THE IMPORTANCE OF HORTICULTURE THERAPY AND GARDENING FOR OLDER ADULTS IN NURSING HOME

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ABSTRACT

Horticulture is the cultivation of fruits, flowers, and vegetables. This is used as a therapeutic approach. Horticultural activities may be a new strategy for the elderly to promote mental, social and cognitive functioning. Over the past few decades, horticulture has been used as a suitable treatment for elderly in long-term care centers while gardening is still not used as a treatment for the elderly in Turkey. The aim of the study was to review the benefits or the positive effects of horticultural therapy on elderly in nursing homes. The study also provides some helpful design solutions to promote the creation of such spaces in nursing homes especially in Turkey. Horticulture requests of elderly individuals in nursing homes need to be met in a way allowing easy access of individuals in nursing homes. The importance of the horticulture in this organization must be understood and adopted.

Keywords: *Gardening, Horticulture terapy, Elderly, Nursing Home, Well-being, Turkey*

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HUZUR EVİNDEKİ YAŞLILARA YÖNELİK HORTİKÜLTÜREL TERAPİNİN VE BAHÇECİLİĞİN ÖNEMİ

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ÖZET

Bahçecilik, meyve, çiçek ve sebze yetiştiriciliğidir. Bu terapötik bir yaklaşım olarak kullanılmaktadır. Bahçıvanlık faaliyetleri, yaşlılar için zihinsel, sosyal ve bilişsel işlevlerini geliştirmek amacıyla yeni bir strateji oluşmaktadır. Uzun vadeli bakım merkezlerinde yaşlılara yönelik, bitki yetiştirmek bir tedavi olarak kullanılırken, Türkiyede hala böyle bir gelişmeye rastlanmamaktadır. Bu derleme çalışmanın amacı, huzurevlerindeki bahçıvanlık etkinliklerin yaşlılar üzerindeki yararlarının ve olumlu etkilerinin incelemesidir. Ayrıca, özellikle huzurevlerinde bahçıvanlık için uygun alanların tasarımına yönelik bazı tasarım kriterlerini sunmaktadır. Huzurevlerindeki yaşlı bireylerın hortikültürel talepleri bireyi zorlamadan karşılayabilecek biçimde organize edilmesi gerekmektedir. Dıs mekânların bu organizasyon içerisindeki önemi mutlaka anlaşılmalı ve benimsenmelidir.

Anahtar Kelimeler: *Bahçecilik, Hortikültürel Terapi, Yaşlı, Huzur Evi, İyileşme, Türkiye*

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1. INTRODUCTION

A number of elderly is rising. Since diseases and disorders that impair functional abilities are common among older people, the likelihood of elderly living in nursing homes also increases (Figure 1).

The elderly in the nursing home show a lot of negative features among the common features in the nursing home is the loss of autonomy and self-confidence, loneliness and despair of depression and dementia (Boerlage et al. 2008, Tse et al. 2012, Drageset et al. 2013, Dahlkvist, et al, 2016; Rappe, 2005).

Going and living in a nursing home is a difficult experience for many older people. This is likely to be more damaging to those who are currently losing their health or illness, illness, dependency and limited social and material resources. Establishment of nursing homes is aimed at helping older people who cannot act independently. However, moving older people to these places is a change in the living environment that can lead to a reduction in socialization with the family and the community and to reduce physical activity and enhance their loneliness understanding. The physical activity of the elderly in the nursing home is much lower than in their homes. In the nursing home, the elderly encounter changes in everyday life, social networks, and support. When they leave their homes, these people are confronted with the loss of their family homes, and neighbors (Perveen, 2013; Tse et al. 2012; Gerritsen et al, 2004; MacRae, 1996; Kane et al, 2003).

Individuals in nursing homes have expressed feelings of loss of freedom, loss of control, loneliness, and feelings of failure in life. Residents also confirmed the loneliness of the nursing home and said they were surrounded by strangers and sick people. Such negative feelings about living in a nursing home have harmful effects on their health, and lead to poor quality of life (Perveen, 2013; Tse et al. 2012; Gerritsen et al, 2004; MacRae, 1996; Kane et al, 2003).

Researches has shown that the quality of life of nursing home residents can be significantly improved by making the nursing home seem not like an institution but like home-while delivering custodial care and needed medical care on a continual basis. Though the elderly would prefer to be at home, if they need significant help with the activities of daily living and continuous monitoring, the nursing home is a better environment.

Figure 1. *Example of nursing home*

Creating an environment that delivers aesthetic pleasure and the possibility of diverse activities as well as socializing opportunities can increase the quality of life in these places (Figure 2) (Rappe, 2005).

