

Effects of Cognitive Stimulation Task on Cognitive State and Activity Participation in Elderly People with Mild Cognitive Impairment (MCI)

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ABSTRACT

Background/Objectives: To investigate the effect of cognitive stimulation task for community living elderly people with MCI on cognitive function and activity participation.

Method/Statistical Analysis: Subjects were 15 community-dwelling elderly persons. The cognitive behavior therapy included the warming up, cognitive stimulation program, cognitive activity program, and cooling down. MMSE-DS to evaluate the cognitive state, and K-ACS to evaluate the activity participation level were conducted with all subjects before and after the intervention in the same method. All statistical analysis method were performed using SPSS version 21.

Findings: Among all participants, men were 4(26.67%) and women were 11(73.33%). significant difference of cognitive state was found between the pre and the post-test. A number of studies have shown that cognitive stimulation program can help maintain opposite to cognitive decline. K-ACS was significant differences between leisure ($p=0.034$) and social activities($p=0.028$). The mean instrumental activities score increased, but this was not significant. This is similar to the result of a study that meaningful activities through the intervention are an important factor on the life of elders.

Improvements/Applications: This research provide useful information for designing efficient interventions and identifying their good influence for progress of community involvement. Future research should examine the effects of community activities on the social impact of the elderly.

Keywords: Activity participation, Cognitive stimulation program, Cognitive state, Elderly person, MCI

Introduction

Dementia due to aging around the world has become one of the major diseases affecting public health and has become a social problem. The prevalence of dementia is expected to double by in 2020 and triple in 2050¹. Mild cognitive impairment (MCI) is a transitional phenomenon between naturally aging and neurocognitive disorder². The concept of MCI has come to the knowledge in the United States, where large-scale research projects have been studied. There is an ultimate view that provides

treatment, and thus reduces the risk of developing senile dementia³. MCI symptoms refers to a condition other than dementia, such as cognitive dysfunction or disability, decreased community activities, or difficulty in performing regular life living activities⁴. In the case of a typical MCI, cognitive decline or memory impairment does not impair the daily life of the elderly, but maintains a function lower than expectations for the individual's age and educational level⁵⁻⁷. However, impaired cognitive ability can have a negative impact on social, functional, and vocational activities.

Cognitive behavior therapy (CBT) was considered the most preferred researched psychological therapy methods, and more than 300 studies on CBT have been published until now. CBT is being applied to a variety of disorders and problems⁸. The main goal of CBT is to train cognitive and behavioral abilities efficiently to cope

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with mental stress and abnormal situations⁹. Cognitive treatment programs consist of cognitive stimulation task, orientation, memory, and concentration training. The universal cognitive stimulation task refers to a program that is applied to group therapy and designed to improve cognitive function and social communication function. Cognitive program involves individually composed sessions centered on specific activities that use brain and body together (e.g. calculation through market play)^{10,11}.

Participation is included in the context of life or in a variety of activities, and is described in the International Classification of Functioning, Disability and Health (ICF)¹². Participation is made up of one of three elements of function in the ICF. Successive activity participation has been shown to positively affect physical, mental, social health and well-being and quality of life. However, when participation is limited, social interaction is reduced and work life, community activities, mobility, and communication decline¹³. Therefore, participation level is very important for the life of the elderly.

Previous research on group therapy has shown that various nonpharmacological treatments improved the cognitive function of elderly people with MCI. However, there is a shortage of research on the effects of cognitive functioning on individual participation. Thus, the goal of this research was to examine the effect of cognitive stimulation task for community living order people with MCI on cognitive function and activity participation.

Materials and Method

Subjects: The study was for 4 months, on from March 2017 to June 2017 at the J City Community Health Center in Republic of Korea. Subjects were 15 community-dwelling elderly over than 70 years old. Inclusion criteria for subject required willingness to the study, walk independently, no diagnosed with dementia, ability to communicate about basic action and understand the program's object. All participants understand and signed the informed agreement to join in the experiment in according to the ethical principles. This study methods were acknowledged by the Semyung University Ethics Committee. Among all participants, men were 5(33.3%) and women were 10(66.7%). Average age was 77.93 ± 3.97 years old and average of educational years was 6.53 ± 3.58 .

