



EFFECTIVENESS OF COGNITIVE EXERCISE ON ANXIETY LEVELS IN THE ELDERLY

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ABSTRACT

Anxiety is a common psychological problem experienced by older adults and can impact quality of life and cognitive function. Various non-pharmacological interventions have been used to reduce anxiety in older adults, but most studies still focus on physical activity and relaxation. Empirical evidence regarding the effectiveness of cognitive training on anxiety in older adults is limited and shows varying results. Therefore, this study was conducted to assess the effectiveness of cognitive training in reducing anxiety levels in older adults. Objective to determine the effectiveness of cognitive gymnastics on anxiety levels in the elderly at the Tresna Werdha 3 Social Home. This study used a quantitative approach with a pre-test and post-test design in one group. A sample of 45 elderly individuals was selected using the Slovin formula. Data collection was conducted through interviews and the Hamilton Anxiety Rating Scale (HARS) questionnaire. The HARS questionnaire was valid (0.30 – 0.80) and reliable (Cronbach's Alpha 0.93). Data analysis was performed using univariate and bivariate methods using paired sample t-tests. Before the intervention, most elderly individuals experienced mild (46.8%) to moderate (31.9%) anxiety. After the intervention, the proportion of elderly with mild anxiety increased to 60%, and 8.9% experienced no anxiety. Paired Sample t-test results showed a significant decrease in anxiety scores ($p < 0.001$). Cognitive gymnastics is effective in significantly reducing anxiety levels in elderly individuals and can be used as a non-pharmacological intervention to improve the psychological well-being of elderly individuals.

Keywords: anxiety; cognitive gymnastics; elderly

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INTRODUCTION

The aging process is a natural stage in the life cycle characterized by a decline in physical, cognitive, and psychosocial function (Sutanto et al., 2023). As people age, their bodies experience changes in physical, mental and social aspects which can impact their health condition (Yusharyahya, 2021). The decline in physical abilities experienced by the elderly, such as difficulty moving, loss of sight or hearing, decreased cognitive abilities, and dependence on others for daily activities can increase their anxiety (Noor & Merijanti, 2020). Perubahan tersebut menyebabkan lansia menjadi kelompok rentan terhadap berbagai masalah kesehatan mental, salah satunya adalah kecemasan (ansietas).

Anxiety in the elderly often arises due to decreased adaptive abilities, loss of social roles, limited activities, and separation from family, especially in the elderly who live in social institutions (Dellaneira Ananda., Wilson., 2020). Untreated anxiety can negatively impact the quality of life of the elderly, including sleep disturbances, decreased cognitive function, increased risk of physical illness, and reduced ability to carry out daily activities (I. P. E. Putri & Budiman, 2019). Elderly people who experience anxiety tend to withdraw from social environments, experience decreased self-confidence, and show greater dependence on others (K. Putri & Rahayu, 2023). Long-term anxiety can contribute to cognitive decline, such as memory loss or difficulty concentrating (Martina et al., 2016). Lansia yang menyadari adanya penurunan kemampuan kognitif yang mereka alami sering kali merasa khawatir tentang masa depan, ketergantungan pada orang lain, atau

kemampuan mereka untuk menjalani aktivitas sehari-hari. Kecemasan ini biasanya timbul akibat ketakutan akan kehilangan identitas atau kemandirian (Nurlan & Eny, 2021).

Anxiety can be a natural response to stress, but if it persists or becomes excessive, it can develop into an anxiety disorder. This anxiety disorder can disrupt a person's daily activities and affect their quality of life. (Sari et al., 2020). If the elderly cannot overcome their anxiety, they tend to have negative views about the meaning of life and psychosocial problems, which is why anxiety has a bad impact on the elderly (Sumbara et al., 2019). According to WHO data, around 3.6% of the world's population or 264 million people are affected by anxiety. Based on the results of research conducted by NSC-R (National 2 Comorbidity Study Replication), there is a group of elderly who experience anxiety, 21.2%, post-traumatic stress, 3.5%, behavioral deviations, 9%, panic, 4.7%, fear, 10.7%, moderate anxiety, 6.1%, severe anxiety, 28.1% (WHO, 2022). The prevalence of anxiety in those aged 55-65 years is 6.9%, while in those aged 65-75 years it reaches 9.7% and those aged 75 years and above has a figure of 13.4% (Kemenkes RI, 2020). Based on 2024 data, the number of elderly residents at the Budi Mulia 3 Social Welfare Home (PSTW BM 3) in South Jakarta reached 358 people, consisting of 133 men and 225 women. Therefore, effective, safe, and easy-to-implement intervention efforts are needed to reduce anxiety levels in the elderly

