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# The Effect Of Fishing Ball Therapy And Puzzle Therapy On Cognitive Function In Elderly Patients With Dementia At Club Bugar Ideal, Bojonggede District, Bogor Regency In 2025

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***Abstract***

*Dementia increases with age, especially in the elderly population. Dementia is a clinical syndrome with progressive decline in cognitive function that interferes with independence and daily activities. Dementia can also cause serious complications, such as a decline in quality of life and health problems that are often the leading causes of mortality. To determine the effect of fishing ball therapy and puzzle therapy on cognitive function in elderly people with dementia at Club Bugar Ideal, Bojonggede District. This study was a quantitative study using a quasi-experimental approach with one equivalent control group pretest-posttest design. Data collection was conducted using the Mini Mental State Examination (MMSE) questionnaire. Data analysis was performed using univariate and bivariate analysis with the Shapiro-Wilk test using Jamovi 2.6.26 software. The average age of respondents was over 60 years old. In terms of gender, the majority were female, with 27 respondents (69.2%). In terms of education, the majority had only completed elementary school, with 17 respondents (43.6%). In terms of employment, the majority were unemployed, with 29 respondents (74.4%). In terms of medical history, the majority had a history of illness, with 23 respondents (59%). Based on the results of the group A fishing ball p value (0.181) > 0.05 and group B Puzzle p value (0.095) > 0.05, meaning that there was no effect of therapy in either the fishing ball or puzzle groups on the cognitive function of the elderly before and after therapy, whereas there was an effect of therapy in group C (fishing ball and puzzle) on the cognitive function of the elderly before and after therapy. The results of the difference test showed no significant differences between the therapy groups, namely fishing ball therapy (A), puzzle therapy (B), and a combination of fishing ball and puzzle therapy (C). The p-values for the comparisons between groups were (A–B p=0.594; A–C p=0.440; B–C p=0.804). Non-pharmacological therapy, namely a combination of fishing ball and puzzle therapy, can improve cognitive function in elderly people with dementia.*

***Keywords: Fishing Ball Therapy, Puzzle Therapy, Cognitive Function, Dementi.***

## INTRODUCTION

The global incidence of dementia is increasing rapidly. Dementia is the seventh leading cause of death worldwide and one of the primary causes of disability and dependency among the elderly (WHO, 2025). The World Health Organization (WHO) has recognized dementia as a public health priority (WHO, 2017). Dementia is a non-communicable disease that can affect anyone; however, its prevalence increases with age, making it a common phenomenon among the elderly population (Setiono, 2022). If not prevented, dementia can lead to serious consequences, including progressive cognitive decline, communication difficulties, and behavioral disturbances, all of which negatively impact patients' quality of life (Kurniasih, 2022). Major challenges faced by individuals with dementia include memory loss, impaired thinking ability, psychological disturbances, and declining physical health (International, 2024). The prevalence of dementia, particularly among older adults, is projected to continue rising until 2050 (Kemenkes, 2021).

According to WHO (2023), one person develops dementia every three seconds globally, with nearly 10 million new cases annually. More than 55 million people worldwide are living with dementia, over 60% of whom reside in low- and middle-income countries. The highest increases are expected in Sub-Saharan Africa, North Africa, and the Middle East, largely driven by population growth and aging (WHO, 2025). In South Africa, dementia prevalence ranges from 3.8% to 11%

among individuals aged 65 years and above, while in Arab countries it ranges from 1.1% to 2.3% among those aged 50 years and above, increasing to 13.5%–18.5% among those aged 80 years and above (Adesola, 2024). In Indonesia, the prevalence of dementia is approximately 27.9%, affecting more than 4.2 million people, with higher risk among those aged over 65 years. Data from the Ministry of Health (2024) indicate that West Java has the highest prevalence, with 57% occurring among the elderly (Arccinirmala, 2024). In Bojonggede District, Bogor Regency, 21.5% of the elderly population is at risk of cognitive decline (Kabupaten Bogor BPS, 2024). This decline may lead to various complications in dementia patients.