Procedures: All researchers completed the regular curriculums of certified institutions and participated in

the program. This study used a pre and post-test design of a one group. The cognitive behavior therapy included the following activities: warming up for 10 minutes, cognitive stimulation program for 30 minutes, cognitive activity program for 40 minutes, and cooling down for 10 minutes. The subjects also had a rest time for about 10 min in the middle of the program depending on their conditions [Table 1]. The cognitive stimulation activity involved numbers, shapes, depths, memories, and cognitive activities that could stimulate the subjects' brains. For the cognitive activity program, the subjects used their hands to make things or participated in a simple sports game. An experienced occupational therapist performed the cognitive behavior therapy on all participants for 1 hour and a half sessions per week, for 15 weeks.

Table 1: Cognitive Behavior Therapy

Time	Contents
10Minute	Greeting, Gymnastics for Dementia Prevention
30 Minute	Cognitive Stimulation Program
40 Minute	Cognitive Activity Program
10 Minute	Joint Movement, Notices

Outcome Measures: All assessments were performed by the staff of occupational therapy and trained student of the occupational therapy. The assessment battery included the Korean version of the Mini-Mental State Examination for Dementia Screening (MMSE-DS), which is a brief cognitive status screening test. This scale is a total of 19 items, ranging from 1 to 5 depending on the item. The range of the score is from 0 to 30, and the higher the score, the better the cognitive state. To interpret the results with MMSE-DS scores, you need to know your gender, age, and academic background. Based on these three criteria, the cognitive decline is judged based on the score interpretation table¹⁴.

Baum and Edwards developed the Activity Card Sort(ACS) to evaluate the activity participation level of the elders aged 65 or more who were hospitalized or living in the community¹⁵. Based on the photographs, the Korean Activity Card Sort (K-ACS) was revised by Lee et al., and collected information on social, instrumental and leisure activities according to the living environment¹⁶. The K-ACS consists of establishment versions, recovery and community living versions. In this study, community living version was used for assessment. The community

life version shows 67 pictures of activities, and the subjects should be classified into four levels (instrumental activity of daily living, low-intensity physical activity, high-intensity physical activity, and social activity). The scoring method is to calculate the possession rate of participating activities = current activity level/past activity level × 100, where the current activity level for each of the instrumental activities, social activities, and leisure activities = ‘activities that they do now in the same level as before’ + ‘activities that they do less than before’ + ‘new activities that they began after 60’ and the past activity level = ‘activities that the participant did in the past’. The test-retest of the reliability of the K-ACS recorded .87 for community older people¹⁷.

Statistical Analysis: All statistical analysis was done using Win SPSS (version 21 ; SPSS Inc, Chicago, IL, USA). We analyzed gender with frequency analysis, age and years of education with descriptive statistics. Cognitive status and levels of participation in activity were compared by Wilcoxon signed-rank tests before and after the intervention. The $p < 0.05$ was considered to be statistically significant.

Results and Discussion

Subjects: In total, 15 subjects completed this study. Among all participants, men were 4(26.67%) and women were 11(73.33%). Average age was 77.93 ± 3.97 years old and average of educational years was 6.53 ± 3.58 [Table 2].

Table 2: Characteristics of Participants

		Subject (%)
Sex	Male	4(26.67%)
	Female	11(73.33%)
Age (M ± SD)		77.93 ± 3.97
Education in Years (M ± SD)		6.53 ± 3.58
Living Arrangement	Alone	10(66.67)
	Couple	4(26.67)
	Children	1(6.66)
Maid	Full Time	0(0.00)
	Part Time	9(60.00)
	Without Maid	6(40.00)

47.5 million people are living with neurocognitive disorder worldwide and the prevalence is expected to double every 20years¹⁷. Healthy elderly people are also at swelled risk of developing neurocognitive impairment

(20%–50% over a period of 2–3years), and the fact that the drug is not the best treatment in the case of symptoms emphasizes the importance of nonpharmacologic early intervention^{18, 19}.

