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THE EFFECT OF ART THERAPY ON IMPROVING THE COGNITIVE FUNCTION OF ELDERLY IN NURSING HOMES IN SEMARANG

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ABSTRACT

Background: Art therapy is a creative process that utilizes art and psychology aspect in an effort to learn something new about oneself. Art therapy can help individuals to express their feeling as a mental stimulation which in long term can increase the regeneration of new neurons which will later have an effect on cognitive function improvements. Improving cognitive function in elderly can increase their ability to do their daily activities independently. **Objective:** To assess the effect of art therapy on improving elderly's cognitive function in nursing homes in Semarang. **Methods:** Quasy experimental research using pre and post-test design with control group methods. Subjects were 32 elderlies who lived in Wisma Lanjut Usia Harapan Asri, Panti Wredha Rindang Asih II Bongsari, or Panti Wreda Pengayoman Semarang. Subjects were >60 years old, had a cognitive function score ≥ 22 using MoCA-Ina instrument, and were not taking any sedative drugs. Sample selection was picked using purposive sampling method and grouped into 2 groups. The art therapy intervention group (n=16) was instructed to follow the all four interventions of art therapy, while the control group (n=16) was instructed to not doing any art drawing activities. Cognitive function scores were measured using MoCA-Ina. The data then analysed using Wilcoxon and Mann-Whitney. **Results:** Significant increase ($p < 0.05$) in the MoCA-INA scores of intervention group from 25,44 ± 2,128 to 26,38 ± 2,094. There was significant difference of MoCA-INA scores between intervention group which was 26,38 ± 2,094 and control group which was 24,13 ± 1,5. **Conclusion:** Art therapy is effective in improving cognitive function of elderly in nursing home in Semarang.

INTRODUCTION

The number of elderly around the world continues to grow every year. According to the World Health Organization (WHO), between 2015 and 2050 the population aged 60 years and over will increase from 12% to 22% of the world's population. By 2050 the world's elderly population is expected to reach 2 billion.[1] Based on the results of the 2019 Inter-Census Population Survey, it is estimated that the number of elderly in Indonesia alone is 25.7 million people (9.6% of the total population) and is estimated to continue to increase to 20% in 2040. By 2050, the number of elderly in Indonesia is estimated to reach 74 million or about 25% of the total population.[2]

As a person get older, it is naturally accompanied by a decline in health because in old age the body's functional decline and become more susceptible to disease. Based on the results of the 2019 Inter-Census Population Survey, as many as 51.1% of the elderly experienced complaints and 26.2% experienced severe illness. There are two main indicators of declining elderly health, namely complaints related to mental disorders and/or severe illnesses and elderly morbidity rates.[2]

Decreased cognitive function will reduce the ability of the elderly to carry out daily activities independently. In addition to affecting the lives of the elderly themselves, cognitive decline can also affect

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other individuals and the surrounding environment. Cognitive decline is also characterized by decreased memory, concentration, ability to learn new things, make decisions, orientation of time, space, and place.[3]

To prevent a greater impact on the daily lives of the elderly, improving the cognitive function of the elderly using art therapy is one of many solutions. Art therapy is based on the idea that the creative process of art-making is a healing process and is a form of nonverbal communication of thoughts and feelings. According to Malchiodi, 1998, art therapy is a modality that can help an individual to create meaning and find relief, resolve problems and conflicts within themselves, and even improve their well-being.[3,4]

In art therapy, the main focus is on personal experiences such as the feelings, perceptions, ideas, and imaginations of each individual and how to develop and express the images that exist within each one. [4,5] Through visual images, a person will be able to communicate more easily and can understand complex emotions, feelings, and thoughts. Making art is an activity that can be enjoyed and can be done by people from all generations and ages, including the elderly. [6]

Many studies have discussed the effect of art therapy on the cognitive function of the elderly, but the researcher has not found research with interventions to give subjects time to tell their background stories and discuss the results of their work after doing art therapy. This is what underlies researcher to further examine the effect of art therapy on the cognitive function of the elderly at Wisma Lanjut Usia Harapan Asri Kota Semarang, Panti Wredha Rindang Asih II Bongsari, and Panti Wreda Pengayoman Kota Semarang.