Complications include reduced quality of life, additional health problems, and even coma or death in advanced stages. These may manifest as decreased ability to perform daily activities, impaired social interaction, malnutrition, infections, and injuries due to falls caused by balance disorders (Kemenkes, 2021). Common cognitive impairments include memory loss (especially recent memory), language difficulties, disorientation, impaired decision-making, and personality changes. Patients may also experience difficulties performing routine tasks and exhibit inappropriate or disruptive behaviors (Alifah, 2022). Cognitive decline is recognized as a hallmark of dementia, and despite conventional treatments such as Aricept, Exelon, and Reminyl, it remains an unresolved issue (Juebin, 2025). Improving cognitive function is therefore essential to enhance the quality of life of individuals with dementia. In general, cognitive improvement can delay or even prevent the progression of dementia. Previous studies indicate that 10–20% of individuals with untreated cognitive impairment may develop dementia within one year (Riani, 2019).

Measuring cognitive function plays a crucial role in determining the extent of decline and its impact on thinking ability, memory, and language (Sari, 2023). Studies have shown that cognitive decline significantly affects quality of life, limiting daily activities, self-care abilities, work capacity, sleep quality, and interpersonal relationships (Riani, 2019). Evidence-based complementary non-pharmacological approaches are increasingly used due to their safety and effectiveness (Setiono, 2022).

One of the interventions that can be applied is complementary therapy, which utilizes various non-pharmacological approaches such as cognitive stimulation therapy, reality orientation therapy, memory therapy, and validation therapy. These interventions are believed to improve cognition, quality of life, and psychological well-being, reduce psychological disturbances, and provide opportunities for social interaction, while being safe, cost-effective, and easily implemented in various settings (Setiono, 2022). One strategy to prevent cognitive decline is activity-based therapy combined with brain gym exercises. Examples include fishing ball therapy and puzzle therapy as part of brain gym interventions (Tanya Buchanan, 2025). Several studies have shown that fishing ball therapy, which combines physical and cognitive stimulation, is effective in improving advanced cognitive functions such as memory and attention in elderly individuals with cognitive impairment (Sulastien, Herni, 2024). Similarly, puzzle therapy has consistently demonstrated positive effects on cognitive function, particularly memory, among elderly individuals with dementia or cognitive decline. Improvements in Mini-Mental State Examination (MMSE) scores range from 2 to 7 points depending on the duration and study sample. Overall, puzzle therapy is recognized as an easily implemented non-pharmacological intervention with significant cognitive benefits (Damayanti, 2023).

Research conducted by Triyulianti (2022) found that the combination of Brain Gym and activity therapy, including resistance exercises, effectively improves cognitive function in elderly individuals with dementia (Triyulianti, 2022). Furthermore, Demurtas (2020) reported that physical activity provides benefits for elderly individuals with Mild Cognitive Impairment (MCI) and dementia, both in maintaining and enhancing cognitive functions (memory, attention, and orientation) as well as non-cognitive aspects. Studies also indicate a positive relationship between good cognitive function and improved quality of life, particularly among the elderly. (Demurtas, 2020). Cognitive decline can

limit daily activities, reduce social interaction, and decrease life satisfaction, whereas maintaining cognitive health helps the elderly remain independent, socially active, and psychologically well (Ye et al., 2025).

Preliminary data from Club Bugar Ideal, Bojonggede District, Bogor Regency, recorded 78 elderly individuals in June–July 2024. Initial screening using MMSE showed that 60 individuals experienced dementia, while 18 did not. Based on this background, the study focuses on examining the effect of fishing ball therapy and puzzle therapy on improving cognitive function in elderly individuals with dementia.

