

## THE EFFECT OF BOARDGAMES THERAPY: SCRABBLE ON COGNITIVE ABILITIES IN ELDERLY WITH DEMENTIA

*Pengaruh Terapi Boardgames: Scrabble Terhadap Kemampuan Kognitif Pada Lansia Dengan Demensia*

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### ABSTRACT

*Cognitive impairment in the elderly causes a decrease in the ability to do various things related to thinking and remembering. Dementia is a term used to describe memory decline in the elderly. Prevention of cognitive impairment can be done by using media that stimulate brain activity. Scrabble is a type of board game that emphasizes initiative, creativity, planning, and flexibility in dealing with success or failure while being entertaining. This study aims to determine the effect of board games (scrabble) on increasing cognitive capacity in the elderly with dementia. The study was conducted at Tresna Werdha Budi Mulia 2 Jelambar, West Jakarta during January-July 2023. The target of the study was the elderly living in nursing homes. Using the Generalized Linear Model (GLM) analytical method, this study design used a quasi-experiment with a two-stage approach. Group pretest-posttest design approach. The sample consisted of 31 elderly in the control group and 31 elderly in the intervention group. The sampling strategy was random using the two-population proportion formula. The research instrument used was the Mini Mental Status Examination (MMSE) questionnaire. Nine therapy sessions were given, and the eighth session showed a significant improvement after the implementation of scrabble game therapy. Statistical test using Paired T-test p-value of  $0.000 < (\alpha) 0.05$  showed that board games (scrabble) can improve cognitive capacity in elderly with dementia. Broad-games therapy: Scrabble can be routinely recommended to be included in daily activities for the elderly so that it can delay the severity of dementia.*

**Keywords:** boardgames, cognitive-ability, dementia, elderly, scrabble

### ABSTRAK

Gangguan kognitif pada lansia menyebabkan penurunan kemampuan dalam melakukan berbagai hal yang berhubungan dengan berpikir dan mengingat. Demensia merupakan istilah yang digunakan untuk menggambarkan kemunduran daya ingat pada lansia. Pencegahan gangguan kognitif dapat dilakukan dengan menggunakan media yang merangsang aktivitas otak. Scrabble adalah jenis permainan papan yang mengedepankan inisiatif, kreativitas, perencanaan, dan fleksibilitas dalam menghadapi kesuksesan atau kegagalan sekaligus menghibur. Penelitian ini bertujuan untuk mengetahui pengaruh permainan papan (scrabble) terhadap peningkatan kapasitas kognitif pada lansia dengan demensia. Penelitian dilaksanakan di Tresna Werdha Budi Mulia 2 Jelambar, Jakarta Barat selama Januari-Juli 2023. Sasaran penelitian lansia yang tinggal di panti. Menggunakan metode analitik Generalized Linear Model (GLM), desain penelitian ini menggunakan quasi eksperimen dengan pendekatan dua tahap. Pendekatan desain pretest-posttest kelompok. Sampel terdiri dari 31 lansia di kelompok kontrol dan 31 lansia di kelompok intervensi. Pengambilan sampel Strategi pengambilan sampel secara acak menggunakan rumus proporsi dua populasi. Instrumen penelitian yang digunakan adalah angket Mini Mental Status Examination (MMSE). Sembilan sesi terapi diberikan, dan sesi kedelapan menunjukkan peningkatan yang signifikan setelah penerapan terapi permainan scrabble. Uji statistik dengan menggunakan Paired T-test

p-value sebesar  $0,000 < (\alpha) 0,05$  menunjukkan bahwa permainan papan (scrabble) dapat meningkatkan kapasitas kognitif pada lansia dengan demensia. Terapi Broad-games: Scrabble dapat direkomendasikan secara rutin untuk dimasukkan dalam aktivitas sehari-hari bagi lansia sehingga dapat menunda keparahan demensia.