Cognitive State and Activity Participation: Table 3 shows the changes in cognitive state, and activity participation after the intervention. The MMSE-DS was used for the evaluation of cognitive state. A statistically difference was showed between the pre and the post-test($p=0.011$). Many previous studies have reported that cognitive stimulation activity helps prevent cognitive decline in the elderly. These programs provide positive effects of keeping or enhancing cognitive function and may stave off or slow the advance to neurocognitive impairment^{20, 21}. In a study that used CBT as intervention, the MMSE score of the experimental group significantly increased, which agreed with the result of this study²².

Table 3: Comparison of Activity Participation by Area in Pre and Post-test

Variable	Pre-test	Post-test	p	
	Mean ± SD	Mean ± SD		
MMSE-DS	22.00 ± 1.51	23.87 ± 1.35	0.011*	
K-ACS	IADL	68.21 ± 3.12	69.76 ± 2.31	0.383
	Leisure	70.32 ± 4.11	80.98 ± 2.12	0.034*
	Social Activities	65.04 ± 4.82	78.18 ± 6.34	0.028*

* $p < 0.05$. MMSE-DS: Mini-Mental State Examination for Dementia Screening, K-ACS: Korean Activity Card Sort, IADL: Instrumental activities.

The K-ACS examines the activity participation level. According to the results, there were significant differences between leisure ($p=0.034$) and social activities($p=0.028$). The mean instrumental activities score increased, from 68.21 ± 3.12 to 69.76 ± 2.31 , but this was not significant ($p=0.383$). This is similar to the result of a study that meaningful activities through the intervention are an important factor on the life of elders. However, the instrumental activities score showed no statistically significant differences. This result seems to be due to lack of the area related to daily life in the intervention program. Most of the instrumental activities are dependent on the guardians, and the elders with mild cognitive impairment could not do them by themselves. Furthermore, it is difficult to directly train instrumental activities during CBT. Baek et al. assessed the ACS for three subjects after

individual home occupational therapy, all three of them showed improvements in the ability of living, two of them showed improvements in leisure activities, and only one of them showed improvement in social activities²³. This is different from the result of this study because the study design, intervention method, and the number subjects are different. Many previous studies acknowledged the importance of activities in the quality of life of the elders and researched the patterns, levels, and frequencies of the activities because “the fact that people are involved in activities means that they are alive.” In particular, ACS is used in many countries as an assessment tool for the performance level of activities of the elders. The ACS is often used as an assessment tool for the degree of involvement of the subject in rehabilitation areas. However, there were no previous studies that provided CBT as treatment for subjects with MCI or neurocognitive impairment and assessed their ACS.

This study has several possible limitations. First, the number of subjects was small size to generalize the results to a larger population of participants. Second, the K-ACS has a simple advantage that it is a self-measuring tool, but it has the disadvantage that it can not accurately determine or measure the actual participation. Because this study was conducted with group therapy activities, there are limitations in providing individualized intervention to individual subjects. In the future, personal care services provided to patients with mild cognitive impairment should help individuals participate in activities rather than housework.

Conclusion

Participation in activities is an ideal ways of sustaining physical and mental functioning and feeling happiness in life. However, limiting activity is a matter of a realistic elderly person who negatively affects individuals by their personal and social impacts. Therefore, in this study, we analyzed the difference of activity by providing intervention to MCI whose activity decreased. Using the results of this study as basic data, it is necessary to promote social participation of the senior citizens living in the community so that the senior citizens are not bored and alienated at home. These results will be linked to the job creation and community care of the elderly that the Korean government is currently pursuing.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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