PROFESIONAL HEALTH JOURNAL
Volume 6, No. 2, December 2024 (Hal. 544-550)
Available Online at https:// http://jurnal.stikesbanyuwangi.ac.id
E-ISSN 2715-6249

BRAIN EXERCISE THERAPY USING SCRABBLE BOARD GAME TO OVERCOME MEMORY IMPAIRMENT IN ELDERLY WITH DEMENTIA IN THE WORKING AREA OF TEGAL SELATAN COMMUNITY HEALTH CENTER

Arriani Indrastuti * | Ramadhan Putra Satria | Mohammad Chafif Auliya Khan |
[a] Diploma 3 Nursing Study Program at Bhamada Slawi University
Author: arrianiindrastuti0@gmail.com

ARTICLE INFORMATION

Article history
Received (20 November 2024)
Revised (28 November 2024)
Accepted (2 December 2024)

Keywords
Elderly with Dementia, Brain Exercise Therapy using the Scrabble Board Game, MMSE

ABSTRACT

Introduction:*Dementia is a condition characterized by cognitive decline, which significantly impacts daily activities and social relationships. Memory loss is one of the earliest signs of dementia, and the elderly are particularly vulnerable to its onset. Brain exercises, such as those that activate both brain hemispheres, can help stimulate cognitive functions and improve brain activity. The* Scrabble *board game has been identified as an effective tool to enhance cognitive abilities, slow the progression of dementia, and provide mental stimulation.****Objective:****This study aims to assess the effectiveness of brain exercise activities and the* Scrabble *board game as therapeutic interventions for elderly individuals experiencing memory impairment in the Tegal Selatan Public Health Center area.* ***Method:****A case study approach was applied, focusing on two clients with memory impairment. Over one week, nursing care was provided, with data collected through interviews, direct observations, and the Mini-Mental State Examination (MMSE).****Results:****The integration of brain gym exercises and* Scrabble *board game therapy resulted in noticeable improvements in memory and cognitive function in both clients. After seven days of therapy, the first client's MMSE score increased from 16 (indicating moderate cognitive impairment) to 21, while the second client's score rose from 18 to 25, indicating no cognitive impairment.****Conclusion:****The combination of brain exercises and* Scrabble *therapy has proven beneficial in enhancing cognitive functions, particularly memory, in elderly individuals with dementia-related memory issues.*

Introduction

Ageing is a natural process experienced by every individual, but it comes with changes as one grows older. According to the World Health Organization (WHO), (WHO, 2019) individuals aged 60 years and above are classified as elderly. With advancing age, various systems in the body undergo changes, and one of the most common issues faced by the elderly is dementia. Dementia is a syndrome characterised by memory disorientation, impaired thinking processes, altered behaviour, and a decline in the ability to carry out daily activities. This decline often manifests as difficulties in recalling information, slower cognitive abilities, and reduced problem-solving skills. Therefore, maintaining brain health in later life becomes an essential aspect of improving the quality of life and extending the productive years of the elderly. If left untreated, this syndrome can become chronic and progressive. However, dementia is not a normal part of the ageing process and can significantly disrupt daily and social activities (Suryatika & Pramono, 2019). In

