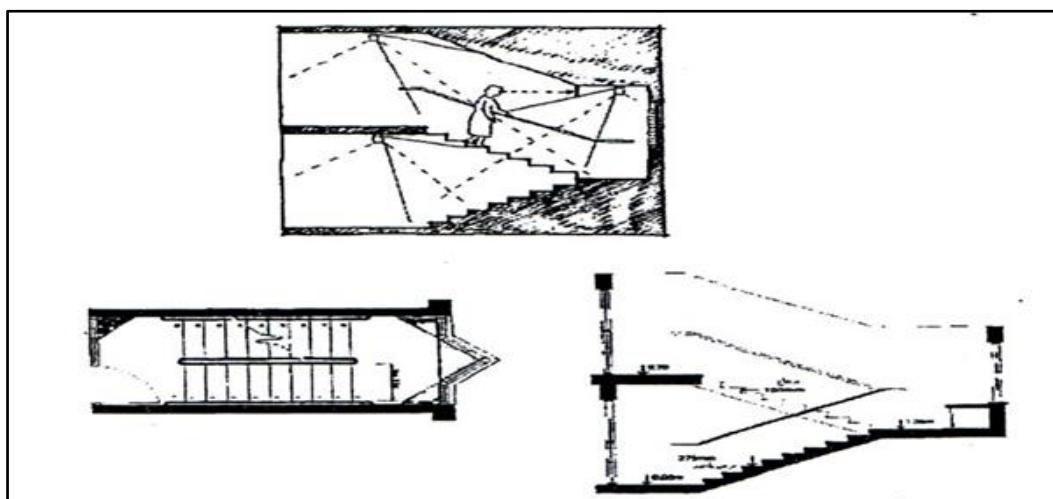


Figure 4. Appropriate Dimensions for Staircase

### Suitable Flooring

The hallways and rooms of elderly homes should have non-slippery, sturdy, and consistently smooth flooring to prevent wheelchair obstruction or loss of balance. Inappropriate flooring selection, especially in hallways, hinders the ease and safety of elderly individuals' movement and reduces accessibility. The most suitable types of flooring are vinyl or soft coverings. Selecting flooring materials that are susceptible to waxing or any similar treatment that may cause the surface to become slippery should be avoided; as such materials may lead to discomfort and reduced balance.

### Assistive Handrails

Assistive handrails should be placed on both sides of the elderly's paths of movement to ensure easy access. These handrails provide both sensory and real security to the elderly and are usually used in places where they provide the most assistance to individuals with disabilities. For example, they are essential in areas with changing angles and slopes, in bathrooms and restroom facilities, and anywhere that may require a momentary lapse of attention, such as transitioning from a dark space to a well-lit area.

Two handrails should be considered for both groups of elderly individuals, those with and without disabilities using wheelchairs, with one rail at a height of 90 centimeters and the other at a height of 65 centimeters. Additionally, to ensure that the elderly can easily grip the assistive handrails with maximum safety and confidence, the handrail section should be rounded and have an approximate diameter of 4 centimeters, with a distance of about 5 centimeters from the wall.

### Physical Programs for Designing Different Spaces of the Desired Site.

#### Administrative spaces

Fine-tuning the design of administrative spaces in elderly homes is a crucial aspect. Research findings indicate that the majority of office spaces are allocated to locations for Administration and meetings (50 meters), while the least amount of space is allocated to pantries and restroom facilities, Table 1.



Table 1. Physical Program of Administrative Spaces

	Space Name	Unit Area (square meters)	Number of Spaces	Total Area (square meters)	Descriptions
Administrative	Administration and Meetings	50	1	50	
	Deputy Office	20	1	20	
	Accounting	12	1	12	
	Archives	12	1	12	
	Security	12	1	12	
	Staff Break Room	14	2	28	
	Staff Cafeteria	50	1	50	
	Reception	12	1	12	
	Office Kitchenette	10	1	10	
	Restrooms	5	2	10	
	Total Sum: 216 square meters				

### Educational Spaces

Regarding the design status of elderly homes in Tehran, specifically focusing on the fine-tuning of the physical program for educational spaces within the facility, research findings indicate that out of the total area considered, which is 762.8 square meters, a portion of 50 square meters is allocated to educational classes such as interpretation and Quran studies, music, literature and poetry, English language, and literacy campaigns, Table 2.

Additionally, 20 square meters are designated for workshops including sewing and embroidery, carpet weaving, ceramics, and vocational workshops.

Table 2. Physical Program of Educational Spaces

	Space Name	Unit Area (square meters)	Number of Spaces	Total Area (square meters)	Descriptions
Educational	Classrooms	50	1	50	Quran Interpretation - Music - Literature and Poetry - English Language- Basic Education
	Workshops	20	1	20	Weaving (Sewing and Embroidery) - Carpet Weaving - Pottery – Technical and professional Production Workshop
	Computer Lab	12	1	12	
	Faculty Room	12	1	12	
	Restrooms	12	1	12	
	Total Sum: 762.8 square meters				

### Service Spaces

In this study, 1047.8 square meters of area is allocated to service spaces, as shown in Table 3.