In line with the background described, dementia is a significant public health concern that can affect anyone and has serious consequences, including progressive cognitive decline, communication difficulties, and behavioral disturbances, which ultimately impact patients' quality of life. If not properly managed, dementia may lead to complications, particularly worsening cognitive decline that reduces quality of life. Nurses play an important role in preventing cognitive decline through interventions such as fishing ball therapy and puzzle therapy for elderly individuals with dementia. Therefore, the research problem is formulated as follows: *How do fishing ball therapy and puzzle therapy influence cognitive function in elderly individuals with dementia at Club Bugar Ideal, Bojonggede District, Bogor Regency?*

## RESEARCH METHODS

This study employed a quasi-experimental design with a pretest-posttest non-equivalent control group approach, involving three groups: Group A (fishing ball therapy), Group B (puzzle therapy), and Group C (a combination of fishing ball and puzzle therapy), without randomization. The research was conducted at Club Bugar Ideal, Bojonggede District, Bogor Regency, from December 7, 2025, to January 7, 2026. The study population consisted of elderly individuals aged 60–85 years, totaling 60 people, with a sample size of 43 respondents selected using probability sampling with simple random sampling, determined through G*Power analysis ($\alpha = 0.05$; power = 0.95; effect size = 1.345), with an additional 10% to anticipate dropouts. The sample was selected based on inclusion criteria, including elderly individuals with mild to moderate dementia, the ability to communicate verbally, willingness to participate in all intervention sessions, and informed consent from family members. Exclusion criteria included severe visual and hearing impairments, severe physical disabilities (such as paralysis or severe stroke), severe psychiatric disorders (such as schizophrenia and bipolar disorder), concurrent participation in other cognitive therapies, and absence from more than 20% of therapy sessions during the study period.

## RESULTS AND DISCUSSION

## Univariate Analysis

Overview of Respondent Characteristics Based on Age, Gender, Education, and Employment History.

**Table 1.** Respondent Characteristics

| Characteristics | Category | (n) | (%) |
|---|---|---|---|
| Age | Pre-elderly | 25 | 64.1 |
| | Elderly | 13 | 33.3 |
| | Late elderly | 1 | 2.6 |
| Gender | Female | 27 | 69.2 |
| | Male | 12 | 30.8 |
| Education | No formal education | 5 | 12.8 |
| | Elementary school | 17 | 43.6 |
| | Junior high school | 10 | 25.6 |
| | Senior high school | 7 | 17.9 |
| Employment History | Employed | 10 | 25.6 |
| | Unemployed | 29 | 74.4 |
| Medical History | Present | 23 | 59.0 |
| | Absent | 16 | 41.0 |

Based on Table 1, the respondents were predominantly in the pre-elderly age group, totaling 25 respondents (61.4%). The majority were female (27 respondents; 69.2%). Most respondents had an elementary school education (17 respondents; 43.6%), were unemployed (29 respondents; 74.4%), and had a medical history (23 respondents; 59%).

## Cognitive Function in Group A (Fishing Ball Therapy)

**Table 2.** Cognitive Function in Group A

| Characteristic | Description | n | Percentage |
|---|---|---|---|
| Cognitive Function (Pre) | Normal | 0 | 0 % |
| | Probable | 11 | 84,62% |
| | Definitive | 2 | 15,38% |
| Cognitive Function (Post) | Normal | 1 | 7.70% |
| | Probable | 12 | 92,30% |
| | Definitive | 0 | 0% |

Based on Table 2, before (pre) fishing ball therapy, most respondents in Group A had probable cognitive impairment (84.62%), while 15.38% had definitive impairment. After (post) therapy, no respondents remained in the definitive category, the probable category increased to 92.30%, and the normal category increased to 7.70%.

## Cognitive Function in Group B (Puzzle Therapy)

**Table 3.** Cognitive Function in Group B

| Characteristic | Description | n | Percentage |
|---|---|---|---|
| **Cognitive Function (Pre)** | Normal | 0 | 0 % |
| | Probable | 13 | 100% |
| | Definitive | 0 | 0% |
| **Cognitive Function (Post)** | Normal | 0 | 0% |
| | Probable | 13 | 100% |
| | Definitive | 0 | 0% |

Based on Table 3, all respondents (100%) were categorized as having probable cognitive impairment both before and after puzzle therapy, indicating no change.

