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Original Paper

Indoor and Built Environment

Indoor and Built Environment
0(0) 1–18
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journals.sagepub.com/home/ibe
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Environmental satisfaction levels of the elderly individuals in nursing home gardens

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Abstract

The present study presents a three-step methodology to determine the environmental satisfaction levels of the elderly individuals in nursing home gardens. The first step comprised the selection of seven nursing homes in five provinces in the Eastern Black Sea region in Turkey. In the second step, 130 participants were selected among the residents of these seven nursing homes via random sampling. In the third step, the satisfaction level of the nursing home residents with the institution gardens was determined. A correlation analysis showed a positive relationship between the environmental and individual characteristics ($r = 0.554$; $p < 0.01$). Simple regression analysis was conducted to determine the effect of environmental characteristics on the satisfaction of individual needs, after determining the direction and level of the relationship between the environmental and the individual characteristics via correlation analysis. The analysis indicated a significant relationship between the environmental and individual characteristics ($R = 0.610$; $R^2 = 0.373$; $F = 75.991$; $p < 0.001$). In conclusion, increased level of satisfaction with the existing physical characteristics of the gardens resulted in an increased level in meeting the psychosocial needs of the elderly individuals, thus, the environmental satisfaction level of nursing home residents increased as well.

Keywords

Elderly individuals, environmental satisfaction, nursing home gardens, physical properties, psychosocial needs, Turkey

Accepted: 29 September 2020

Introduction

Approach to the subject

A prevalent view throughout the history established that individuals psychologically and physically benefited from being in nature and surrounded by green areas and plants. Rapidly increasing urbanization and loss of green areas in the urban context and everyday life in the twenty-first century amplified the interest in green areas and the relationship between the green areas and individuals. Thus, relevant scientific studies presented a considerable progress during the last 30 years.[1]

The benefits of living in the nature and green spaces for individuals[2] were studied by environmental psychology researchers and it was widely accepted that being in contact with the nature had positive effects on human psychology.[3–6] Besides a direct interaction, observing the nature and green areas, such as flowers and trees outside a window and the feeling of proximity to such areas that could be accessed when anticipated

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provides various psychological benefits to individuals.[7,8]

Although the importance of parks and green areas for individuals is commonly associated with recreational and social activities, individuals can also have significant psychological benefits from the passive relationship established with the nature and the plants.[9–15]

Relationship between human and environment

Altman[16] described such relationship as a mutual bilateral interaction between the human and the environment and argued that as environment affected individuals, they also affected the environment. Imamoglu[17] stated that environment shaped individuals while the individuals shaped the environment. In other words, researchers on human and environment relations suggested that individual characteristics and environmental characteristics were not isolated from each other. Indeed, such relationship occurred between the (individual) subject and the (environment) object. In the model developed within the scope of the present study, the physical properties of the environment, which eventually led to satisfaction and preference or dissatisfaction and non-preference, were evaluated within the context of subjective and mental characteristics of individuals. The present study designated the physical properties of the environment as location, service, capacity, transportation, neighbourhood groups, structural and herbal elements in the gardens and functions of the nursing home gardens (physical, ecological, recreation, psychological, aesthetic, sociological and therapeutic). The subjective characteristics of individuals were the demographic characteristics of the elderly individuals and their psychosocial needs and expectations.

Theories about ageing

There exists a plethora of theoretical research that explains ageing. Disengagement, Activity, Role Exit Theories are among these studies. According to the Disengagement Theory, the phenomenon of ageing is a process of withdrawal for an individual.[18,19] Given that an elderly individual goes through such process while living in a nursing home, he/she might completely be disconnected from life, surroundings and other individuals. Therefore, instead of witnessing such withdrawal from life, designing environments where elderly individuals have the chance to experience nature, spend time, feel valued and even feel at home is essential. The Activity Theory suggested that elderly individuals could receive higher satisfaction from life due to their activities.[20–23] Role Exit Theory was defined by Blau as the process of losing several values of the adult identity for an ageing individual.[19,24] Elderly individuals in a nursing home might experience such loss higher compared to those living with their family, since, most elderly individuals assume a different role in nursing homes, leaving the values they accumulated throughout their life and the roles they had in the family behind. According to the Social Exchange Theory, weakened social position of an elderly individual led to decreased satisfaction and gradual withdrawal from relationships.[25]

Problems about ageing

Elderly individuals with increased physical problems exhibit depressive tendencies through establishing the causes of their depression on their physical problems.[26] Indeed, the main source of the problems experienced by elderly individuals often stems from the feeling of isolation from society due to repulsion, abandonment and solitude.[27] Elderly individuals staying in nursing homes are particularly isolated from the society, with a decreasing sense of belonging and ownership based on their place of residence.[28]

Such negative psychology, which increases due to the physical deficiencies of a place of residence[29,30] may further affect the mental and psychological structures of the elderly individuals and cause an increase in the reflected physical ailments.[28] Therefore, the nursing home gardens, designed as spaces that are pleasing for elderly individuals, might provide solutions for several biological, psychological, social and mental problems.

Moore et al.[31] emphasized the significance of 'feeling like home and feeling at home' in places such as nursing homes and elderly care homes. Furthermore, Frank[32] argued that an emotional connection between the space and the individual was essential in order to feel at home. Psychologically, creating an environment for 'feeling at home' has the potential to increase the quality of life and satisfaction levels of residents in places such as nursing homes and elderly care homes.[33–36] The concept of 'homemade' emerges due to the need to feel like at home, yet the residents in nursing homes or elderly care homes have limited capacity to realize such concept. In such context, 'home' covers the physical, psychological and social features.[37–39] Physical factors in the artificial and natural environment contribute to creating a sense of home in such institutions.[40–42] Especially, the use of communal areas in natural and artificial environments can positively affect the feeling of being at home.[43,44] To create a sense of home in elderly care or nursing homes is important, however, several research indicated that the elderly individuals still struggled to achieve such feeling.[45] In nursing homes or health institutions,

landscape gardens are commonly used for therapeutic purposes and healing disorders. For instance, healing gardens are designed to aid healing. Clinical findings of the patients indicate benefits such as decreased blood pressure, decreased anger and aggression, and increased ability to concentrate when exhausted.[46–49] Elderly individuals, who live in nursing homes, described such gardens as 'homelike spaces' more, when compared to elderly individuals, who live with their families at home.[50]

Environmental satisfaction

Satisfaction of a landscape and assessment of such satisfaction appear due to the interaction between the object and the subject and involve the physical characteristics of the environment and individual responses.[51,52] Another definition indicates that the design elements, the environmental variables and their combined layout within the landscape affect the observer.[53] In other words, it questions the extent to which certain criteria are met. Such criteria are considered in two groups: individual and environmental. Individual criteria include sociodemographic characteristics, while the environmental criteria include the physical and formal/aesthetic considerations. Environmental satisfaction is the assessment of the individual's subjective and mental responses and the measurable physical characteristics of the environment. It becomes possible to measure the satisfaction of an individual based on his/her subjective evaluation of the environment.[54,55] Satisfaction level is influenced by the existing physical and social context and the harmony between the subjective and mental processes of the individual.[56–61] In this respect, the present study was intended to develop a model to determine the satisfaction levels for the gardens at nursing homes (Table 1). For the proposed model, the factors that affected environmental satisfaction were listed as follows:

