

BRAIN GYM IMPROVES COGNITIVE FUNCTION FOR ELDERLY WITH DEMENSIA

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ABSTRACT

Background: Dementia is a combine of clinical symptoms caused by various background diseases and is characterized by loss of short-term memory, global disorders, mental functions (including language functions), withdrawal of abstract thinking skills, difficulty in caring for himself, behavioral changes, emotional instability and loss of time recognition and place. Brain gym is one of the exercises to improve cognitive performance on elderly with dementia.

Objectives: This study was to determine the effect of brain gym on cognitive performance on elderly with dementia in Social Service Unit Tresna Werdha Jember.

Methods: A Quasy Experimental design was done to conduct 30 elderly with dementia were recruited using purposive sampling divided into 2 groups, experimental and control group. The independent variable of research this study was brain gym and the dependent variable was cognitive function at elderly. Data were collected by using MMSE score and then analyzed using Wilcoxon Signed Rank Test with level of significance $\alpha \leq 0.05$.

Results: The results identified a significant influence between the implementation of Brain Gym to improve cognitive function in the elderly with dementia.

Conclusion: Brain gym increase cognitive performance on elderly with dementia.

Key words: Elderly, brain gym, cognitive function, dementia.

INTRODUCTION

The neurological system, especially the brain, is a major factor in adaptive aging. This aging process occurs in a degenerative manner which affects changes in the elderly, one of which is a change in cognitive function. Changes in cognitive function can affect daily activities and even daily dysfunction in elderly people who have dementia (Nugroho, 2008).

There are 47 million people suffering from Alzheimer's dementia in the world, and as many as 22 million of them are in Asia. Based on population projection data of the Indonesian Ministry of Health's data and information center (2017), it is

estimated that in 2017 there will be 23.66 million elderly people in Indonesia (9.03%). It is predicted that the number of elderly people in 2020 (27.08 million), 2025 (33.69 million), 2030 (40.95 million) and 2035 (48.19 million).

The cognitive function of the elderly is influenced by age, regeneration ability in the brain, vascularity inadequacy to the brain and hormones. In addition, risk factors that can affect the decline in cognitive function are the offspring of the family, education level, brain injury, poisons, not doing physical activity, and chronic diseases such as Parkinson's, heart disease, stroke and diabetes (Sauliyusta &

Rekawati, 2016). Dementia is progressive, where the structure and chemistry of the brain becomes more damaged over time. The ability of the elderly to remember, understand, communicate and reason gradually decreases. This condition results in the disfunction of everyday life.

Brain gym is one method of improving cognitive function in the elderly. According to Munir (2015), this exercise can stimulate good physical and brain activity. Dennison (2008), states that the brain gymnastic movement activates the neural relationship between the body and the brain, so that the flow of electromagnetic energy throughout the body becomes good. This is consistent with the study of Yusuf, Ah, et al. (2010) which states that there is an influence of brain gymnastics on improving cognitive function in the elderly. The difference with previous research is that this study was conducted on elderly people who experience dementia. Brain gym interventions are expected to improve cognitive function in elderly people who experience dementia.

METHODS

Study Design

The design used in this study is a quasy-experiment pre-posttest control group design.

Setting

This research was conducted at UPT PSTW Jember from October to November 2018.

Research Subject

The samples used in this study were 30 elderly with purposive sampling with the criteria of elderly aged 60–80 years and physically and mentally healthy. The independent variable in this study is brain gymnastic method (Brain Gym), while the

dependent variable is the cognitive function of the elderly.

