

International Handbook of Occupational Therapy Interventions

Chapter 46

Horticultural Therapy for the Cognitive Functioning of Elderly People with Dementia

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Horticultural therapy using a periodic and effective method may improve cognitive and psychosocial functioning of elderly people with dementia.

Abstract Horticultural therapy is an intervention using a set of recreational activities that include the beneficial effect of plants and nature for the prevention or treatment of illness. The intervention is not limited either by the client's age or illness. The aim is to improve the patients' quality of life (QOL) (Fukushima et al. 2005). This cost-effective therapy has advantages at the community level compared with other therapies.

This chapter discusses the benefits of using horticultural therapy with a focus on cognitive function among elderly people with dementia.

Keywords Cognitive function • Dementia • Horticultural therapy • MMSE (Mini-Mental State Examination) • Quality of life (QOL)

Background

In developed countries there is a rapidly increasing occurrence of dementia in the elderly. Dementia is normally treated with drugs that offer temporal symptomatic control of cognitive decline and have demonstrated efficacy for patients with mild to moderate dementia, although some drugs have some deteriorating effects. The nonpharmacologic interventions are alternative therapies that include bright light therapy, exercise and behavior management techniques, validation therapy (i.e., improvement of communication), psychotherapeutic intervention, art therapy, music therapy, occupational therapy, and horticultural therapy.

Among these therapies, horticultural therapy is aimed at improving the patients' cognitive function and thus their quality of life. It encourages patients to use their five senses in activities such as basking in the sun, feeling the wind blow, and hearing the song of birds and the sound of water flowing. This therapy is low-cost.

Horticultural therapy has been applied in many countries, such as Australia, Germany, Korea, New Zealand, the United States; and Sweden (Söderback et al., 2004). The patients have physical and mental impairments due to illness or injury. Some hospitals and health care centers have applied horticultural therapy for bedridden patients and those with a history of depression and lack of self-esteem (Lee et al., 2008a). It has also been used for the rehabilitation of prisoners (Lee et al., 2008b).

In Japan, the keeping of house plants and private gardens is a popular recreational activity, and the traditional arts of *bonsai* (potted plants) and Buddhist rock gardens attest to a long history of the application of gardening for maintaining the balance between physical and mental health. Currently, approximately 40% of the population of Japan is engaged in recreational (for no financial gain) horticultural activities (Matsuo, E. 2002).

Horticultural therapy in Japan was developed in 1980 because of a growing elderly population and an insufficient system of care for patients with dementia. These factors caused the patients' reduced self-control and social abilities that could be the reason of many cases of depression. This issue encouraged the development of new therapies that followed a more holistic approach, addressing both physical and mental aspects of dementia. Among these therapies horticultural therapy seems to be very suitable for Japanese patients who feel inclined to horticulture, as many do. This therapy (1) is tailored to the patients' needs and ability; (2) has clear goals for the patient; (3) emphasizes gardening activities; (4) is conducted by health care professionals, such as horticultural therapists or medical/health and welfare experts; and (5) focuses on improving health and welfare. This therapeutic approach has been studied in the elderly who have participated in horticultural therapy during the past 10 years (Yasukawa, 2002).

This chapter describes the application of horticultural therapy for elderly people with dementia as an additional occupational therapy intervention.

Purpose

Horticultural therapy entails people interacting with plants, in this case to improve the cognitive function of elderly patients with dementia or with mental or physical disabilities. The main purpose of horticultural therapy is to provide these patients with graded and carefully designed gardening activities. The interactive idea of horticultural therapy is presented in Fig. 46.1 (Yasukawa, 2002).

Horticultural therapy can also be used as an educational tool that provides children with the knowledge of basic horticultural techniques and awareness of the health care issues regarding the elderly (Tennessee and Lalli, 1997).