- The subjective and mental characteristics of elderly individuals were defined due to their sociodemographic characteristics and psychosocial needs and expectations.
- The physical characteristics of the environment were defined due to the existing physical characteristics and functions of the nursing home gardens.[62–65]

The environment and the individual, identified as two important factors affecting environmental satisfaction, were not be isolated from each other within the scope of the present study, since the individual is in a constant relationship with the physical environment. The characteristics, activities, needs, expectations, behaviours and mental (perception + cognition) processes of an individual affects the way the environment is perceived. Therefore, perception is affected by impulses based on necessities, cognition occurs, and the individual reacts to the environment with certain behaviour (satisfaction).[66]

Keul[67] described the environmental satisfaction concept as a complex totality of environment-related variables that do not actually belong to the inhabited space and claimed that the satisfaction level was determined through the expectations and the way the environment was perceived.

Furthermore, Keul[67] stated that satisfaction should not be limited to the interior space yet should be considered with respect to elements such as the region, settlement and neighbourhood.

Each environment is composed of elements (living and non-living) that define it. Environment is the product of the combination of these components, especially their features such as shape, texture and colour. In this context, defining the combination patterns of environmental components (plants, seating units, shading elements, promenades, porticos, roads, paths, ramps, stairs, etc.) is extremely important for environmental perception and assessment and the satisfaction and preference developed towards certain environments,[68,69] The environmental assessment of an individual has been emphasized to depend on the subjective and mental characteristics (age, gender, needs, etc.) of an individual as well as the information retrieved from the physical characteristics of the environment. In this respect, the use of multiple variables as simultaneous inputs during the assessment process becomes possible.

Assessing the environment and expressing satisfaction is a result of such sensory and emotional processes. Visible surfaces of an environment are described as 'form/aesthetics' through the visual perception, emotions and thoughts of individuals. Individuals experience attraction or displeasure towards the environment based on its expressions and visual aspects, while perceiving, understanding and interpreting it through

Table 1. The framework developed for determining the level of environmental satisfaction.

Individual (subjective) characteristics	Environmental (objective) characteristics
Psychosocial needs of the elderly Level of environmental satisfaction	Physical properties of nursing home gardens

'form/aesthetics.'[69] Furthermore, the existing physical and functions of the environment are interpreted, evaluated in line with the expectations and needs of an individual and either satisfaction or non-satisfaction are expressed.

Aims of the study

Within the scope of the model developed in the present research, environmental satisfaction was considered as an individual behaviour that emerges due to the evaluation of the physical and functional characteristics of the environment based on the psychosocial needs of an individual. Correspondingly, the aim of the present study was to determine the physical and functional characteristics of the nursing home gardens that provide a high level of environmental satisfaction and the related psychosocial needs of individuals. Hence, the level of environmental satisfaction of nursing home residents towards nursing home gardens varies based on their subjective and mental characteristics and the nursing home garden characteristics. Based on this basic assumption, the following assumptions were specifically investigated:

- Users in each nursing home have different levels of satisfaction with the existing physical characteristics of the gardens and fulfilling their psychosocial needs.
- There is a relationship between the level of satisfaction with the physical characteristics and functions of the gardens and fulfilling the psychosocial needs of the users.
- Increased levels of satisfaction with the existing physical characteristics and functions of the gardens result in increased levels of user satisfaction with fulfilling their psychosocial needs in the gardens.

Material and method

Selection and description of the case areas

The present study, which aimed to identify the environmental satisfaction and preferences of elderly individuals in nursing home gardens, was conducted in nursing homes in the Eastern Black Sea Region in Turkey (Figure 1).

Furthermore, selected nursing homes were operating under the General Directorate of Disabled and Elderly Services, of the Turkish Ministry of Family and Social Policies. The reason for such selection criterion is that these nursing homes are more prevalent and accommodate higher number of elderly individuals. There are seven nursing homes in the Eastern Black Sea Region in Turkey, with 596 elderly residents and all nursing homes operate under the control of the Ministry (Table 2 and Figure 2). Therefore, the present study was conducted in the abovementioned seven nursing homes.

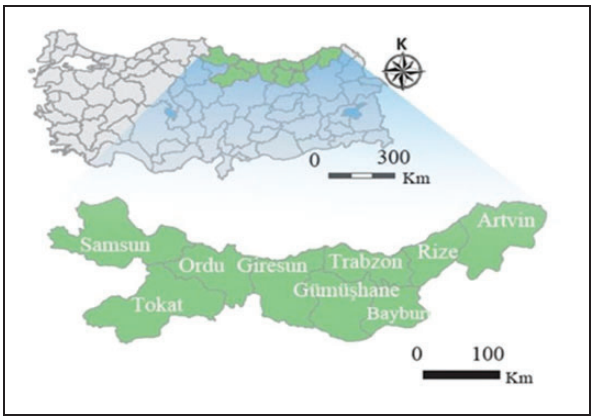


Figure 1. Selected nursing homes and the provinces in the Eastern Black Sea Region of Turkey.[70]

Audit studies in the nursing homes revealed the necessity for the following evaluations based on their current physical characteristics:

- The location of the nursing homes indicated that those in Ordu, Trabzon and Giresun provinces were in the urban context, those in Rize and Artvin provinces were either in districts other than the central district or in rural areas. Residents of the nursing homes in the urban context had easier access to urban spaces. Shuttles provided the transportation to the urban centre from all nursing homes, and the nursing homes in Trabzon and Ordu also had the opportunity of public transport.
- The examination of the neighbourhood groups revealed that Artvin Murgul, Naime-Ismail Yılmaz and Rize Fındıklı Nursing Homes were in remote locations from other districts and the city centres. The neighbourhood characteristics of the Trabzon, Ordu and Giresun Nursing Homes indicated that they were located at certain proximity to residential zones and other functional urban areas. Trabzon Çamlık Nursing Home and Ordu Ahmet Cemal Maden Nursing Home included institutions such as kindergarten, orphanage and other social service units.
- The circulation elements of the nursing homes were examined, and all nursing homes included in the present study had roads and ramps; however, only several had promenades and stairs. Naime Ismail Yavuz and Murgul Nursing Homes were found to have no paths in their gardens. Naime Ismail Yavuz Nursing Home was the only one without stairs,

Table 2. Nursing homes studied within the scope of the present study.

Code	Province	Name of the nursing home	Number of residents	Normal care	Special care
1	Artvin	Artvin Naime-Ismail Yilmaz Nursing Home	32	21	11
2	Artvin	Artvin Murgul Nursing Home	40	28	12
3	Giresun	Giresun Nursing Home and Elderly Care and Rehabilitation Centre	72	44	27
4	Ordu	Ordu Ahmet Cemal Mağden Nursing Home	157	135	22
5	Rize	Fındıklı Nursing Home and Elderly Care and Rehabilitation Centre	52	22	30
6	Trabzon	Trabzon Nursing Home and Elderly Care and Rehabilitation Centre	170	23	147
7	Trabzon	Trabzon Köşk Nursing Home	73	67	6
	Total		596	340	256

while the other six nursing homes had different types of stairs.