Indonesia, it was estimated that the number of dementia cases in 2015 was approximately 1.2 million, projected to rise to 2.3 million by 2030 and 4.3 million by 2050 (Suriastini et al., 2018). To address cognitive decline, various interventions have been developed. Two increasingly popular approaches are brain exercises and therapy through games such as Scrabble (the Scrabble board game). Brain exercises involve a series of activities designed to stimulate brain activity and enhance cognitive abilities through physical movements that require coordination, concentration, and memory. These exercises can help improve memory, focus, and problem-solving skills in the elderly (Martini, Fitriangga, and Fahdi, 2016). On the other hand, Scrabble is recognised as an effective method for training and maintaining cognitive function in the elderly. This game not only engages creative thinking to combine letters into words but also stimulates the brain in terms of verbal memory, concentration, and logical thinking. By incorporating light competition and social interaction, Scrabble provides excellent stimulation for brain health in older adults. Previous studies suggest that engaging in habitual activities involving brain training, such as crossword puzzles and Scrabble, can help reduce the risk of dementia (Tri Septa, 2019). Unlike prior studies, interviews with health programme officers for the elderly in the working area of Tegal Selatan Health Centre revealed that no research had been conducted on improving cognitive function in the elderly through the combination of brain exercises and Scrabble therapy. Therefore, this study, using a case study approach, aims to examine the impact of implementing brain exercises and Scrabble therapy. This is crucial to explore the extent to which these interventions can improve cognitive function in the elderly and how these methods can be adapted into public health programmes to support healthy and productive ageing.

Method

The research design used in this study is a case study approach with a descriptive method, aimed at illustrating the nursing process by focusing on one significant issue in managing nursing care for elderly individuals with memory impairments. Inclusion criteria: Elderly individuals aged over 60 years who experience memory impairments and are willing to participate as respondents. Exclusion criteria: Elderly individuals under 60 years old and those without memory impairments. Sampling Technique: The study employed a non-probability sampling technique, specifically convenience sampling, selecting two elderly participants managed over one week. Interventions included brain exercises and Scrabble board game therapy delivered once daily for 60 minutes. Data Collection: Data were gathered through interviews, observations, and active involvement in providing nursing care. The instrument used for data collection was the Mini Mental State Examination (MMSE). MMSE Scoring Interpretation:Scores < 17: Severe cognitive impairment, Scores 18–23: Mild to moderate cognitive impairment and Scores > 24: Normal cognitive function, Data Collection Procedure: The procedure was conducted after obtaining the respondents' consent via an informed consent form, adhering to ethical principles, which include:Respect for human dignity: Honouring the intrinsic worth and dignity of individuals.Respect for privacy and confidentiality: Safeguarding participants' privacy and maintaining the confidentiality of their data. Justice: Ensuring fairness in treatment and selection of participants. Balancing harms and benefits: Evaluating the potential risks and benefits to minimise harm and maximise positive outcomes. This approach ensured that the interventions and data collection adhered to ethical standards while focusing on the improvement of cognitive function in the elderly.

PROFESIONAL HEALTH JOURNAL
Volume 6, No. 2, December 2024 (Hal. 544-550)
Available Online at https:// http://jurnal.stikesbanyuwangi.ac.id
E-ISSN 2715-6249

Results

The case study began with an assessment conducted on two elderly clients, with the following results: Mrs. K, an 82-year-old female with a final education level of MTS (Islamic junior high school), scored 16 out of 30 on the MMSE (Mini-Mental State Examination), indicating moderately low intellectual impairment compared to the normal range. Mrs. W, a 64-year-old female with a final education level of secondary school, scored 21 on the MMSE, indicating moderate cognitive impairment compared to the normal range. During the assessment, both clients reported experiencing frequent forgetfulness, including difficulty remembering people, time, and places. The nursing diagnosis established for both clients based on the assessment results was memory impairment related to the ageing process. Interventions and implementations provided for both clients included memory exercises and reality orientation therapy. To enhance memory, brain gym exercises and the Scrabble board game were used as interventions. The implementation was carried out over one week, involving two sessions per client, each lasting 60 minutes. Evaluation of the implementation of brain gym exercises showed a difference in MMSE scores before and after the interventions. After one week, Mrs. K's MMSE score increased from 16 to 18, while Mrs. W's score improved from 21 to 25. Based on the data obtained, the MMSE scores of the two clients varied, with Mrs. K still within the range of mild cognitive impairment, whereas Mrs. W reached the level of normal cognitive status. The analysis of the evaluation of the implementation of brain gym exercises and the Scrabble board game therapy is as follows:

Table 1: Evaluation Results of Brain Gym and Board Game Scrabble Therapy Implementation

Evaluation	Day	MMSE Score
Kasus 1 (Mrs. K)	1	16 (Severe Cognitive Impairment)
	7	18 (Mild Cognitive Disorder) |
Kasus 2 (Mrs. W)	1	21 (Mild Cognitive Impairment)
	7	25 (Normal Cognitive Status)

This table outlines the progress of the two clients after one week of intervention. The first case (Mrs. K) showed a slight improvement from a score of 16 to 18, remaining in the moderate dementia range. Meanwhile, the second case (Mrs. W) demonstrated a more significant improvement, with the score increasing from 21 to 25, moving from mild dementia to normal cognitive status. This analysis suggests that both interventions brain gym exercises and the Board Game Scrabble therapy had a positive effect on cognitive function, particularly for Mrs. W, who showed a notable improvement.

Discussion

Based on the anamnesis data, it was found that there are several similarities and differences between the two cases. Both clients are female, aged over 60, and have the same diagnosis. According to the assessment of the two cases with memory disturbances due to dementia, the age of the client in Case 1 is 82 years, while in Case 2, the client is 64 years old. As individuals age, they undergo a process of ageing, during which they experience gradual physical, mental, and social decline. This process leads to anatomical and biochemical changes in the central nervous system, with brain weight declining by approximately 10% between the ages of 30 and 70. In the brain, the number of neurons decreases progressively, with areas such as the superior temporal gyrus (the area most susceptible to neuronal loss), the precentral gyrus, and the striatum being affected. Pathologically, a decrease in cholinergic neurons leads to a reduction in the neurotransmitter acetylcholine, resulting in cognitive and behavioural disturbances (Yuliati & Hidaayah, 2017). Dementia is influenced by various factors, including age, genetics, gender, lifestyle, and education level (Bahrudin, 2017). Dementia is typically associated with individuals

aged over 60, with the risk increasing with age. Genetic factors can cause dementia due to mutations that increase the risk within families. In terms of gender, women are more likely to develop dementia compared to men, largely due to their higher life expectancy. Older women are at greater risk of cognitive decline than men, and this is linked to the role of endogenous sex hormones in cognitive function. Estrogen receptors have been found in brain areas responsible for learning and memory, such as the hippocampus. Low estradiol levels are associated with declines in general cognitive function and verbal memory. Estradiol is thought to have neuroprotective properties, limiting oxidative stress damage and acting as a protector of nerve cells from amyloid toxicity in Alzheimer's patients (Yuliati & Hidaayah, 2017).This discussion highlights the effects of ageing and hormonal changes, especially in women, on cognitive decline and dementia, drawing attention to both the anatomical and biochemical processes involved. Lifestyle factors also contribute to cognitive decline and dementia in the elderly. Elderly individuals who are less active, particularly those who do not engage in regular physical exercise, are at higher risk for dementia. Maintaining an active lifestyle, including regular exercise, is crucial for preventing or reducing the risk of dementia. Education level is another important factor. People with higher levels of education tend to acquire more knowledge, which helps them recognize changes in their cognitive abilities more effectively. In contrast, individuals with lower levels of education are at a higher risk for dementia. Education helps compensate for neurodegenerative conditions, as well as vascular-related cognitive disorders, and is associated with greater brain weight. Those with higher education tend to have larger brain volumes and are better able to cope with cognitive decline and neurodegeneration than those with lower education levels (Sari, Ningsih, & Pratiwi, 2017). Both clients have completed their education up to junior high school. After undergoing brain gym exercises and Scrabble Board Game therapy for 7 days, both clients showed improved MMSE scores. In Case 1, Mrs. K's initial MMSE score was 16, which increased to 23, and in Case 2, Mrs. W's initial MMSE score was 18, which increased to 25 after the application of brain gym exercises and Scrabble Board Game therapy. This improvement in MMSE scores is attributed to the fact that brain gym exercises and Scrabble Board Game therapy can enhance cognitive function or memory in the elderly by improving blood flow and oxygen supply to the brain. Additionally, brain gym exercises stimulate both hemispheres of the brain to work harmoniously and simultaneously (Abdillah & Octaviani, 2017). Brain gym exercises activate the brain in three dimensions: lateral communication, focusing-understanding, and centring-regulating. Movements involving the entire brain produce stimuli that can enhance cognitive abilities (alertness, concentration, speed, perception, learning, memory, problem-solving, and creativity), synchronising the ability to engage in activities and think at the same time, improving the balance or harmony between emotional control and logic, optimising the performance of the senses, and maintaining flexibility and balance in the body (Surahmat & Novitalia, 2017). Brain gym exercises are a form of physical training that, when performed regularly, can help prevent the decline of cognitive function. When elderly individuals engage in brain gym exercises, vasodilation of blood vessels and an increase in heart rate occur, allowing blood circulation to reach the entire body, including the brain. This improvement in blood circulation ensures a steady supply of nutrients and oxygen, optimising brain function, which ultimately enhances short-term memory and stimulates the activity of nerve growth factor (NGF) (Suryatika & Pramono, 2019). Physical activities such as brain gym exercises stimulate trophic factors and neuronal growth, which may help slow cognitive decline in dementia.

