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The Effect of the Dakon Game on the Cognitive Function of the Elderly at the Turusgede Rembang PPSLU

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ABSTRACT

Cognitive decline is often considered a natural condition in the elderly. However, this disorder can cause forgetfulness, difficulty concentrating, and communication difficulties, impacting daily activities and quality of life. One non-pharmacological intervention that can be used to improve cognitive function is the traditional game of Dakon. This study aimed to determine the effect of Dakon on the cognitive function of elderly people at the Turusgede Rembang Community Learning Center (PPSLU). The study used a quantitative pre-experimental design with a one-group pre-post test and a cohort approach. The study population consisted of 30 elderly people with cognitive decline, and 28 were selected using a purposive sampling technique. The research instruments included the Mini Mental State Examination (MMSE) questionnaire and the Dakon game standard operating procedures (SOP). Data analysis was performed using the Wilcoxon test with a significance level of α=<0.05. The results showed a ρ value of 0.000<0.05, thus accepting H_1, indicating that Dakon significantly improves cognitive function in the elderly. Most respondents experienced improved cognitive scores due to their ability to follow the game stages well, concentrate, and cooperate during the intervention. One respondent experienced no improvement in cognitive function, influenced by factors such as advanced age, low education level, lack of social interaction, and health conditions such as hypertension. It can be concluded that the traditional Dakon game is an effective non-pharmacological intervention in improving the cognitive function of the elderly at the Turusgede Rembang PPSLU.

Keywords: traditional Dakon games, cognitive function, elderly

INTRODUCTION

The elderly are individuals who enter the age of 60 years and above and are said to be the final stage of the life phase of both men and women. The ever-increasing elderly population is inseparable from the human growth process where the elderly will experience an aging process or Aging Process (Grinin et al., 2024). This aging process causes changes in organ function, one of the impacts of changes in organ function is a decrease in brain function caused by brain atrophy, so that it can result in degenerative diseases in the elderly, namely a decrease in cognitive function (Basuki et al., 2025).

A decrease in cognitive function will cause the elderly to forget more easily, difficulty focusing, disorientation, and difficulty communicating. A decrease in these aspects will interfere with daily activities and reduce the quality of life because it will cause various

problems such as forgetting how to do daily activities (bathing, eating, dressing), difficulties in transactions, getting lost on the road (Riasari et al., 2022). In addition, the decline also makes the elderly less confident in their condition and tend to withdraw from social activities, causing anxiety and depression disorders in the elderly (Lin, 2024).

World Health Organization (WHO) in 2021, the prevalence of the elderly who experienced a decline in cognitive function worldwide was 65.6 million people, in the United Kingdom the elderly experienced a decrease in cognitive function by 45%. Meanwhile, in Indonesia, the elderly who experienced a decline in cognitive function by 121 million with Presentase 5.8% are male and 9.5% female. According to the chairman of the Indonesian Psychogeriatric Association, in general, the elderly will easily experience a 30% decline in memory in the age range of 50-59 years, 35-39% in the age range of 65 years, and 80% in the age range of 80 years. Based on data from the Central Java Health Office (2019), the prevalence of dementia-like cognitive function decreased by 13.48% (Sari & Margiyati, 2024).

Based on an initial survey conducted by researchers at PPSLU Turusgede Rembang, on January 20, 2025 through interviews with 6 elderly people, it was found that the elderly when asked "what day is today" and their date of birth, they could not remember well. In addition, the elderly said that they often forget about the activities that have just been carried out, and do not know the developments around.

Factors that affect cognitive function are age, gender, physical activity and sport, education, health status, mental and emotional status, environmental conditions and social interaction barriers (Syafira et al., 2023). Cognitive function decline is a health problem that occurs in the elderly, cognitive function includes various aspects such as orientation, language, attention, memory, calculation and construction functions. This decline can result in problems such as long-term memory and information processing. For long-term memory, the elderly will have difficulty in reexpressing stories or events that do not really interest them and new information or information about people (Latifah, 2021). The impact experienced from a decline in cognitive function if not treated immediately is dementia and in the long term can lead to disease Alzheimer's (Lisnawati, 2024).