- The common spaces in all seven nursing homes were open and green spaces, carparks, soft paved open spaces, hard paved open spaces, and seating spaces. Inner court existed only in the garden of Naime Ismail Yavuz Nursing Home since it was situated in a street-type residential area. Rear gardens were present in all nursing homes except the Naime Ismail Yavuz and Murgul Nursing Homes. Open and green spaces, which could be described as recreational areas, were only present in the nursing homes in Ordu, Rize and Trabzon. A specifically designed space for food and beverage only existed in Ahmet Cemal Mağden Nursing Home. It had the function of a barbecue space. Children's play area only existed in Ahmet Cemal Mağden Nursing Home garden. There existed no meeting areas specifically designed for gathering and social events. Sports areas existed only in Ahmet Cemal Mağden Nursing Home garden. An open swimming pool existed in the garden of the Trabzon Köşk Nursing Home. Patio and viewing areas only existed in Giresun, Ordu, Rize and Trabzon Köşk Nursing Homes. There are animal shelters in the gardens of Rize and Köşk Nursing Homes. An area for planting and vegetation existed in the garden of the Naime Ismail Yavuz Nursing Home and did not exist in any other nursing homes.
- Furniture and structural landscape elements in nursing home gardens were investigated and all nursing home gardens included camellias, pavements, lighting elements, wall elements, benches and trash cans.
- The investigation of the vegetation in nursing home gardens revealed 54 different genera and 79 species and subspecies of these genera. Type of vegetation least diversified in the gardens of Murgul and Naime Ismail Yavuz Nursing Homes and the highest diversity and number of plants were determined in the garden of Ahmet Cemal Mağden Nursing Home.

Sample selection

Healthy elderly nursing home residents were included in the sample group and the elderly individuals who required special health care were excluded from the study. Hence, the sample group was composed of elderly individuals who were independent or semi-dependent, self-sufficient, could verbally communicate, did not have dementia and accepted to participate in the study. The decision in selecting independent or semi-dependent elderly individuals was based on their capability to experience nursing home gardens, thus these individuals could deliver further statements and expectations on the spatial characteristics of the gardens. The dependent individuals were excluded from the study since they usually spent their lives in the rooms or care units, hence could not experience the nursing home gardens and their expectations and viewpoint towards life were highly different when compared to those of healthy elderly individuals. Therefore, the questionnaire was carried out with the healthy elderly individuals in the seven nursing homes in the region, excluding those who needed special care.

Sample size

Sampling is the formation of smaller groups, selected from a universe and have the same characteristics with that universe, using specific methods. It is possible to make a prediction for the universe based on the results of the sample group. The methods to form sample groups include random, systematic, cluster or stratification sampling approaches. The sampling method used in the present study is the random sampling method.[71]

Sample size was calculated by equation (1)[72]

$$n = \frac{Z2 \times N \times P \times Q}{(N-1) \times D2 + Z2 + P \times Q} = 130 \qquad (1)$$

where N is the total number of residents in the seven nursing homes, 596 (obtained from each

