Kor. J. Hort. Sci. Technol. 28(5):884-890, 2010

Effects of Horticultural Occupational Therapy on the Physical and Psychological Rehabilitation of Patients with Hemiplegia after Stroke

Mi Young Kim[1], Gui Soon Kim[2], Neil S. Mattson[3], and Wan Soon Kim[2]*

[1]Department of Occupational Therapy, Seoul Metropolitan Eunpyeong Hospital, Seoul 122-913, Korea
[2]Department of Environmental Horticulture, University of Seoul, Seoul 130-743, Korea
[3]Department of Horticulture, Cornell University, Ithaca, NY 14853, USA

Abstract. To examine the effects of horticultural occupational therapy (HOT) on the physical and psychological rehabilitation of stroke patients with paralysis on one side of the body, a horticultural therapy (HT) program was implemented along with occupational therapy (OT) in 20 patients with hemiplegia after stroke (treatment group). In the control group, another 20 patients with hemiplegia after stroke received OT but no HT. The HOT program consisted of various indoor horticultural activities that proceeded stepwise on a weekly basis over the course of four weeks. The selected horticultural occupations were organized into four-phases: motivation, adaptation, sociality, and interpersonal relationships and communication. The grooved pegboard test (GPT), geriatric depression scale (GDS), and functional independent measure (FIM) were tested to the patients in this study. Unlike control group, the treatment group showed statistically significant differences in GPT, GDS, and FIM ($p<0.001$). In addition, communication, social cognition, and self-care scores as FIM subordinate factors were improved significantly by HOT program which motivated patients to engage in rehabilitation therapy. This finding suggests that HOT has the potential to be used as an OT program for stroke patients with hemiplegia.

***Additional key words*:** functional independent measure, geriatric depression scale, grooved pegboard test, interpersonal communication, self-care, social cognition

Introduction

The world population of disabled persons is increasing with the industrialization of modern society, as more and more people are being affected by various accidents or diseases that cause them to lose their occupational abilities. Psychological and social disabilities are prevalent among the aged, the poor, retirees, and mentally stressed people. Most people in modern civilized society live far apart from nature, suggesting that they could benefit from horticultural therapy (HT) (Kim, 1999).

Stroke, which occurs most frequently in the elderly, is reported to be a leading cause of death, second only to cancer, and as a single disease, it is known to be the leading cause of death in Korea (Health Insurance Review and Assessment Service, 2006). Patients who survive a stroke may be left with devastating disabilities, such as hemiplegia, language deficits and other impairments. Hemiplegia can be a more serious consequence of stroke than spasticity (Patten et al., 2004). Spasticity is a disorder of the body motor system, and especially the central nervous system, in which certain muscles are continuously contracted. Hemiplegia is a condition where there is paralysis of one half of a patient's body. Hemiplegia is more severe than hemiparesis, wherein one half of the body is weakened but not paralyzed.

As recent advances in the treatment of stroke patients have prolonged the lives of stroke patients, complementary therapies and other remedies are needed to treat these patients. Horticultural occupations are being used as a therapeutic tool to treat stroke patients with hemiplegia. HT was shown to have psychological, emotional and sensory benefits in the rehabilitation of stroke patients. Such beneficial effects suggested the need for further study on horticultural occupations as a means of comprehensive rehabilitation therapy (Kim, 2000). The growth processes of various plants have been shown to motivate patients to be involved in a treatment program and to help them to build self-confidence and gain a sense of responsibility (Relf, 1981). In addition to its psychological and emotional benefits, it is expected that HT will play an important role in improving physical functions and helping patients to continue their treatment (Kim, 2001). Horticultural occupations involving the use of horticultural crops have

***Corresponding author:** wskim2@uos.ac.kr
※ Received 23 July 2010; Accepted 16 August 2010.

enhancing effects on the five senses, which is a sole effect of HT (Kim, 2001). In some cases, HT is combined with other types of therapy to improve the results, and occupational therapists usually plan the therapy programs (Seo, 2005).

While the psychological benefits of HT have been clearly demonstrated in previous studies, evidence for the physical benefits of HT is insufficient (Jeong, 2004). HT and occupational therapy (OT) are two different fields. However, they have compatible objectives for the rehabilitation of patients and improving their quality of life. The integration of horticultural and occupational therapies, defined as horticultural occupational therapy (HOT), was first used for the rehabilitation of American soldiers wounded in the First World War (Son et al., 2002). There have been many developments in OT, and it now plays an important role in modern rehabilitation therapy. However, horticultural occupations or activities therapy has not widened its range of application. This study examines the effects of HOT on the psychological and physical rehabilitation of stroke patients compared with existing OT.