METHODS

This research was conducted in May – September 2023 at Wisma Lanjut Usia Harapan Asri, Panti Wredha Rindang Asih II Bongsari, and Panti Wreda Pengayoman Kota Semarang. This research was a quasy experimental study with pre and post-test design method with control group to analyze the effect of art therapy on improving cognitive function of the elderly living in nursing homes in Semarang. This intervention involves the use of various art media, imagery, and creative processes, where the individual's response to their artwork reflects aspects of development, personality, interests, and emotional concerns. It is based on the principle that all individuals possess the inherent ability to express themselves through creative means.

The samples used in this study were 32 elderly who met the inclusion criteria and were not included in exclusion criteria, with sample selection using purposive sampling method. The inclusion criteria in this study were the elderly who live in Wisma Lanjut Usia Harapan Asri, Panti Wredha Rindang Asih II Bongsari, or Panti Wreda Pengayoman Kota Semarang; willing to take part in all four series of art therapy; were able to see, hear, speak, and understand and were able to read Indonesian; were not taking sedative drugs; and had a MoCA-Ina score of at least 22. The exclusion criteria in this study were refusal to participate in the study, upper and lower extremity disabilities, severe illness, or tremors.

The research subjects were divided into 2 groups, which were the art therapy intervention group (n = 16) and the control group (n = 16). Subjects were given an explanation of how MoCA-Ina works to measure the level of cognitive function before being treated as a pre-test and given an explanation again after intervention as a post-test. The art therapy intervention was structured based on the Expressive Therapies Continuum (ETC), which includes kinesthetic/sensory, perceptual/affective, cognitive/symbolic, and creative levels, and was implemented in four stages consisting of seven sessions (90–120 minutes each) adapted from Ganim (2013)[7]. These stages included emotional expression, cognitive-emotional exploration, body awareness, and reflective transformation, all designed to facilitate emotional processing, self-awareness, and cognitive engagement. Instruction on art therapy is given directly before each of the four sets of art therapy interventions. Subjects belonged to the control group were not given any intervention

The data that has been obtained is then analyzed statistically using the SPSS program. Normality test was done by using the Saphiro-Wilk test. Hypothesis test was done by using Wilcoxon and Mann-Whitney.

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RESULTS

Table 1. Subject Characteristics Data

Variable		*Art Therapy*	
		Control	Intervention
Age	60-69 years old	3 (18,8%)	4 (25%)
	70-79 years old	8 (50%)	7 (43,8%)
	80-90 years	5 (31,3%)	5 (31,3%)
Gender	Man	8 (50%)	6 (37,5%)
	Woman	8 (50%)	10 (62,5%)
Education	Elementary School	4 (25%)	1 (6,3%)
	Middle School	7 (43,8%)	3 (18,8%)
	High School	2 (12,5%)	8 (50%)
	Diploma-3	1 (6,3%)	3 (18,8%)
	Strata-1	2 (12,5%)	1 (6,3%)

Based on the research that has been done, the total samples collected were totaled to 32 people. The sample aged 60-69 years were as many as 7 which 3 of them belonged to the control group and 4 of them belonged to the intervention group; aged 70-69 years as many as 15 which 8 of them were belonged to the control group and 7 of them were belonged to the intervention groups; aged 80-90 years as many as 10 which 5 of them were belonged to control groups and 5 of them were belonged to the intervention group. (Table 1)

Table 2. Normality Test Results

Group		Mean ± SD	p
Pre test	Intervention	25.44 ± 2.128	0.022‡
	Control	24.13 ± .500	0.034‡
Post test	Intervention	26.38 ± 2.094	0.014‡

Information; **Significant; ‡Shapiro Wilk*

Based on the normality test that has been done, the pre-test result of the intervention group was 0.022; the pre-test result of the control group was 0.034; and the post-test result of the intervention group was 0.014 which showed abnormal results so for bivariate analysis was done using Wilcoxon and Mann-Whitney tests to see the difference between the two variables. (Table 2)