The positive impact of contacting nature with activity in the green area on the physical and mental health of all age groups, especially the elderly, is something that has been proven by a large number of recent studies Ulrich, 1984; Sherman et al, 2005; Stigsdotter, & Grahn, 2002; Pouya et al, 2015; Pouya & Demirel,2015; Ulrich et al, 1991; Marcus & Barnes, 1999, Rappe, & Kivelä, 2005). One of the most important and effective activities in this field is horticulture (Rae, 2014; Shaw, 2015; Clatworthy et al, 2013). For decades, horticulture has been used as a treatment for people with disabilities and needs, including adults with physical and mental disabilities, children with disabilities, the elderly and prisoners. Horticulture can stimulate emotions in people. Because plants rely on human care to grow (Moshfegh et al, 2015; Perveen, 2013).

Nursing homes, for meeting the needs of the elderly for their welfare and care in Western cultures often due to cultural differences in Turkey it is not a preferred solution. However, the change in the lifestyles of today's living conditions, gradually in the public and private nursing homes in Turkey has led to a continual rise. However, when the perspective of spatial organization analyzed, the number of successful examples in Turkey is rather limited. According to "Nursing Home and Elderly Care and Rehabilitation Centers Regulation for Nursing Homes" (2001) there are some principles related to common use and private use in the interior space, but there is no relevant approach to external space design or activities. However, the fact that spending time in outer space directly affects the quality of life in the elderly is often noticed especially recently (Oğuz et al, 2010).

Providing care for the elderly in Turkey, which is lower in comparison with developed countries due to cultural differences, and this nursing home is provided by the central government. With regard to the reduction of social assistance, residents of nursing homes face many problems, including psychological disorders such as isolation, depression, and loneliness, that the most common of which is depression (Şenol et al, 2013).

Figure 2. *Gardening in the nursing home by elderly*

Method

This research aims to develop and adopt planning and design strategies in Turkey in order to contribute to the literature on gardening and horticulture in nursering homes which there is not yet sufficient study and data. Although the topic of horticulture and its importance in mental and physical well-being is highly researched by researchers, the distinction of this paper is to examine the importance of these types of activities in nursing homes. On the other hand, providing some helpful design solutions to promote the creation of such spaces in nursing homes specially in Turkey.

Nursing Homes In Turkey

The older population is growing worldwide. In Turkey, the proportion of the 65-year-old population increased to 4.3% in 1990, 7.5% in 2000, 7.2% in 2010 and 7.7% in 2012. As for the TURKSTAT population forecast, while the population growth rate was 11.2 per thousand in 2013, It will reduce it to 8.4 per thousand in 2023. It seems that the reason for this is a rapid decline in fertility and an increase in life expectancy. The demographic structure is gradually changing. For example, rural-urban migration has increased, the traditional family structure has been replaced by the nuclear family, women have started to play a more active role in working life. Fertility rates dropped to 2.23 in comparison with the previous year. According to the TURKSTAT estimates, the number of old people will multiply (Lök et al, 2017; Bekaroğlu et al, 1991).

Table 1. shows the percentage distribution of age groups within the overall population over the years from 1935 to 2000. We see that, in our country, the share of the elderly population within the overall population has remained under 5 per cent until the end of the 20th century. According to the 2000 census results, the population aged 65 and over, which was 3.858.949, represented 5.7 per cent of the overall population. Calculations based on the assumption that current demographic trends would continue signify that the 21st century will be a century of the elderly also in Turkey, in parallel to the expectation in the whole world. It is expected that together with the changing age structure, the elderly population will gain importance on social, demographic and economic terms also in Turkey, especially in the second half of the century. According to the Turkish Statistical Institute projections, the elderly population counted as 3.9 million in the 2000 Census is forecasted to represent 19 per cent of the overall population by 2050 (State Planing Organization, 2007).

Table 1. *Percentage Distribution of Age Groups within the Overall Population, Census Results*

Year	Total Population	Age Groups (percentage)		
		0-14	15-64	65 years and above
1935	16.158.385	41.4	54.7	3.9
1940	17.820.950	42.1	54.3	3.5
1945	18.790.174	39.5	57.1	3.3
1950	20.974.188	38.3	58.4	3.3
1955	24.064.763	39.3	57.3	3.4
1960	27.754.820	41.2	55.2	3.5
1965	31.391.421	41.9	54.1	4.0
1970	35.605.176	41.8	53.8	4.4
1975	40.374.719	40.6	54.8	4.6
1980	44.736.957	39.1	56.1	4.7
1985	50.664.458	37.6	58.2	4.2
1990	56.473.035	35.0	60.7	4.3
2000	67.803.927	29.8	64.5	5.7

The first order of elderly services in Turkey belong to a nursing home within the framework of social security and social services programs. Elderly care services are carried out by the Social Services and Child Protection Agency (SHÇEK) in Turkey. In 1956 the General Directorate of Social Services was established and the State has been held responsible for the planning and execution of the services that are brought to life by this date. With the Social Services and Child Protection Agency (No. 2828) enacted in 1983, this institution directly undertook all duties related to the elderly freshman. The most important services related to elderly welfare are institutional care (nursing home), elderly counseling centers and home care services. There are a total of 239 nursing homes in Turkey (Aylaz et al, 2005; Çohaz, 2010; Ardahan, 2010).