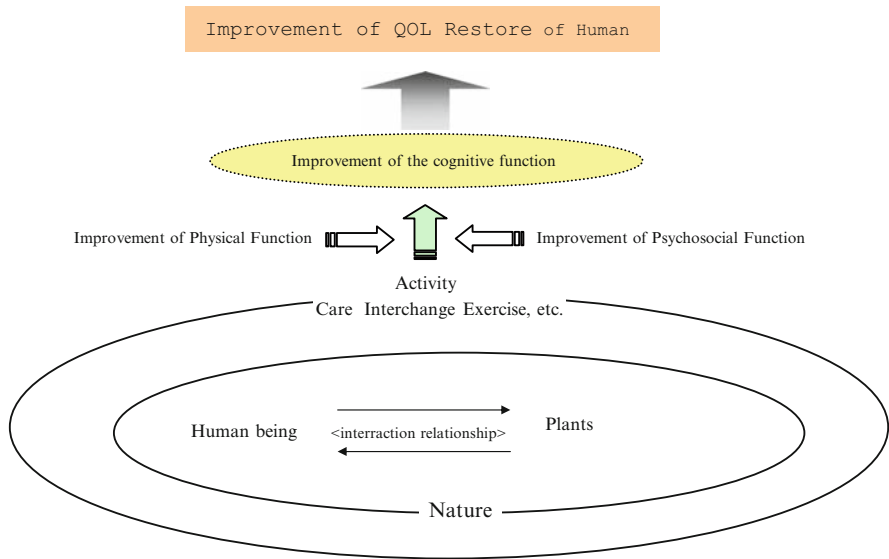


Fig. 46.1 The process of development of human welfare and improvement of quality of life using horticulture therapy.

Method

Candidates for the Intervention

Horticultural therapy is applicable for a wide range of patients suffering from stroke, traumatic brain injury, developmental and mental disorders, dementia, or depression. The patients participating in horticultural therapy in this chapter are presented in Table 46.1.

In Japan, horticultural therapy is favorably used by senior citizens who prefer a home-based activity and live in group homes. Traditionally, adult children will take care of the health of their elderly parents. However, the increasing number of working women prevents many families from taking care of their elderly family members at home (Okamoto et al., 1998). Some reports show that dementia-affected elderly people who are admitted to hospitals or nursing homes quickly develop more advanced dementia symptoms (Motonaga and Asada, 2002; Shimamura et al., 1998; Tanaka and Kato, 2007), with a decrease in cognitive function along with socially inappropriate behavior. The most common problematic behaviors among people with dementia are delusion, refusal of care, and verbal abuse (Tanaka and Kato, 2007).

Table 46.1 Patients participating in the horticultural therapy presented in this chapter

Group	Patient	Age	Sex	Previous profession	Physical condition					Experience in gardening and agricultural activities				
					Physical function		Present medical record							
					Eye sight	Hearing	Paralysis	Hypertension	Diabetic	Hyperlipemia	Heart disease	Other	Conversation ability	
GH-S: (n = 9)	A	85	Male	Office worker	Walking Δ^* 2	Eye sight Δ^* 5	Hearing Δ^* 5	Paralysis	Hypertension \times	Diabetic	Hyperlipemia \times	Heart disease	Gout, glaucoma	No
	B	85	Female	Unclear	Walking Δ^* 2			Hypertension \times					Osteoporosis, Spinal disease	Yes
	C	80	Female	Unclear	Walking Δ^* 2			Hypertension \times						Yes
	D	90	Female	Entrepreneur	Walking Δ^* 2	Eye sight Δ^* 4	Hearing Δ		Hypertension \times				Brain Apoplexy	Yes
	E	92	Female	Farmer			Hearing Δ		Hypertension \times			Heart disease \times	Malignant tumor	Yes
	F	87	Female	Kimono-maker				Hypertension \times					Malignant tumor, abdominal and aortic aneurysm	Yes
	G	71	Female	Office worker									Brain apoplexy	No
	H	80	Female	Entrepreneur	Walking Δ^* 2	Eye sight Δ		Hypertension \times				Heart disease \times		Yes
	I	76	Female	Restaurant worker	Walking Δ^* 2	Eye sight Δ	Hearing Δ	Hypertension \times					Brain apoplexy, brain atherosclerosis	Yes