Materials and Methods

Patients and Horticultural Occupational Therapy Program

Patients

Forty stroke patients with hemiplegia who were hospitalized at three hospitals in Seoul and scored 20 or more on the mini-mental state examination (MMSE-K) and 10 or more on the geriatric depression scale (GDS) participated in this study (Table 1). The MMSE-K is a Korean standard cognition ability test introduced by Folstein et al. (1975, 1983) revised by Kwon and Park (1989). The patients' medical histories, experience with horticultural occupations, rejection of horticultural occupations or activities, cognitive ability and ability to endure 30 minute of engagement in horticultural occupations were examined. Screening processes were used to select patients who had the ability to understand instructions from a therapist and to perform simple activities. The control group included 20 patients (11 men, nine women, average age 66 years). Twelve patients had left-sided hemiplegia, and the other eight patients had right-sided hemiplegia. Eleven patients had been paralyzed for less than six months, two for less than 12 months, one for less than 24 months, and the remaining six had been paralyzed for more than 25 months. The treatment group included 15 men and five women, with an average age of 58 years. Thirteen patients had left-sided hemiplegia, and the other seven were had right-sided hemiplegia. One patient had been paralyzed for less than six months, six for less than 12 months, two for less than 24 months, and the remaining eleven had been paralyzed for more than 25 months.

HOT Program Treatment

The HOT program was designed to elicit physical and psychological improvements in stroke patients, especially to improve upper limb dexterity and independence in activities of daily living. To construct a HOT program, existing horticultural occupations as HT were analyzed, and a variety of indoor horticultural activities deemed fit for stroke patients were selected, considering that the patients were sitting on a wheelchair in unstable postures. The selected horticultural occupations were organized into four-phases: (1) motivation (the plant and its contacts), (2) adaptation (motion characteristic induction), (3) sociality (expression of thoughts of oneself), and (4) interpersonal relationships and communication (personal relationships). The phases were implemented stepwise over the course of 4 weeks, 1 week for each phase (Table 2). This four-phase HOT program was carried out with different horticultural occupations each month for three months (three stages). The program was group-based, and there were 5-10

Table 1. Demographic characteristics of 40 stroke patients with hemiplegia in this study. The patients were selected on the basis of 20 points or more on the mini-mental state examination (MMSE-K)[z] and 10 points or more on the geriatric depression scale (GDS)[y] among those who were hospitalized at three hospitals in Seoul.

Category	Classification	No. of patients (%)	
		Control	Treatment
Gender	Male	11 (55)	15 (75)
	Female	9 (45)	5 (25)
Age (years)	40-50	3 (15)	5 (25)
	50-60	3 (15)	8 (40)
	60-70	5 (25)	3 (15)
	70-80	6 (30)	1 (5)
	80-95	3 (15)	3 (15)
Duration (months)	1- 6	11 (55)	1 (5)
	7-12	2 (10)	6 (30)
	13-24	1 (5)	2 (10)
	25-36	6 (30)	11 (55)
Hemiplegia side[x]	Right	8 (40)	7 (35)
	Left	12 (60)	13 (65)

[z]The MMSE-K is Korean version of the test introduced by Folstein et al. (1975, 1983) revised by Kwon and Park (1989), and it has been standardized for use in the Korean elderly population.

[y]GDS is a psychological disability caused by a negative self-image, feelings of failure, loss, helplessness, and worthlessness (10-16 = mild;17-22 = moderate; 23-30 = severe) (Jeong et al., 2006; Yesavage et al., 1986).

[x]Hemiplegia is a condition where there is paralysis of one half of a patient's body.

Table 2. Horticultural occupational therapy program designed to elicit physical and psychological improvements in stroke patients, especially to improve upper limb dexterity and independence in daily living activities.