Physical activity can enhance vascularisation in the brain, increase dopamine levels, and cause molecular changes in neurotrophic factors, which are beneficial for neuroprotective functions and directly related to improved synaptic plasticity and memory function. Word games, including Scrabble, have been shown to significantly improve cognitive function in older adults with mild cognitive impairment. After eight weeks of playing word games for 30 minutes daily, significant improvements were found in sustained attention, as well as other cognitive functions such as memory and executive function (Jeong et al., 2016). Electronic Scrabble games (e-games) have the potential to enhance cognitive well-being and attention skills in adults and the elderly. However, further research is needed to fully understand their effectiveness. The main findings of the study indicate that both Scrabble players and crossword puzzle solvers show significant advantages in various cognitive tasks compared to control groups. However, the specific abilities that stand out are linked to the strategies used. For instance, Scrabble players tend to excel in visual pattern recognition and rule-based memory, while crossword puzzle players focus more on semantic associations and context-based information processing. (Toma, 2014). The use of Scrabble in adult education, gerontology, and medical practice can offer benefits in improving cognitive brain health (Tokovská, 2024). Playing games is associated with less cognitive decline throughout life, both from the ages of 11 to 70 years, and from 70 to 79 years. After accounting for various other factors, these results suggest that more frequent game playing may help reduce cognitive decline with age (Drew M. Altschul and Ian J. Deary, 2019). Brain gym exercises and Scrabble Board Game therapy are non-pharmacological approaches that are effective for elderly women in maintaining synaptic plasticity in the brain, as well as optimising memory and cognitive functions through increased expression of BDNF, IGF-1, and extragonadal estrogen. Physical exercise can enhance the brain's ability to create new cells, particularly dentate gyrus cells, as regular exercise improves blood circulation throughout the body, including the brain. This enhanced circulation ensures proper distribution of nutrients and oxygen to the brain, ultimately improving memory and minimising memory decline (Wahyuni, 2016). Research on non-pharmacological therapies, such as brain gym and resistance training, shows that these can improve cognitive function in elderly individuals with dementia. The evaluation of the brain gym intervention indicated a significant difference in MMSE scores before and after one week of brain gym and Scrabble Board Game therapy. In Case 1 (Mrs. K), after one week of intervention, the MMSE score increased from 16 to 23. In Case 2 (Mrs. W), after the intervention, the MMSE score improved from 21 to 25. Based on the data, the two clients had different MMSE scores: Mrs. K's score was within the range of mild cognitive impairment (21-25), while Mrs. W's score was within the range of normal cognitive status (25-30). This suggests that the combination of brain gym exercises and Scrabble Board Game therapy can enhance cognitive function in elderly individuals with dementia, even over a relatively short period. The results of this case study align with research conducted by Suryatika and Pramono in 2019, which involved three elderly individuals aged 68-70 years. Before the brain gym intervention, their mini-mental status scores ranged from 0 to 16, indicating cognitive impairment. After seven days of brain gym exercises, there was an increase in their mini-mental status scores, but they remained within the 0-16 range. This was due to the respondents being unable to maintain concentration during the brain