Treatment efforts include pharmacological therapies such as memantine, galantamine, rivastigmin, and donepezil (Basuki et al., 2025), as well as non-pharmacological therapies in the form of games such as puzzles, crossword puzzles, and traditional Dakon games (Oktaviani, 2022).

Traditional Dakon games are an effective form of cognitive stimulation because they involve aspects of memory, concentration, orientation, and language. This activity activates the brain's nervous system through the process of counting, visual observation, and repetitive social interaction by involving the hippocampus and amygdala which play a role in memory and emotions so that it can improve cognitive function and psychosocial comfort (Septiana et al., 2019). Siregar Rinco's research (2024) showed that playing Dakon increased the MMSE score of the elderly from 21.7 to 22.6 after three interventions over three weeks, which proves the effectiveness of Dakon in improving cognitive function and preventing the progression of dementia.

Sister Callista Roy's Adaptation Model explains that humans are adaptive systems that respond to various internal and external stimuli through regulatory and cognator coping mechanisms, resulting in adaptive physiological responses, self-concept, role function, and interdependence (Laily et al., 2024). The aging process causes a decline in the body's organs' ability to repair tissue, increasing the risk of degenerative disorders, including cognitive decline in the elderly. Based on national policy, individuals aged 60 years and above are categorized as elderly and experience changes in immunity and metabolism that impact disease susceptibility (Astuti et al., 2018). Cognitive decline itself is a disruption in the ability to receive, process, store, and reuse information, encompassing aspects of attention, memory, language, motor skills, and executive function (Sari & Margiyati, 2024; Zou, 2025).

Dakon, a traditional Indonesian game, is a cognitive activity that stimulates thinking processes, concentration, decision-making, memory, and even calculation skills through strategies and visual observation (Sari & Margiyati, 2024). This cognitive activation involves the integrated work of the left and right brain, thereby strengthening memory and analytical functions (Siregar et al., 2021). Dakon game stimulation has been shown to support improved cognitive function because it involves repetitive interaction, calculation, and hand-eye coordination, which encourage neural activity related to memory and emotional regulation (Lisjayanti et al., 2022). Thus, Dakon has the potential to be a non-pharmacological intervention that supports positive adaptation in older adults according to Roy's framework.

The purpose of this study is to determine the influence of traditional Dakon games on the cognitive function of the elderly at PPSLU Turusgede Rembang, by identifying the cognitive function of the elderly before and after being given traditional Dakon games and analyzing the changes that occur to determine the effectiveness of the intervention.

METHODS

This study used a pre-experimental design with a one-group pre-posttest design to measure the cognitive function of elderly people before and after a traditional Dakon game intervention. This design is suitable for preliminary research, although it lacks a comparison group, thus uncontrollable potential confounding variables. The study population consisted of 30 elderly people at the Turusgede Rembang Community Health Center (PPSLU) experiencing cognitive decline. Twenty-eight individuals were selected using purposive sampling based on the inclusion criteria: elderly aged ≥60 years, experiencing cognitive decline, being able to communicate, willing to participate, and following the entire intervention. Elderly individuals with severe visual and hearing impairments, reading disabilities, or severe mental disorders were excluded from the sample. Confounding variables such as comorbidities and social activity were not measured due to the relatively homogeneous living environment of the respondents.

The independent variable was the traditional Dakon game, while the dependent variable was cognitive function. The instrument used was the Indonesian version of the (MMSE) questionnaire with score categories: 27–30 (normal), 21–26 (mild impairment), 11–20 (moderate impairment), and 0–10 (severe impairment). Measurements were conducted face-to-face using standard procedures in a calm environment.

The Dakon intervention was delivered in nine sessions over three weeks three times per week, each lasting fifteen minutes, and following the standard operating procedures for playing Dakon. Although the frequency and duration were not based on specific empirical evidence, the implementation procedures were carried out consistently. Respondents' engagement levels were not objectively measured, but were observed to be performing well. Using the MMSE twice in close succession has the potential to cause a learning effect, but this risk is considered small given the respondents' cognitive status.

Data analysis was performed using the Wilcoxon Signed-Rank test because the data were ordinal and derived from two paired measurements. Data descriptions did not use medians, ranges, or IQRs, but rather based on standardized MMSE categories commonly used in the elderly population. Although the sample size was relatively small, the significant results indicate a potential positive effect of the Dakon game on cognitive function in the elderly.