Stage[z]	Step[y]	Horticultural occupational therapy program	
		Occupational therapy (OT)	Horticultural therapy (HT)
I	Motivation	Simple puzzle, pegboard, tactile activity	Water-culture using arrow-head vine (*Syngonium podophyllum*)
	Adaptation	Functional upper limb activity, exercise skate, R.O.M, graded ROM ark	Flower arrangement in cup with freesia (*Freesia hybrida*)
	Individual work	Activity of daily living training, dressing, eating, grooming	Making a flower basket using milk pack
	Group work	Simple group activity	Making calendars using plant leaves
II	Motivation	Complex puzzle, graded pegboard, tactile activity	Sowing sprout vegetable seeds
	Adaptation	Stacking cone pattern board, shoulder exercise ladder, bilateral sanding	Making potpourri with rosemary (*Rosmarinus officinalis*)
	Individual work	Activity of daily living training	Making vegetable soup
	Group work	Middle simple group activity	Making calendars using tree leaves
III	Motivation	Puzzle, grooved pegboard	Planting a seedling of pepper, egg plant, and tomato
	Adaptation	Unilateral and bilateral activity with weight bearing, grip function	Making a flower basket with chrysanthemum and carnation
	Individual work	Activity of daily living training	Making pressed flower card
	Group work	General group activity	Making calendar using dry flower

[z]I: first month, II: second month, III: third month.
[y]Motivation: cognitive integration and cognitive treatment, Adaptation: sensory motor function treatment, Individual work: activity of daily living treatment, Group work: psychosocial skill and psychological treatment.

patients in each group. Patients raised the horticultural products they made in their wards, gifted what they made, and kept a garden diary to keep themselves motivated and interested in the program.

The patients in the control group only just received OT without HT during the same period as HOT program. The OT was programmed to elicit physical improvements of stroke patients as with HOT program. For this purpose, we analyzed existing occupations to select diverse indoor activities fit for stroke patients sitting postures (Table 2). The OT program was group-based, and in each group there were 5-10 patients as same as HOT program.

In the pre- and post-tests, grooved pegboard test (GPT), geriatric depression scale (GDS), and functional independent measure (FIM) were administered to the both groups in order to evaluate the effects of the HOT intervention. The evaluation of horticultural activities was administered only to the patients in the treatment group to evaluate their satisfaction with the horticultural occupations.

Test Tools

Grooved Pegboard Test

The GPT is a tool used to test delicate hand movement and performance of activities requiring visual-motor coordination skills. The pegboard (GPBT # 32025) has 25 key-shaped holes into which key-shaped pegs are placed. Pegs must be rotated to match the hole before they can be inserted, which requires complex visual-motor coordination. The total time taken to insert the 25 pegs into the holes was measured in seconds. Hand functioning is considered better when a shorter time is required to complete the sequence (Lee et al., 1999). The reliability of the GPT is α = 0.79.

Geriatric Depression Scale

Depression is a psychological disability caused by a negative self-image, feelings of failure, loss, helplessness, and worthlessness. The GDS was created by Yesavage et al. (1986). The scale is divided as follows. GDS 10-16: mild 'Some dejection' the condition where there is not some strength and from daily life being joyful, the condition which is visible with the fact that is insufficient. 17-22: moderate 'Dejection' the condition where there is not vitality from daily life and is not every matter desire and the condition. 23-30: severe 'Serious dejection' the condition where it is the difficult to overcome a dejection by force of oneself is indicated as a more severe depression (Jeong et al., 2006).

The reliability of the GDS is α = 0.94.

Functional Independent Measure

The FIM assesses self-sufficiency in activities of daily living, and is comprised of 18 items assessing six areas of function. It was developed by Granger et al. (1986) with the support of a joint task force of the American Congress of Rehabilitation Medicine and the American Academy of Physical Medicine and Rehabilitation. The six areas include; Self care (A: eating, B: grooming, C: bathing, D: dressing-upper body, E: dressing-lower body, and F: toilet), Sphincter control (G: bladder management, H: bowel management), Mobility and Transfer (I: bed, chair, or wheelchair, J: toilet, K: tub and shower), Locomotion (L: walk or wheel chair, M: stairs), Communication (N: Comprehension, O: Expression), Social cognition (P: social interaction, Q: problem solving, R: memory). The items can be subdivided into the 13 items motor subscale and five items cognitive subscale. Each of the 18 items is rated on a seven-point scale: 1 = total dependence, 2 = maximal assistance, 3 = moderate assistance, 4 = minimal contact assistance, 5 = needs supervision, 6 = modified independence, and 7 = total independence. The total score is determined by adding the patient scores on each of the 18 items, and can range from 18 to 126. Total score signifies as follows: 8-35 = total assistance, 36-53 = maximal assistance, 54-71 = moderate assistance, 72-89 = minimal contact assistance, 90-107 = supervision or setup, 108-125 = modified independent, 126 = complete independent. The FIM has the advantage of including items that assess psycho-social functions, including social-cognitive and interpersonal communication. The reliability of the FIM is α = 0.95.

