



Original Article

## The effects of occupation-centered activity program on fall-related factors and quality of life in patients with dementia

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**Abstract.** [Purpose] The purpose of this study was to investigate the effects of an occupation-centered activity program for dementia patients living in a local community, and examined the effects of the occupation-centered activity program on their cognitive functions, fall-related factors, and quality of life. [Subjects and Methods] Thirty subjects were divided into two groups: the experiment group (n=15) and the control group (n=15). The occupation-centered activity program was then applied to dementia patients for 60 minutes, 5 times/week for 12 weeks. To identify their cognitive functions before and after the intervention occupation-centered activity program, Mini-Mental State Examination-Korea (MMSE-K) and the Global Deterioration Scale (GDS) were used. To assess fall-related factors, Korean Falls Efficacy Scale for the Elderly (FES-K) was used and leg strength, agility, and balance of the participants was measured. To examine quality of life, the Korean version of Quality of Life-Alzheimer's Disease Scale (KQOL-AD) was used. [Results] The results of the intervention showed that although cognitive function improved in both the experimental and control groups, fall-related factors and the quality of life significantly improved only in the experimental group. [Conclusion] This indicates that the occupation-centered activity program had a positive effect on dementia patients' cognitive functions, fall-related factors, and quality of life.

**Key words:** Fall-related factors, Quality of life, Dementia

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### INTRODUCTION

The elderly population with dementia in Korea accounts for 9.18% of the population, or 540,000 individuals, as of December 2012<sup>1)</sup>. These numbers are expected to increase to 1.27 million by 2020, and to double every 20 years<sup>1)</sup>. The elderly with dementia show impaired cognitive function and damaged motor functions because of an overall damage to their cerebral cortex<sup>2)</sup>. A decrease in balance arising from damaged motor functions leads to an overall decline in their gross motor functions and gradually increases their fall risk<sup>2)</sup>. A high fall risk is a serious problem because it restricts the activities of daily life and social activities of the patients, subsequently reducing their quality of life, and ultimately causing various complications, potentially including death<sup>2)</sup>. In regard to the fall risk of elderly patients with dementia, it is necessary to consider both psychological (fall efficacy)<sup>3)</sup> and physical factors (leg strength, agility, and balance)<sup>4)</sup>. Fall prevention programs include exercise programs<sup>3)</sup>, and balance and muscle exercises<sup>7)</sup>. However, adjusting the difficulty level of such programs is challenging, and therefore its application for elderly with dementia is limited. In addition to fall risks, by the nature of senile dementia, these patients are also likely to have other problems, such as cognitive impairments. Hence, it is necessary to develop and implement a combined intervention program that considers all of these problems. Studies that have developed and imple-

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mented a program that considers the characteristics of dementia patients and includes activities related to fall risks are scarce, and no study has investigated the effects of such programs on the quality of life, which is an important goal of rehabilitation.

In this regard, this study aimed to i) develop and implement an occupation-centered activity program that contains activities specific to dementia, ii) examine the efficacy of the occupation-centered activity program in regard to fall-related factors and quality of life of the patients, and iii) contribute to improving the design of future programs targeted for providing therapy for dementia patients to alleviate their symptoms.