This study adhered to ethical principles of health research, including respondent consent, confidentiality, and protection of participant comfort and safety.

RESULTS

Table 1. Distribution of Respondents among the Elderly at PPSLU Turusgede Rembang in June 2025

Category		Frequency	Percentage (%)
Age (years)	61-65	16	57,1
	66-70	8	28,6
	71-75	4	14,3
Gender	Man	12	42,9
	Woman	16	57,1
Education	No School	17	60,7
	SD	11	39,3

Based on the characteristics of the respondents, most older adults were between 61–65 years old (57.1%), followed by those aged 66–70 years (28.6%), with a smaller proportion aged 71–75 years (14.3%). This suggests that the majority of participants were in the early elderly stage. In terms of gender distribution, female respondents accounted for 57.1%, while males comprised 42.9%. This pattern is consistent with general demographic trends where females tend to have longer life expectancy.

Regarding education, most respondents had never attended school (60.7%), while the remaining 39.3% had completed elementary school. This indicates that the sample predominantly consisted of individuals with low formal education, which may influence baseline cognitive functioning. However, this study did not directly examine the relationship between education level and cognitive outcomes, so any interpretation should be made cautiously.

Table 2. Distribution of Cognitive Function Categories Before and After the Traditional Dakon Game Intervention

Traditional Dakon Games	Cognitive Function				
	Normal	Light	Moderate	Heavy	Total
Pre-Test	0 (0%)	6 (21,4%)	17 (60,7%)	5 (17,9%)	28 (100%)
Post-Test	6 (21,4%)	17 (60,7%)	4 (14,3%)	1 (3,6%)	28 (100%)
Wilcoxon Signed Ranks Asymp. Sig. (2-tailed) = 0,000					

Prior to the intervention (pre-test), 17 respondents (60.7%) were categorized as having moderate cognitive impairment, making it the most common category among participants. After the traditional Dakon game intervention (post-test), the largest proportion of respondents shifted to the mild impairment category, with 17 individuals (60.7%) classified in this group. Additionally, the number of respondents in the severe impairment category decreased from five (17.9%) to one (3.6%), and six respondents (21.4%) achieved scores within the normal range.

The Wilcoxon Signed-Rank Test yielded a significance value of 0.000, indicating a statistically significant difference between pre-test and post-test MMSE scores. These results suggest an improvement in MMSE categories following the intervention. However, the findings should be interpreted within the context of the study design.

DISCUSSION

1. Identification of Cognitive Function of the Elderly before being given the Traditional Dakon Game at PPSLU Turesgede Rembang

This is shown based on the results of the pre-test using the Mini Mental State Examination (MMSE) questionnaire consisting of 11 questions, which were filled in by researchers through interviews with the elderly.

Age factors affect the decline of cognitive function when a person enters old age, there is a decline in organ function, including the brain, due to atrophy in the prefrontal grisea area which has an impact on the decline of cognitive, intellectual and memory abilities. Gender also affects, especially in women who experience a decrease in the hormone estrogen postmenopause. Estrogen plays a role in the functions of the hypothalamus, hippocampus, midbrain, and cortex that affect mood, mental status, learning processes and memory. In addition, the level of education also contributes to cognitive function. Older people with low education are at greater risk of cognitive decline due to a lack of sustained intellectual stimulation that is essential for maintaining and improving brain function (Rodriguez, 2021).

This study showed that before being given traditional Dakon game interventions, most of the elderly were in the category of moderate cognitive function decline. This is evidenced by the inability of the elderly to answer questions according to existing indicators, such as the elderly being able to remember names but having difficulty remembering dates, days, months, years, places of residence, and less able to name objects and count. The moderate level of decline in cognitive function experienced by the elderly is caused by the lack of habit in remembering dates, days, months and years so that they are used to not knowing what day, month and year it is, because their daily routine is limited only in the orphanage environment. Even the elderly who experience a moderate decline in cognitive function tend to find it difficult to remember new things or old things because of low motivation to remember something because, the lack of social interaction and the many rules that are mowatchous make the elderly feel bored and unfree, thus also worsening the cognitive function of the elderly.