## Cognitive Function in Group C (Combination Therapy: Fishing Ball and Puzzle)

**Table 4.** Cognitive Function in Group C

| Characteristic | Description | n | Percentage |
|---|---|---|---|
| **Cognitive Function (Pre)** | Normal | 0 | 0 % |
| | Probable | 9 | 69,23% |
| | Definitive | 4 | 30,77% |
| **Cognitive Function (Post)** | Normal | 3 | 23,1% |
| | Probable | 10 | 52,6% |
| | Definitive | 0 | 0% |

Based on Table 4, prior to therapy, most respondents had probable cognitive impairment (69.23%), while 30.77% were in the definitive category. After therapy, the definitive category decreased to 0%, the probable category decreased to 52.6%, and the normal category increased to 23.1%.

**Normality Test – Group A (Fishing Ball Therapy)**

**Table 5.** Normality Test (Shapiro-Wilk)

| Variable | Statistic | P | SE |
|---|---|---|---|
| Pre Combination Therapy | -1,87 | 0,572 | 0,756 |
| Post Combination Therapy | | 0,001 | 0,401 |

Based on Table 5, the Shapiro-Wilk test result shows a p-value of 0.001 (<0.05), indicating that the data are not normally distributed. Therefore, the normality assumption is not met, and the Wilcoxon test is used.

**Normality Test – Group B (Puzzle Therapy)**

**Table 6.** Normality Test (Shapiro-Wilk)

| Variable | Statistic | P | SE |
|---|---|---|---|
| Pre Puzzle Therapy | -2,25 | 0,642 | 0,924 |
| Post Puzzle Therapy | | 0,001 | 0,373 |

Based on Table 6, the Shapiro-Wilk test result shows a p-value of 0.001 (<0.05), indicating non-normal data distribution; thus, the Wilcoxon test is applied.

**Normality Test – Group C (Combination Therapy)**

**Table 7.** Normality Test (Shapiro-Wilk)

| Variabel | Statistik | P | SE |
|---|---|---|---|
| Pre-Therapy Fishing Ball and Puzzle | -5,87 | 0,807 | 0.899 |
| Post-Therapy Fishing Ball and Puzzle | | 0,008 | 0.763 |

Based on Table 7, the Shapiro-Wilk test result shows a p-value <0.05, indicating that the data are not normally distributed; therefore, the Wilcoxon test is used.

**Homogeneity Test**

**Table 8.** Homogeneity Test (Levene's Test)

| | F | Df | Df 2 | P |
|---|---|---|---|---|
| *Levene's* | 6,96 | 2 | 36 | 0,003 |

Based on Table 8, the homogeneity test shows a p-value of 0.003 (<0.05), indicating that the variances between groups are not equal (heterogeneous).

**Bivariate Analysis**

**The Effect of Fishing Ball Therapy on Cognitive Function in the Elderly**

**Table 9.** The Effect of Fishing Ball Therapy on Cognitive Function in the Elderly

| Variable | Mean | SD | P | Effect Size |
|---|---|---|---|---|
| Pre Fishing Ball Therapy | 20,5 | 2.73 | 0,181 | -1.00 |
| Post Fishing Ball Therapy | 21,6 | 1.45 | | |

Based on Table 9, the analysis results for Group A (fishing ball therapy) show a p-value of 0.181 (> 0.05), indicating that the null hypothesis ($H_0$) is accepted and the alternative hypothesis ($H_a$) is rejected. This means that there is no statistically significant effect of fishing ball therapy on cognitive function in the elderly before and after the intervention.