Persons who are deprived of physical and social aspects are taken to nursing homes but they are 60 years of age or older in mental and spiritual health who are deprived of physical and social well-being but who can meet their daily needs independently (such as eating, drinking, and toilet), do not have a severe illness or disability requiring continuous medical care and treatment.

In addition to meeting the daily needs of older people living in nursing homes, it is also important to make medical care and treatments, to help solve psychological and social problems, to develop social relations, to evaluate their time, also by taking into account the food expenditure rates and health status, all necessary services are provided in coordinated fashion by specialists such as doctors, nurses, social workers, psychologists, dietitians and physiotherapists to ensure that they are fed properly (Perveen, 2013; Tse et al. 2012; Gerritsen et al, 2004; MacRae, 1996; Kane et al, 2003).

Nature and Health Benefits for Older Adults

Older people benefit from engagement with outdoor environments in three main ways: participation in outdoor physical activity, better mental health and function, and social interaction with others. Table 2. is a review of the literature - a listing of studies that makes it abundantly clear why older adults need access to nearby nature (Wolf & Housley, 2016; Nelson et al, 2007).

Table 2. *Nature and Health Benefits for Older Adults (Wolf & Housley, 2016)*

Physical Activity and Mobility	Regular participation in moderate physical activity generates substantial benefits for older people's health. Those who are more active may delay the onset of changes associated with aging and common chronic diseases. Participating in physical activity also improves balance and muscle strength, preventing accidental falls, a major cause of disabilities in older people. For older people, simply walking outside and staying outdoors for a brief time is beneficial. Gardening is an activity that contributes to overall health and perceived well-being. And even non-aerobic activities have positive effects on well-being.
Mental Health & Well Being	The connection between nearby nature and active living has been studied extensively. Recent studies have focused on the relationships between nature encounters and mental health, cognitive function, and mood. Simply walking through a natural space or engaging in a calm activity, such as enjoying a patch of flowers or birdwatching, can support mental health and well-being. Here are some of the research highlights
Essential Social Connections	Older people have much to share and contribute in their communities. Ensuring their access to community green spaces, parks, and walkways provides a wealth of physical, mental and social benefits that not only benefit each individual but also improves community quality of life. At the neighborhood level, having nearby nature facilitates informal social interactions. Residential common spaces having more trees and vegetation are associated with increased use of common spaces and stronger neighborhood social ties. Urban parks and greening projects can help create the environments that facilitate social contacts and community attachment.
Cognitive Function & Dementia	A number of cognitive impairments, collectively termed dementia, afflict older persons. For example, some older people were impaired by Alzheimer's disease and some degree of depression. Nature is an abundant source of sensory experiences and provides dementia patients with opportunities for relaxation, physical activity, connection to cultural heritage, enjoyment and stimulation of the senses. Assisted living interventions that promote normal household life, encourage independence and mobility, and incorporate natural elements (including plants, trees, animals, daylight) in the lives of people with dementia are generally recommended. For those experiencing depression, a garden-walking program with a reflective journaling component can contribute to significant reduction in depression levels. Participants in one study greatly benefited from "being away" from daily pressures, experiencing the beauty of the garden, focused self-reflection and feeling gratitude.

Definition of Horticulture Therapy

Horticulture as "the arts and the science of plant growth, including flowers, fruits, vegetables, and trees and shrubs that lead to the development of people's minds and feelings and the enrichment and health of civilization" (Figure 3) (Relf et al., 1992). Horticultural treatment (HT) is a recovery process in which plants and horticulture activities are utilized to improve the body, mind, and morale of the people. According to the dictionary, horticulture is derived from the hortus, meaning a garden and culture is culture in the dictionary as soil cultivation; the development, improvement or modification of the mind, feelings, interests, behaviors, tastes, ideas, customs, skills, art, etc., (Perveen, 2013; Tse et al. 2012).

Figure 3. Horticulture of elderly people

It is argued that HT is one of the most effective treatments for people of all ages, backgrounds and abilities. The terms "Horticultural therapy" and "therapeutic horticulture" are defined as the process of interaction between individuals and plants or gardens. " HT is the professional use of the plants as an environment through which certain specific clinical goals are realized." HT is a process where individuals can continue to recover by using plants and horticulture. It is achieved through direct or inactive involvement (Perveen, 2013; Simson, S., & Straus, 1997; Haller & Kramer, 2006).

Therapeutic horticulture or horticultural therapy

Horticulture are used as a method of treatment for different age groups of people in different environments to promote health, well-being and social cohesion. Over the past few decades, horticulture has been used as a suitable treatment for people with disabilities and various needs, including adults with physical and psychological disabilities, disabled children, poor people, and prisoners (Perveen, 2013; Rappe, 2005; Davies, 1998; Sempik et al, 2003).