**Kata Kunci:** board-games, demensia, kemampuan kognitif, lansia, scrabble

## INTRODUCTION

Cognitive control is one of the most important parts of human existence. Aging is an important area of study because of the needs of the growing elderly population. The aging process of the brain and growing age both contribute to the deterioration in cognitive performance in the elderly.<sup>1</sup> As a person ages, more changes occur in the body's numerous systems, resulting in a decline in function. Every year, there is a decrease in volume in each area, including the frontal lobe (0.55%) and the temporal lobe (0.28%).<sup>2</sup> The majority of brain regions, including the frontal lobe, play a significant role in memory storage. The elderly experience a decline in cognitive function, including slower information processing, loss of information during transmission, and difficulty accumulating and retrieving information from memory.<sup>3</sup>

One type of cognitive decline in the elderly is dementia or senile dementia, which is an identical problem and is often found in the elderly. Dementia is a condition when a person experiences a decrease in memory and thinking power which significantly interferes with daily life activities. Every three seconds, one person in the world experiences dementia.<sup>1</sup> Globally, dementia is a leading cause of reliance and impairment in the elderly, and it affects not just the affected person but also their family, community, and civilization. 11.9% of years spent living with a handicap resulting from a noncommunicable disease (NCD) globally are attributed to dementia.<sup>4</sup>

Dementia is a disorder that can occur in the elderly due to the aging process and damage to nerve cells and their connections. In severe dementia, there can be problems in carrying out daily activities and people become less

independent. Elderly people with dementia have cognitive conditions that significantly affect a person's daily functioning including memory impairment, decreased thinking ability, and difficulty in communicating. The decline in cognitive function in the elderly requires maintenance to delay further or chronic cognitive damage. Cognitive function is very important for the welfare of the elderly because a decrease in cognitive function has an impact on decreasing social activities in daily life so the elderly become unproductive and cause problems in public health. Elderly people who experience decreased cognitive function can experience dependency because they cannot independently carry out daily activities.<sup>5</sup>

Numerous contexts in which board games can be useful in healthcare settings are highlighted in the literature on the subject. The main way that board games vary from electronic ones is that they include social interaction.<sup>6</sup> Board game media is an excellent medium for treating people with mild dementia in the elderly, since board games may be specially adapted to employ highly exact principles to lessen the varied impacts of dementia patients in the elderly. Aside from that, board games can encourage older people to think critically to solve various difficulties, and this is accompanied by intensive contact between players because they require at least two or more people to participate.<sup>7</sup>

Playing board games is a recreational activity that promotes exposure to novelty, taking initiative, planning, and adapting to win or lose, and brings immediate enjoyment to participants. Regular brain-training activities, such as crossword puzzles and scrabble, can help minimize the incidence of dementia.



**Figure 1. The Intervention Group Then Received Scrabble Board Games**

Scrabble is an intermediary or media in the form of a game to sharpen brain function or stimulate brain abilities. Scrabble is a game in the form of a board where the way to play is to arrange various kinds of words that have meaning.<sup>8</sup> People who play Scrabble boost their creativity by attempting to build new words from the letters offered to them, as well as words that differ from those currently on the board. Playing Scrabble can enhance six different cognitive domains in the brain, including language, calculation, visual-spatial, short- and long-term memory, and critical thinking, in addition to being an enjoyable and challenging game.<sup>9</sup>

The goal of this research was to determine the effect of scrabble board game treatment on cognitive abilities in elderly people with dementia because it is crucial to maintain cognitive abilities in those with dementia to prevent high levels of severity.