Table 3. Comparison of Before and After Intervention of Cognitive Function Levels in the Art Therapy Intervention Group

Group	Cognitive Function		NR	PR	Ties	Mean	p
	Pretest (n=16)	Post test (n= 16)					
Art Therapy	25.44 ± 2.128	26.38 ± 2.094	0	11	5	6,00	0,002*†

Information; *Significant; †Wilcoxon; NR= Negative Rank, PR= Positive Rank

Based on the Wilcoxon test for the art therapy intervention group on cognitive function, a p-value of 0.002 was obtained, indicating a statistically significant difference, meaning there was an increase in cognitive function scores on the post-test compared to the pre-test. The positive rank showed that 11 samples experienced an increase in cognitive function scores. Meanwhile, the negative rank (NR = 0) indicated that no samples experienced a decrease in cognitive function scores following the intervention. In addition, there were 5 samples that had the same cognitive function scores on both the pre-test and post-test (ties) (Table 3).

Table 4. Comparison of Cognitive Function Levels between the Art Therapy Group with Control Group

Group	Cognitive Function	Mean Rank	p
Control (n=16)	24.13 ± 1.5	11.81	
Art Therapy (n=16)	26.38 ± 2.094	21.19	0.004*¶

Information; *Significant; ¶Mann-Whitney

Based on the Mann-Whitney test for the control group, an average cognitive function score of 24.13 was obtained with a standard deviation of 1.5. As for the intervention group, an average cognitive function score of 26.38 was obtained with a standard deviation of 2.094. So that a result of 0.004 was obtained which showed a significant relation means there was a difference in cognitive function scores between the control and intervention groups. (Table 4)

DISCUSSION

This study showed that there was a significant increase in cognitive function scores in the intervention group given art therapy, indicated by a significant increase in MoCA-INA post-test results. In the intervention group, there was an increase from pre-test results from 25.44 ± 2.128 to 26.38 ± 2.094 in post-test results. The results of the study is fitting with the researchers' major and minor hypotheses, which stated that art therapy can improve the cognitive function score of the elderly in nursing homes in Semarang. This is fitting with research conducted by Dewi, et al which found that there was a significant increase in the cognitive function score of the group given art therapy intervention for four weeks which is the initial time of adaptation of neural neurons to physical activity. [11]This is also fitting with research

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conducted by Kim, et al in Korea who explain that art therapy can stimulate brain activity. In addition, the study also explained that art therapy can improve coordination between hands and eyes and improve the movement of other body parts and also improve the work of the right and left hemispheres of the brain. Art therapy can help keep the balance of an individual's physical and mental abilities. [8]

The improvement of cognitive function that occurred in the intervention group is fitting with the statement that art therapy can stimulate brain cells. With art therapy, elderly can do physical activity by making works in the form of art, solving problems by determining the concept of the art to be made and determining the colors to be used, and socializing with other elderly who also do art therapy together. These three factors can increase neuron activity which will later affect the improvement of cognitive function. [9]

Art therapy can act as a form of stimulant that corrects impaired cognitive function.[10] Art therapy can make the elderly imagine the concept of the art to be created, therefore the conceptualization process will activate the cortex of the brain so as to stimulate neuroplasticity. Neuroplasticity allows the brain to strengthen neural connections that already exist. Neuroplasticity allows the brain to increase neural activity to regulate cognitive function even in the elderly who already have some nerve damage along with the aging process. [11]

Another study conducted by Ching-Teng Yao also found that art therapy can improve the level of cognitive function of the elderly. In this study, various art materials such as watercolors, colored pencils, paper rollers, and clay were used which can increase social interaction between participants during activities, stimulate the interest of the subjects, and encourage the potential and ability of the subjects to be creative so that the capacity to express themselves, the ability to release negative feelings, and the ability to relax themselves also increases which then has an impact on increasing the level of their cognitive function.[12]