The decline in cognitive function in the elderly can cause the elderly to experience memory decline such as forgetfulness, difficulty focusing, disorientation, and difficulty in communicating. A decrease in these aspects will interfere with daily activities and reduce the quality of life because it will cause various problems such as forgetting how to do daily activities (bathing, eating, dressing). These findings are consistent with Lee et al. (2021) who reported that cognitive impairment in the elderly is closely associated with functional decline and increasing dependence in daily activities.

In addition to functional limitations, cognitive decline also has psychosocial consequences. Older adults who are aware of their cognitive difficulties may experience reduced self-confidence, feelings of inadequacy, and a tendency to withdraw from social interactions. This social withdrawal can contribute to the emergence of anxiety and depressive symptoms. Muhammad and Meher (2021), similarly found that cognitive impairment in late life is significantly correlated with higher levels of depressive symptoms and social isolation in older adults. Thus, the results of this study align with previous evidence indicating that cognitive decline does not only affect cognitive performance itself but also impacts quality of life and mental health, underscoring the importance of early detection and appropriate non-pharmacological interventions.

2. Identification of Cognitive Function of the Elderly after being given the Dakon Traditional Game at PPSLU Turusgede Rembang

This is in line with previous research conducted by Masruroh and Isnaini (2021), which stated that there was an improvement in cognitive function in the elderly after being given the traditional game of Dakon. This can be explained because traditional Dakon games are an effective medium to stimulate brain work, through thinking, remembering and decision-making activities. Games also provide a fun experience so that it can improve concentration and memory of the elderly.

The results of the study showed a significant change in the decline of cognitive function of the elderly after being given the traditional game of Dakon, most of the respondents had a mild decrease in cognitive function, this was evidenced by the increase in *post test* scores, almost all respondents were able to answer questions such as day, date, month, year, and place of residence as well as mention the name of the object and count. So that there was an increase in scores in several items on the questionnaire. The improvement in cognitive function occurs because the traditional game of Dakon is able to stimulate various aspects of brain abilities

such as memory, concentration, strategy, calculation and decision-making during the game, the elderly are trained to remember holes, estimate steps and strategize games, all of which are beneficial in improving brain function.

The positive effect of the traditional Dakon game may also be influenced by the enthusiasm of the elderly when participating in the activity. Increased engagement can create a supportive social atmosphere that encourages other participants to become more involved. Social participation is known to be an important protective factor for cognitive health. A study by Waraulia (2025) found that cognitively stimulating activities combined with social interaction significantly enhance memory performance in older adults. Because Dakon is played in pairs, the game promotes interaction, conversation, and cooperative decision-making, all of which contribute to the stimulation of language and communication skills.

Socially interactive activities are also associated with improved emotional well-being. According to Singh (2025) social engagement in later life is linked to increased endorphin release, reduced stress levels, and improved mood stability. These physiological and emotional responses may indirectly support cognitive processes such as attention, working memory, and emotional regulation. The mechanism is consistent with findings by Cowan et al. (2021), who reported that positive emotional states can enhance cognitive performance by strengthening neural pathways involved in memory consolidation.

Thus, the application of traditional Dakon games as an intervention in an effort to maintain and improve cognitive function in the elderly is highly recommended. This approach not only improves the cognitive aspect, but also strengthens the social and emotional connections between players through the interactions that occur during the game. This game has proven to be a simple, fun, yet effective method in stimulating the brain work of the elderly and preventing the decline in cognitive function that commonly occurs with age. This shows that traditional Dakon games have an effect on improving the cognitive function of the elderly.

3. Analysis of the Influence of Traditional Dakon Games on the Cognitive Function of the Elderly at PPSLU Turusgede Rembang

The existence of these changes shows that the traditional game of Dakon has an influence on the decline of cognitive function caused by several factors. This is in accordance with research Siregar et al. (2021) stating that the elderly who play the traditional game of Dakon 3 times a week can improve mood, judging from the social aspect it can make the elderly establish interactions between players, this interaction is important because social isolation is a risk

factor for cognitive function decline. If the game of Dakon is done regularly and repeatedly, it will have an effect on the brain which will automatically transmit impulses through the same synapses so that memory can be easily remembered.