Treatments to reduce anxiety in the elderly are divided into two categories: pharmacological and non-pharmacological. Pharmacological therapy uses medications to treat anxiety, including alprazolam, clobazam, and diazepam (Rahman, 2020). Non-pharmacological therapy involves distraction, which involves redirecting attention to something else, thereby forgetting the anxiety you're experiencing and feeling relaxed. Various methods include distraction therapy, one of which is cognitive gymnastics (Setyowati, Agustina Rahayu, et al., 2022). Cognitive gymnastics is a structured activity that combines simple body movements with stimulation of cognitive functions, such as attention, concentration, memory, and coordination. This activity is believed to increase blood flow to the brain, stimulate the nervous system, and provide a relaxing effect that contributes to reducing anxiety (Sartika et al., 2020). Panti Sosial Tresna Werdha 3, as a social service institution for the elderly, plays a crucial role in improving the physical and mental well-being of its residents. However, intervention programs focused on the mental health of the elderly, particularly those addressing anxiety, still require development and evidence-based evaluation. Therefore, this study aims to determine the effectiveness of cognitive gymnastics on anxiety levels in the elderly at Panti Sosial Tresna Werdha 3 as a promotive and preventive effort to improve the quality of life of the elderly.

METHOD

In this study, the researcher used a quantitative descriptive approach. The population used in this case study was elderly people with anxiety disorders. The sample size was calculated using the Slovin formula and purposive sampling. Thus, a total of 45 elderly people were selected. The inclusion criteria were elderly people aged 60 years and over who were willing to participate as respondents, as well as elderly people at the Tresna Werdha 3 Social Home who experienced anxiety disorders. Exclusion criteria included elderly people with acute injuries or musculoskeletal discomfort such as muscle injuries, stiffness, weakness, and muscle disorders, elderly people with mental disorders, and elderly people under 60 years of age. Data collection techniques included subject identification interviews and the HARS questionnaire. The HARS questionnaire was valid (0.30 – 0.80) and reliable (Cronbach's Alpha 0.93). Bivariate analysis used a paired t-test.

RESULT

Table 1, it is known that of the 45 total respondents, the majority were women (34 respondents) (75.6%). The most common age group was 60-65 years (33.3%). The majority of respondents had an elementary school education (17 respondents) (37.8%). Based on Table 1, the analysis results show that the majority of respondents experienced physical complaints, with 39 respondents

(86.7%). The majority of respondents had participated in cognitive gymnastics (29 respondents (64.4%).

Table 1
Respondent Characteristics Based on Gender, Age, Education, and Physical Condition

Characteristics	Category	f	%
Gender	Male	11	24,4
	Female	34	75,6
Age (year old)	60-65	15	33,3
	66-70	7	15,6
	71-75	11	24,4
	76-80	7	15,6
	81-85	4	8,9
	>86	1	2,2
Education Level	No Schooling	9	20,0
	Elementary School	17	37,8
	Middle School	10	22,2
	High School	8	17,8
	Bachelor's Degree	1	2,2
Physical Condition	No Complaints	6	13,3
	Complaints	39	86,7
Cognitive Gymnastics	Never	16	35,6
	Ever	29	64,4

Table 2.
Anxiety Levels Before and After Cognitive Gymnastics

Anxiety Levels	Before Cognitive Gymnastics		After Cognitive Gymnastics	
	f	%	f	%
Normal	0	0,0	4	8,9
Mild anxiety	22	46,8	27	60,0
Moderate anxiety	15	31,9	11	24,4
Severe anxiety	8	17,0	3	6,7
Mean	1.69			
Median	2.00			

Table 2, anxiety levels before participating in cognitive gymnastics show that the majority of respondents experienced mild anxiety, namely 22 people (46.8%). The mean score was 1.69, which falls between the mild and moderate anxiety categories, and the median score was 2.00, indicating that half of the respondents experienced moderate or milder anxiety. Table 2 shows that anxiety levels after participating in cognitive gymnastics show that 27 respondents (60.0%) experienced mild anxiety, with a mean score of 1.29, closer to the mild anxiety category. The median score of 1.00 indicates that more than half of the respondents were in the mild or even normal anxiety category after participating in cognitive gymnastics.