gym exercises, preventing significant improvement in their mini-mental status scores. In contrast to this previous study, the present research was conducted over one week (seven days) with two 60-minute sessions per week, which showed an improvement in cognitive function in both clients.

Conclusion

Based on the results of the brain gym exercises and Scrabble Board Game therapy in improving cognitive function in elderly individuals with dementia, it can be concluded that after one week of brain gym intervention, there was a significant increase in the MMSE score, ranging from 21 to 25. This improvement is likely due to the short duration of the intervention, which lasted only one week with two 60-minute sessions per week. It is recommended that elderly individuals continue to engage in brain gym exercises and Scrabble Board Game therapy regularly, increasing the frequency of interventions to 2-3 times a week, while maintaining the 60-minute duration, in order to achieve optimal improvement in cognitive function.

Ethical Approval and Consent to Participate

This research involving human participants, human data, or human networks includes a statement regarding ethical approval and consent. The ethical approval was granted by the ethics committee chaired by Ramadhan Putra Satria, M.Kep, with the committee reference number 139/Univ.Bhamada/KEP.EC/VI/2024.

Acknowledgements

I would like to express my sincere gratitude for the prayers and support of my family, parents, and friends, who have helped in the writing of this article.

References

Ammy Retno Suryatika, & Wijarnako Heru Pramono. (2019). PENERAPAN SENAM OTAK TERHADAP FUNGSI KOGNITIF PADA LANSIA DENGAN DEMENSIA. *Jurnal Manajemen Asuhan Keperawatan UP2M Akper Widya Husada Semarang*, *3*(1), 28–36. https://jurnal-d3per.uwhs.ac.id/index.php/mak/article/view/56/49

Awaludin Jahid, Abdillah, & Ayu Pradana Octaviani. (2018). PENGARUH SENAM OTAK TERHADAP PENURUNAN TINGKAT DEMENSIA. *Jurnal Kesehatan STIKes Cirebon*, *9*, 112–118. https://jurnal.stikescirebon.ac.id/index.php/kesehatan/issue/view/4

Bahrudin, M. (2017). Neurologi Klinis. Malang: UMM Pres.

Drew M. Altschul and Ian J. Deary. (2019). Playing Analog Games Is Associated With Reduced Declines in Cognitive Function: A68-Year Longitudinal Cohort Study. Journals of Gerontology: Psychological Sciences cite as: J Gerontol B Psychol Sci Soc Sci. Vol. 75, No. 3 2020. https://doi.org/10.1093/geronb/gbz149

Jeong, J. H., Na, H. R., Choi, S. H., Kim, J., Na, D. L., Seo, S. W., Park, S. A., Kim, E.-J., Han, H. J., Han, S.-H., Yoon, S. J., Lee, J.-H., Park, K. W., Moon, S. Y., Park, M. H., Choi, M. S., Han, I.-W., Lee, J. H., Lee, J. S. …, & Kim, J. Y. (2016). Group- And Home-Based Cognitive Intervention For Patients With Mild Cognitive Impairment: A Randomized Controlled Trial. Psychotherapy And Psychosomatics, 85(4), 198–207. DOI: 10.1159/000442261

Lasmini, & Rita Dewi Sunarno. (2022). PENERAPAN SENAM OTAK (BRAIN GYM) TERHADAP PENINGKATAN FUNGSI KOGNITIF PADA LANSIA DENGAN DIMENSIA. *Jurnal Ilmu Keperawatan Dan Kebidanan*, *13*(1), 205–214.