GH-T: (n = 12)	J	90	Male	Organization worker	Δ*	Δ						Δ
	K	76	Male	Unclear	Δ*			×			×	Prostatomegaly
	L	82	Male	Farmer		Δ						
	M	90	Male	Civil servant					×			Δ
	N	86	Male	Entrepreneur	Δ*	Δ						Δ
	O	97	Male	Farmer	2	Δ					×	Δ
	P	81	Female	Farmer								
	Q	88	Female	Entrepreneur	x*							Malignant tumor
	R	84	Female	Farmer	1							
					Δ*				×			
					2							
	S	85	Female	Teacher		Δ						
	T	80	Female	Part timer							×	
	U	88	Female	Farmer		Δ					×	

Δ little disorder; × disorder; *1 using wheelchair; *2 uses a cane; *3 dyschromatopsia; *4 nearsighted; *5 uses a hearing aid.

The symptoms of dementia can act as a barrier to communication, creating frustration and disruptive behaviors, particularly for long-term care residents (Moniz-Cook et al., 2003), because of three factors: neurogenic causation (Foundas et al., 1995), psychogenic causation (Pietrukowic and Johnson, 1991), and deterioration of physical condition (Horowitz, 1997).

Epidemiology

In Japan, the numbers of demented elderly are expected to increase from 2,480,000 in 2002 to 4,990,000 in 2025 (Japan Ministry of Health, Labor, and Welfare, 2006).

Setting

Patients with dementia who participate in horticulture therapy in Japan live in group homes, nursing homes, long-term care facilities, long-term medical treatment hospitals, and centers for disabled people.

The Role of the Horticultural Therapist

The horticultural therapist acts as *a teacher, a guide, and a facilitator* for the patients in the horticulture sessions (Table 46.2), and *an advisor* for the other staff. Through interviews the therapy content is adapted to the individual patients' condition.

Prior to each therapy session, the horticultural therapist conducts relaxing activities and mild gymnastics. These activities are also repeated after the sessions and before the patients return to their wards. The therapy sessions end with a

Table 46.2 The therapist's role during a therapy session and its purposes

Session time	Activity	Purpose
Before	Interview	Obtain information on the physical and mental condition of patients
During	Relaxing gymnastic	Warming up of body before activity
	Horticultural activity	Teach basic techniques in horticulture Assist the patients' activities during therapy
After	Relaxing gymnastic	Cooling down and relaxing after horticultural session
	Interview	Obtain information on the patients' feelings about the session Encourage patients to increase their self-esteem Provide some direction in life for patients

discussion of the patients' perception about the value of participating. This part of the therapy sessions is aimed at increasing the patients' self-esteem.

The role of the staff is to assist the horticultural therapist and to help the patients to carry out a therapy session. The staff is responsible for maintaining the continuity of the session and for recording additional information about the patients' physical and psychosocial condition during the therapy sessions.

Results

Clinical Application

The horticultural therapy program was carried out for 3 months, with 12 sessions each week (Table 46.3). Prior to a horticultural therapy session, information on the patients' physical and psychosocial conditions is gathered by the horticultural therapist. This information is combined with weather data, such as air temperature and humidity. This information is used to decide where to hold the session—outdoors or indoors. In hot weather, rain, or high humidity, the horticultural therapy is carried out indoors in order to prevent any negative effects on the patients. The therapy session is facilitated by using a specially designed mobile gardening cart for outdoor (Fig. 46.2) and indoor use (Fig. 46.3).

