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**Effect of Brain Exercise on Cognitive Function in the Elderly with Dementia At the Graha Werdha Marie Joseph Pontianak**Sri Ariyanti^{1*}, Surtikanti², Tri Wahyuni³, Yenni Lukita⁴¹ Bachelor of Nursing Program, Muhammadiyah Institute of Technology and Health, West Kalimantan, Indonesia²⁻³ Bachelor of Nursing Program, Muhammadiyah Institute of Technology and Health, West Kalimantan, Indonesia⁴ Diploma Nursing Study Program, Muhammadiyah Institute of Technology and Health, West Kalimantan, Indonesia**ABSTRACT**

The increase in the number of elderly people in Indonesia is related to increasing health problems, including a decline in cognitive function due to the aging process. One of the disorders that occur in the elderly is dementia, which is characterized by a decrease in memory, thinking, and the ability to carry out daily activities. To prevent cognitive decline, one of the non-pharmacological interventions that can be applied is brain exercises. This study aims to determine the effect of brain gymnastics on improving cognitive function in the elderly. The type of research used in this study is quantitative research using a pre-experimental research design using a one group pretest and posttest design approach with a sampling technique, namely purposive sampling with a sample of 25 elderly respondents living in Graha Werdha Marie Joseph Pontianak. The data collection technique that will be used is the MMSE questionnaire. The intervention lasted for two weeks by providing nursing actions in the form of brain exercises for 15 minutes a day, after which an evaluation was carried out on the respondents. Data analysis using paired tests. The results showed that there was an effect of brain gymnastics on improving cognitive function in the elderly (p value 0.000). Brain exercises can be done regularly as a form of intervention in improving cognitive function in the elderly.

Keywords: Brain Exercise, Elderly, Dementia

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**1. Introduction**

The elderly group is a group that is susceptible to various diseases, due to the decrease in immunity and the increase in comorbidities with age. This condition can worsen health and increase the death rate. The elderly aged 60 years and above were recorded to have the highest mortality rate, reaching 42%. Diseases that are often suffered by the elderly include heart, diabetes, and stroke, as well as decreased immune system function which can worsen health conditions and risk causing death (Milita et al., 2021).

The aging process causes physical, social, and psychological changes that affect the quality of life of the elderly. Decreased body strength and physical organ function reduce the ability of the elderly to carry out daily activities. In addition, the decline in cognitive capacity and feelings of loneliness that often occur in the elderly can also affect their emotional well-being. Social factors also play an important role in maintaining the quality of life of the elderly. Social activities that involve interaction with others can provide emotional support, increase self-esteem, and reduce loneliness, all of which contribute to improving the quality of life of the elderly. Sustrami, (2017) stated that active social participation is closely related to the quality of life of the elderly, where positive social activities can protect against a decline in quality of life that often occurs with age.

Decreased cognitive function in the elderly is the main factor that causes difficulties in carrying out normal daily activities, as well as being the main reason for dependence on others for self-care (Mongisidi, 2019). Decreased cognitive function in the elderly has a significant impact on their ability to carry out daily activities independently. Difficulty in remembering, concentrating, or making decisions causes the elderly to be unable to carry out routine tasks such as eating, bathing, or taking care of themselves. This increases their dependence on others for care, which in turn affects the quality of life of the elderly and adds to the physical and emotional burden on caregivers. This impact creates a major challenge in ensuring the well-being of the elderly and their care needs.

Gymnastics for the elderly is a type of exercise that is easy to do with minimal physical impact, making it very suitable for the condition of the body of the elderly. This exercise combines muscle movements with breathing techniques that are performed regularly and mindfully. Breathing exercises aim to optimize respiratory function and chest capacity. One way to maintain the health of the elderly is to implement a healthy lifestyle, one of which is through exercise. Gymnastics for the elderly is an ideal form of physical activity for the elderly, which provides great benefits in maintaining body fitness. This activity also helps the body of the elderly in reducing free radicals contained in the body (Handayani et al., 2020). Gymnastics for the elderly can be considered an effective intervention in improving various dimensions of quality of life in the elderly.