Research has shown that patients and the elderly have health and well-being when exposed to plants. Centers that work with the elderly population use garden sites in their landscape as part of their health interventions (Barnicle and Midden, 2003; Bassen and Baltazar, 1997; Rappe and Kivela, 2005; Collins & O'Callaghan, 2008). These efforts are carried out with various forms of inactive fun to active group activities, such as the production and cultivation of the plants, which have shown that it increases the emotional health and participation of the elderly (Collins & O'Callaghan, 2008). Horticulture is an activity that many older people enjoy doing (Figure 4). The majority (90%) of nursing home residents surveyed in one of the studies reported that they enjoyed gardening in the past. Many have regretted leaving their homes and horticulture activities (Rothert and Daubert, 1981; Collins & O'Callaghan, 2008).

Figure 4. *Horticulture is beneficial for older people because it is an enjoyable form of exercise; increases levels of physical activity and helps mobility and flexibility; encourages the use of all motor skills; improves endurance and strength; helps prevent diseases*

"Horticulture is one of the progressive advancements of previous Americans and as a therapeutic activity that increases physical and mental health. They found that older people who live in a health facility for long periods of time and do not have exercise satisfaction are less. However, people who participated in horticulture activities had a significant increase in self-esteem due to passive contact with plants and active participation (Barnicle, 2003).

Horticulture is widely accepted as an activity for the elderly. In general, horticultural groups are effective in improving social performance, self-efficacy. In a horticulture program, participants have learned to work with plants in a healthy, professional or recreational setting. In general, there is evidence that a program conducted in an outdoor environment often shows positive results compared to the indoor environment. Horticulture is defined as art and science of the growth of flowers, fruits, vegetables, trees and shrubs, and, leads to the development of people's minds and feelings, enrichment and the health of communities. Advantages of horticulture on the level of physical abilities can help to increase muscle strength, improve motor skills and improve balance (Perveen, 2013).

Horticulture in the nursing home

The moving and living in a nursing home is a difficult experience for many people (Aylaz et al, 2005; Çohaz, 2010; Ardahan, 2010). The quality of life in a nursing home is lower than other places. Long-term care for older people is often accompanied by loneliness, social isolation and feeling of worthlessness (Perveen, 2013; Tse et al. 2012; Gerritsen et al, 2004; MacRae, 1996; Kane et al, 2003).

This issue is likely to be more difficult for those who currently have a health problem or illness, pain, dependency, and social and material resources. Nursing homes are built for older people who cannot act independently. Nevertheless, living in a nursing home leads to a change in the living environment, which can lead to a decline in socialization with the family and society, reduced physical activity and increased perceptions of loneliness. The problems of independence and security are shared by the inhabitants.

According to Gren (1991), an older person in institutional care often takes on an inactive role as a dependent. In addition, the design of nursing homes is often very important, which can exacerbate isolation, loneliness, and loss of ability and identity (Rappe, 2005; Perveen, 2013).

An individual with special needs is a person who might benefit from paticipation in horticultural activities or from viewing plants and landscape, but who requires special adaptations or modifications for this to occur. These special adaptations may be required because of pysical, mental, or social limitations that prohibit the individual from acting on his or her own without assistance.

Enabling or accessible gardens are public and private gardens can be made significantly more useful to individuals with disabilities. This involves more approprite design and the incorporation of tools, techniques, and plant material selected to enhance gardening for elderly peolpe (Relf & Dorn, 1995).

Over the past 20 years, in nursing homes, health centers, and daycare centers for the elderly, they have been designing gardens that specifically address the physical, cognitive, emotional and spiritual needs of the elderly. Powell Lawton's behavioral psychoanalysis, conducted in the 1970s and 80s, emphasized that the environment could have major effects on people with cognitive impairment (Garcia, 2014).

One of the positive effects of plants on the functional and cognitive abilities of elderly people has an effect on their psyche through observation of garden and horticulture. Studies have shown that exposure to plants can create positive emotions and reduce mental stress as well as increase the emotional and cognitive health of the elderly (Rappe, 2005).

The studies show that the protective effect of horticulture and other activities such as knitting can be due to the stimulation of cognitive functions. It was shown in a diminution that Dutch elderly men, who were horticulturists, showed a lower risk of cardiovascular disease than those who were less active. Horticulture independently has a positive correlation with total cholesterol, HDL cholesterol, and systolic blood pressure. Participation in horticulture, such as sport, decreases with a growth of age. Transfer to residential care has led to a significant reduction in the range and frequency of horticultural activities in relation to living in an independent home. Stein (1997) noted that through horticulture, residents of nursing homes were able to create new memories and new meanings for their lives (Perveen, 2013; Rappe, 2005; Davies, 1998; Sempik et al, 2003).

Figure 5. *Garden beds, equipment and tools can all be modified if necessary, so older people can create a garden that is interesting, accessible and productive*

Horticulture is a kind of breeding of a living creature, and one of the things that make the elderly a better quality of life is to feel useful. Plants need daily care for their growth, and this activity makes them feel good in the elderly. Those who are often worried and nervous about their future health are more hopeful and more relaxed by seeing the growth of plants (Lewis 1996; Blake, & Mitchell, 2016).

