Section: Community Nursing

Application of brain gym exercise on cognitive function in elderly with dementia

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Abstract
An elderly person is defined as someone who has reached the age of 60 years and older, entering the final stages of life. Dementia, also known as senility, refers to cognitive decline that is severe enough to interfere with daily living and social activities. This decline typically begins with memory loss or forgetfulness. Cognitive function is essential for individuals in their daily activities, and maintaining it is crucial for overall well-being. Brain exercises are light activities that involve cross movements designed to harmonize and optimize the performance of both the right and left hemispheres of the brain, thereby improving cognitive function. This study aims to determine the effects of brain exercises on cognitive function in elderly individuals with dementia. The research design is a case description, conducted from June 3, 2024, to June 9, 2024. The data collection tool used was the Mini Mental Status Examination (MMSE) questionnaire. The results indicated that the MMSE score for the respondent, Mrs. S, improved from a score of 15, indicating severe cognitive impairment, to a score of 21, reflecting mild cognitive impairment. This finding suggests that brain exercises are effective in enhancing cognitive function in elderly individuals with dementia. It is important for elderly individuals experiencing dementia to engage in brain exercises regularly and effectively, without becoming complacent, even if there is an improvement in cognitive function. This practice can help enhance their quality of life and productivity.

Keywords: Elderly care; brain exercise; community nursing; cognitive function; family nursing

Introduction

An elderly person is defined as someone who has reached the age of 60 years and older, entering the final stages of life (Putri, 2021). This group undergoes a process known as aging, which involves a decline in physical, mental, and psychosocial conditions often associated with increasing age. Physical decline can manifest in various systems, such as the respiratory, auditory, and visual systems (Rahayu et al., 2023). According to estimates from the World Health Organization (WHO), the number of elderly individuals worldwide is projected to increase significantly by 2025 compared to 1990, with countries like China experiencing a 220% increase, India 242%, Thailand 337%, and Indonesia 440%. In Indonesia, the elderly population was approximately 21.2 million in 2008, with a life expectancy of 66.8 years. By 2010, this number rose to 24 million, with a life expectancy of 67.4 years (Nono & Selano, 2020). As of 2018, the Ministry of Health of the Republic of Indonesia reported that the elderly population had reached around 27.1 million, constituting nearly 10% of the total population. By 2020, this number was estimated to be 28.8 million, with a life expectancy of 71.1 years. The classification of elderly individuals includes middle-aged (45-49 years), elderly (60-74 years), older elderly (75-90 years), and very old (over 90 years) (Sakarosa & Ersila, 2023). At this age, the elderly face various challenges, including physical setbacks (in the respiratory, auditory, and visual systems), psychological issues (such as loss of finances, status, friends, and employment), and cognitive decline (affecting learning and memory functions). These changes require adjustments for the elderly as they adapt to their new roles.

A common complaint among the elderly is memory decline or frequent forgetfulness. It is important to clarify that senile dementia is not synonymous with aging; many elderly individuals can live normal lives without significant cognitive issues or behavioral changes (Rahayu et al., 2023). As people age, they often experience health problems, with cognitive decline being one of the most prevalent issues. Psychologically, cognitive disorders can lead to frustration and even depression among the elderly. Cognitive impairment ranges from normal function to dementia (Rahayu et al., 2023). Dementia is characterized by a decline in memory, thinking, behavior, and the ability to perform daily activities. The loss of intellectual capacity in dementia affects not only memory but also cognition and personality (Al-Finatunni'mah & Nurhidayati, 2020). According to the World Alzheimer Report (2019), the prevalence of dementia is rapidly increasing, with an estimated 46.8 million people diagnosed worldwide in 2017, including 20.9 million in the Asia-Pacific region. Each year, there are approximately 7.7 million new cases. In Indonesia, it is estimated that around 1.2 million people had dementia in 2017, with projections of 2 million by 2030 and 4 million by 2050.