Dementia is a condition characterized by a decrease in memory, thinking ability, behavior, and the ability to carry out daily activities. Loss of intellectual capacity in





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dementia affects not only memory, but also cognitive and personality function. One approach to prevent cognitive decline in the elderly with dementia is through brain exercises (Finatunni & Nurhidayati, 2020). Dementia is a symptom of a decline in memory, thinking, behavior, and the ability to perform daily activities. Loss of intellectual capacity in dementia is not only in memory or memory, but also in cognitive and personality. Dementia is a cognitive decline that is so severe that it interferes with daily living activities and social activities. Cognitive decline in dementia usually begins with a decline in memory or memory. Elderly people are closely related to the occurrence of dementia (Suryatika & Pramono, 2019).

Brain gymnastics is a light exercise that involves crossing movements to create harmony and optimize the performance of the right and left brains. This gymnastics can be done by anyone, including the elderly, with the aim of stimulating the brain to maintain its intellectual power. Brain exercise movements can help reactivate the alertness centers in the brainstem for those who experience decreased alertness. This activity is flexible, it can be done anywhere and anytime, even in a relaxed position such as sitting or lying down, with a duration of at least one minute per movement. The relationship between the mind and muscle movements suggests that positive thoughts can improve brain integration and strengthen muscles, while negative thoughts can relax muscles. Brain gymnastics is one of the effective efforts in maintaining and improving cognitive function, especially in the elderly who experience a decrease in memory or alertness (Suryatika & Pramono, 2019; Margareth et al., 2024).

Based on the results of observations made in January 2025, the elderly at Graha Werdha are more active in the room and there are rarely activities carried out outside the room. So with this research, it can be a work program for grape managers to anticipate the elderly who experience a decline in cognitive function considering that the number of elderly people is increasing from year to year. With this brain gymnastics, we want to invite the local elderly to do activities or exercise (gymnastics) to reduce the elderly who experience cognitive function disorders. With the increase in the number of elderly people year by year, it will continue to increase and experience a decline in cognitive function, this must be anticipated considering the number of the elderly population that is increasing year by year. In addition, the grape manager said that so far socialization between graha residents is lacking and the elderly here there are less routine activities.

This study aims to examine the impact of the application of brain gymnastics on cognitive function in the elderly with dementia.

2. Research Method

The type of research used in this study is quantitative research with a pre-experimental design research design with a one group pretest and posttest design approach,





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to see the effect of brain gymnastics on improving cognitive function in the elderly. The data collection technique that will be used using the questionnaire As well as the measuring tool used is the *Mini MentalSate Examination* (MMSE) questionnaire. The sampling technique was using purposive sampling, the respondents were given brain exercise interventions 3 times a week in 2 weeks. The analysis in this study uses univariate analysis and bivariate analysis and analysis techniques used by *the Paired Samples t-test*. The population in this study is all elderly who have experienced a decline in cognitive function, The sample in this study is the elderly who live in Graha Marie Joseph and meet the following inclusion criteria: Elderly people aged over 60-74 years, willing to be respondents, able to see and hear, experience a decline in cognitive function and do not experience chronic diseases.

This research has passed the ethics test at the ethics committee of the Muhammadiyah Institute of Technology and Health of West Kalimantan with number: 72/II.I.AU/KET. ETIK/VI/2025. The researcher started the study by asking for consent from the respondents, and when filling out the questionnaire, the respondents were only asked to write down their initials to maintain confidentiality. After the respondent finishes filling out the questionnaire, the data is stored in a safe place. The researcher then provided an intervention in the form of brain gymnastics to the elderly. The research was conducted at Graha Werdha Marie Joseph Pontianak, where the researcher asked for the time and consent of the respondents to participate. After that, the researcher measured the cognitive function of the respondents using a pre-test questionnaire before conducting an intervention for 15 minutes. After the respondents finished filling out the post-test questionnaire, the researcher expressed gratitude and greetings as a form of appreciation for their participation.

3. Result and Discussion

a. Result

Table 1.