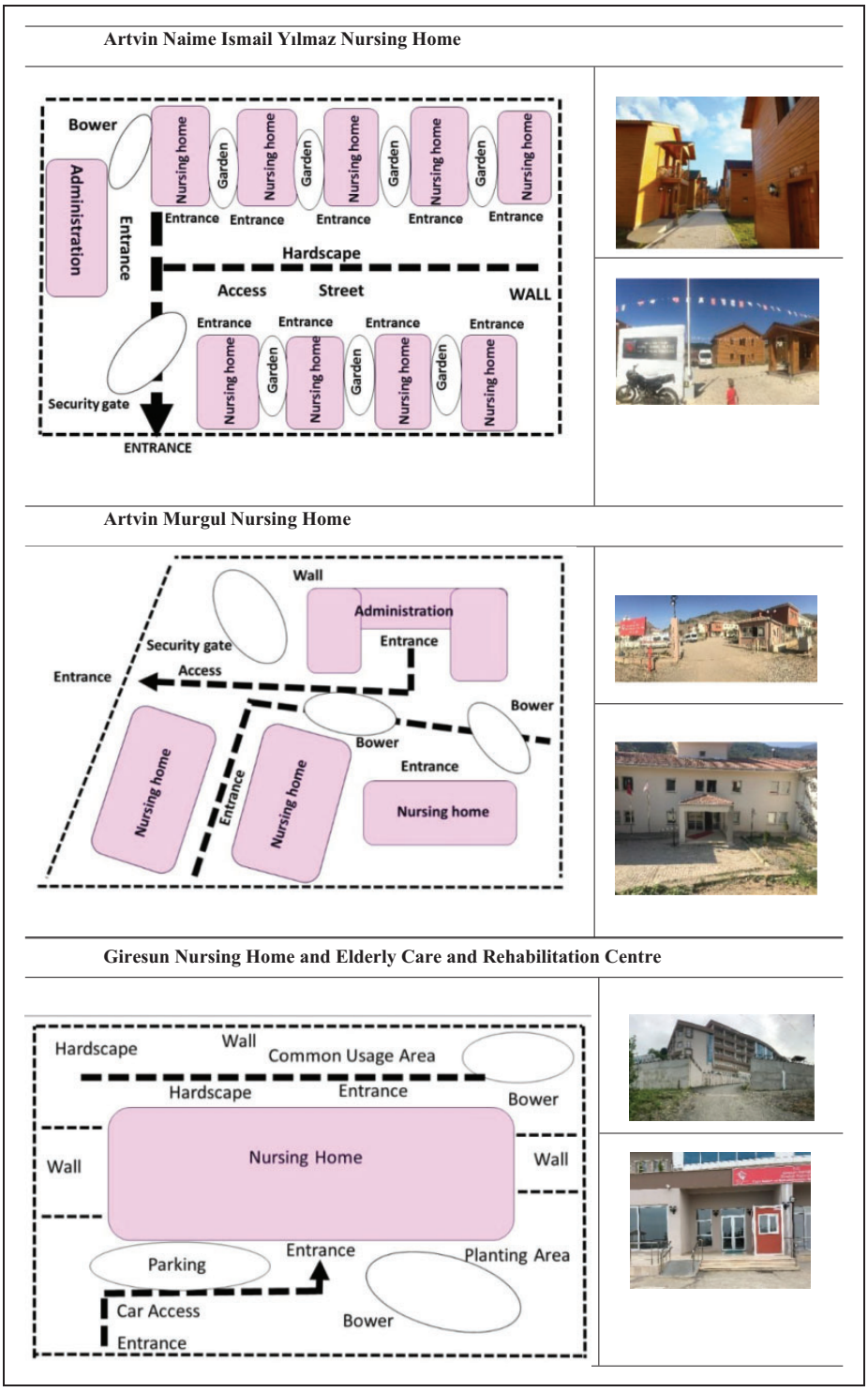
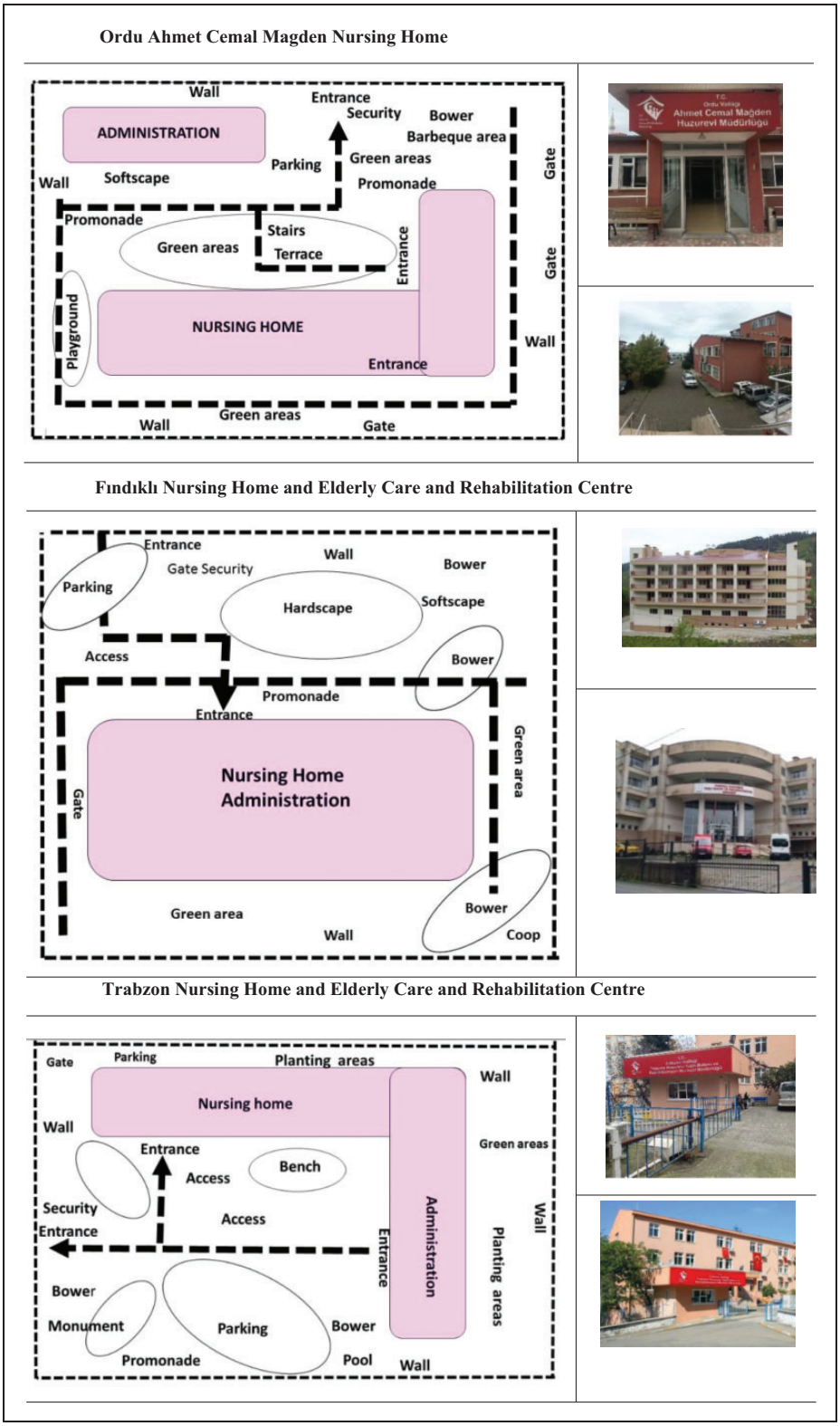


Figure 2. Planimetric schemes and photographs of the nursing homes studied within the scope of the present study.

institution on 20 September 2017); Z is the confidence level (99 confidence = 2.58), P is the probability of the event (0.5), Q is the improbability of the event (1–0.5 = 0.5), D is the accepted error margin (10% error margin = 0.1), n is the sample size.

Sample size based on each nursing home was also calculated using equation (2), using the information obtained from each institution on 20 September 2017

$$n\ province = \frac{n \times N\ province}{N} \quad (2)$$



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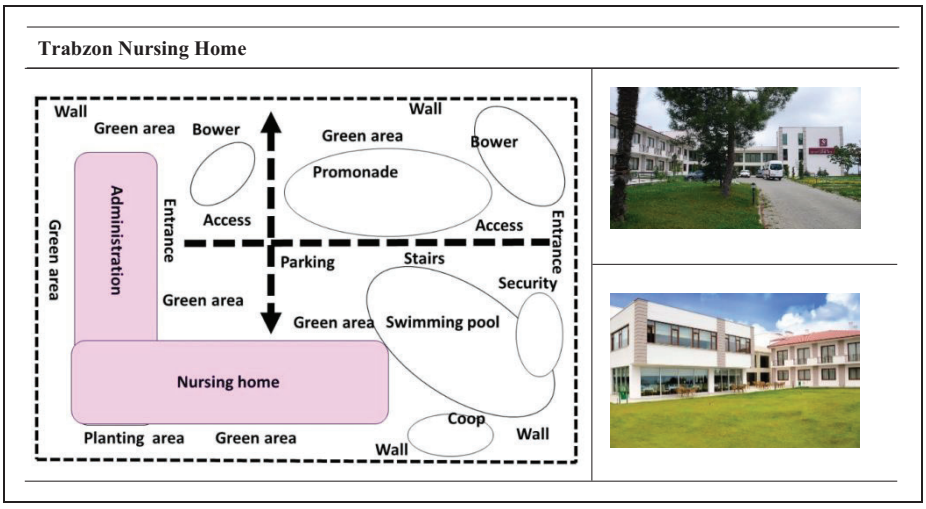

Figure 2. Continued.

where N is the total number of residents in the seven nursing homes, 596; n is the sample size (130), is the total number of nursing home residents in the province, $n_{province}$ is the sample size in the province.

Since the survey was conducted in nursing homes in the Eastern Black Sea Region, the sample size for each province was calculated with the formula presented above (Table 3).

Questionnaire form for determining environmental satisfaction levels

The social and psychological needs that affected the environmental satisfaction levels and the existing physical properties of gardens were determined through a literature review. Such background knowledge was categorized under two main sections in the questionnaire form and the nursing home residents were asked to respond to items in the questionnaire which were based on the Likert Attitude Scale. The questionnaire was carried out using face-to-face technique, as an interview was carried out in spaces such as the garden, room, meeting room and the tearoom.

The two main sections and the sub-categories in the questionnaire are as follows:

1. Individual characteristics
   a. Sociodemographic characteristics
   b. Psychosocial needs

2. Environmental characteristics
   a. Existing physical characteristics

The first part was intended to determine the sociodemographic characteristics of the nursing home residents who participated in the study (Table 4).