Table 3.
Analysis of Mean Scores Between Pre-Test and Post-Test Results: Anxiety Levels of Respondents Who Participated in Cognitive Gymnastics

Result	Mean	N	Std.Deviation
Pair 1	Pre	45	5.109
	Post	45	4.884
Paired Sample t-Test	2,311		
Sig (2-tailed)	<0,001		

Table 3 above, it shows a decrease in the average value between the pre-test and post-test results. The mean value at the time of the pre-test was 20.62 with a standard deviation of 5.109, while in the post-test the mean value decreased to 18.31 with a standard deviation of 4.884. The results of the statistical test show that the average value after participating in cognitive gymnastics is lower than before. The average difference is quite large, namely 2.311, and this result is declared very significant because the sig value is <0.001. This indicates that there is a statistically significant difference between the pre-test and post-test scores

DISCUSSION

The gender of respondents at the Budi Mulia PSTW was 3 out of 45, with the majority being female (34 respondents (75.6%). Meanwhile, there were 11 male respondents (24.4%). The statistical analysis showed a mean value of 1.76. The median value of 2.00 also confirms that more than half of the respondents were female. According to the study Dewi et al., (2025), women tend to have higher levels of anxiety than men. Approximately 16 women (45%) experienced mild to moderate anxiety. Meanwhile, 10 men (36%) showed some level of anxiety. According to WHO, (2021) Elderly women have a higher prevalence of anxiety disorders globally than men, caused by a combination of hormonal factors (such as decreased estrogen), psychological factors, and the pressures of more complex social roles. The results showed that the majority of elderly respondents at the Budi Mulia 3 PSTW were women. Elderly women have a higher prevalence of anxiety than men, with the higher anxiety levels in elderly women due to hormonal, psychological, social factors, ways of thinking, and greater emotional sensitivity (Umar et al., 2023).

Based on the data, the most dominant age group of respondents was in the 60–65 year range (33.3%), while the least dominant age group was ≥ 86 years (2.2%). The mean value was 2.58, which is between the 66–70 and 71–75 year age groups, while the median value of 3.00 indicates that half of the respondents were in the 71–75 year age group or younger. In the study Setyowati, Sigit Purnomo, et al., (2022), elderly aged 60–74 years, 24 out of 32 respondents, or 75%, were found to experience more anxiety than other age groups. During this age range, elderly generally enter the early stages of aging, characterized by various physical, cognitive, and psychosocial changes that require adjustment. According to the WHO, (2021), elderly aged 70 and above tend to be more susceptible to anxiety than other age groups. At this stage, elderly begin to experience a significant decline in physical function, such as decreased physical strength, sensory abilities, and memory. This study found that anxiety in the elderly occurs across various age ranges. The author obtained data that showed that anxiety was most prevalent in the elderly aged 60–65 years. This anxiety in the elderly, according to the author, arises due to accompanying triggers, such as role changes, decreased physical function, dependency, and social isolation. Based on the data, 17 elderly respondents (37.8%) had an elementary school education, while 9 respondents (20.0%) had no education. The mean score was 2.44, which falls between the elementary and junior high school categories. The median score was 2.00, indicating that respondents had a maximum elementary school education.

According to Warouw et al., (2018) explains that the higher a person's education level, the more experience and skills they possess in solving problems. This statement is supported by empirical data showing that approximately 50% of elderly people experiencing anxiety had an elementary school education. Research conducted by Maharani, (2016) suggests that educational attainment plays a role in influencing anxiety levels in the elderly. Elderly people with low levels of education, particularly elementary school graduates, tend to have higher levels of anxiety. This is reinforced by the finding that the majority of elderly people experiencing severe anxiety come from groups with elementary school education backgrounds.

Low levels of education contribute to high levels of anxiety in the elderly, due to limitations in understanding and responding to the physical and emotional changes that occur in old age. This opinion aligns with the author's research, which revealed that elderly with low levels of education tend to have more limited coping abilities, making them more susceptible to anxiety. Regarding physical condition data, it shows that the majority of respondents had physical complaints, namely 86.7%, with a mean value of 1.87, and a median value of 2.00, confirming that more than half of respondents experienced physical complaints.

According to Fitria et al., (2022) that chronic diseases such as hypertension, diabetes, and persistent joint pain can be major triggers of anxiety in the elderly, especially if not treated comprehensively.