Horticulture can stimulate feelings in person (Figure 6). Because plants need essential human care to their grows. Lewis (1996) states that horticulture is particularly effective for those who believe they are affiliated with others. This is a way of giving a sense of responsibility and independence, especially for those who think that these features have been lost due to illness, disability or commitment. Horticulture can then play an important role in increasing self-esteem too. The physical activity of the elderly in the nursing home is much lower than that of people living in their own independent homes. In nursing homes, the elderly encounter changes in everyday life, social networks, and support. Older people may feel that they have lost their families and neighbors when leaving conventional homes (Perveen, 2013).

Residents of nursing homes have pointed to the loss of control, loneliness, and feeling of failure in nursing homes. Such negative feelings about living in a nursing home have harmful effects on their health and lead to poor quality of life. The new approach to caring for the elderly can prevent mortality due to spatial changes and also increase the quality of life of the elderly. It has been pointed out that horticultural activity may be a good strategy to increase physical and cognitive performance as well as socialization in the elderly.

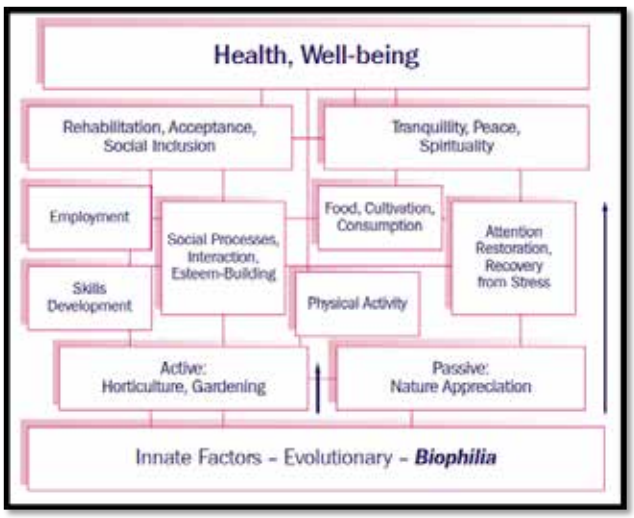

Figure 6. *Health and Well-being Through Nature and Horticulture (Aldridge & Sempik, 2002).*

Dementia is a long-term condition that affects the health of the individual, personal circumstances, and family life. Alzheimer's disease is the most common form of dementia and usually occurs in people over the age of 70. Early dementia begins before the age of 65. Dementia also has a great influence on the relationship between the individual and his family and friends. Physical

activity with long-term memory can increase the sense of familiarity and control in the elderly (Tse, 2010; Woods et al, 2012; Rappe, & Topo, 2007; Rappe, & Lindén, 2002; Garcia, 2014).

A number of studies about horticulture therapy have shown the benefits of horticulture activities for dementia patients. Detweiler et al. (2012) concluded that garden therapy is effective in reducing pain, improving attention, reducing stress, reducing drug intake, and reducing depression. Jarrot and Gigliotti (2010), in a case study of 8 nursing homes, showed that groups participating in horticultural activities showed better adaptive behavior. Yasukawa (2009) similarly, the level of communication, interaction, and the ability of patients with Alzheimer who were involved with horticulture for three months is better than others (Tse, 2010).

Design consideration of horticulture gardens

In designing and creating horticultural gardens, the essential principles used by designers in terms of various sources are briefly summarized as follows.

In a space designed as a garden for the elderly, it is necessary to consider the users' physical and emotional safety. In design should ensure the accessibility of all residents in nursing homes. The designer should design spaces with physical and emotional comfort to elderly, causing them to tend to stay in the garden and interact with others. Designs should create comfortable places for walking and sitting that encourage their social interactions (Figure 7). Elements in the garden should, as far as possible, divert the elderly from stress and avoid using foreign objects and elements. Outstanding points in the design of horticulture garden in nursing homes is the availability and interaction with the plants. In order to create a sense of relaxation, designer should have better creates spaces as possible as to create nature sounds, such as water, plants and animals sound (Foke et al, 2017; Marcus, C. C., & Barnes, 1999; Marcus, C. C., & Sachs, 2013; Souter-Brown,2014; Marcus & Francis, 1997)

Figure 7. *Raised beds are generally 3'-4' wide and as long as desired. However, depending on the individual's strength and endurance, it would be wise to limit the length of the bed to 10 or 20 feet to prevent overexertion in circling the bed*

The entrance to the garden must be specified so that the user can find it easily. The starting point and end of the garden are recognizable. It is recommended secondary entry for personnel or repairs and emergency entry. This entry should not be visible. Install sign for informative

purposes and user guide. They can be located near the entrance as the focal point. Providing storage for tools and materials used for horticulture activities. Provide water resources to support horticultural activities.

Planning a raised garden is understanding the needs and abilities of the gardeners. The garden area should be as small as possible to adequately meet these needs. As the garden size increases, the fun of horticulture tends to change to drudgery. All of the raised beds or planters should be easily accessible and arranged in a fashion to fit together as an attractive landscape unit. Avoid the tendency to line up little garden plots in rows resembling graveyards. Trees and shrubs can be used to enclose one or more sides of the raised garden site, providing both privacy and a pleasing backdrop, but avoid shading the garden with excessive plantings. Beds and planters can be designed to fit individual needs. (Url 11).