**The Effect of Puzzle Therapy on Cognitive Function in the Elderly**

**Table 10.** The Effect of Puzzle Therapy on Cognitive Function in the Elderly

| Variable | Mean | SD | P | Effect Size |
|---|---|---|---|---|
| Pre Puzzle Therapy | 20,6 | 3,33 | 0,095 | -1,00 |
| Post Puzzle Therapy | 22,2 | 1,34 | | |

Based on Table 10, the analysis results for Group B (puzzle therapy) show a p-value of 0.095 (> 0.05), indicating that there is no statistically significant effect of puzzle therapy on cognitive function in the elderly before and after the intervention.

**The Effect of Combined Fishing Ball and Puzzle Therapy on Cognitive Function in the Elderly**

**Table 11.** The Effect of Combined Fishing Ball and Puzzle Therapy on Cognitive Function in the Elderly

| Variabel | Mean | SD | P | Effect Size |
|---|---|---|---|---|
| Pre Combined Fishing Ball and Puzzle Therapy | 20.0 | 3.24 | 0,005 | -1,00 |
| Post Combined Fishing Ball and Puzzle Therapy | 22.7 | 2.75 | | |

Based on Table 11, the analysis results for Group C (combined fishing ball and puzzle therapy) show a p-value of 0.005 (< 0.05), indicating that the null hypothesis ($H_0$) is rejected and the alternative hypothesis ($H_a$) is accepted. This means that there is a statistically significant effect of the combined therapy on cognitive function in the elderly before and after the intervention.

**Differences in Cognitive Function Among Elderly Groups Receiving Fishing Ball Therapy (A), Puzzle Therapy (B), and Combined Therapy (C)**

**Table 12.** Differences in Cognitive Function Among Therapy Groups

| Group | | A | B | C |
|---|---|---|---|---|
| **A** | **Mean** | - | -0,538 | -1,077 |
| | **p-value** | - | 0,594 | 0,440 |
| **B** | **Mean** | - | - | -0,538 |
| | **p-value** | - | - | 0,804 |
| **C** | **Mean** | - | - | - |
| | **p-value** | - | - | - |

Based on the analysis results in Table 12, the comparison of mean differences in cognitive function among the therapy groups fishing ball (A), puzzle (B), and combined therapy (C)—indicates no statistically significant differences. Descriptively, the mean difference values suggest that the combined therapy group (C) demonstrates a greater improvement in cognitive function compared to the fishing ball (A) and puzzle (B) groups, as reflected by the negative mean differences in the A–C (-1.077) and B–C (-0.538) comparisons.

However, all p-values for between-group comparisons exceed the significance threshold of 0.05 (A–B p=0.594; A–C p=0.440; B–C p=0.804), indicating that these differences are not statistically significant. This suggests that although the combined therapy tends to produce better outcomes, the variation in cognitive function changes across groups is not strong enough to demonstrate significant differences, possibly due to sample size, variability in respondent characteristics, and the limited duration of the intervention.

## Discussion

**Characteristics of Research Respondents Based on Age, Gender, Education, Employment History, and Medical History**

Based on the research findings, the majority of respondents were in the pre-elderly age group, totaling 25 respondents (61.4%). These findings are consistent with data from the Alzheimer's Association (2025), which indicate that numerous epidemiological studies have shown that the risk of dementia increases significantly with advancing age due to neuronal degeneration, reduced cognitive reserve, and the progressive accumulation of neurodegenerative pathology. Risk factor analyses identify age as a primary non-modifiable indicator with a strong biological association with cognitive decline in older adults (Association, 2025).

Similarly, a study by Sri Hidayati (2025) at the Tirto Pekalongan Public Health Center stated that dementia represents a form of change in the structural and physical functions of the elderly. The incidence and prevalence of dementia tend to increase with age. As individual age increases, life expectancy within a population also rises, which is ultimately expected to contribute to a higher prevalence of dementia (hidayati & Baequny, 2025). This is further supported by Fasihah (2023), who found that older age is an important risk factor for dementia in the Indonesian population.(Fasihah Irfani Fitri, 2023).