Table 3. Sample size based on provinces.

Province	Capacity	N ($Z = 99\%$, $D = 10\%$)
Artvin	72	15
Giresun	72	15
Ordu	157	35
Rize	52	12
Trabzon	243	53
Total number of nursing homes: 7596		130

Table 4. Sociodemographic characteristics in the questionnaire form.

Age
Gender
Marital status
Education
Profession
Income level
Type of stay
Length of stay

Furthermore, the first part aimed to identify the level of environmental satisfaction based on their psychosocial needs (Table 5).

The second part consists of questions that aim to determine nursing home residents' satisfaction levels for the physical properties of the gardens (Table 6). The participants responded the statements through a five-point Likert-type scale, in which 1 and 2 indicated that the functions were successfully fulfilled and the level of environmental satisfaction was high, 3 indicated that the participants did not have an idea on the

Table 5. Psychosocial needs in the questionnaire form.

Social relationships	The nursing home garden brings me and other residents together and provides us a warm environment (socially warm)
	The nursing home garden brings me and other residents together through various opportunities and allows us to socialize and communicate (social communication)
	The other residents are like a family to me, I get along very well with them (agreement)
Security	The garden of the nursing home is secure, I feel secure in the garden (security)
Activity	I use the nursing home garden for active activities (active activity)
	I use the nursing home garden for passive activities (passive activity)
	I use the nursing home garden for hobby activities (hobby activity)
Peacefulness	The nursing home garden gives me peace (peacefulness)
	The nursing home garden is harmonious with the environment (harmonious with the environment)
	The nursing home garden offers us a warm environment (warm)
	The nursing home garden gives me happiness (happiness)
Aesthetics	The nursing home garden is unique and different (unique)
	The nursing home garden is attractive and beautiful (attractive, beautiful)
	The nursing home garden is repelling and ugly (repelling, ugly)
	The nursing home garden provides us natural environments (natural)
	The nursing home garden provides us artificial environments (artificial)
	The nursing home garden is well-maintained (well-maintained)
	The nursing home garden is clean (clean)
Sense of belonging	I got used to the nursing home (getting used to)
	I feel like at home in the nursing home garden (sense of belonging)
	I feel like a stranger in the nursing home and its garden (alienation)
Prestige	The nursing home garden is flamboyant (flamboyant)
	The nursing home garden is impressive (impressive)
	The nursing home garden is attractive (attractive)
Comfort	The nursing home garden is comfortable (comfort)
	The nursing home garden is spacious (spacious)
	The nursing home garden is luminous (luminous)
	The nursing home garden is practical (practical)
	The nursing home garden is peaceful (peacefulness)
	The nursing home garden is organized (organized)

Table 6. Existing physical characteristics of the nursing homes in the questionnaire.

Are you satisfied with the design of the nursing home garden?
Are you satisfied with the location of the nursing home and the garden?
Are you satisfied with the functional areas in the immediate vicinity of the nursing home?
Are you satisfied with the distance of the nursing home to the city centre?
Are you satisfied with the accessibility to the institution from any location in the city?
Are you satisfied with the accessibility while walking, strolling or going from one place to another in the nursing home garden?
Are you satisfied with the nursing home building, your room?
Are you satisfied with the structural landscape elements in the nursing home garden?
Are you satisfied with the vegetative landscape elements in the nursing home garden?
Are you satisfied with the furniture in the garden? (seating furniture, tables, signposts, trash bins, sports equipment, etc.)
Are you satisfied with the circulation elements in the nursing home garden?
Are you satisfied with the activity spaces in the nursing home garden?
Are you satisfied to share the garden with other nursing home residents?
Are you satisfied with the gardening activities such as planting seeds and seedlings?

question and 4 and 5 indicated a decrease in the level of satisfaction.

Initially, 30 statements were submitted to the participants, targeting the requirements of being sociable, secure, efficient, peaceful, beautiful, sense of belonging and prestigious. The factor analysis of the scale was conducted prior to the evaluation of the responses to the statements on the psychosocial needs of the users,

and hence the related variables were grouped to define the conceptual sub-factors. Thus, seven expressions with factor loads less than 0.5 were excluded from the scale and the number of statements in the scale was decreased to 23. These 23 statements were grouped under three factor groups and total variance of these factors was determined as 52.1%.

1. The statements attributed to the first factor group indicated that the responses commonly corresponded to the needs defined as comfort and prestige needs in literature, therefore, this factor group was named as the need for comfort. This factor alone constituted the 26.9% of the total variance and included 14 statements. It also had the highest reliability value.
2. The statements attributed to the second factor group indicated that the responses commonly corresponded to the need for peacefulness in literature and, therefore, this factor group was named as the need for peacefulness. This factor group consisted of four statements. This factor alone constituted the 13.3% of the total variance and had a high reliability value.
3. Similar to the psychosocial needs, the questions based on the physical conditions of the gardens that were submitted to the participants through a Likert-type scale. The statements attributed to the third factor group indicated that the responses commonly corresponded to the need for sense of belonging in literature and, therefore, this factor group was named as the need for belonging. The third factor group was composed of five statements and constituted the 11.9% of the total variance.

Similarly, factor analysis was conducted for the second part of the questionnaire and relevant variables were grouped together to form the conceptual sub-factors. Varimax rotation principal components analysis was conducted and the responses with a factor loads less than 0.40 were hidden. Thus, four statements with factor loads less than 0.40 were excluded from the scale and the number of statements in the scale decreased to 10. These 10 statements were grouped under three factor groups and the total variance of these factors was 58.9%.

1. The statements attributed to the first factor group indicated that the responses commonly corresponded to the location of the environmental features in literature and, therefore, this factor group was named as the 'location features.' This factor alone constituted the 28.1% of the total variance and included three statements. It had the highest reliability value ($\alpha = 0.99$).
2. The statements attributed to the second factor group indicated that the responses commonly corresponded to the accessibility features in literature and, therefore, this factor group was named as the 'accessibility features.' This factor group was composed of three statements and constituted the 16.3% of the total variance. The reliability value of the factor group was 0.972.
3. The statements attributed to the second factor group indicated that the responses commonly corresponded to landscape design features in literature. The group consists of four statements and was named as the 'design features.' This factor group constituted the 14.5% of the total variance and had the lowest reliability value ($\alpha = 0.673$).

Results

Findings based on the sociodemographic characteristics of individuals

Nineteen of the nursing home residents, who participated in the questionnaire, were female and 111 were male. Of the 130 participants, 40 had and 90 did not have a pension; however, the participants without a pension received a consumer fee from the institution. Further socio-demographic characteristics of the nursing home residents, who participated in the present study, were presented in Table 7.

Effect of existing physical properties of the environment on the psychosocial needs of individuals

Mean values for the factors were calculated based on the participant evaluations for each nursing home and ANOVA analysis was conducted to determine whether the responses differed based on nursing homes (Tables 8 and 9).