For interactions and working with the plants, gardening beds should be used at different heights of the boxes. Plants should be available to all users. Used paving should be simple and adaptable to wheelchairs, with a minimum width of 1/2 m. The surfaces should not be slipped during wetting and should be designed without reflection of consistent color. Avoid the distance between the tiles (except expansion joints) (Foke et al, 2017; Marcus, C. C., & Barnes, 1999; Marcus, C. C., & Sachs, 2013; Souter-Brown,2014; Marcus & Francis, 1997).

Provide at least one bench every 5 meters along the route. This not only enables users to regularly keep track of the rest, but also provide a visual indication to encourage them to walk more. Provide different types of seats in the desired spaces. Provide chairs right or opposite each other for social interactions. Between the tile and the chair, design a hard surface with a width of at least 0.6 meters. Also, pay attention to the color contrast between the chair and the hard surface. Create a disabled wheelchair near the embedded bench. Establishing suitable shelters for 10 to 12 people in special circumstances such as barbers. Align the rails along the track to help people move and maintain balance. It is better to have these rails fitted at different heights (Foke et al, 2017; Marcus, C. C., & Barnes, 1999; Marcus, C. C., & Sachs, 2013; Souter-Brown, 2014; Marcus & Francis, 1997).

The designer is required to create a shadow in the areas designed for horticulture so that they do not shine directly from the sun. This can be done by installing appropriate canopies. These canopies simultaneously provide the necessary light for plant growth. The shape and form of the work chairs for horticulture are also important points in design that should be taken into consideration. These seats should allow easy use and mobility of the elderly. Drinking water springs and toilet bowls at the garden level should have proper access and be available for all types of elderly people (Foke et al, 2017).

Plants, flowers, and vegetables used for horticulture should be selected properly. There are several criteria for choosing plants (Table 3). Sensory features in plant selection are among the most important issues. (Figure 8). Hot colors example of red and orange stimulate the mind, while cold colors like blue and purple create a sense of calm in the elderly. The tissue of plants is also understood through tactile sense, and plants with soft and interesting tissues are considered

by the users. The smell and aroma of plants are also important in choosing species. Some smells awaken past memories. Some smells occur by touching leaves or crushing plants. Plants that attract birds and other living organisms provide a good opportunity to see sighting. Stay as far away as possible from poisonous plants or barbs in horticulture. To educate and raise the information of users, it is possible to provide a guide for use or information required through labels (Foke et al, 2017; Marcus, C. C., & Barnes, 1999; Marcus & Sachs, 2013; Souter-Brown, 2014; Marcus & Francis, 1997)

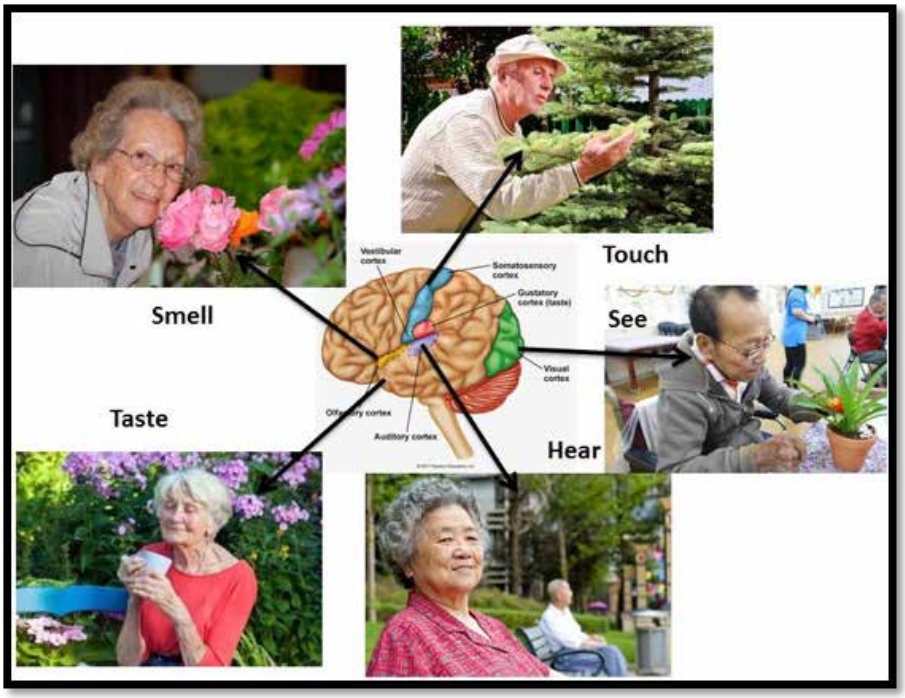

Figure 8. *Stimulation of five senses in horticultural therapy*

Table 3. *Examples of plants that can be featured in therapeutic gardens for their different characteristics*

