

The Effects of Group Exercise Program on the Depression in the Elders with Dementia

The purpose of this study is to investigate the effects of group exercise program on depression in the elders with dementia. Subjects of this research were selected from the patients of Hyoja hospital(Yongin, Korea). They were elders with dementia having minor to moderate degrees of cognitive function. Twenty-four subjects were randomly assigned into two groups, each with 12 people; exercise group and the control group. The control group only performed general physiotherapy, while the exercise group performed exercise program and general physiotherapy for 8 weeks. Depression of the exercise group and the control group were measured at baseline before the study, at 4 weeks, and at 8 weeks after the study. Depression was measured by Geriatric Depression Scale Short Form Korea Version(GDSSF-K). Firstly, when comparing the levels of depression within the same group, depression was significantly lower in the exercise group, after the group exercise program. However, depression of the control group did not show significant changes before or after the study. Secondly, when comparing the levels of depression of the control group and the exercise group, differences between the levels measured before the study and 8 weeks after the study, was a statistically significant decrease of depression. Thirdly, effects of group exercise program according to the applied period were analyzed showing 8 weeks of group exercise to be more beneficial than 4 weeks. People who performed continuous group exercise program showed decrease in depression compared to the absence of group exercise program. This can infer beneficial effects of group exercise program. Group exercise program had desirable influence on decreasing the level of depression.

Key words : *Cognition, Dementia, Depression, Group exercise*

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INTRODUCTION

Dementia is a relatively common condition, affecting roughly 5 per cent of people aged 65 years and beyond(1). Dementia afflicts millions of Americans, and the economic and emotional costs of care for individuals with the disorder are astronomical(2). There are about more than 50 modality causative diseases to cause dementia such as degenerative disorder, cerebrovascular disease, metabolic disease(3). It has owned different clinical time by a cause and classified for progressive, degenerative, irreversible dementia, and curable dementia by clinical course(4).

Vascular dementia and Alzheimer's disease are representative causes of dementia. Vascular dementia is one clinical configuration concerned of ischemic and hemorrhagic cerebrovascular disease.

Depression is common among people with dementia, and it significantly affects their quality of life, behavioral symptoms, psychological symptoms, and ADL(activities of daily living) disorder. The level of the ADL is crucial functional standard for the dementia patient, and the level is lower in the patient who has severe dementia degree(5,6). Patients with major depression had an increased risk of development of dementia(7). Especially, if the patient

has depression, the level of ADL is lower than the patient without depression(8).

Pharmacotherapy and non-pharmacological treatment are demanded from a treatment of dementia at the same time. There are group exercise treatment, group art therapy, group music therapy, group reminiscence therapy, and reality therapy by non-pharmacological treatment methods of dementia. In addition, home exercise program for old people with dementia and a hospitalization rehabilitation program, are tried variously in the geriatric hospitals(9).

As such, study for non-pharmacological treatment methods for a dementia old person is necessary. Activities are an essential part of the therapeutic care of people with dementia(2). The relationship between physical activities including exercise and mental health has been widely studied. Regular exercise is associated with a delay in onset of dementia and Alzheimer's disease(10). Regular exercise have an effect on cognitive function, activities of daily living and exercise capacity in patient with senile dementia. Also, regular exercise program reduce the incidence of heart disease and behavioral complications, as well as improve the symptoms caused by decreased levels of total cholesterol, triglyceride, and low density lipoprotein cholesterol and increased level of high-density lipoprotein-cholesterol(11). Light exercise and vigorous exercise were not significantly associated with decreased risk of mild cognitive impairment(MCI), however, moderate exercise performed in midlife or late life was associated with a reduced odds of having MCI(12). Laurin et al. reported that physical exercise was associated with decreased risk for subsidence in cognitive function, Alzheimer disease, and any dementia(13), whereas Broc et al. showed no association between physical exercise and dementia(14). Therefore, the aim of this study is to investigate the effects of group exercise program on the depression in the elders with dementia.

METHOD

Subjects

Subjects of this research were selected from the patients of Hyoja hospital (Yong-in, Korea). Subjects were chosen to be elders with dementia having minor to moderate degree of cognitive function and 1 to 2 degree of clinical dementia rating. Study was started out by randomly dividing the 24 subjects into two groups, each with 12 people; exercise group and the

control group.