## METHODS

This study was conducted in Panti Tresna Werdha Budi Mulia 2, Jelambar,

## RESULT

### Univariate Analysis

**Table 1. Frequency Distribution of Respondent Characteristics**

Variable		Intervention n(%)	Control n(%)
Age	Elderly (60-74)	0 (0%)	0(0%)
	Old (75-90 years)	16 (51.6%)	16 (51.6%)
	Very Old (>90 years)	15 (48.4%)	15 (48.4%)
Gender	Female	14 (45.2%)	13 (41.9%)
	Male	17 (54.8%)	18 (58.1%)

Based on Table 1, the age characteristics of respondents in both groups, the majority (51.6%) were in the old category (75-90 years), while gender was dominated by men, 54.8% (intervention group) and 58.1% (control group).

Jakarta Barat, using a method that was quantitative and a quasi-experimental design with pre-post-testing of two groups. This research was conducted from January 2023 to July 2023. This study employed the purposive sampling approach. The sample used was 62 elderly people (intervention group: 31 and control group 31) with inclusion criteria aged >60 years, able to read and write, no loss of consciousness, and no hearing or vision problems. Exclusion criteria for elderly people who experience physical limitations. The conduct of the study began with a check of the respondents' vital signs to confirm their general well-being, followed by a measurement of cognitive capacities. The intervention group then received Scrabble Board-games (a game that used a board containing random letters, the way to play it is to put together a meaningful word) treatment three times a week for three weeks, with one session lasting 15 minutes and attended by the researcher, while the control group continued with their normal activities in the nursing home. The study concluded by assessing the cognitive ability of both groups. Assessment of cognitive function used MMSE (Mini Mental Status Examination) The validity test for the MMSE provided a r value of 0.776, while the reliability test provided a r value of 0.827. The data analysis used uni-variate (frequency distribution), bi-variate (T-test), and multivariate data analysis using a Generalized Linear Model (GLM).

**Table 2. Cognitive Abilities in The Intervention Group and Control Group Before and After The Scrabble Board Game Activity (n=31)**

Group	Cognitive abilities							
	Severe dementia		Moderate dementia		Mild dementia		Normal	
	Pre n(%)	Post n(%)	Pre n(%)	Post n(%)	Pre n(%)	Post n(%)	Pre n(%)	Post n(%)
Intervention	0	0	17(54.8)	7 (22.6)	14(45.2)	17(54.8)	0	7(22.6)
Control	0	7(22,6)	24(77.4)	22(71)	7(22.6)	2(6.5)	0	0

Based on Table 2 before the Scrabble board game activity, the intervention group's cognitive ability was 54.8%, whereas the control group's was 77.4%, getting into the category of moderate dementia. Following therapy, 71% of the control group had moderate dementia and 54.8% of the intervention group had mild dementia.

### Bivariate Analysis

Bivariate analysis was used to analyze the effectiveness of implementing the Scrabble game intervention to improve cognitive abilities. To test the effect of this, it is necessary to use the T-test because the data is normally distributed.

**Table 3 Differences in Cognitive Function in Elderly People with Dementia Before and After the Scrabble Board Game Activity**

	Intervention Group				Control Group			
	Mean(SD)	Std Error Mean	Df	p-value	Mean(SD)	Std Error Mean	Df	p-value
Pre-Post	2.194(1.167)	0.21	30	0	0.065(0.25)	0.045	30	0.161

Table 3 shows the mean and standard deviation of the cognitive abilities of elderly people with dementia before and after being given the Scrabble game intervention in the intervention group -2.194 (SD=1.167) and the control group 0.065 (SD=0.250). The results of the different tests for the intervention group showed a p-value of 0.000 (<0.05), meaning there was a difference in cognitive ability scores between the pre-test and post-test in the intervention group. In the control group, the p-value was 0.161, which

means there was no difference in cognitive ability scores between the pre-test and post-test.

### Multivariate analysis

GLM-RM (General Linear Model Repeated Measure) is an assessment to get an idea of differences in values for variables that are measured repeatedly and differences between groups. Results of analysis of applying the Scrabble game to the intervention and control groups at Panti Tresna Budi Mulia 2.