Correlation analysis was conducted to determine whether there existed a relationship between the satisfaction levels of the elderly resident participants with the physical characteristics of the nursing home gardens and their satisfaction levels based on the capacity of these gardens in meeting their psychosocial needs. The results of the correlation analysis indicated a positive correlation between the two mean values with a level of 55.4% ($r = 0.554$; $p < 0.01$, $N = 130$). Such finding supported the assumption, as the satisfaction levels with the physical characteristics of the gardens increase the satisfaction levels based on the capacity of the gardens in meeting the psychosocial needs of the elderly individuals increase.

Correlation analysis was conducted to determine whether there existed a relationship between the

Table 7. The demographic characteristics of the residents in each nursing home.

Demographic characteristics		1	2	3	4	5	6	7
Total number of individuals		7 indiv.	8 indiv.	15 indiv.	35 indiv.	12 indiv.	12 indiv.	41 indiv.
Length of stay	1 year	3 indiv.	5 indiv.	7 indiv.	16 indiv.	2 indiv.	2 indiv.	12 indiv.
	2 years	4 indiv.	3 indiv.	8 indiv.	11 indiv.	4 indiv.	3 indiv.	23 indiv.
	More than 2 years	–	–	–	8 indiv.	6 indiv.	7 indiv.	6 indiv.
Type of stay	Paid	2 indiv.	3 indiv.	2 indiv.	7 indiv.	4 indiv.	5 indiv.	15 indiv.
	Unpaid	5 indiv.	5 indiv.	13 indiv.	28 indiv.	8 indiv.	7 indiv.	26 indiv.
Income level	Pension	2 indiv.	5 indiv.	2 indiv.	7 indiv.	4 indiv.	5 indiv.	15 indiv.
	No pension	5 indiv.	3 indiv.	13 indiv.	28 indiv.	8 indiv.	7 indiv.	26 indiv.
Health status	Special care	–	–	–	–	–	–	–
	Healthy	7 indiv.	8 indiv.	15 indiv.	35 indiv.	12 indiv.	12 indiv.	41 indiv.
Marital Status	Married	1 indiv.	1 indiv.	2 indiv.	5 indiv.	3 indiv.	2 indiv.	5 indiv.
	Single	6 indiv.	7 indiv.	13 indiv.	30 indiv.	9 indiv.	10 indiv.	36 indiv.
Level of education	Illiterate	2 indiv.	–	3 indiv.	5 indiv.	2 indiv.	2 indiv.	4 indiv.
	Literate	1 indiv.	1 individ.	9 indiv.	7 indiv.	7 indiv.	3 indiv.	13 indiv.
	Primary School	2 indiv.	2 indiv.	1 indiv.	15 indiv.	1 indiv.	4 indiv.	11 indiv.
	High school	2 indiv.	3 indiv.	–	5 indiv.	1 indiv.	3 indiv.	10 indiv.
	Two-year degree	–	1 indiv.	–	1 indiv.	–	–	1 indiv.
	Undergraduate	–	1 indiv.	2 indiv.	2 indiv.	1 individual	–	2 indiv.
Gender	Female	2 indiv.	2 indiv.	3 indiv.	5 indiv.	2 indiv.	1 indiv.	4 indiv.
	Male	5 indiv.	6 indiv.	12 indiv.	30 indiv.	10 indiv.	11 indiv.	37 indiv.
Hometown	Ankara	–	–	–	–	–	–	2 indiv.
	Artvin	6 indiv.	8 indiv.	–	–	–	–	–
	Antalya	–	–	–	–	–	–	1 indiv.
	Ardahan	1 indiv.	–	–	–	–	–	–
	İstanbul	–	–	–	–	–	–	2 indiv.
	Balıkesir	–	–	–	–	–	–	1 indiv.
	Sivas	–	–	–	–	–	–	1 indiv.
	Erzurum	–	–	–	–	–	–	1 indiv.
	Rize	–	–	–	–	12 indiv.	–	2 indiv.
	Trabzon	–	–	–	–	–	12 indiv.	25 indiv.
	Ordu	–	–	–	35 indiv.	–	–	–
	Giresun	–	–	15 indiv.	–	–	–	2 indiv.
	Çorum	–	–	–	–	–	–	2 indiv.
	Bursa	–	–	–	–	–	–	1 indiv.
	Aydın	–	–	–	–	–	–	1 indiv.
Age	60–64	2 indiv.	3 indiv.	3 indiv.	7 indiv.	2 indiv.	1 individual	6 indiv.
	65–69	3 indiv.	1 indiv.	6 indiv.	14 indiv.	5 indiv.	4 indiv.	14 indiv.
	70–74	–	2 indiv.	3 indiv.	5 indiv.	3 indiv.	5 indiv.	12 indiv.
	75–79	1 indiv.	1 indiv.	1 indiv.	7 indiv.	1 indiv.	1 indiv.	5 indiv.
	80 and more	1 indiv.	1 indiv.	1 indiv.	2 indiv.	1 indiv.	1 indiv.	4 indiv.

satisfaction levels of the elderly resident participants with the physical characteristics of the nursing home gardens and their satisfaction levels based on the capacity of these gardens in meeting their psychosocial needs. The results of the correlation analysis indicated a positive correlation between the two mean values with a level of 55.4% ($r = 0.554$; $p < 0.01$). Such finding supported the assumption, as the satisfaction levels with the physical characteristics of the gardens increase the satisfaction levels based on the capacity of the gardens in meeting the psychosocial needs of the elderly individuals increase.

Subsequent to presenting the direction and magnitude of the relationship between the physical characteristics of nursing home gardens and the psychosocial needs of the elderly individuals, who use these gardens, through a simple regression analysis was conducted to determine the effect of the physical properties of the gardens on the satisfaction of the needs (Table 10).

The analysis indicated that there was a significant relationship between the physical characteristics and the needs ($R = 0.61$; $R^2 = 0.373$; $F = 75.991$; $p < 0.001$). The success of physical characteristics explained the satisfaction level of meeting the needs

Table 8. Mean values for the factors based on the psychosocial needs of individuals in each nursing home.

	Nursing home code							
Psychosocial needs	1	2	3	4	5	6	7	
Comfort (*Mean*)	3.28542	3.17812	3.11386	2.30780	2.76133	3.07091	2.19987	*F*: 9.019
Comfort (*SD*)	0..33252	0.31948	0.287966	0.80878	0.40440	0.56830	0.72168	Sig: 0.000
Peacefulness (*Mean*)	3.14285	2.87500	2.83333	2.05000	1.77083	2.39583	2.14634	*F*: 4.004
Peacefulness (*SD*)	0.719622	0.896421	0.899735	0.911124	0.391069	0.52719	1.02007	Sig: 0.001
Belonging (*Mean*)	3.0000	3.2750	3.33330	2.62857	2.40000	2.88333	2.64878	*F*: 5.630
Belonging (*SD*)	0.64291	0.47734	0.49952	0.57012	0.17056	0.50060	0.62574	Sig: 0.000

Table 9. Mean values for the factors based on the existing physical characteristics of each nursing home.