Examples Of Plants For Colour		**Examples Of Plants For Texture**		**Examples Of Fragrant Plants**	
Arundo dona 'Versicolour'	*Graptophyllum pictum* 'Tricolour'	*Pennisetum* x *advena* 'Rubrum' (Red Fountain Grass)	*Leucophyllum frutescens* (Barometer Bush)	*Gardenia mutabilis* (Thai Gardenia)	*Aloysia virgata* (Sweet Almond Verbena)
Bridelia ovata (variegated)	*Aglaonema* cultivars	*Dalbergia latifolia* (Black Rosewood)	*Argyreia nervosa* (Elephant Climber)	*Cananga odorata* var. *fruticosa* (Dwarf Ylang Ylang)	*Uvaria grandifl ora* (Red Hot Poker)
Cyathula prostrata (Purple Hookweed	*Syngonium* cultivars	*Ficus villosa* (Villous Fig)	*Licuala grandis* (Ruffl ed Fan Palm)	*Pleiocarpa mutica* (Kanwene)	*Vallaris glabra* (Bread Flower)
Hibiscus rosa-sinensis 'Cooperi'	*Planchonella obovata* (Sea Gutta)	*Conocarpus erectus* var. *sericeus* (Silver Buttonwood)	*Calathea* cultivars	*Gardenia jasminoides* (Cape Jasmine)	*Ocimum basilicum* (Basil)
Ipomoea batatas 'Margarita' (Margarita Sweet Potato Vine)	*Saraca indica* (Asoka Tree)	*Microsorum musifolium* 'Crocodyllus' (Crocodile Fern)	*Pellionia repens* (Rainbow Vine)	*Magnolia figo* (Banana Shrub)	*Citharexylum spinosum* (Fiddlewood)
Dillenia excelsa (Simpoh Lak)	*Trachelospermum asiaticum* cultivars	*Orchidantha fi mbriata*	*Ipomoea quamoclit* (Cypress Vine)	*Ixora fi nlaysoniana* (Siamese White Ixora)	*Quisqualis indica* (double-petalled)
Clerodendrum thomsoniae (Bleeding Heart)	*Hamelia patens* (variegated) (Variegated Firecracker)	*Petrea volubilis* (Sandpaper Vine)	*Tetracera indica* (Fireweed)	*Wrightia religiosa* (Water Jasmine)	*Tarenna fragrans* (River Tarenna)
Plectranthus scutellarioides cultivars (Coleus)		*Pilea mollis* 'Moon Valley'		*Jasminum sambac* cultivars (Arabian Jasmine)	
Examples Of Plants Associated With Local Cultural Memory		**Examples Of Edible Plants**		**Examples Of Plants For Attracting Fauna**	
Psidium guajava (Guava) * Kampung home garden	*Adenanthera pavonina* (Saga) *Seeds are a symbol of love	*Annona squamosa*(Custard Apple)	*Averrhoa bilimbi* (Belimbing)	*Afgekia sericea* (Silky Afgekia)	*Asclepias curassavica* 'Silky Yellow' (Milkweed)
Tamarindus indica (Tamarind) * Kampung home garden	*Carica papaya* (Papaya) *Kampung home garden	*Centella asiatica* (Indian Pennywort)	*Platostoma palustre* (Chin Chow)	*Rhodomyrtus tomentosa* (Rose Myrtle)	*Cratoxylum cochinchinense* (Kayu Arang)
Nephelium ramboutan-ake (Pulasan) * Kampung home garden	*Hymenocallis speciosa* (Spider Lily) * Habitat of fi ghting spiders	*Coffea arabica* (Arabica Coffee)	*Lansium domensticum* (Langsat)	*Etlingera elatior* (Torch Ginger)	*Calotropis gigantea* (Giant Milkweed)
Manihot esculenta	*Artocarpus*	*Leptospermum*	*Kaempferia*	*Callerya*	*Cheilocostus*

(Tapioca) * Kampung home garden	*heterophyllus* (Jackfruit) * Kampung home garden	*madidum* ssp. *sativum* (Weeping Tea-Tree)	*galanga* (Sand Ginger)	*reticulata* (Evergreeen Wisteria)	*speciosus* (Crepe Ginger)
Syzygium aqueum (Jambu Ayer) * Kampung home garden	*Ipomoea batatas* (Sweet Potato) *Kampung home garden & commonly used in local cuisine	*Basella alba* 'Rubra' (Red Ceylon Spinach)	*Plectranthus amboinicus* 'Variegatus' (Variegated Indian Borage)	*Aristolochia acuminata* (Dutchman's Pipe)	*Gomphrena globosa* 'Fireworks' (Bachelor's Button)
Manilkara zapota (Chiku) *Kampung home garden	*Punica granatum* (Pomegranate) *Symbol of good luck in Chinese culture	*Tagetes lucida* (Sweetscented Marigold)	*Persicaria hydropiper* (Laksa Leaf)	*Leea rubra* (Pucok Merah)	*Odontonema cuspidatum* (Cardinal's Crest)
Impatiens balsamina (Balsam) *Kampung home garden	*Azadirachta indica* (Neem Tree) *Signifi cance in Hinduism	*Gnetum gnemon* (Belinjau)	*Piper nigrum* (Common Pepper)	*Rotheca myricoides* 'Ugandense' (Blue Butterfl y Bush)	*Flacourtia inermis* (Thornless Rukam)
Pandanus amaryllifolius (Pandan) *Kampung home garden & commonly used in local cuisine		*Clitoria ternatea* (Butterfly Pea)		*Ficus deltoidea* (Mistletoe Fig)	