**Table 4 Test Results of Within-Subjects Effect**

Variable	Within Subjects Effects	df	Mean Square	f	Sig
Cognitive abilities	Greenhouse-Geisser	1.975	28.536	60.604	0.000

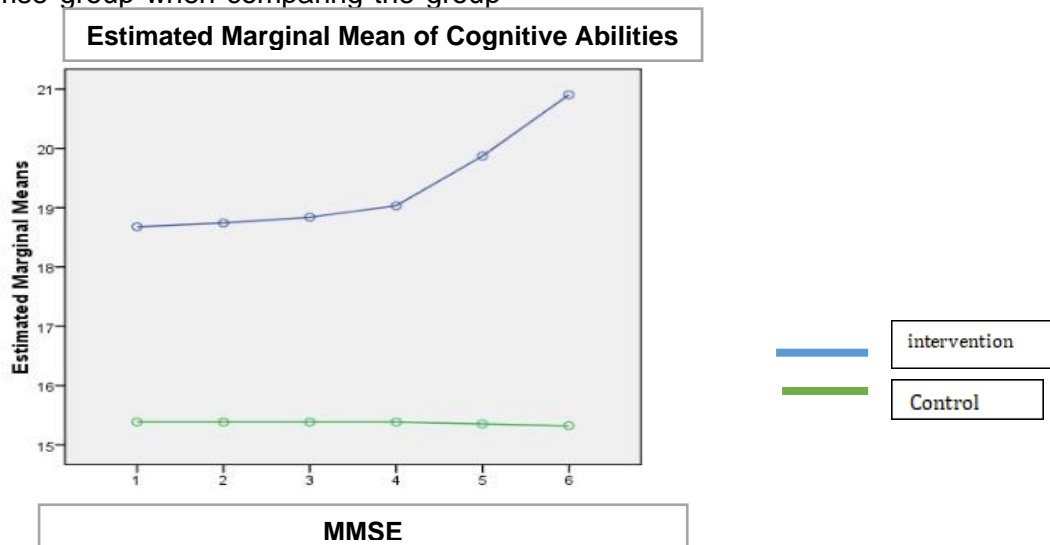
Based on Table 4, the Greenhouse-Geisser (Sig) value is 0.000<0.05, which means there is a significant increase in cognitive ability over time.

**Table 5 Test Results of Within-Subjects Contrasts**

Source	Factor	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
MMSE	Level 1 vs. Level 2	.065	1	.065	2.069	.156	.033
	Level 2 vs. Level 3	.145	1	.145	3.214	.078	.051
	Level 3 vs. Level 4	.581	1	.581	7.200	.009	.107
	Level 4 vs. Level 5	10.081	1	10.081	15.445	.000	.205
	Level 5 vs. Level 6	15.500	1	15.500	42.397	.000	.414
MMSE * Group	Level 1 vs. Level 2	.065	1	.065	2.069	.156	.033
	Level 2 vs. Level 3	.145	1	.145	3.214	.078	.051
	Level 3 vs. Level 4	.581	1	.581	7.200	.009	.107
	Level 4 vs. Level 5	11.758	1	11.758	18.015	.000	.231
	Level 5 vs. Level 6	17.565	1	17.565	48.044	.000	.445
Error(Factor)	Level 1 vs. Level 2	1.871	60	.031			
	Level 2 vs. Level 3	2.710	60	.045			
	Level 3 vs. Level 4	4.839	60	.081			
	Level 4 vs. Level 5	39.161	60	.653			
	Level 5 vs. Level 6	21.935	60	.366			

Based on table 5 in the improvement column which compares each improvement with improvement 1 (pretest). The data obtained was that there was a change in p-value  $\leq 0.05$  in the seventh scrabble game treatment, and then there was a change in p-value on days eight to ten, which means that differences in cognitive abilities in the elderly could be seen on the seventh day after the intervention. In the column mmse\*group when comparing the group

with the control group, the p-value is  $\leq 0.05$  for all performance comparisons. This means that the difference in ability before and after the intervention is not the same between the group and the control group. There is a group effect when level 1 ability is compared with ability 2, ability 3, ability 4, ability 5, ability 6, ability 7, (the p-value is not yet significant), ability 1 is compared with abilities 8, 9, and 10 (p-value  $< 0.05$ )



**Figure 1. Graph of Cognitive Function Abilities in The Elderly**



Based on Figure 1 the graphic image shows that there was an increase in cognitive ability in the intervention group, while in the control group, the cognitive ability values tended to be flat.