	Nursing home code							
Physical characteristics	1	2	3	4	5	6	7	
Location (*Mean*)	2.2381	3.3750	2.6000	2.4571	2.9167	2.75	2.4146	*F*: 0.935
Location (*SD*)	0.91721	1.30247	1.24212	1.26823	1.31137	1.28806	1.34119	Sig: 0.472
Accessibility (*Mean*)	3.1429	2.8750	2.1778	2.5771	3.8889	2.3056	2.0488	*F*: 5.072
Accessibility (*SD*)	1.21499	1.35620	1.11175	1.21291	1.02822	0.96879	1.07124	Sig: 0.000
Design (*Mean*)	2.71143	3.3125	2.45	2.0286	2.1042	2.5833	2.0427	*F*: 4.039
								Sig: 0.001

Table 10. Regression analysis results based on the effect of physical characteristics of gardens on the needs of elderly individuals.

Model		*B*	Std. error	β	*t*	*p*
1	Constant	1.059	0.180		5.898	0.000
	Physical characteristics	0.607	0.070	0.610	8.717	0.000

$p < 0.01$.

by 37.3%. Such finding supported the assumption that, the satisfaction level of the nursing home gardens increases with respect to the increased satisfaction with psychosocial needs.

Effect of the factors related to the physical characteristics of gardens on factors related to the psychosocial needs of elderly individuals

The relationship between the physical characteristics of nursing home gardens and the psychosocial needs of the elderly individuals was presented. Sub-factors related to the physical characteristics, namely the location, accessibility and design features, were examined through a correlation analysis to determine the relationship between these sub-factors and satisfaction levels with the needs (Table 11). Pearson correlation analysis was conducted to determine whether there existed a significant relationship between factors and the results indicated that there was a significant positive relationship between the location features of the garden and comfort ($r = 0.577$; $p = 0.0$), peacefulness ($r = 0.409$; $p = 0.0$) and sense of belonging ($r = 0.409$; $p = 0.0$) needs of the elderly individuals. Table 11 shows that the location features of the gardens mostly affected the comfort need of the elderly individuals. The accessibility feature of the gardens had a positive significant relationship with the comfort ($r = 0.439$; $p = 0.0$), peacefulness ($r = 0.44$; $p = 0.0$) and a sense of belonging ($r = 0.355$; $p = 0.0$) needs. Table 11 shows that accessibility feature commonly affected the peacefulness and comfort needs. The design features of the gardens commonly affected the sense of belonging needs of the elderly individuals ($r = 0.430$; $p = 0.0$) and these variables exhibited a positive significant relationship. There was a positive significant relationship between the design features of the gardens and the comfort ($r = 0.308$; $p = 0.0$) and peacefulness ($r = 0.273$; $p = 0.002$) needs of the elderly individuals (Table 11).

Table 11. Findings of the correlation analysis between the physical characteristics of nursing home gardens and the psychosocial needs of the elderly individuals.

	Need for comfort	Need for peacefulness	Need for belonging	Location features	Accessibility features	Design features
Need for comfort	1					
Sig.						
Need for peacefulness	0.730**	1				
Sig.	0.000					
Need for belonging	0.654**	0.716**	1			
Sig.	0.000	0.000				
Location features	0.577**	0.409**	0.409**	1		
Sig.	0.000	0.000	0.000			
Accessibility features	0.439**	0.440**	0.355**	0.349**	1	
Sig.	0.000	0.000	0.000	0.000		
Design features	0.308**	0.273**	0.430**	0.276**	0.347**	1
Sig.	0.000	0.002	0.000	0.001	0.000	

**$p < 0.01$. $N = 130$.

The direction and magnitude of the relationships between the sub-factors related to the physical characteristics of nursing home gardens and the sub-factors related to the psychosocial needs of the elderly were determined through the correlation analysis and multiple regression analysis was conducted to determine the effect of the sub-factors on the satisfaction of the needs (Table 12). Regression analysis was conducted on the factors of physical properties at once through the 'enter method.' The regression analysis yielded an R^2 value of 0.382. The analysis was compatible with the linear model ($F = 25.935$; $p = 0.0$) and there was no autocorrelation.

As seen in Table 12, the three factors related to the physical characteristics of the gardens had a positive significant effect on the satisfaction of meeting the needs of the elderly individuals.

The factors that explain meeting the needs and the related satisfaction at a high level were location features ($\beta = 0.256$; $p = 0.0$), accessibility features ($\beta = 0.198$; $p = 0.001$) and design features ($\beta = 0.135$; $p = 0.0$).

The effect of these physical characteristics on factors related to the needs of the elderly individuals was presented in Table 13.

Based on these results, location features were significantly effective on the satisfaction of the elderly individuals by nursing home gardens in meeting their comfort needs ($\beta = 0.466$; $p = 0.0$), and were followed by the accessibility features ($\beta = 0.243$; $p = 0.002$) and the design features ($\beta = 0.95$; $p = 0.203$).

Similarly, satisfaction levels based on the need for peacefulness in nursing home gardens were significantly affected by the accessibility features ($\beta = 0.314$; $p = 0.0$), followed by the location features ($\beta = 0.276$; $p = 0.001$) and the design features of the gardens ($\beta = 0.089$; $p = 0.289$).

Table 12. Regression analysis results of the relationship between factors related to the physical characteristics of gardens and the satisfaction on the psychosocial needs of elderly individuals.

Model	*B*	Std. error	*β*	*t*	*p*
(Constant)	1.087	0.183		5.937	0.000
Location	0.256	0.052	0.375	4.939	0.000
Accessibility	0.198	0.056	0.277	3.555	0.001
Design	0.135	0.063	0.163	2.152	0.033

$R = 0.618$; $R^2 = 0.382$; corrected $R^2 = 0.362$; Model $F = 25.935$; $p = 0.000$.

Finally, the satisfaction of the elderly individuals in meeting the need of belonging was significantly affected respectively, by the design features ($\beta = 0.302$; $p = 0.0$), location features ($\beta = 0.271$; $p = 0.001$) and accessibility features ($\beta = 0.155$; $p = 0.064$).

Discussion

Currently, problems based on ageing due to the increase in the elderly population became inevitable. Various problems arise due to the characteristics of the elderly individuals and several others are due to the characteristics of the environments of these individuals.

Elderly individuals have health problems more frequently and they live with chronic disorders. Such disorders or health problems naturally affect the environmental satisfaction of the elderly individuals. The most special and sensitive among the elderly individuals are those residing in nursing homes, given that

Table 13. Regression analysis results, representing the effect of the factors related to the physical characteristics of the gardens on the factors related to needs.