Data Analysis

SPSS (version 12.0; SPSS Inc., Chicago) was used for data analysis. Frequency analysis was used to examine the demographic characteristics of the control and treatment groups. Independent t-tests and paired t-tests were used to verify the homogeneity and effectiveness of the program, respectively.

Results and Discussion

A test of statistical independence was conducted before the interventions in order to verify the homogeneity of the general characteristics between the control and treatment groups. The results showed no significant differences in the GPT, GDS and FIM results before the intervention between the control and treatment groups at 1% significant level, which also suggested that the two groups were homogeneous (Table 3).

In the control group, where patients received only OT, GPT performance (hand dexterity) improved from 206.25 to 183.45 seconds after the OT intervention without statistically significant difference (Table 4). However, GPT performance improved more significantly from 172.2 to 124 seconds after the HOT intervention in the treatment group ($P < 0.001$). Unlike GPT, the GDS score showed a statistically significant difference in the two groups all by the intervention. In comparison to the control group (decreased 11.5% in GDS score from 16.95 to 15.10), change in GDS score showed a more marked decrease of about 48.3% in the treatment group, suggesting that there was a greater reduction in depression in the treatment group. In addition, both groups showed significant improvement in total FIM score, from 73.60 ± 3.3 to 84.55 ± 3.0 in the control group, and from 78.85 ± 4.1 to 95.50 ± 3.8 in the treatment group ($P < 0.001$). It is not surprising that the patients in the control group showed improvement in hand dexterity (GPT) and FIM because the control group was in the early stages of disability (less than six months after stroke) and had a high possibility of a good prognosis. On the other hand, the treatment group was in the late stages of disability (longer than six months after stroke), and they had a lower possibility of improvement than those in the control group. However, the treatment group also showed improvement in hand dexterity and FIM scores after the HOT program.

There were differences in the FIM subordinate factors of the patients in the control and treatment groups before and after the therapy program (Table 5). The communication

Table 3. Homogeneity comparison of grooved pegboard test (GPT), geriatric depression scale (GDS), and functional independent measure (FIM) of control and treatment groups before therapy program (n = 20 per group).

Group	Items[z]		
	GPT (%)	GDS (%)	FIM (%)
Control	100.0 ± 9.0[y]	100.0 ± 10.6	100.0 ± 4.2
Treatment	83.5 ± 10.0	65.5 ± 18.9	107.1 ± 5.4
Significance	NS	NS	NS

[z]GPT is a tool used to test delicate hand movement and performance of activities requiring visual-motor coordination skills (Lee et al., 1999); GDS is a psychological disability caused by a negative self-image, feelings of failure, loss, helplessness, and worthlessness (Jeong et al., 2006; Yesavage, 1986). FIM assesses self-sufficiency in activities of daily living, and it is comprised of 18 items assessing 6 areas of function (Granger et al., 1986).
[y]Mean ± SE standardized as a percentage (control group = 100%).
[NS]Nonsignificant at 1% significant level.

Table 4. Changes in grooved pegboard test (GPT), geriatric depression scale (GDS), and functional independent measure (FIM) of control and treatment groups before and after therapy program. The occupational therapy was programmed for control group; the horticultural occupational therapy was provided for treatment group (n = 20 per group).

Group	Therapy program	Items[z]		
		GPT (seconds)	GDS (10-30 scale)	FIM (18-126 scale)
Control	Before	206.3 ± 18.5[y]	16.9 ± 1.7	73.6 ± 3.3
	After	183.5 ± 17.9	15.1 ± 1.6	84.6 ± 3.0
	Significance	NS	*	**
Treatment	Before	172.2 ± 20.7	11.6 ± 1.5	78.9 ± 4.1
	After	124.0 ± 17.2	6.0 ± 0.8	95.5 ± 3.8
	Significance	***	***	***

[z]GPT is a tool used to test delicate hand movement and performance of activities requiring visual-motor coordination skills (Lee et al., 1999); GDS is a psychological disability caused by a negative self-image, feelings of failure, loss, helplessness, and worthlessness (10-16 = mild, 17-22 = moderate, 23-30 = severe) (Jeong et al., 2006; Yesavage, 1986). FIM assesses self-sufficiency in activities of daily living, and it is comprised of 18 items assessing 6 areas of function (Granger et al., 1986).
[y]Mean ± SE.
[NS,*,**,***]Nonsignificant or significant at P = 0.05, 0.01 or 0.001, respectively.