## SUBJECTS AND METHODS

This study included 30 dementia patients admitted to daytime care center in Jeolla Province. This study conformed to the ethical principles of the Declaration of Helsinki. All of the subjects were diagnosed with dementia by neuropsychiatrists, and this study obtained written approval from the subjects under the cooperation of the dementia business operator and the head of the institution (Kaya IRB-163). While the experimental group (n=15) took part in the occupation-centered activity program and took medications for their dementia symptoms, the control group (n=15) did not participate in the occupation-centered activity program, but continued taking medications for their dementia symptoms. This study applied the occupation-centered activity program 5 times per week for a total of 24 sessions for approximately 60 minutes per session. The program included physical activities, cognitive activities, daily life activities, instrumental daily life activities, handicraft, traditional Korean music activities, and other music activities. This program included calibrated activities appropriate and meaningful for dementia patients based on Oh and Kim's convergent occupational therapy program<sup>6)</sup>, Song et al.'s group music therapy program<sup>7)</sup> and an exercise program<sup>2, 5)</sup>. The occupation-centered activity program was performed 5 times per week for a total of 24 sessions for around 60 minutes per session. This study used the Mini-Mental State Examination-Korea (MMSE-K)<sup>8)</sup> and the Global Deterioration Scale (GDS)<sup>9)</sup> to assess cognitive functions. For fall-related factors, this study used the Korean Falls Efficacy Scale for the Elderly (FES-K), Chair Stand and 244 cm Up and Go tests, suggested by the Senior Fitness Test<sup>4)</sup> and fall efficacy<sup>10)</sup> to measure leg strength and agility and applied Richard et al.'s one leg standing test (1984)<sup>4)</sup> to measure balance. For assessing quality of life, the Korean version of the Quality of Life-Alzheimer's Disease Scale (KQOL-AD)<sup>11)</sup> was used. For the subjects' general information, each question was converted into numerical scores and was analyzed statistically. All of the measures were analyzed using the SPSS/WIN statistical program 21.0. Their general characteristics were analyzed by descriptive statistics. A paired t-test was conducted to identify whether any difference was significant in fall-related factors before and after the implementation of the occupation-centered activity program and for the quality of life before and after the occupation-centered activity program. The statistical significance level was established at  $p < 0.05$ .

## RESULTS

The general characteristics of the study subjects are described in Table 1. The experimental group included 13 men and 2 women, while the control group included 11 men and 4 women. The average age of patients in the experimental group was  $82.0 \pm 4.6$  years, and in the control group was  $80.9 \pm 3.4$  years. Six patients were diagnosed with vascular dementia and 9 with Alzheimer's disease in the experimental group, and 4 with vascular dementia and 11 with Alzheimer's disease in the control group. For education level, the number without an academic degree was the highest in both the experimental group and the control group (Table 2).

For cognitive functions, the MMSE-K showed that the ex-post increased compared to the ex-ante in both the experimental group and the control group, but an increase in the experimental group was much larger than that in the control group. In addition, while the experimental group showed a statistically significant increase, the difference in the control group was not significant ( $p < 0.01$ ). In the GDS, cognitive function increased in both the experimental group and the control group, similar to in the MMSE-K, and both of the groups showed statistically significant differences ( $p < 0.01$ ). In the FES-K, there were increases in both of the groups, but only the experimental group showed a statistically significant difference ( $p < 0.001$ ). In the Chair Stand test, the number of repetitions increased significantly in the experimental group, but decreased in the control group, and this difference in the control group was not significant. In the 244 cm Up and Go test, while there were decreases in both the experimental group and the control group, the experimental group showed a significant difference ( $p < 0.01$ ). In the one leg standing test, the experimental group showed a significant increase ( $p < 0.01$ ), while the control group showed a non-significant decrease. In the KQOL-AD the experimental group showed a significant increase ( $p < 0.01$ ), while the control group showed a non-significant decrease.

## DISCUSSION

This study applied an occupation-centered activity program to elderly people with dementia at a daytime care center in Jeolla Province; identified the program's effect on their cognition, fall-related factors, and quality of life; and intended to put forward the theoretical basis for various therapeutic approaches of occupational therapy. The results of this study showed that there was a positive effect on the cognitive function, fall-related factors, and quality of life of the experimental group who were administered occupational therapy along with medications for 12 weeks. Such results are similar to those of Cho's