In the control group, there was a significant difference in average cognitive function scores, which was lower at 24.13 ± 1.5 compared to the intervention group which was 26.38 ± 2.094. This result is fitting with research conducted by Dewi, et al which also found that the average pre-test result of the control group was lower at 21.56 compared to the average post-test result of the intervention group which was higher at 24.80. [12] This study is fitting with the results of previous research conducted by Chavez-Eakle that stated that there are differences in cerebral blood flow between individuals who are creative and accustomed to channeling their creativity through art and control subjects when performing verbal tasks. Subjects with high creativity showed higher brain blood flow activity in the right and left parts of the brain compared to control subjects. [13] According to research conducted by Anna Leeuwis, et al there was found a significant relation between cerebral blood flow and cognitive function. In the study, it was found that there was a correlation between higher brain blood flow and better performance in executive function, attention, and memory in the intervention group. This supports the theory that art therapy can increase blood flow in the right and left brain which then also affects the improvement of cognitive function. [14]

In the intervention group, there were no subjects who experienced a decrease in cognitive function scores between pre-test and post-test results but there were some subjects who had fixed scores on the pre-test and post-test. This is fitting with research conducted by Choi Hee and Jeon Young which also found several subjects who had fixed scores on the pre-test and post-test. Similar results were found in a study conducted by Noor, et al., significant results were found in elderly subjects who already suffered from cognitive function decline that leads to dementia conditions, namely there was an average increase in cognitive function scores of 4.27. While in the elderly who only experience mild cognitive function decline, no significant results were obtained. [15] These results can be caused by several factors such as the physical weakening of the elderly so that they are unable to follow the art therapy stage for a long time, then there are also internal factors such as lack of confidence in some elderly to be able to communicate with other elderly in the art therapy stage so that the socializing factor of the elderly is less affected which then has an impact on not increasing cognitive function scores in the post-test.

The limitation of this study was that researcher could not control the daily activities of the elderly outside of research. Increased levels of cognitive function in the intervention group can occur due to other factors such as genetic factors, daily activities,

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physical activity, nutritional intake, and stress levels that cannot be controlled by researcher. The elderly who live in the nursing homes routinely do activities such as spiritual and non-spiritual guidance, playing music, and dancing which can also stimulate the level of cognitive function of the elderly. [16] In addition, the physical limitations of the elderly who tend to be more easily tired cause the elderly to be unable to carry out an activity continuously for a long time, including drawing, so that some of the implementation of art therapy activities is considered less than optimal.

CONCLUSION

This study concluded that there is a significant increase in MOCA-Ina scores in the intervention group after being given art therapy and a significant difference in MOCA-Ina scores with a lower result in the control group than the intervention group given art therapy.

ETHICAL APPROVAL

The research was conducted after obtaining ethical clearance from the Health Research Ethics Commission (KEPK) Faculty of Medicine, Universitas Diponegoro with a series of no. 179/EC/KEPK/FK-UNDIP/V/2023. The identity of the research subject was kept confidential and all costs related to the research were the responsibility of the researcher.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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AUTHOR CONTRIBUTIONS

The authors confirm contribution to the article areas as follows: Conceptualization, Kareena Kumar, Yosef Purwoko, Soesmeyka Savitri, and Dwi Ngestiningsih; methodology, Kareena Kumar, Yosef Purwoko; software, Kareena Kumar; validation, Kareena Kumar, Soesmeyka Savitri; formal analysis, Kareena Kumar, Yosef Purwoko; investigation, Dwi Ngestiningsih; resources, Kareena Kumar, Soesmeyka Savitri; data curation, Kareena Kumar; writing—original draft preparation, Kareena Kumar, Yosef Purwoko; writing—review and editing, Kareena Kumar, Soesmeyka Savitri, Dwi Ngestiningsih; supervision, Yosef Purwoko, Soesmeyka Savitri, and Dwi Ngestiningsih; project administration, Kareena Kumar; funding acquisition, Kareena Kumar; final approval, Yosef Purwoko, Soesmeyka Savitri, and Dwi Ngestiningsih.

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