Independent var.	Need for comfort			Need for peacefulness			Need for belonging		
Model	*B*	*β*	*t*	*B*	*β*	*t*	*B*	*β*	*t*
(Constant)	0.992		5.037***	0.702		2.601**	1.568		9.077***
Location features	0.349	0.466	6.255***	0.256	0.276	3.351***	0.163	0.271	2**
Accessibility feat.	0.191	0.243	3.182*	0.306	0.314	3.719***	0.098	0.155	1.868
Design features	0.087	0.095	1.280	0.099	0.088	1.065	0.221	0.302	3.723***
	$R = 0.636$			$R = 0.524$			$R = 0.544$		
	$R^2 = 0.405$			$R^2 = 0.275$			$R^2 = 0.295$		
	Corrected $R^2 = 0.391$			Corrected $R^2 = 0.257$			Corrected $R^2 = 0.279$		
	Model $F = 28.593$			Model $F = 15.909$			Model $F = 17.616$		
	$p = 0.000$			$p = 0.000$			$p = 0.000$		

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

ageing is one of the most problematic periods in life and elderly individuals might require institutional care.

Literature review on the subject indicated a comprehensive research conducted by Rockaway[73] at Brandeis University, named 'Garden designs for the elderly: a guide to design successful outdoor landscapes.' Rockaway[73] concluded that open spaces were not feasible for the elderly individuals, it was a major deficiency and existing design criteria should address such problems. Rockaway[73] determined design criteria based on the studies of gerontologists, psychologists, sociologists, urban planners, landscape architects and architects. Further in the study, Rockaway[73] argued that the increase in the elderly population in the United States demanded the designers to put more effort into understanding the requirements of the elderly individuals and design accordingly. Designing successful environments for this particular group required a comprehensive knowledge of other requirements of the elderly individuals besides their psychological needs. Designs and designers that address such needs could provide environments that the elderly individuals benefited physically and emotionally and were satisfied with.[73] A similar finding was determined in the present study. Thus, as the satisfaction of nursing home residents with the physical nursing home garden features increased, in other words, as the physical conditions were improved, the elderly would feel better psychologically.

A different study conducted by Tutal et al.[74] accessibility and usability were considered the prerequisites for the built environment and participation in everyday life in Tutal et al.'s[74] study. The study argued that participation in the built environment and everyday life was only possible via accessibility, regardless of age, gender, religion, language, nation or physical or mental condition of individuals. Tutal et al.'s[74] study was established upon the concept of active ageing and elderly-friendly cities through utilizing health, participation and safety in the best viable way to increase the quality of life in the aging process.[74] Karaçor and Özdede[75] developed some design criteria for their environmental design project for Düzce nursing home in 2015. At the beginning of these criteria, they considered accessibility. Karaçor and Özdede[75] developed several design criteria for the environmental design project for Düzce Nursing Home in 2015. The most significant of these design criteria was addressed as accessibility.[75] Similarly, accessibility attribute of institutional gardens was rated as one of the three most important attributes by institution residents. Furthermore, accessibility was determined as the second most effective attribute that explained satisfaction among these three physical attributes (accessibility, design and location).

Another study, which focused on the outdoor design in three elderly nursing homes in Ankara and was conducted by Oğuz et al.,[76] examined (1) existing exterior design approaches in nursing homes and revealed (2) the outdoor use patterns of the elderly individuals who lived in these nursing homes. The authors of both studies claimed that the goal of design and planning should be to provide perceivable and livable spaces, regardless of the scale of these spaces.[75,76]

In Koura et al.[77] participants were evaluated before and after each therapy activity, and results showed that garden therapy activities revived at least four of the five senses. Koura et al.[77] determined that most activities revived the visual and tactile senses, while none affected the olfactory and auditory senses. However, the collecting and tasting the cultivated products within the scope of planting activities stimulated the gustatory sense.[77,78] The present study explored the effects of the existing physical properties of the nursing home gardens on the comfort, peacefulness and sense of belonging requirements of the nursing home residents and a relationship between the two was identified.

Zeisel et al.[79] concluded that elderly people, who spent time outdoors, had improved sleep patterns, less pain complaints, and slowed down dementia and Alzheimer's symptoms.[79] Sugiyama and Thompson[80] identified a direct relationship between the quality of living environments and the health of elderly individuals and concluded that elderly individuals, who lived in supportive environments, were more physically active.[80] Similar to the findings of Sugiyama and Thompson,[80] the present study also found a positive relationship between the characteristics of the environment and the psychosocial needs of the elderly individuals.

Conclusion

The present study determined environmental satisfaction levels and environmental preferences in nursing home gardens. Significant aspect of the present study were that it addressed issues such as elderly individuals, nursing homes, satisfaction and preference, which were frequently studied in postgraduate and academic circles, within the scope of environmental characteristics, established the relationship between these issues and landscape architecture, and explored the characteristics that increased environmental satisfaction and preference for nursing home gardens. The originality of the present study was based on the presented research model and examination of the elderly individuals and their environments within the scope of 'object and subject interaction,' along with determining the level of environmental satisfaction and preference of nursing home residents in nursing home gardens. The present research is also original in terms of providing insight on the research domain and addressing the lack of criteria on the functional and spatial characteristics of nursing home gardens in the legislatives of the Disabled and Elderly Services General Directorate of the Ministry of State for Family and Social Policies in Turkey.

The present study indicated that the level of environmental satisfaction of residents was highly affected by the requirements of comfort, peacefulness and sense of belonging. Furthermore, the study showed that the level of environmental satisfaction varied for each nursing home. The psychosocial requirement that affected the level of environmental satisfaction most was the need for comfort, second ranking requirement was peacefulness and third was sense of belonging. Similarly, the physical characteristics that affected the level of environmental satisfaction were location features, accessibility features and design features. Among these, the physical characteristic that affected the level of environmental satisfaction most was accessibility. Furthermore, results show that satisfaction levels varied based on institutions due to the different accessibility features of each nursing home. The second ranking physical characteristic that affected the level of environmental satisfaction was design features of the nursing home gardens. The designs of the spaces in the gardens differed based on institutions and were found insufficient both through researcher examination and participant evaluation. The location features indicated that the researcher examinations and participant evaluations were similar. Therefore, location features were less effective in shaping the level of satisfaction with the environment and did not cause significant differences for different nursing homes.

The present study also scrutinized the effects of each sub-factor of the physical characteristics of the environment on the sub-factors of the psychosocial requirements of individuals. Results show that location and accessibility features of nursing home gardens affected the satisfaction of the elderly individuals in terms of meeting their needs for comfort, peacefulness and sense of belonging. Furthermore, design features were found to affect the needs for comfort and peacefulness.

Limitations of the study

There were several limitations to the present study, which was conducted with the aim to determine the environmental satisfaction levels and environmental preferences in nursing home gardens:

- The study was conducted only in the selected nursing homes in the Eastern Black Sea Region, Turkey.
- The number of participants based on seven nursing homes could be considered as a limitation. Further number of nursing homes could lead to a larger sample size, therefore the reliability of the study could increase.
- In the questionnaires conducted with nursing home residents, several participants remained impartial and abstained from expressing their opinions and actual judgements.
- Nursing home residents were uncomfortable with expressing their actual judgements, thinking that they would either be discharged from the institution or encounter negative situations.

Given the limitations above, further studies can expand case study areas to more than one region or identify study areas around Turkey to conduct similar research and compare the findings with the present study.

Authors' contribution

All the authors contributed equally in the preparation of this article.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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