This group of elderly people with chronic diseases are more susceptible to anxiety due to the decline in physical, psychological and social functions that accompany the aging process (Sutanto et al., 2023). Thus, poor physical condition or chronic illness are significant factors that increase the risk of anxiety in the elderly, necessitating holistic physical and psychological management in elderly care. The author's research data indicates that 29 respondents (64.4%) had participated in cognitive gymnastics. Sixteen respondents (35.6%) stated they had never participated in cognitive gymnastics. The mean score was 1.64, and the median score was 2.00, indicating that more than 50% of respondents had participated in cognitive gymnastics.

According to research by Setyowati, Agustina Rahayu, et al., (2022), 100% of elderly who regularly participated in a brain gymnastics program experienced improved cognitive function and decreased anxiety levels. This demonstrates the effectiveness of cognitive gymnastics as a non-pharmacological intervention in maintaining the mental health of the elderly. This study aligns with previous research that participation in cognitive gymnastics can have a positive impact on the elderly by reducing anxiety. This is supported by the Embodied Cognition theory by Martha & Suzanne, (2019), which states that the interaction of the body with the environment, such as through cognitive-motor activities, can help individuals manage emotions. Seniors who regularly participate in brain gymnastics experience improved cognitive function and decreased anxiety.

Measurements after cognitive gymnastics showed a decrease in anxiety in the majority of seniors. Mild anxiety (60.0%), moderate anxiety (24.4%), severe anxiety (6.7%), and 8.9% of respondents experienced no anxiety. The mean score was 1.29, which is closer to the mild anxiety category, and the median score was 1.00, indicating that more than half of respondents were in the mild or even normal anxiety category after participating in the gymnastics. Research by Izhar, (2017) showed that after participating in Tera gymnastics for four weeks (12 sessions), the anxiety levels of seniors decreased significantly, and some even no longer experienced severe anxiety, demonstrating the effectiveness of Tera gymnastics in reducing anxiety.

According to the Indonesian Ministry of Health (2024), structured physical and mental exercise at least twice a week can have a positive impact on emotional balance and cognitive function in seniors, especially when done regularly and tailored to individual physical abilities. This aligns with research findings showing differences in anxiety levels in seniors after cognitive gymnastics intervention. A significant decrease in anxiety was observed in the elderly, demonstrating that cognitive gymnastics is highly effective in reducing anxiety. This aligns with previous research that showed a significant decrease in overall anxiety after elderly individuals participated in the cognitive gymnastics program. Furthermore, physical activity can stimulate the release of serotonin, dopamine, and endorphins—three hormones involved in mood regulation and anxiety reduction.

The results of the Paired Samples Test (PST) showed a significant difference between anxiety scores before and after cognitive gymnastics. The average difference was 2.311, with a significance value of $p < 0.001$, indicating a highly statistically significant difference. According to research by Witt et al., (2021), a paired t-test aims to determine differences between two conditions within the same group, for example, before and after an intervention. The difference is considered statistically significant if the p-value (sig.) < 0.05 , indicating a significant effect of the treatment on the measured variable. Based on the author's theory and research findings, cognitive gymnastics is an effective non-pharmacological intervention and is feasible to implement as a strategy to significantly reduce anxiety levels in the elderly. This activity is easy to do and is adaptive to the physical condition of the elderly, and has been proven to provide real psychological benefits.

CONCLUSION

Of the 45 respondents, the majority were female, with the majority aged 60–65 years. The highest level of education for most respondents was elementary school. Physically, the majority of

respondents experienced physical complaints related to their participation in cognitive gymnastics; most respondents stated they had participated in the activity. The distribution results showed that before the cognitive gymnastics, the majority of respondents experienced mild anxiety (46.8%), with a mean of 1.69 and a median of 2.00, indicating mild to moderate anxiety. After the cognitive gymnastics, anxiety decreased, indicated by an increase in mild anxiety to 60.0% and a decrease in severe anxiety to 6.7%. Some respondents also returned to normal levels (8.9%). The decrease in the mean to 1.29 and median to 1.00 indicates a shift in the distribution toward lower levels of anxiety. Based on the analysis, cognitive gymnastics was statistically proven effective in reducing anxiety levels in the elderly. The difference in anxiety scores before and after the intervention showed a significant average difference of 2.311, with a significance value of $p < 0.001$. This indicates that cognitive gymnastics has a real effect on reducing anxiety, so it can be used as a non-pharmacological intervention that is beneficial for the mental health of the elderly.

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