Measurement scale

Depression was measured by using the Geriatric Depression Scale Short Form Korea Version(GDSSF-K). The GDSSF-K scores ranged from 0 to 15, with higher scores representing more depressive symptoms. Kee simplified Geriatric Depression Scale to save time and it seemed to be measured usefully(15). Reliability and validity were inspected, and the Cronbach α coefficient appeared .88 because there was the above-mentioned name value(15).

Procedure

The exercise group performed 8 weeks of group exercise program and general physiotherapy, while the control group only performed general physical therapy. Depression of the exercise group and the control group was measured before the study and 4 weeks and 8 weeks after the study. Group exercise program involved in the period of 8 weeks for around 35 minutes a day, three times per week.

The group exercise program was carried out in the state that sat down on a chair to prevent a certain accident in progress. The group exercise program was composed in warm-up, aerobic exercise, and cool-down exercise. It was carried out for total of 35 minutes (warm-up 15 minutes, aerobic exercise 15 minutes, cool-down exercise 5 minutes).

Warm-up exercise program was composed of stretching, gymnastics, and sensory stimulation. Sensory stimulation was provided by rubbing or tapping with hands. The group exercises were composed by the exercise program that could be imitated easily.

Aerobic exercise has been executed to enjoy themselves. Aerobic exercise used ball and stick with music. Aerobic exercise program was composed of kinking a ball, throwing the ball and catching it again, passing over the ball next to someone, doing gymnastics with the bar, and moving and rubbing the body with holding a small ball. Cool-down exercise was composed of stretching, breathing exercise, and clapping hands.

Data analysis

Collected data were statically analyzed by SPSS PC Win 13.0 program. To evaluate the change by application period of group exercise program in group, we used Wilcoxon matched pairs test. To evaluate the change by application period of group exercise program

between group, we used Mann-Whitney U Test Alpha was set at .05.

RESULTS

General characteristic of the subject

Table 1. General characteristics of the subjects

Classification		F	M	Total
Control group	vascular	4(50.0)	1(25.0)	5(41.7)
	Alzheimer's	4(62.5)	3(75.0)	7(58.3)
	total	8	4	12
Exercise group	vascular	3(37.5)	2(50.0)	5(41.7)
	Alzheimer's	5(62.5)	2(50.0)	7(58.3)
	total	8	4	12
Age	study group	76.63	76.75	76.67
	control group	79.75	76.25	78.58
	total	78.19	76.50	77.63
Education year	study group	7.50	10.50	8.50
	control group	7.13	12.25	8.83
	total	7.31	11.38	8.67

NOTE. Values are n (%).
Abbreviation: F, female; M, male.

Twenty four participants(mean age=77.6) were enrolled in this study. The types of dementia were Alzheimer's disease (n=14) and vascular dementia (n=10). Education year was average 8.6 year. Age and education were not significantly different between the groups(table 1).

Changes of depression scores by application periods

Table 2. Change of depression score in the control group and the exercise group by application periods (Unit: point).

Classification	BS	4 WL	8 WL
Control group	7.58±2.57	8.42±3.58	8.08±3.03
Exercise group	7.75±2.70	6.33±2.87	5.92±1.44

Values are mean ±SD.
Abbreviations: BS, before study; 4WL, 4 weeks later; 8WL, 8 weeks later.

The average score of the depression scale of exercise group decreased with eight weeks later 5.92±1.44, four weeks later 6.33±2.87 points, with a public prosecutor before study 7.75 points. The number of the depressed public prosecutor average marks of

control group appeared with eight weeks later 8.08±3.03, four weeks later 8.42±3.58 points, with a public prosecutor before study 7.58±2.57 points. Control group was compared before study, and rose 4 weeks and 8 weeks after the study.

An analysis of effect by a group exercise program

Analysis of the effect before study and after 4 weeks

There were statistically significant decrease in attention from exercise group(p<0.05) however, there wasn't significant decrease in attention from control group(table 3).

Table 3. Analysis of the effect before study and later 4 weeks

Classification	T	Z	p-level
Control group	18.00	1.33	0.182
Exercise group	3.00	2.10	0.036*

* p<0.05

Analysis of the effect after 4 weeks and after 8 weeks

When the changes in attention were analyzed in control and exercise groups after 4 weeks and 8 weeks, there were no statistically significant changes in attention in both groups(table 4).

Table 4. Analysis of the effect after 4 weeks and after 8 weeks

Classification	T	Z	p-level
Control group	16.00	0.77	0.441
Exercise group	12.00	0.34	0.735

Analysis of the effect after 8 weeks and before study

There were statistically significant decrease of attention in exercise group(p<0.05), however, there were not statistically significant decrease in attention in control group(table 5).