In terms of gender, the majority of respondents in this study were female. This finding is in line with Yossie (2022), who reported that women are more likely to experience dementia due to a combination of biological and social factors, as well as their longer life expectancy, which increases the likelihood of developing dementia in later life (Putri et al., 2022). This is further supported by Uxue (2024), who found that comorbid factors (such as cardiovascular disease) and household economic status can mediate the relationship between gender and dementia risk, indicating that women tend to show a higher prevalence of dementia after adjusting for other health conditions (Zubiagirre et al., 2024).

Regarding educational level, most respondents had only completed primary school. This finding is supported by Hyun (2022), who reported that lower levels of education are associated with a higher risk of dementia due to limited cognitive reserve, while higher levels of education and occupational complexity are associated with reduced dementia risk through sustained mental stimulation throughout life (Hyun et al., 2022). Another study by Vicky (2025) found that higher education contributes to the formation of more complex neural networks, enabling the brain to better delay age-related cognitive decline (Vikky Adelia, 2025).

In terms of occupational history, most respondents were not employed. This finding is consistent with Hyun (2022), who stated that occupations requiring mental stimulation and cognitive complexity can reduce the risk of dementia by enhancing cognitive reserve (Hyun et al., 2022). Additionally, Ong et al. (2021) found a relationship between employment status and dementia risk, showing that lower levels of education and occupational achievement are associated with higher dementia prevalence. Elderly individuals who remain active in occupational roles or social activities tend to have greater mental stimulation, which is associated with better cognitive function (Ong et al., 2021).

Furthermore, the majority of respondents had a history of illness. This finding aligns with Azwar (2021), who reported that chronic diseases such as hypertension, diabetes, and cardiovascular disorders are significantly associated with cognitive decline. Vascular impairments resulting from conditions such as hypertension or diabetes can increase the risk of brain function deterioration by restricting blood flow to brain tissue (Azwar & Setiati, 2021). This is also supported by Arnita (2025), who found that elderly individuals with chronic diseases are more likely to experience cognitive impairment, reinforcing the relationship between comorbidities and dementia risk (Arninta Rahma Khoirunnisa & Rufaida Amaturrohman, 2025).

In conclusion, the aging process contributes to structural changes in the brain and a decline in cognitive mechanisms. The predominance of female respondents reflects global epidemiological trends indicating a higher prevalence of dementia among women. Additionally, the majority of respondents with low educational levels reinforces the finding that limited education is associated with

reduced cognitive reserve, thereby increasing vulnerability to dementia in older adults. The fact that most respondents were not employed is associated with limited mental stimulation, which may reduce cognitive reserve and worsen cognitive function. Furthermore, the high proportion of respondents with a history of illness indicates that chronic comorbidities play a significant role in increasing the risk of cognitive impairment, as conditions affecting blood flow, metabolism, and systemic inflammation can accelerate degenerative processes in the brain.

**Overview of Cognitive Function in the Fishing Ball, Puzzle, and Combination (Fishing Ball and Puzzle) Groups among the Elderly**

Based on the research findings, in Group A (fishing ball therapy), there was a decrease in the category of severe cognitive impairment and a slight increase in the normal category after the intervention. These findings are consistent with Prasetia (2025), who reported that simple physical activities can help maintain and improve cognitive function in the elderly through body movement stimulation associated with coordination, concentration, and brain activity planning (Prasetia, 2025). Similarly, Gilang (2024) found that the use of exergames (a combination of physical exercise and memory stimulation) resulted in a significant improvement in MMSE scores following combined physical-cognitive training in older adults (Gilang Dwi Pratiwi, 2024). It is assumed that fishing ball therapy, which involves physical movement while requiring task concentration, can reduce the severity of cognitive impairment and help maintain brain function in the elderly.