The Horticultural Therapy Sessions

The therapeutic sessions are performed in the following way:

- Prior to a session, the patient's physical and mental condition is investigated and a short interview is carried out with the aim of determining the present mood of the patient (Fig. 46.4).
- The activities that will be carried out during the session are carefully explained.
- The patients perform five minutes of relaxing gymnastics and sing a song accompanied by some music (Fig. 46.5).
- The patients work in groups of three or four, together performing a horticulture task. In addition, each patient performs an individual horticulture task (Fig. 46.6). Examples of tasks performed during therapy sessions are (1) artistic activities, such as flower pressing (Fig. 46.7); (2) picking flowers; or (3) pick vegetables, and cooking and eating them.
- A discussion is held at the end of every session, during which the therapists and the patients share their feelings about the session and their expectations for the next one (Fig. 46.8).
- After the session, the staff meets to plan the next session.

Table 46.3 Program for horticultural therapy

Session	Contents	Allocate time (hour)	Temp. °C/ Humid.%
1	<input type="checkbox"/> Opening remarks <input type="checkbox"/> Planting sunflowers <input type="checkbox"/> Group planting of summer flowers in a round planter	1.5	28/28
2	<input type="checkbox"/> Observing the sunflowers <input type="checkbox"/> Planting white radish sprouts <input type="checkbox"/> Group planting of summer flowers (flower “Ya-tai”) <input type="checkbox"/> Care for group planting in a round planter	1.5	28/28
3	<input type="checkbox"/> Observing the sunflowers <input type="checkbox"/> Planting qing-geng-cai <input type="checkbox"/> Observing the white radish sprouts <input type="checkbox"/> Care for group planting in a round planter and flower “Ya-tai”	1.25	28/38
4	<input type="checkbox"/> Harvesting and tasting the white radish sprouts <input type="checkbox"/> Hydroponic cultivation of pothos <input type="checkbox"/> Care for group planting in a round planter and flower “Ya-tai”	1.25	32/36
5	<input type="checkbox"/> Replant the qing-geng cai <input type="checkbox"/> Plant the radish <input type="checkbox"/> Care for group planting in a round planter and flower “Ya-tai”	1.25	30/34
6	<input type="checkbox"/> Observing the sunflowers <input type="checkbox"/> Observing water cultured pothos <input type="checkbox"/> Replanting the radish <input type="checkbox"/> Care for group planting in a round planter and flower “Ya-tai”	1.25	24/40
7	<input type="checkbox"/> Observing and thin out the radish <input type="checkbox"/> Caring for group planting in a round planter and flower “Ya-tai” <input type="checkbox"/> Make pressed flowers	1.5	24/40
8	<input type="checkbox"/> Replanting the pothos <input type="checkbox"/> Observe and care the radish <input type="checkbox"/> Care for group planting in a round planter and flower “Ya-tai”	1.5	24/40
9	<input type="checkbox"/> Observing sunflowers <input type="checkbox"/> Lay out the pressed flowers <input type="checkbox"/> Care for group planting in a round planter and flower “Ya-tai”	1.5	28/35
10	<input type="checkbox"/> Making framed pressed flowers–1 <input type="checkbox"/> Care for group planting in a round planter and flower “Ya-tai”	1.5	24/50
11	<input type="checkbox"/> Making frame for the pressed flowers–2 <input type="checkbox"/> Care for group planting in a round planter and flower “Ya-tai”	1.5	18/68
12	<input type="checkbox"/> Harvesting the radish and qing-geng cai <input type="checkbox"/> Care for group planting in a round planter and flower “Ya-tai” <input type="checkbox"/> Framed pressed flower show <input type="checkbox"/> Taking a ceremonial photograph <input type="checkbox"/> Tasting party <input type="checkbox"/> Closing address	1.25	18/53



Fig. 46.2 Outdoor horticultural therapy group session using a mobile garden, Hana-Ya-tai.



Fig. 46.3 A: Indoor horticultural therapy setting. B: Walk-in garden.

How the Intervention Eases Dementia

Horticultural therapy encourages elderly people with dementia to participate in physical activities. These easy exercises performed in contact with nature may stimulate movements, cardiac activities, and brain frontal lobe activities. In addition, the interaction with other group members and the experience of doing horticulture activities are expected to stimulate memory and basic psychosocial functions.