## DISCUSSION

Based on the research results, it was found that most of the respondents' ages were in the old category. Age is the largest recognized risk factor for cognitive decline.<sup>4</sup> Previous research shows that there is cognitive decline occurs with increasing age, characterized by a slowdown in information processing, affecting cognitive skills, such as attention, memory, and executive function, caused by changes in brain structure and function over time and factors such as decreased blood flow and oxidative stress.<sup>3</sup> There is a significant increase in the prevalence of dementia with increasing age. It is estimated that 5% of the population aged over 65 years, and 20-40% of the population aged over 85 years suffer from dementia.<sup>10</sup>

The results of this study illustrate that there are more males than females. Men have a higher risk of developing dementia compared to women because men have a higher degree of cerebral amyloid angiopathy and increased brain activity with age-related atrophy in the frontal, parietal, and temporal regions.<sup>11</sup> However, other research conducted in Indonesia said that there was no relationship between gender and the incidence of dementia.<sup>12</sup> The differences in the results of this study may be caused by lifestyle factors that can influence the incidence of dementia such as lack of physical activity, tobacco use, unhealthy eating patterns, and dangerous alcohol use as well as disease conditions that can increase the risk of dementia, including hypertension, diabetes, hypercholesterolemia, obesity, and depression.<sup>4</sup>

In the results of this study, data was found that the cognitive ability score (MMSE score) of the elderly before the Scrabble game was carried out in the control group was moderate dementia at 24 (77.4%) and mild dementia at 7 (22.6%) while in the intervention group, 17 (54.8%) had moderate dementia and 14 (45.2%) had mild dementia. In both groups, before the intervention was given, the condition of the elderly was mostly at the moderate dementia level. Dementia is a disease that arises due to decreased cognitive function in the elderly. Decreased cognitive function in the elderly is a serious problem because it can interfere with the daily activities and independence of the elderly.<sup>13</sup> People with mild-moderate dementia can express the signs and symptoms of dementia that they are starting to feel, but elderly people with dementia tend to have a negative self-perception of themselves.<sup>14</sup> Thirty-two elderly people experienced moderate dementia (44.4%) with 50 people (69.4%) showing low self-esteem.<sup>15</sup> Previous research conducted at the Pasuruan Elderly Social Services UPT research results in Pandaan showed elderly people with moderate dementia. has a moderate level of dependence ( $p = 0.022 < \alpha = 0.05$ ).<sup>16</sup> Elderly people with moderate dependency criteria also have problems with continence, dressing, toileting, moving and eating independently.<sup>16,17</sup> Elderly people with moderate dementia will have an impact on their level of independence and also negative perceptions of themselves.

After providing board game therapy: Scrabble, there was a change in cognitive level in the intervention group to 17 (54%) with mild dementia, 7 (22.6%) with severe dementia, and 7 (22.6%) with normal levels. This change in cognitive level shows positive results in increasing the cognitive level of the elderly after being given board game therapy: scrabble. Board game therapy: Scrabble has several benefits, namely improving memory skills, coordinating body parts such as hands so that they are more skilled in carrying out fine and gross motor skills, being able to think precisely and regularly so that they make decisions more quickly, have patience and are more careful in their actions. , generating ideas through processing letters into words.<sup>8</sup>