Table 5. Changes in the functional independent measure (FIM) subordinate factors of control and treatment groups before and after therapy activity. The occupational therapy was programmed for control group; the horticultural occupational therapy was provided for treatment group (n = 20 per group).

Group	Therapy activity	FIM subordinate factor[z]		
		Self-care (6-42 scale)	Communication (2-14 scale)	Social cognition (3-21 scale)
Control	Before	19.0 ± 1.4[y]	11.7 ± 0.7	16.0 ± 1.3
	After	22.7 ± 1.0	12.0 ± 0.7	16.7 ± 1.3
	Significance	***	NS	NS
Treatment	Before	24.3 ± 1.7	9.8 ± 0.6	13.5 ± 0.8
	After	29.6 ± 1.9	12.2 ± 0.3	17.3 ± 0.6
	Significance	***	***	***

[z]FIM assesses self-sufficiency in activities of daily living, and it is comprised of 18 items assessing 6 areas of function (Granger et al., 1986). The six areas include; Self care (A: eating, B: grooming, C: bathing, D: dressing-upper body, E: dressing-lower body, and F: toilet). Sphincter control (G: bladder management, H: bowel management), Mobility and Transfer (I: bed, chair, or wheelchair, J: toilet, K: tub and shower), Locomotion (L: walk or wheel chair, M: stairs), Communication (N: Comprehension, O: Expression), Social cognition (P: social interaction, Q: problem solving, R: memory).
[y]Mean ± SE.
[NS,**,***]Nonsignificant or significant at P = 0.01 or 0.001, respectively.

scores and social cognition scores in the treatment group significantly increased from 9.8 ± 0.6 (SE) to 12.2 ± 0.3 and from 13.5 ± 0.8 to 17.25 ± 0.6 respectively ($P < 0.001$) while those in the control group were not statistically significant. Self-care scores unlike communication and social cognition results showed significant improvement in all control and treatment groups. These results suggest that horticultural occupations are effective in improving communication abilities, self-care, and social cognitive functioning.

Only 14% to 16% of patients who are in the early stages of paralysis on one side of the body recover normal or near-normal function in the paralyzed hand (Nakayama et al., 1994). Hemiplegia has severe physical and psychological effects on patients because they have to depend on equipment or the assistance of other people in order to perform everyday activities (Kim, 1994; Pedretti and Early, 2001). HT is reported to play important roles in improving physical abilities and helping patients sustain their rehabilitation treatment (Kim, 2001). Although the psychological benefits of HT have been clearly shown in previous studies, there is insufficient evidence for the physical benefits of HT, which has delayed the application of HT to rehabilitation. Patients with hemiplegia use their non-paralyzed hand to perform most activities of daily living, and the dependence on the

non-paralyzed hand becomes heavier when the paralysis is more severe (Kim, 1994). Multiple studies have demonstrated that the strength and dexterity of the non-paralyzed hand were also weakened and normal function was not recovered in stroke patients with hemiplegia (Han et al., 1992). Programs for the treatment of the non-paralyzed hand are needed for effective rehabilitation, but there has been little development of such programs.

For effective improvements in physical functions, the HOT program used in this study included activities that could be performed with the non-paralyzed hand of patients with hemiplegia and were designed to (1) to improve the dexterity of the non-paralyzed hand; (2) to alleviate depression and motivate patients through horticultural occupation using living plants; and (3) to enhance the patients' communication and social skills through group-based horticulture activities. Comparisons of the results before and after the interventions in the control and treatment groups revealed significant differences in the GPB performance and FIM scores of the patients in the treatment group. This indicates that the HOT program was effective in improving the physical functions of stroke patients with hemiplegia by increasing their hand dexterity and independence in daily living activities. Horticultural occupations integrated with OT were effective in treating the patients' physical disabilities, improving the dexterity of the non-paralyzed hand and helping the patient improve their ability to perform everyday activities independently. This is consistent with the findings of other studies that demonstrated that normal function was not returned to the non-paralyzed hand, even 2 months after a brain attack (Han, 2004).