Evidence-Based Practice

Horticulture therapy significantly ($p < .05$) (Fig. 46.9) influenced the cognitive function of patients with dementia (Table 46.1), as demonstrated by the results of



Fig. 46.4 Meeting of therapist and staff before and after session discussing and exchanging ideas and information.



Fig. 46.5 Relaxing gymnastic activities before and after horticultural therapy sessions.



Fig. 46.6 A,B: Participants in horticultural therapy taking care of plants.



Fig. 46.7 Artistic activity of making pressed flowers from therapy garden.

the Mini-Mental State Examination (MMSE) (Folstein et al., 1975); the scores were 16.9 ± 4.3 before participation and 18.9 ± 4.2 after participation) (Yasukawa, unpublished data). These result were similar to the results for schizophrenia patients (Minei et. al., 2008).

In the interviews, the patients experienced improvement in communication, affect display, expression, spontaneity, activity, interest in communication exchange, and role behavior that contributed to normalization of family relationships and life rhythm adjustment. These results agree with Neuberger's (2008) statement that



Fig. 46.8 Information exchange between therapists and participants after horticultural therapy sessions.

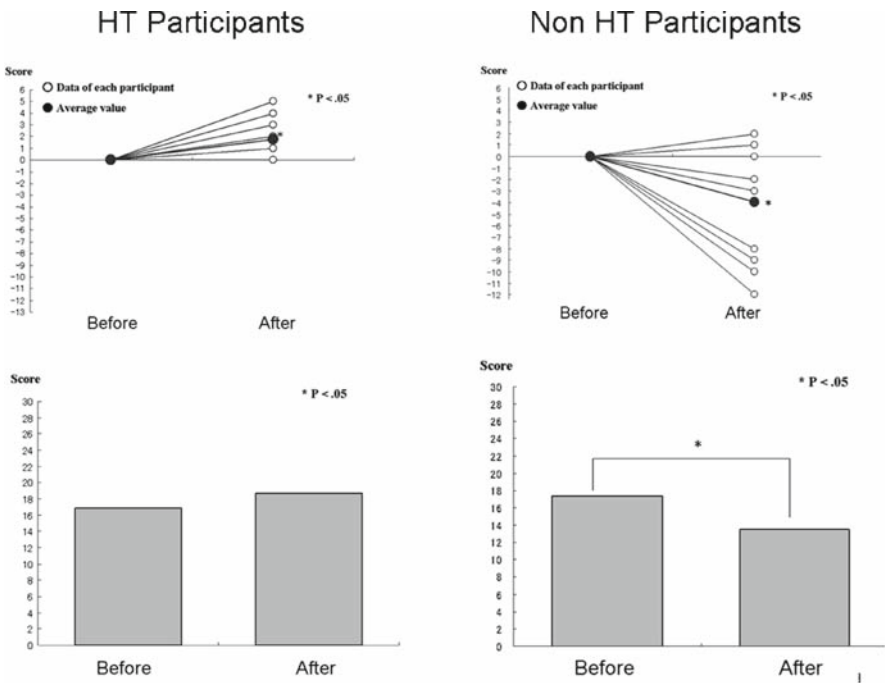


Fig. 46.9 Changes on the Mini-Mental State Examination (MMSE) score of horticultural therapy participants compared to nonparticipants.

horticultural therapy positively influences recovery, communicational skills, and body functioning.

Conclusion

The elderly patients with dementia who practiced horticultural therapy showed increased cognitive ability. Key factors for successful cognitive improvement are the contact with growing plants and the interaction among the participating patients and staff that generates patients' improved quality of life (Yasukawa, 2003).

There is an increased interest in a holistic approach to medical treatment. Here, horticultural therapy offers a combination of medical, environmental-friendly, and artistic approach that benefits the development of new values and the culture of modern society (Mooney and Milstein, 1994).

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