In line with the nursing theory, Sister Callista Roy (Adaptation Model) explained that humans are adaptive systems that are able to adapt to various stimuli from the environment to achieve balance. In this study, the traditional game of Dakon acts as an external stimulus that stimulates the coping mechanism of cognition through thinking, remembering, concentrating and social interaction activities so as to cause adaptive responses in the form of increased cognitive function, pleasure, and confidence in the elderly.

After the Dakon intervention conducted three times a week for three weeks, several participants showed improvements in their cognitive function categories, including shifts from severe to moderate, moderate to mild, and mild to normal impairment. Observationally, participants who improved demonstrated better adherence to instructions, increased accuracy in counting seeds, and greater ability to follow the game sequence. Similar findings were reported by Abd-Alrazaq et al. (2022), who noted that traditional cognitive games enhance procedural memory and task engagement in older adults.

Participants who progressed from moderate to mild impairment showed increased focus and understanding of the game flow, aligning with Choi et al. (2025), who found that structured game-based activities help sustain attention in older adults with moderate deficits. Those who improved from mild impairment to the normal category displayed enthusiasm, better numeracy skills, and active social interaction patterns consistent with Lisjayanti et al. (2022), who reported that repeated rule-based activities can strengthen attention and memory.

However, a small percentage of the elderly do not show a change in category even though their scores have increased, this is influenced by the age factor of respondents who have entered the elderly category, where according to research Gonzales et al. (2022) at that age there is an increase in degenerative processes in the brain which has an impact on the decline of cognitive ability so that the response to stimulation becomes less optimal. Low education and minimal cognitive reserve also reduce the ability of the elderly to process new stimuli. The lack of social interaction makes engagement and focus during activities decrease (Mackenzie & Abdulrazaq, 2021). In addition, the health status of hypertension inhibits blood flow to the brain so that concentration and participation are reduced. These factors cause the intervention to be suboptimal. However, overal the traditional game of Dakon has a positive and significant

impact on the improvement of cognitive function of the elderly, the success of the traditional game of Dakon is due to the fact that when carrying out the treatment, it runs well and is carried out with implementation instructions in accordance with *standard operating procedures* (SOP). This success is also helped by a cooperative attitude in the elderly who regularly and focus on following the researcher's instructions.

CONCLUSION

The results of the study showed that before being given the traditional game of Dakon, most of the elderly were in the category of moderate cognitive function decline, but after the intervention there was an improvement in cognitive function so that the majority of the elderly were in the category of mild cognitive function decline. The analysis using the Wilcoxon test also proved the significant influence of the traditional game of Dakon on improving the cognitive function of the elderly at PPSLU Turusgede Rembang.

LIMITATION

This study has several limitations that should be considered when interpreting the findings. First, the traditional Dakon game requires concentration and adherence to specific rules; however, some participants had difficulty maintaining focus and needed repeated explanations from the researcher. This may have introduced variability in the quality of engagement and could have influenced individual outcomes. In addition, the presence and guidance of the researcher during each session may have unintentionally affected participant performance, creating the possibility of observer or facilitation effects.

Second, the study used a one-group pre–post test design without a control group, which limits the ability to attribute improvements solely to the intervention. Alternative explanations, such as increased social interaction, familiarity with the testing environment, or natural fluctuations in cognitive performance, cannot be ruled out. The repeated use of the MMSE within a relatively short timeframe also raises the possibility of learning effects, where participants improve simply because they remember the test items rather than experiencing true cognitive enhancement.

Third, participant engagement during the intervention varied considerably. Differences in motivation, mood, social interaction, and physical condition may have influenced how effectively each participant benefited from the activity. Additionally, the study was constrained

by time, as the intervention could only be conducted in the afternoon to avoid disrupting routine activities at the institution. This limited scheduling flexibility and may have affected the optimal involvement and readiness of the elderly during the sessions.

Finally, although the study provides promising preliminary insights into the potential of Dakon as a culturally meaningful cognitive intervention, further research using larger sample sizes, controlled experimental designs, and more comprehensive cognitive assessments is needed to strengthen the validity and generalizability of the findings.

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