Gymnastics is a form of exercise aimed at improving cognitive function (Rahayu et al., 2023). One effective strategy to prevent cognitive decline due to aging and stimulate brain capacity is through brain exercises. Brain exercise consists of simple movements that balance different parts of the brain, enhance concentration, and help unblock areas of the brain to function optimally (Lasmini & Sunarno, 2022). Cognitive improvement can be achieved through Brain Gym, which involves simple movements designed to increase blood and oxygen flow to the brain, thereby stimulating optimal brain function. Brain Gym exercises are easy to perform and can be done by anyone, anywhere, and at any time. Typically, these exercises are conducted once a week for 10-15 minutes. They help refresh the brain, which may be hindered by blockages, and gradually improve intellectual function (Novytra, 2022). The role of nurses in providing care for dementia patients is crucial in slowing the progression of dementia and enhancing cognitive function through targeted nursing interventions that improve the health condition of the individual. Based on the issues outlined, the author is interested in creating a Final Scientific Work for Nurses on the topic "Application of Brain Gym Exercise to Cognitive Function in Elderly People with Dementia."

Case Description

At this stage, the author conducted a study from June 3 to June 9, 2024, collecting data from Mrs. S as follows: The assessment included patient identity, health history, health function patterns, physical examination, supporting examinations, and data analysis. The assessment took place on June 2, 2024. This research involved one patient, Mrs. S. Mrs. S is 78 years old, Muslim, and currently does not work. She is divorced and resides in Secang, Magelang Regency, living with her son. However, Mrs. S often feels lonely because her son works from morning until evening. According to family members, Mrs. S frequently forgets the day and often misnames family members, appearing restless. She has no history of hypertension, diabetes mellitus, or previous hospitalizations. Additionally, Mrs. S's family has no history of genetic diseases, and she has no known allergies to drugs, food, or environmental factors. The physical examination of Mrs. S revealed a blood pressure of 120/80 mmHg, a pulse rate of 108 beats per minute, a respiration rate of 20 breaths per minute, and a temperature of 36.5°C. On June 2, 2024, at 09:00, the family reported that Mrs. S often forgets, and the patient herself expressed difficulty remembering events and the names of people around her. The Mini-Mental State Examination (MMSE) score obtained was 15, indicating severe mental function impairment, leading to the nursing diagnosis of Memory Disorders (D.0062) related to the aging process. To address this diagnosis, brain exercise therapy was chosen as an intervention to improve the patient's cognitive function. It is recommended that elderly individuals engage in brain exercises to prevent cognitive decline (Rahayu et al., 2023). The nursing plan aimed to address memory disorders (D.0062) related to the aging process, with the desired outcome being an improvement in memory (L.09079). After three sessions of nursing care, it was hoped that Mrs. S would demonstrate an increased ability to learn new things, remember factual information, recall certain behaviors, remember events, and perform learned skills.

Nursing interventions included memory training, observation, identification of problems, monitoring behavior, and tracking changes in memory. The therapeutic plan involved teaching methods tailored to the patient's abilities, correcting orientation errors, facilitating recall of past experiences, and stimulating memory using recent events (e.g., asking for the names of family members). Family involvement in treatment was also encouraged. Education focused on explaining the purpose and procedure of the exercises and teaching appropriate memory techniques. Evidence-based practice (EBP) was implemented to enhance cognitive function in elderly individuals with dementia (Al-Finatunni'mah & Nurhidayati, 2020). The implementation for Mrs. S followed the planned interventions, emphasizing the provision of brain gym exercises for elderly patients with dementia. The actions were carried out daily from June 3 to June 9, 2024, with each session lasting 10-15 minutes. Mrs. S's cognitive function was assessed using the MMSE before and after each session.

Day 1: June 3, 2024
At 10:00, an assessment of the problems experienced was conducted. The family reported that Mrs. S often forgets. The patient stated she could not remember events or the names of people around her. Before the MMSE, her score indicated severe mental function impairment (score of 15). After a 10-15 minute brain gym exercise intervention, Mrs. S appeared more cooperative and gradually began to mention times, places, and names of family members. After the exercise, her MMSE score improved to 17.