Instruments

Data collection and collection during the research was obtained through a direct observation process to respondents. The instrument for assessing cognitive function in this study was using the Mini Mental State Examination (MMSE) instrument. Ah. Yusuf, Indarwati and Jayanto (2016) explained that there were five domains of cognitive functions assessed in the MMSE instrument, namely orientation, registration, attention and counting, recall, and language skills described in 11 question items. The interpretation of the results in the MMSE instrument is that if the MMSE value is in the range of 27-30 then it is included in the category of good cognitive function, if the MMSE value is in the score range of 22-26 it is included in the category of sufficient cognitive function, and if the MMSE value is less than or equal score 21 then included in the category of cognitive function is less. The instrument used as a reference in the implementation of brain gymnastics (Brain Gym) is to use the Standard Operating Procedure (SOP) of brain gymnastics. Giving brain gymnastics in the intervention group was 4 times a week for 1 month with the duration of each meeting 15-20 minutes. The implementation of group brain exercises was aimed at 15 respondents in the intervention group. The researcher led the way of brain gymnastics which was accompanied by a homestead companion at UPT PSTW Jember. Post-tests were conducted after 1 month to determine differences in cognitive function in the intervention group.

Data Analysis

The data analysis process in this study used SPSS through the Wilcoxon signed

rank test statistical test to determine the differences in the scores of the pre-test and post-test level of cognitive function of the intervention group and the control group with a significance level of $\alpha \leq 0.05$.

Ethical Consideration

This research has gone through an ethical test from the Jember University and obtained permission from UPT PSTW Jember.

RESULTS

Characteristic of Respondents

Table 1. Characteristics of Elderly Respondents Aged 60–80 Years at UPT PSTW Jember in October-November 2018 (n = 30)

Characteristics of Respondents		n	%
Gender	Male	8	26,67
	Female	22	73,33
Educational history	Did not finish elementary school	22	73,33
	Finish elementary school	7	23,33
	Finish Junior High School	1	0,33
Work employment status	Work	21	70,00
	Not working	9	30,00

Based on table 1 above, it can be seen that the majority of respondents are female, the education status does not complete elementary school (SD) and the majority have a history of work.

Level of Cognitive Function of the Elderly

Table 2. Level of Cognitive Function of the Elderly Aged 60-80 Years at UPT PSTW Jember in October-November 2018 (n = 30)

	Control		Intervention	
	pre	post	pre	post
Mean	7.00	7.00	5.50	8.62
	p=0.802		p= 0.013	

Distribution of cognitive function levels in the elderly intervention group before being given brain gymnastics (pre-test) as many as 13 elderly (86.67%) had less cognitive function levels, 13.33% elderly with sufficient cognitive function and 0% elderly with good cognitive function. The results of the pre-test level of cognitive function in the control group also found that most of the elderly had a level of cognitive function that is less than 9 elderly (60%), 40% of the elderly with sufficient cognitive function and 0% of the elderly with good cognitive function.

The results showed an increase in cognitive function of the elderly in the intervention group after being given treatment in the form of brain exercise for 1 month. The number of elderlies with sufficient cognitive function increased to 33.33%, 0.67% of the elderly experienced an increase in cognitive function to be good and there was a decrease in the number of elderlies with less cognitive function i.e. 86.67% decreased to 53.33%. The post test results in the control group showed an increase in the number of elderlies with less cognitive function i.e. 60% to 66.67%, 33.33% to the elderly with less cognitive function and 0% to elderly with good cognitive function.

The results of the Wilcoxon signed rank test statistical test data calculation showed that there were differences in cognitive function scores between the intervention groups given brain gymnastics

which were indicated by a significance value of $p = 0.013$. whereas in the control group there was a significance value of $p > 0.005$ which is the value of $p = 0.802$ so that it can be said that there was no significant difference between the scores of cognitive functions before and after the control group.

DISCUSSION

Aging and being elderly for some people can be a burden. Elderly people will begin to lose independence, both physically such as limited mobility, and psychologically such as cognitive damage. Elderly people will experience a decline in cognitive and psychomotor functions. Cognitive functions include the process of learning, orientation, understanding, understanding and attention. This will cause the reaction and behavior of the elderly to be slower (Joseph, 2010).