The reason that the GPB performance of the patients in the treatment group was higher than that of the patients in the control group, even before the intervention, was that the patients in the treatment group had been receiving OT for more than 4 years before participating in this study. Although the patients in the treatment group had a longer duration of disability than the patients in the control group, they showed greater improvements in hand dexterity after the HOT program. This indicates that combined with horticultural occupations can produce better results than OT alone and that HOT has the potential to be used as a program for activating hand function and improving daily activity performance.

Horticultural applications had a psychological effect on stroke patients by alleviating depression. There were also significant differences in the patient scores pertaining to communication and self-care after the HOT program, suggesting that horticultural occupations are effective in improving the social skills of patients with hemiplegia. This indicates that the HOT program has the potential for effective use in professional rehabilitation programs eliciting the activation of the non-paralyzed hand in stroke patients with hemiplegia. This is consistent with the results of other studies that found that horticultural activities helped to increase patients' self-confidence and self-expression, to improve their social skills, and to promote positive thinking (Getz et al., 1982). The horticultural activities was beneficial in treating physical and mental disabilities (Tereshkovieh, 1973), and provided benefits similar to those provided by physical or occupational therapy (Kim, 1999; Kwon, 2006).

Similar to people enjoying the peace and healing effects while they are involved in horticultural occupations, or as a leisure activity (Kim, 1999), it is expected that stroke patients with hemiplegia also can improve their physical health, raise self-confidence, and increase their quality of life by participating in horticultural activities as a leisure or a therapy. This study examined effects of HOT on improving hand function and psychological rehabilitations of stroke patients with hemiplegia, and provided evidence that the HOT program was effective as a rehabilitation therapy. It also showed horticultural occupations are effective in improving hand dexterity of the non-paralyzed hand in stroke patients with hemiplegia. Limitations of this study include the inability to generalize because of small sample size, and the fact that researchers could not completely control the influence of external factors on the results. Patients in the treatment group were patients with late-stage stroke (3.8 years after a stroke), while those in the control group were with mid-stage stroke (1.4 years after a stroke). Therefore the two groups are not comparable in terms of duration of disability and hand dexterity. The HOT program improved hand dexterity, independence, self-care, interpersonal relationship, and interpersonal relationships and provided psychological stability to stroke patients with hemiplegia. This proved the HOT was an effective rehabilitation program. It is expected that developing horticultural occupational programs will contribute to rehabilitation treatment and welfare of local society.

Literature Cited

Folstein, M.F., L.N. Robins, and J.E. Helzer. 1983. The mini-mental state examination. Arch. Gen. Psychiatry 40:812-820.

Folstein, M.F., S.E. Folstein, and P.R. McHugh. 1975. Mini-mental state a practical method for grading cognitive state of patients for the clinicians. J. Psychiatric Res. 12:189-198.

Getz, D.A., A. Karrow, and J.J. Kielbaso. 1982. Inner city preferences for trees and urban forestry programs. J. Arboriculture 8:258-263.

Granger, C.V., B.B. Hamilton, R.A. Keith, M. Zielesky, and F.S.