Characteristics of Elderly Respondents in Graha Werdha Marie Joseph Pontianak
(n = 25)

Characteristics	Frequency (f)	Percentage (%)
Age		
60-74 years old	23	92,0
75-90 years	2	8,0
Gender		
Man	10	40,0
Woman	15	60,0
Education		
Primary school	6	24,0
Junior High School	10	40,0
High School	9	36,0





Total	25	100
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Primary Data Sources 2025

The results of the analysis in table 1 show that the distribution of the frequency of respondents in the age group with the most is 60 to 74 years old with 23 respondents (92.0%), with the most gender category being female as many as 15 respondents (60.0%) and the last education category with the most is junior high school with 10 respondents (40.0%).

Table 2.

Results of Analysis of the Influence of Brain Gymnastics on Improving Cognitive Function in the Elderly in Graha Werdha Marie Joseph Pontianak (n = 25)

Intervention	Mean	Standar Deviasi	P Value
Before Brain Gymnastics	19,92	1,631	0,000
After Brain Gymnastics	26,04	1,881	

Paired Test Results

Based on table 2, the results of the analysis before and after brain gymnastics using *the paired test* were obtained, the average MMSE score before brain gymnastics was 19.92 and after brain gymnastics was carried out increased to 26.04. The results of the statistical test showed a value of p vale=0.000 which means that H_a was accepted so that it can be concluded that Brain Gymnastics has an effect on improving cognitive function in the elderly in Graha Werdha Marie Joseph Pontianak.

b. Discussion

The results showed that most of the elderly showed normal cognitive function with a score range of 24-30. The *Mini Mental State Examination* (MMSE) questionnaire consists of 11 questions about: time orientation, place orientation, registration, calculation and attention, remembering, language (naming objects, word repetition, three-step commands, closing the eyes command, writing sentences, and copying images). The average score after brain gymnastics was obtained 26.04. The results of this study showed that after doing brain exercises for 15 minutes for 2 weeks, none of the elderly respondents had a decrease in cognitive impairment.

This study is in line with research that brain gymnastics is effective in improving cognitive function in the elderly with dementia if done 4 times in 1 week for 1 month with a duration of 15-20 minutes (Suhari et al., 2019).

Entering old age, several problems experienced by the elderly are one of which is cognitive problems. The cognitive function of the elderly can be measured by the assessment of Mini Mental State Examination (MMSE) scores. Changes in the cognitive function of the elderly are associated with increased depression and affect the quality of life of the elderly (Okvitasari et al., 2024). The aging process will cause





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changes in the composition of the nervous system, specifically in the brain, which is characterized by the degeneration of neurons and oligodendrocytes, which ultimately leads to a decline in cognitive function in the elderly (Komala et al., 2021).

Brain gymnastics is especially beneficial for the elderly because it can help maintain and improve their cognitive function which tends to decline with age. This exercise is designed to stimulate the brain by involving physical movements that combine coordination between the left and right brains, which can increase blood flow to the brain, improve communication between nerve cells, and support neuroplasticity, which is the brain's ability to adapt and form new neural pathways. These exercises that involve simple physical movements and breathing techniques can also improve concentration, memory, and emotional balance. For the elderly, brain exercises can be an effective method in slowing or preventing cognitive decline often found in conditions such as dementia or Alzheimer's. In addition, brain exercises can help reduce stress, improve sleep quality, and improve the physical and mental well-being of the elderly, ultimately contributing to improving their quality of life.

When the elderly do brain exercises, the vasodilation process in the blood vessels and an increase in heart rate occurs, which promotes blood circulation throughout the body, including the brain. This increased blood flow ensures a smoother supply of oxygen and nutrients to the brain, so that brain functions can run optimally. This can ultimately improve short-term memory as well as stimulate the activity of nerve growth factors (Suryatika & Pramono, 2019).

4. Conclusion

Brain exercise, if done regularly, can improve the cognitive function of the elderly with dementia. Brain gymnastics is only one of the non-pharmacological complementary therapies that can be done at any time on the elderly by health workers.

Suggestion

The results of this study are expected to be applied by health workers in providing services to the elderly to improve the cognitive function of the elderly by providing brain exercises regularly.

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