Table 3. Physical Program of Service Spaces

	Space Name	Unit Area (square meters)	Number of Spaces	Total Area (square meters)	Descriptions
Service	Elders' Dining Room	400	1	400	Special Menu with Dietary Foods
	Kitchen	100	1	100	
	Food Storage	30	1	30	
	Cleaning Room	6	2	12	
	Women's Hair Salon	40	1	40	
	Men's Hair Salon	30	1	60	
	Total Sum: 1047.8 square meters				

	Bank	50	1	50	
	Tea House	30	2	60	
	Taxi Waiting Room	12	1	12	
	Prayer Room- Ablution Room	60	2	120	
	Supermarket	100	1	100	
	Bookstore	50	1	50	
	Restrooms	6/6	8	52/8	
	Engine Room and Facilities	400	1	400	
	Technical Equipment Storage	50	1	50	
	Security and Control	10	1	10	
Total Sum: 1047.8 square meters					

**Recreational and Cultural Spaces**

Table 4 presents some items related to the design status of comprehensive recreational and cultural spaces in elderly homes. The results indicate that out of 1434.8 square meters of recreational and cultural spaces, the majority of the areas are allocated to the main hall and gallery for displaying artworks.

Table 4. Physical Program of Recreational-Cultural Spaces

	Space Name	Unit Area (square meters)	Number of Spaces	Total Area (square meters)	Descriptions
Recreational-Cultural	Library				
	Study Hall	100	1	100	
	Loan Office	10	1	10	
	Library Supervisor Room	12	1	12	
	Lounge	150	2	300	
	Meeting Hall				
	Main Hall	500	1	500	
	Control Room	10	1	10	
	Waiting Area	100	1	100	
	Backyard	50	1	50	
	Gallery for Displaying Artworks	2	200	400	
	Office for Elderly-related Associations	30	5	150	
	Restrooms	6/6	8	52/8	
	Total Sum: 1434.8 square meters				

**Detailed Physical Program for Therapeutic, Rehabilitation, and Sports Spaces**

In this project, 1851.8 square meters are dedicated to therapeutic, rehabilitation, and sports spaces, categorized as shown in Table 5.

Table 5. Therapeutic, Rehabilitation, and Sports Spaces

	Space Name	Unit Area (square meters)	Number of Spaces	Total Area (square meters)	Descriptions
Therapeutic	Reception	12	1	12	
	Waiting Hall	50	1	50	
	Doctor's Office	16	2	32	
	Examination Room	16	2	32	
	Nursing	30	1	30	
	Inpatient	30	2	60	Three Beds per Room
	Counselor's Room	20	1	20	

Pharmacy	90	1	90	
Speech Therapy	20	2	40	
Therapy Group	35	2	70	
Physiotherapy Hall	150	2	300	
Chess Room	45	1	45	
Yoga Hall	100	2	200	
Pool - Hydrotherapy				
Reception and Waiting Area	45	2	90	
Shoe and Towel Delivery Area	12	2	24	
Locker Room	30	2	60	
First Aid	12	2	24	
Shower	5	8	40	
Staff Room	30	2	60	
Buffet	20	2	40	
Swimming Pool	120	2	240	
Rest Area	60	2	120	
Massage Room	60	2	120	
Restrooms	6/6	8	52/8	
Total Sum: 1851.8 square meters				

### HVAC System of the Project

The comprehensive design status of the HVAC system for elderly homes in Tehran is indicated. An evaporative cooler as well as a mist system are used to reduce dry air temperature. However, the process of water interacting with air in this system is different.

In the evaporative cooler, water is pumped under high pressure towards nozzles arranged in multiple rows along the airflow path. As a result of the pump pressure and passing through narrow nozzle openings, the water turns into a powder form, increasing surface evaporation. Water spraying from the nozzles not only reduces the passing air temperature but also removes dust and purifies the air to some extent.

If needed, to increase capacity and reduce the outgoing air moisture, a coil can be installed and circulated with cold water produced by a cooling tower to provide better conditions. By installing a hot water coil in the evaporative cooler and supplying it through the central engine, this equipment can also be utilized in winter. Installing a return air duct to recirculate a portion of the warm air can be highly beneficial in terms of energy efficiency.

### DISCUSSION

Activities that can be effective in improving the mental health of the elderly include socializing, recreation, staying active, having a warm family environment, engaging in conversations, and providing recreational facilities. Therefore, a place that can meet all these needs and allow the elderly to live alongside their families can be referred to as elderly care centers. This place can be built with the best facilities and specific standards for the elderly and the disabled, providing necessary equipment and amenities for suitable exercises according to their age.