Sherwin. 1986. Advance in functional assessment for medical rehabilitation. Topics in Geriatric Rehabilitation 1:59-74.
Han, T.R. 2004. Changes in function of the non-paralyzed hand over time in stroke patients with one-sided paralysis. J. Kor. Acad. Rehabilitation Medicine 28:13-19.
Han, T.R., J.H. Kim, and S.J. Lee. 1992. Importance of evaluating hand function of patients with one-sided paralysis. J. Kor. Acad. Rehabilitation Medicine 16:420-430.
Health Insurance Review and Assessment Service. 2006. Peoples making health. Proc. Health Rev. and Assessment 71:5-7.
Jeong, S.A. 2004. Effects of a horticultural therapy program applied in accordance with psychological adaptation stages on psychological and physical rehabilitation of stroke patients. Master's Diss., Konkuk Univ. Seoul, Korea.
Jeong, S.H., M.R. Huh, B.H. Lee, and J.C. Park. 2006. Effects of horticultural therapy on self-esteem in patients with senile diseases. J. Kor. Soc. Plant People and Environ. 9:79-87.
Kim, E.K. 2000. Effects of horticultural therapy on rehabilitation of stroke patients. Master's Diss., Konkuk Univ. Seoul, Korea.
Kim, H.Y. 1999. Horticultural therapy. p. 52-58. Hyosung Catholic Univ., Press. DaeGu, Korea.
Kim, M.Y. 1994. Study on upper limb function after stroke. J. Kor. Soc. Occupational Therapy 3:19-26.
Kim, S.Y. 2001. Effects of horticultural therapy on rehabilitation of stroke patients with one-sided paralysis. Master's Diss., Konkuk Univ. Seoul, Korea.
Kwon, Y.C. and J.H. Park. 1989. Standardization of Korean old person in mini-menta1 state examination (MMSE-K). Kor. J. Neuropsychiatric Asso. 28:508-513.
Kwon, Y.H. 2006. Effects of horticultural therapy on psychology and sociality of people with mentally retarded disabilities. Master's Diss., Univ. of Seoul, Seoul, Korea.
Lee, T.Y., J.G. Oh, H.Y. Kim, G.S. Lee, and M.H. Kim. 1999. Effects of upper limb function of the paralyzed side on hand dexterity of the non-paralyzed side. J. Kor. Soc. Occupational Therapy 7:56-67.
Nakayama, H., H.S. Jorgenson, and H.O. Raschou. 1994. Compensation in recovery of upper extremity function after stroke. Arch. Physical Medicine and Rehabilitation 75:853-857.
Patten C., J. Lexell, and H.E. Brown. 2004. Weakness and strength training in persons with poststroke hemiplegia: Rationale, method, and efficacy. J. Rehabilitation Res. Dev. 41:293-312.
Pedretti, L.W. and M.B. Early. 2001. Occupational therapy practice skills for physical dysfunction. Mosby, Missouri.
Relf, P.D. 1981. Dynamics of horticultural therapy. Rehabilitation Literature 42(5-6):147-150.
Seo, J.G. 2005. Seoul horticultural fair 2005: Horticulture and Human care. p. 89-109. Kor. Soc. Hort. Sci. Suwon, Korea.
Son, G.C., S.G. Park, H.O. Bu, G.Y. Bae, and G.Y. Baek. 2002. Horticultural therapy. Joongang Publishing Company, Seoul, Korea.
Tereshkovieh, G. 1973. Horticultural therapy. HortScience 8:460. (Abstr.)
Yesavage, J.A., T.L. Brink, T.L. Rose, O. Lum, V. Huang, M.B. Adey, and V.O. Leirer. 1986. Development and validation of a geriatric depression screening scale: A preliminary report. J. Psychiatric Res. 17:37-49.

반신마비 뇌졸중 환자의 심리와 정서적 재활에 대한 원예작업치료 효과

김미영[1] · **김귀순**[2] · Neil S. Mattson[3] · **김완순**[2*]

[1]서울시립은평병원, [2]서울시립대학교 환경원예학과, [3]코넬대학교 원예학과

(*교신저자)

초 록. 반신마비 뇌졸중 환자의 심리적·정서적 재활에 대한 원예작업치료의 효과를 확인하고자 40명의 반신마비 뇌졸중 환자 가운데 20명을 대상으로 원예치료와 작업치료를 시행하였다(치료군). 나머지 20명을 대상으로 작업치료만을 실시하였다(대조군). 원예치료 프로그램은 다양한 실내원예활동으로 구성되었으며 1주일을 기본으로 4주 단위로 3단계 즉 3개월 동안 실시하였다. 선정된 원예작업은 동기유발, 적응, 사회성, 관계와 소통의 4개의 단위로 구성되었다. 원예작업치료의 효과 분석을 위해 손기능척도(GPT), 노인우울척도(GDS), 일상생활동작검사(FIM)를 실시하였다. 그 결과 대조군과 달리 원예작업치료를 받은 처리군에서 재활 효과가 우수하였으며 GPT, GDS, FIM 모두 통계적으로 고도로 유의한 결과를 나타냈다. 또한 원예작업치료를 통해 환자들의 재활치료에 대한 동기부여는 물론 FIM의 하부요소인 의사소통, 사회인지도, 자기보호 항목도 크게 향상되었다. 본 연구를 통해 원예작업치료가 반신마비 뇌졸중 환자에 대한 작업치료 프로그램으로 활용될 수 있다는 것을 확인 가능하였다.

추가 주요어 : 일상생활동작검사, 노인우울척도, 손기능척도, 의사소통, 자기보호, 사회인지도