Research results were analyzed using a paired T-test in the intervention group (p-value: 0.000) and the control group (p-value 0.161) so that a significant difference was found in the increase in cognitive abilities in the phase between the pre-test and post-test in the intervention group. Multivariate analysis results showed differences in cognitive abilities between the two groups before and after intervention with a p-value of 0.000. Greenhouse-Geisser sig value ( $0.000 < 0.05$ ) indicates a significant increase in cognitive abilities over time. The results of the Test of Within-Subjects Contrasts are the results of a comparison that compares each increase with the pretest, a p-value  $\leq 0.156$ , which can be interpreted as an increase in cognitive ability that has not been seen since the first treatment after the treatment in the mmse\*group column.

The graphic results show that in the intervention group, the increase in cognitive abilities appeared in the seventh treatment and continued to gradually increase until the tenth intervention. Meanwhile, in the control group, cognitive ability scores tended to be flat. Educational games with crossword puzzle types can be used to slow the onset of dementia.<sup>18</sup> Board games as a therapeutic medium, elderly people who suffer from mild dementia can play this board games with fellow elderly friends or their family.<sup>7</sup> Board game modality therapy can improve test results that stimulate the brain by providing adequate stimulation to maintain and improve the brain's cognitive function so that it can work when taking, processing, and interpreting images or information that has been absorbed, and the brain works in storing messages or information obtained.<sup>18</sup>

The increase in the MMSE score was caused by the enthusiasm and level of willingness to learn that the elderly learned new things for brain health, namely by cognitive training broad games: scrabble. This cognitive exercise will stimulate the brain by providing adequate stimulation to maintain and improve cognitive function. Cognitive function is a complex function in the human brain which involves aspects of memory, both short-term and long number memory, attention, planning and reasoning functions as well as strategic functions in a person's thinking, such as language and vocabulary.<sup>19</sup> Brain stimulation occurs when sensory input is processed by the association cortices, cortical neurons send impulses to the medial temporal lobe which includes the hippocampus and surrounding temporal cortex areas. The prefrontal cortex and medial temporal lobe receive input from acetylcholine-releasing neurons located in the basal forebrain. This splash of acetylcholine is thought to enable the formation of a memory. The loss of acetylcholine input released by the brain's basal neurons can disrupt the process of forming new memories and retrieving old memories.<sup>20</sup> The MMSE score of elderly people who received therapy increased significantly compared to elderly people who did not receive therapy. Broadgames therapy: Scrabble can stimulate the brain with the process of reading (perception), understanding clues (comprehension), analyzing clues (analysis), stimulating the brain to try again possible answers (retrieval), and deciding which answer is correct (execution), so that therapy This activates parts of the brain, namely the hippocampus and entorhinal cortex, by producing neurons, the transmitter acetylcholine, which can improve cognitive function and prevent dementia.

Therapy to improve cognitive function must be carried out regularly. The results of the study showed that an increase in cognitive abilities was only seen after the 7th administration of the intervention and continued to increase until the tenth administration. This shows that activities that stimulate brain function must be carried out regularly so that the brain remains stimulated and can reduce the risk of dementia severity. Elderly people who do not carry out cognitive activities regularly may also have a history of illness.<sup>21</sup>

## CONCLUSION

Broadgames therapy: Scrabble is proven to be able to improve cognitive function in the elderly. This therapy can be used to train the brain's nerves so they can work well. Activities that stimulate the brain can delay the increase in the severity of dementia.

Broadgames therapy: Scrabble can be recommended to be done in between daily activities for elderly people who live with their families or elderly people in institutional settings. The results of this research can be used to help families, cadres, and nurses in maintaining cognitive function in the elderly, and there must be assistance for the elderly when providing interventions. Based on the results of this study, the researchers recommend doing additional research in a larger, longer-term study to ascertain the long-term effects of Scrabble therapy on cognitive function and quality of life in dementia patients, as well as to look into the influence of Scrabble on other cognitive domains like executive function and visuospatial skills.

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