Miroslava Tokovská, D. D. J. Š., Dominika Doktorová, & Jana Šolcová. (2024). Promoting Cognitive Brain Health and Sustained Attention in Adults and Older Adults Through e-Games. *Journal of Social Studies Education Research*, *15*(3), 1–22. https://jsser.org/index.php/jsser/article/view/5648/678

Nur Hidaayah, Y. (2017). PENGARUH SENAM OTAK (BRAIN GYM) TERHADAP FUNGSI KOGNITIF PADA LANSIA DI RT 03 RW 01 KELURAHAN TANDES SURABAYA. *Jurnal Ilmiah Kesehatan (Journal of Health Science)*, *10*(1). https://journal2.unusa.ac.id/index.php/JHS/article/view/149

S.A, Rinanda, Tirta Adikusuma Suparto, Tirta Adikusuma Suparto, Sri Sumartini, Asih Purwandar, & Wahyoe Puspita. (2023). Pengaruh Aktivitas Fisik terhadap Fungsi Kognitif pada Lanjut Usia: Kajian Literatur. *Jurnal Ilmiah Ners Indonesia*, *4*(1). https://www.online-journal.unja.ac.id/JINI/article/view/24971

Sari, C. W. M., Ningsih, E. F., & Pratiwi, S. H. (2018). DESCRIPTION OF DEMENTIA IN THE ELDERLY STATUS IN THE WORK AREA HEALTH CENTER IBRAHIM ADJIE BANDUNG. *Indonesian Contemporary Nursing Journal (ICON Journal)*, *3*(1), 1. https://doi.org/10.20956/icon.v3i1.3736

Septa Nurhantoro, T., & Pegita Rianinda Putri. (2019). LANGUAGE GAMES REDUCING THE RISK OF DEMENTIA IN ELDERLY ADULTS. *LANGUAGE GAMES REDUCING THE RISK OF DEMENTIA IN ELDERLY ADULTS*, 666–671. https://prosiding.respati.ac.id/index.php/PIC/article/view/141

Suratmat, Raden, & Novitalia. (2017). PENGARUH TERAPI SENAM OTAK TERHADAP TINGKAT KOGNITIF LANSIA YANG MENGALAMI DEMENSIA DI PANTI SOSIAL TRESNA WERDHA WARGA TAMA INDERALAYA. Majalah Kedokteran Sriwijaya, 49(4). https://ejournal.unsri.ac.id/index.php/mks/article/view/8525

Suriastini, W., Turana, Y., Suryani, L. K., Sukadana, I. W., Sikoki, B., Witoelar, F. Anandari, I. G. (2018). Laporan Hasil Studi Demensia Bali 2018 Menggugah Lahirnya Kebijakan Kelanjutusiaan. Retrieved from http://www.surveymeter.org/id/node/374

Toma, Michael, Diane F. Halpern, & Dale E. Berger. (2014). Cognitive Abilities of Elite Nationally Ranked SCRABBLE and Crossword Experts. *Online Library*, *28*(5), 727–737. https://doi.org/10.1002/acp.3059

Wahyuni, A. (2016). Pengaruh aktivitas dan latihan fisik terhadap kognitif pada penderita demensia. Retrieved from http://juke.kedokteran.unila.ac.id/index.php/majority/article/view/873

Wang H, Penny M. Pexman, Gary Turner, Filomeno Cortese, & Andrea B. Protzner. (2018). The relation between Scrabble expertise and brain aging as measured with EEG brain signal variability. *Sciencedirect.Com*, *69*, 249–260. https://www.sciencedirect.com/science/article/abs/pii/S0197458018301763

WHO. (2019). Dementia. Retrieved from https://www.who.int/news-room/factsheets/detail/dementia