RESULTS

Various studies showed the benefits of horticultural garden and horticulture as a mediating role for patients' physical functioning such as pain relief, increased balance, emotional or psychological functions such as reducing stress and modulating stimulation, cognitive functions and activities and promoting social participation, or avoiding social isolation or loneliness. These various forms of benefits are important factors for improving the quality of life, as well as reducing long-term care costs in the nursing home.

Horticulture is widely accepted as an activity for the elderly. In general, horticultural groups are effective in improving social performance, self-efficacy. In a horticulture program, participants have learned to work with plants in a healthy, professional or recreational setting. Studies have shown that exposure to plants can create positive emotions and reduce mental stress as well as increase the emotional and cognitive health of the elderly. The authors state that the protective effect of horticulture and other activities such as knitting can be due to the stimulation of cognitive functions.

Plants need daily care for their growth, and this activity makes them feel good in the elderly. Those who are often worried and nervous about their future health are more hopeful and more relaxed by seeing the growth of plants. This is a way of giving a sense of responsibility and independence, especially for those who think that these features have been lost due to illness, disability or commitment. Horticulture can play an important role in increasing self-esteem too. The physical activity of the elderly in the nursing home is much lower than that of people living in their own independent homes. In elderly homes, the elderly encounter changes in everyday life, social networks, and support.

According to a survey conducted in a nursing home in Turkey (Oguz et al, 2010), 85% of respondents are in favor of spending time in the garden and there was no significant difference between the sexes in this respect. 55% of the participants said they would enjoy planting themselves in the garden. Before these individuals settled in the nursing home it is determined that they are engaged in such activities. Participants who don't want to be deal gardening in the nursing home, due to health problems, these activities can't be accepted were identified during verbal negotiations (Oğuz et al, 2010).

In a space designed as a garden for the elderly in nursing homes, it is necessary to consider the users' physical and emotional safety. Designs should create comfortable places for walking and sitting that encourage their social interactions (Figure 9). Elements in the garden should, as far as possible, divert the elderly from stress and avoid using foreign objects and stomachs. Designer to create a sense of relaxation should create sounds of nature, including water, plants, and animals (Figure 10). The entrance to the garden must be specified so that the user can find it easily. For interactions and ease with the plants, gardening beds should be used at different heights of the boxes. Plants should be available to all users (Figure 11). The designer is required to create a shadow in the areas designed for horticulture. This can be done by installing appropriate canopies. Plants, flowers, and vegetables used for horticulture should be selected properly. Sensory features in plant selection are among the most important issues. To educate and raise the information of users, it is possible to provide a guide for use or information required through labels.

Figure 9. *Designs should create comfortable places for walking and sitting that encourage their social interactions*

Figure 10. *Designer to create a sense of relaxation should create sounds of nature, including water, plants, and animals*

Figure 11. *For interactions and ease with the plants, gardening beds should be used at different heights of the boxes. Plants should be available to all users*

Residents of nursing homes have the feeling of loss of control, loneliness, and feeling of failure in nursing homes. Such negative feelings about living in a nursing home have harmful effects on their health and lead to poor quality of life. The new approach to caring for the elderly can prevent mortality due to spatial changes and also increase the quality of life of the elderly. It has been pointed out that horticultural activity may be a good strategy to increase physical and cognitive performance as well as socialization in the elderly.

In today's increasingly aging societies, to improve the quality of life at an advanced age living environment specially designed for the elderly are needed. Horticulture programme as an activity can increase in self-confidence, self-esteem and hence improve the quality of life in nursing homes. Although this issue is important on a global scale, taking necessary precautions especially in Turkey and for the establishment of spatial standards the required breakthroughs should be initiated as soon as possible. In developed countries as the lively surroundings of the elderly, the understanding of institutional structure like nursing homes has begun to be abandoned, where elderly people can feel themselves at home and live more independently, and "elderly settlement areas" in which service centers are located have begun to be established. Horticulture requests of elderly individuals in nursing homes without the force of the individual in a way that can meet, it needs to be organized. The importance of the horticulture in this organization must be understood and adopted.

There are not enough studies about the effects of the horticulture on the physical and mental health of the elderly. Although this research is intended to develop recommendations on the organization of horticulture activities, for aging and environment interaction requires a multidisciplinary approach. The co-operation of related occupational groups on the way of increasing quality of life in old age, both in terms of design and planning, as well as improving health and welfar more efficient and effective results will emerge.

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