**Table 1.** The general characteristics of the subjects (N=30)

Categories	Items	Experimental group		Control group	
		N	%	N	%
Gender	Male	13	86.7	11	73.3
	Female	2	13.3	4	26.7
Age (years)		82.0 ± 4.6		80.9 ± 3.4	
Diagnosis	Alzheimer's dementia	6	40.0	4	26.7
	Vascular dementia	9	60.0	11	73.3
Education (years)	0	7	46.7	8	53.3
	6	4	26.7	2	13.3
	9	3	20.0	5	33.3
	12	1	6.6	0	0

**Table 2.** Comparison of the changes in cognition, fall-related factors, and QOL

		Experimental group		Control group	
		Pre-test (Mean ± SD)	Post-test (Mean ± SD)	Pre-test (Mean ± SD)	Post-test (Mean ± SD)
Cognition	MMSE-K	15.5 ± 2.9	18.1 ± 0.8**	15.6 ± 2.4	16.3 ± 1.9
	GDS	4.3 ± 0.7	3.8 ± 0.6*	4.5 ± 0.7	4.2 ± 0.6*
Fall-related factors	FES-K	27.5 ± 5.1	34.9 ± 8.0***	28.3 ± 4.0	26.7 ± 4.0
	Chair stand test (time)	11.7 ± 6.5	14.5 ± 4.5*	12.7 ± 6.0	11.9 ± 4.9
	244cm Up and Go test (sec)	7.5 ± 2.2	5.6 ± 2.2*	7.5 ± 1.1	7.4 ± 2.3
	One leg standing test	4.7 ± 1.1	5.5 ± 1.2*	6.9 ± 3.0	5.7 ± 1.2
QOL	KQOL-AD	25.9 ± 6.5	29.0 ± 5.8*	25.5 ± 5.0	23.5 ± 4.5

\*p&lt;0.05, \*\*p&lt;0.01, \*\*\*p&lt;0.005

study<sup>12)</sup>, where cognitive functions improved when a cognitive-enhancement group training program was performed in dementia patients for 8 weeks. These results showed that when cognitive occupational therapy was implemented, dementia patients used their hands and stimulated their brain, which in turn strengthened their brain function and improved their cognitive function<sup>13)</sup>. In addition, traditional Korean music and other music activities used in this study showed similar results to those of Song et al.'s study<sup>7)</sup> where traditional Korean music therapy provided to those aged between 69 and 92 years of age, once to twice per week for 15 sessions of 50 minutes each resulted in improved cognitive functions. Those results demonstrate that traditional Korean music activities resulted in improved ability to recall the past and ultimately enhanced cognitive function. In other words, if music familiar to the elderly, such as traditional Korean music, is provided, it could have a positive effect towards improving the cognitive functions and quality of life of elderly patients with dementia. Physical activities used in this study, including yoga, were also found to have a positive impact on fall efficacy. These results were consistent with those of Tiedemann et al.'s study<sup>13)</sup>, in which a yoga program was applied to 54 elderly individuals living in a local community for 12 weeks. The yoga group's fall efficacy and fall-related factors improved more than those of the control group. These results demonstrate that a physical activity program can have a positive effect on the fall efficacy of elderly patients, both with and without dementia.

The occupation-centered activity program applied in this study included physical, cognitive, and instrumental daily life activities, and showed a positive effect on dementia patients' cognitive and physical functions. These results were similar to those of Lee et al.'s study<sup>14)</sup>, which applied a combined intervention providing physical activities, cognitive training, and social interaction at the same time, and showed a positive effect on dementia patients' quality of life and cognitive functions. Such results demonstrate that enhancing dementia patients' participation and activity changed brain plasticity, which led to changes in their cognitive function, improvements in their emotional fall efficacy, and ultimately had a positive effect on their quality of life<sup>15)</sup>. In other words, these are similar to the goal of occupational therapy on dementia patients, which aims to facilitate their participation in various activities during the therapy period. Therefore, we conclude that therapeutic interventions for patients with dementia should consider various factors specific to dementia patients, including physical, cognitive, and daily life activities.

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