In Group B (puzzle therapy), the results showed no significant change in cognitive category after the intervention, although most respondents remained within the probable category. Several studies indicate that puzzles, as a form of cognitive stimulation therapy, can help slow cognitive decline or even improve cognitive function scores in the elderly, although the results vary depending on duration and frequency. This finding is in line with Wahyudi (2024), who stated that mentally stimulating activities such as puzzles can help maintain cognitive skills and train memory and attention. Puzzle therapy has been shown to improve memory, orientation, and thinking ability after a certain intervention period (Dheni Wahyudi, 2024). Additionally, Susanti (2024) found that regular implementation of puzzle therapy (e.g., 5–9 sessions or more) can lead to improvements in MMSE scores (Susanti et al., 2024). It is therefore assumed that puzzle therapy remains an effective non-pharmacological cognitive stimulation when applied consistently.

In Group C (combination of fishing ball and puzzle therapy), the results showed an increase in the normal category and a reduction in the impaired category after the intervention. These findings are supported by Yi Q (2024), who demonstrated that combined physical-cognitive interventions can improve global cognition, memory, and executive function in older adults. Meta-analyses further confirm that the combination of physical and mental stimulation is more effective than single interventions across various domains of brain function (Yi Q, Liu Z, Zhong F, Selvanayagam VS, 2024). Similarly, Reci (2025) reported that combining aerobic exercise with crossword puzzles significantly improved MMSE scores after the intervention (Reci, A., Sabri, R., & Yuliharni, 2025). It is therefore assumed that multi-domain interventions (physical and cognitive) are more effective in enhancing cognitive function than single approaches, as physical activity improves circulation and neurotrophic factors, while cognitive stimulation directly trains memory and attention functions.

**The Effect of Fishing Ball Therapy, Puzzle Therapy, and Their Combination on Cognitive Function in the Elderly**

Based on the research findings, Group A (fishing ball therapy) showed no statistically significant effect on changes in cognitive function among the elderly. This finding is supported by Deschenes (2022), who reported that light physical exercise without a cognitive structure often does not produce significant differences in specific cognitive scores. The effect of light physical activity on cognitive function is often dependent on higher duration and intensity, whereas low-intensity activities may primarily benefit general health without significantly improving specific cognitive outcomes

(Deschenes & Stock, 2022). Similarly, Tolley et al. (2022) found that simple physical stimulation without clear cognitive intervention tends to produce smaller effects on memory or executive function compared to more complex programs, indicating that single low-intensity physical activity improves fitness but not cognitive scores significantly (Tolley et al., 2022).

From these findings, it is assumed that fishing ball therapy does not significantly improve cognitive function because, as a form of light physical activity, it primarily enhances physical fitness and motor coordination, but is not sufficiently strong to stimulate deeper cognitive domains such as memory, attention, and executive function. This may be due to the lack of complex cognitive challenges, resulting in limited stimulation of brain neuroplasticity. Additionally, the relatively short duration, frequency, and intensity of the therapy may contribute to the absence of statistically significant changes in cognitive function.

In Group B (puzzle therapy), the results also indicated no statistically significant effect on cognitive function among elderly individuals with dementia. This finding is consistent with Purnama (2021), who found that single puzzle interventions over a short period (e.g., less than six weeks) tend to show an increasing trend in cognitive scores, but not always to a statistically significant extent without combination with other programs. Cognitive games alone generally have mild effects and often require longer duration or higher intensity to produce meaningful improvements (Sigit Purnama, 2021).

It is assumed that puzzle therapy alone does not significantly improve cognitive function because single-domain cognitive stimulation without physical activity is insufficient to produce meaningful changes within a limited intervention period. Although puzzles can train thinking ability, concentration, and problem-solving, elderly individuals with probable cognitive impairment require more comprehensive and repeated stimulation to achieve significant improvement.

In contrast, Group C (combination of fishing ball and puzzle therapy) demonstrated a significant effect on cognitive function before and after the intervention. This finding is supported by Rahmi (2025), who stated that dual stimulation (physical and mental) works synergistically to enhance neuroplasticity, improve cerebral circulation, increase neurotrophic factors, and strengthen concentration and executive function. Physical activity enhances blood flow and the release of neuroprotective molecules, while cognitive challenges promote the formation of new neural connections, creating a stronger combined effect than either intervention alone (Firdaus et al., 2025).