Elderly people can remain active in various ways according to their level of education and social background. The brain that is rarely used will decrease its function, therefore maintaining the potential of the brain in the aging process is very important. Learning and continuing to do activities is the key to stimulation of the brain, if this stimulation is given continuously it can improve human intelligence until the age of 80-90 years (Denniso, 2006 in Pratiwi, 2016).

Brain gymnastics (brain gym) is one of the stimulations to optimize, stimulate brain function to be more relevant to the elderly, facilitate blood flow and oxygen to the brain. Brain gymnastics (brain gym) is a series of simple movements that are fun and are used to improve learning skills by using the whole brain. Brain gymnastics is useful to raise awareness and reflex of the elderly who have been lost. RAS (reticular activating system) or someone's alertness

center can be alerted again with brain gymnastics (Pratiwi, 2016).

This fun motion exercise in brain gymnastics is the core of educational kinesiology, abbreviated as Edu-Kinesthetic (Edu-K), a method developed by Paul E. Dennison, an educator in America and director of the Word Remedial Valley 4 Word Learning Center. education comes from the Latin word educate which means to pull out, while kinesiology comes from the Greek kinesis which means movement. Education Kinesiology is a way to pull out or display potential in a student of any age that was originally locked, through these simple movements believed to be able to stimulate all parts of the brain so that they can open parts of the brain that were previously blocked (As'adi, 2011)

Scientists have conducted research and concluded that people who experience a decline in cognitive function must make top priority to improve quality of life. Having a higher level of education accompanied by being in a higher social stratum is assumed to reduce cognitive decline (Ahmad, 2006). Based on demographic data on the results of the study indicate that the elderly who have a history of graduating education have an MMSE value that is better than the elderly who have a history of not completing education.

Lesmana (2006) in Yusuf (2010) states that work experience had an impact on the quality of the elderly thinking process. The results of the study of the majority of the elderly have a work history as farm laborers and coolies. They fall into the category of heavy cognitive function, while those who have a work history of traders, farmers, tailors have good cognitive functions. The author assumes that good cognitive function seen from the history of work is associated with the habits of the elderly thinking and counting which is an activity of training the brain.

Brain gym provides a stimulus for repair of the fibers in the corpus collosum which provides many two-way neural connections between the cortical areas of both brain hemispheres, including the hippocampus and amygdale. The brain gymnastic movement reactivates the neural connections between the body and the brain so as to facilitate the flow of electromagnetic energy throughout the body. This movement supports electrical and chemical changes that take place on all mental and physical events (Joseph, 2010).

The role of the hippocampus in consolidation as a cross-reference system, which links certain aspects of memory stored in separate parts of the brain so as to increase nucleic acids in changes in neuronal memory. Synapse affects the processing of information or data received so that people will store information in their memory. Repair of synapse function can affect the performance of the cerebral cortex involved in the process of new information as a pathway to the cortex for permanent memory storage. The cerebral cortex is the outer layer of the brain involved in a high level of cognition that can be followed by an increase in other cognitive functions such as orientation, registration, attention, counting, reciting and language (Yusuf, 2010).

The results showed a difference in cognitive function in the intervention group after brain exercises for 1 month. This proves that brain exercise has a positive influence on improving cognitive function in the elderly.

Brain exercise activities carried out regularly can improve cognitive function in the elderly. Brain gymnastic movements can improve intellectually including cross movements, with the hips, brain gymnastic movements that increase energy including gravity glide, relaxed hooks, earth buttons.

Brain gymnastics can activate three dimensions of the brain. The concentration dimension can increase blood flow to the brain, and increase oxygen reception. The lateral dimension will stimulate the coordination of the two hemispheres of the left brain and right brain (improve breathing, stamina, release tension and reduce fatigue). Focusing dimensions to help release focus barriers from the brain (improve lack of attention and lack of concentration).

CONCLUSION

Routine brain gymnastics (brain gym) can improve cognitive function of the elderly with dementia.

SUGGESTION

With the results of this study, it is expected that health workers can make the results of this study as input in providing services to the elderly to improve the cognitive function of the elderly by providing routine brain gymnastics.

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