The need for gathering and socializing spaces for the elderly and counseling centers - emotional needs of the elderly always exist, and as individuals age, their needs increase accordingly. Considering lounges as places for sitting and resting and creating spaces that can facilitate effective communication among the elderly is essential. These spaces can include sitting and viewing areas.

It means creating diverse spaces where nature is harnessed to meet the cooling and heating needs of the elderly, which are highly sensitive. The sound of water and chirping birds can be the best environment for tranquility and creating new connections. Therefore, having a clean and attractive environment significantly contributes to this matter. Color, lighting, and the surface texture are among the most

important features of creating a suitable space for the elderly. This set demonstrates that a high percentage of the spaces are allocated to social spaces and lounges.

The best suggested activities for the elderly (based on their literacy and individual preferences) include reading books and newspapers, strolling in green spaces, socializing and conversing with friends, watching movies, buying from buffets, sitting on benches and observing the streets, watching children play, and listening to music. Additionally, extraordinary events such as religious ceremonies, celebrations, concerts, and light games have a positive impact on the mood of the elderly and prevent monotony in their daily lives.

Furthermore, since the elderly spend most of their day in such environments, it is recommended to provide services such as hair salons and commercial stalls that cater to their needs. Moreover, if they have handicrafts, they can offer them for sale in these places. Service spaces should be designed in a way that allows the elderly to independently use them.

Bathroom facilities in such spaces should be separate for men and women. Additionally, washing and drying equipment should be easily accessible, and access to the bathroom from outside should also be provided for necessary occasions. The bathroom for those with physical disabilities should be designed in a way that enables independent use, as it is essential for the self-esteem of the elderly [9].

The restaurant is equipped with a large, well-equipped kitchen. Providing group catering services for a large number of individuals in such communal spaces requires mechanization, cost-saving work processes, electronic data processing (DP), and automated units known as "programmed kitchens" (from menu planning to provisioning and distribution of food and dishwashing). Preparing meals for over 800 to 1000 people involves different table settings and dishes. Preparation tables and serving areas are heated either by steam or electricity. The surface temperature of the table should be kept around 60°C [15].

Depression is more prevalent among elderly individuals who live alone and also experience physical discomfort. Therefore, it is necessary to create a suitable and better environment for their living to reduce the depressions caused by loneliness. Elderly people who, despite their old age, participate in social activities and have relatively good social relationships are less prone to various diseases, especially mental illnesses.

Another important issue is work. Work is the best way to spend one's old age. Work not only meets a real need in relation to the elderly, but with proper management, the results of the work of the elderly can address many aspects of societal needs. Therefore, self-employment workshops are recommended in this residential facility.

These workshops include revitalizing activities that are made available to the elderly upon request, including greenhouses, pottery workshops, and handicrafts. If these activities yield results, they can be sold in commercial booths within the same complex so that the elderly can see the results of their work and experience a sense of usefulness and productive living.

The elderly need physical and mental security, and this should be taken into account in the design of spaces related to the elderly. The elderly should feel secure that they can seek help in times of need or receive prompt treatment during illness. They should feel calm and free from harassment in the spaces they occupy. These examination rooms should have double doors with a total width of 120 centimeters, and it is recommended to consider a room area of about 18 square meters.

Due to the high age of the residents in this complex, the probability of accidents resulting from old age increases. It is necessary to have a short distance space for this purpose, along with a necessary medical practitioner. However, since it is a temporary space, it should have a parking area equipped with an ambulance for necessary transfers to hospitals.

Elderly individuals can follow exercise programs similar to those designed for young people in terms of principles and adaptability. Therefore, open-air or covered halls suitable for sports such as volleyball,

table tennis, etc., are considered in this complex. Furthermore, diverse pathways for walking and cycling can be created. Due to the elderly's age and the feeling of fatigue during the journey, there should be resting areas for sitting and relaxing, accompanied by a buffet and beautiful scenery. Boating and water activities offer a sense of vitality and freshness to the elderly. If there are suitable environmental facilities, this recreational sport can be utilized. Otherwise, aquatic physiotherapy and hydrotherapy can be used.

On the other hand, activities with lower energy costs, such as golf, bowling, billiards, and gentle stretching exercises, have less impact on physical fitness but can be effective in creating a sense of vitality in the elderly. For this purpose, spaces with suitable views and ventilation can be used for non-aerobic games such as billiards, chess, etc.

In conclusion, considering the mentioned topics and the fact that Iran is among countries with a large elderly population. Also due to the increasing number of active elderly individuals living alone and independently in their own homes in developed countries and Iran, the adherence to the mentioned guidelines for the elderly is essential in architectural designs, especially in green spaces. Designers and architects should incorporate them into their designs to create a suitable, usable, and enjoyable environment for the elderly, as they will be part of this segment of society in the future.

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