Table 5. Analysis of the effect after 8 weeks and before study

classification	T	Z	p-level
Control group	29.00	0.36	0.722
Exercise group	3.00	2.50	0.013*

* p<0.05

Analysis of the effect between groups

When compared the levels of depression of the control

group with the study group, differences at 4 weeks later-before the study and 8 weeks later-before the study was statistically significant ($p < 0.05$).

Table 6. Effects of group exercise program on the depression

Classification	Control group (Rank Sum)	Exercise group (Rank Sum)	U	Z	p-level
4 weeks later – before study	193.5	106.5	28.5	-2.511	0.012*
8 weeks later – 4 weeks later	147.0	153.0	69.0	0.173	0.862
8 weeks later – before study	187.0	113.0	35.0	-2.136	0.033*

* $p < 0.05$

When compared between four-week-after results and before-research; and between eight-week-after results and before-research; the research group was statistically significant lower than the control group. Therefore, the group exercise program was effective in reduction in depression (table 6).

DISCUSSION

This study has found that participants taking part in group exercise program showed decrease of depression level, but participants joining in control group did not show any change in the depression level.

Depression is common in Alzheimer's disease (AD; 5-35%). It is associated with increased disability, cost of care and carer burden. If confirmed and cured appropriately, depression can advance, leading to better functioning and, in turn, provide for the process of rehabilitation. Although restoration to previous function may not be feasible, the aim of rehabilitation should be to reduce the impact of dementia on the person's functioning and maximize the person's potential (16).

Exercise is known to be associated with a lower prevalence of depression across the age range but little is known about its relationship to depression in AD (17). However, previous studies showed exercise had a potent protective factor for cognitive decline (13), supported as a strategy on depression (18), and has decreased the depression (19, 20, 21, 22). Laurin et al. showed that regular physical activity could represent an important and potent protective

factor for cognitive decline and dementia in elderly persons (13). Lee reported that regular participation of gymnastic exercise and walking program in exercise during elderly women is advocated as one strategy to depression, risk factors of dementia, and may result in improving symptoms of disease of the elderly women. Generally, women experience depression in greater numbers than men. If enough patients could be recruited, it is recommended to separate women from men in further studies (18). Doses of dementia patients' exercise was effective when the patient exercised for 20 to 60 minutes at a time, 2 to 3 times per a week, intensity of 60 to 80% of maximal heart rate (23). Participants in our study participated 3 times a week for around 35 minutes a day, but the heart rate was not checked. Further studies are needed to identify the heart rate during the exercise. Gorman insisted that regular exercise pushed forward movement of the dementia patient, and pain, depression and mortality were decreased (19). Teri et al. insisted that as a result of having exercise in a subject for 12 weeks, it has decreased the depression of Alzheimer's disease patients (22). Mahendra insisted that provision of an integrated programme of exercise and behavioral management training in the homes, improved the physical health of people with Alzheimer's disease, and reduced depression in the shorter term (21). Beesley and Mutrie insisted that exercise is beneficial in mild to moderate depression and may also be of use in more chronic and severe depression (24). On a study about the nursing intervention program for dementia, Ji showed that as a result of having hand exercise, art therapy, music therapy and cognitive therapy in a subject for 12 weeks, it has decreased the depression of dementia patients. However, hand exercise in that study was just ten motions including clapping, tap-ping, and rolling to improve the brain function. It is well known that exercise induces molecular biological and physiological changes in the brain (25). Kim et al. reported that treadmill exercise using rats can be used as a useful strategy for alleviating neuropsychological symptoms associated with Alzheimer's disease, such as depression (20).

In this study decrease of depression level of exercise group, which performed a group exercise program for 8 weeks, showed significant differences for statistics. Depression of the control group did not differ statistically significant degree.

This study is limited by the relatively small participants numbers, because there was a difficult environment to recruit dementia patients in a hospital. In

addition, effects of group exercise was not investigated according to degrees and types of dementia. And, it was not able to be limited for the dementia drug, which subject of study was taking. Future studies should recruit more participants and consider to investigate the relationship among dose of physical function.

CONCLUSION

The purpose of this study was to investigate the effects of group exercise program on depression in the elders with dementia. Group exercise program resulted in significant decline in level of depression in the elders with dementia. It is likely that appropriate group exercise for depression in the elders with dementia influences decreasing level of depression.

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