It is therefore assumed that the combination therapy produces a synergistic effect between physical activity and cognitive stimulation, providing multisystem stimulation in the elderly. Fishing ball activity likely improves cerebral blood flow, brain oxygenation, and neurotrophic factor release, while puzzle therapy simultaneously challenges memory, attention, and executive functions. This combination enables more optimal activation of neuroplasticity pathways, resulting in significant improvements in cognitive function. A multidomain therapeutic approach is considered more appropriate for the elderly, as cognitive decline is multifactorial and not influenced by a single aspect. Therefore, interventions integrating both physical and cognitive components are believed to be more effective in improving and maintaining cognitive function compared to single interventions.

**Differences in the Effects of Fishing Ball Therapy, Puzzle Therapy, and Their Combination on Cognitive Function in the Elderly**

Based on the research findings, there were no statistically significant differences in changes in cognitive function among the elderly across the fishing ball therapy group, puzzle therapy group, and the combination therapy group. This finding indicates that, statistically, the three types of therapy did not demonstrate meaningful differences in effectiveness when compared to one another, although descriptively there were variations in the mean changes in cognitive function. The mean difference values descriptively showed that the combination therapy group (fishing ball and puzzle) had a higher

average improvement in cognitive function compared to the single-therapy groups, particularly when compared to the fishing ball group.

The results suggest that interventions providing only light physical stimulation (fishing ball) or single-domain cognitive stimulation (puzzle) were insufficient to produce statistically significant cognitive changes within the duration of the intervention. This finding is consistent with Tiocosby et al. (2025), who reported that single cognitive stimulation interventions such as puzzles show variability in effectiveness. Puzzle therapy can significantly improve cognitive function scores in the elderly when applied regularly in a pre-post design, although the magnitude of the effect depends on the duration and frequency of therapy (e.g., 2–3 sessions per week over several weeks) (Jessy Maretha Tiocosby, 2025). Meanwhile, Nisa (2019) stated that light physical activity such as fishing ball therapy can improve cerebral blood flow, neurotrophic factors, and metabolic capacity of the brain, which are important physiological mechanisms in maintaining or enhancing cognitive function in the elderly (Oktafina Safita Nisa, 2019).

It is assumed that, in this study, the non-significant effect of puzzle therapy alone may be due to suboptimal duration or intensity of the intervention. Similarly, the effect of fishing ball therapy may be limited because it primarily involves light physical stimulation without sufficient cognitive challenge, resulting in only modest improvements that do not always reach statistical significance, particularly with a small sample size or short intervention period.

In contrast, the combination of fishing ball and puzzle therapy showed a statistically significant improvement in cognitive function, indicating that multidomain or dual-task interventions that integrate physical and mental stimulation work synergistically. This finding is supported by Carrasco (2025), whose meta-analysis provides strong evidence that combining physical activity with cognitive stimulation yields greater benefits for overall cognitive function compared to either physical or cognitive interventions alone. The studies included in the meta-analysis also demonstrate that such combined interventions contribute to increased production of neurotrophic factors that support neuronal growth and differentiation, as well as increased hippocampal volume, which is essential for memory and cognitive function (Vásquez-Carrasco, E., 2025).

## CONCLUSION

The conclusions of this study are as follows:

1. The characteristics of respondents indicate that the majority were pre-elderly, female, had elementary-level education, were not working, and had a history of illness.
2. There was an improvement in cognitive function before (pre) and after (post) the fishing ball therapy.
3. There was an improvement in cognitive function before (pre) and after (post) the puzzle therapy.
4. There was an improvement in cognitive function before (pre) and after (post) the combined therapy (fishing ball and puzzle).
5. There was no significant effect on cognitive function levels in the fishing ball therapy group.
6. There was no significant effect on cognitive function levels in the puzzle therapy group, while a significant effect was found in the combined therapy group (fishing ball and puzzle).
7. There was no significant difference in cognitive function levels among the fishing ball, puzzle, and combined therapy groups.

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