Day 2: June 4, 2024
At 10:00, the nurse conducted the MMSE test, resulting in a score of 16, indicating severe mental function impairment. Following a 10–15minute brain gym exercise session, Mrs. S was more cooperative and could name the time, place, and family members. She remembered the date by looking at the calendar. After the exercise, her MMSE score improved to 18, indicating mild impairment.

Day 3: June 5, 2024
At 10:00, the MMSE test resulted in a score of 16, indicating severe impairment. Mrs. S expressed a desire to learn brain exercises. After the session, she remembered the nurse's name and her daily activities, appearing neat and clean. After the brain gym exercise, her MMSE score improved to 18, indicating mild impairment.

Day 4: June 6, 2024
At 10:00, the MMSE test resulted in a score of 17, indicating severe impairment. Mrs. S again expressed a desire to learn brain exercises. After the session, she successfully performed three brain gym exercises and remembered her daily activities. Her MMSE score improved to 20, indicating mild impairment.

Day 5: June 7, 2024
At 10:00, the MMSE test produced a score of 18, indicating mild impairment. Before the session, Mrs. S expressed her eagerness to perform the brain gym exercises. She successfully remembered the names of people around her and could perform her daily activities. After the exercises, her MMSE score remained at 20, indicating mild impairment.

Day 6: June 8, 2024
At 10:00, the MMSE test resulted in a score of 18, indicating mild impairment. Mrs. S expressed her willingness to participate in the brain gym exercises. After the session, she began to remember the names of her family members one by one. Her MMSE score improved to 20, indicating mild impairment.

Day 7: June 9, 2024
At 10:00, the MMSE test resulted in a score of 19, indicating mild impairment. After the brain exercise therapy, Mrs. S successfully memorized the names of the nurses and her family members. Following the session, her MMSE score improved to 21, indicating mild impairment.

Evaluation
After the nursing interventions, Mrs. S demonstrated improved memory ability. Following seven days of brain exercise therapy (Brain Gym Exercise) conducted daily for 10-15 minutes, the evaluation results indicated that Mrs. S found it easier to concentrate and remember hand movements associated with the exercises. The nursing problem of Memory Disorders related to the aging process was partially resolved. Ongoing memory training interventions focusing on concentration and family involvement in treatment were recommended. Initially, Mrs. S's MMSE score was 15 (severe impairment), which improved to 21 (mild impairment) after the intervention **(Table 1)**.

Discussion
The study was conducted on Mrs. S, a 78-year-old elderly female. She is Muslim, divorced, and has completed elementary school. Currently, Mrs. S does not work, and her daily needs are covered by her deceased husband's pension. She resides in Secang District, Magelang, with her son. However, Mrs. S often feels lonely because her son works from morning until evening. In terms of health history, the only health issues Mrs. S has experienced are headaches and severe dizziness. At present, she reports no ongoing health problems, although she mentions frequently forgetting where she puts things and having difficulty remembering people's names. Based on the MMSE assessment, she received a score of 15, indicating severe impairment in mental function. Additionally, Mrs. S tends to sleep in various places, often in the TV room. There are no hereditary health problems reported in her family.

Table 1. Observation during study.

Days to	MMSE value before brain gym exercise	MMSE value after brain gym exercise
1	15	17
2	16	18
3	16	18
4	17	20
5	18	20
6	18	21
7	19	21

Nursing care provided to Mrs. S, who has dementia, identified one diagnosis: memory disorders. In this case study, the author plans nursing care actions based on the confirmed diagnosis of memory disorders. One of the nursing care plans involves brain gym exercises, which are expected to improve the patient's cognitive and intellectual function. This brain gym intervention is based on nursing interventions focused on memory training. In addressing the diagnosis of memory disorders, brain gym therapy exercises were chosen to enhance the patient's cognitive function. It

is recommended that elderly individuals engage in activities that stimulate the brain, such as brain gym exercises. Reduced daily activities can lead to a decline in the body's abilities, particularly in the brain. Additionally, brain gym therapy can be performed anywhere, at any time, and is suitable for all ages, from children to the elderly. The researchers implemented brain gym exercises for seven days, conducting sessions once a day for 10-15 minutes. Before starting the exercises, the client's cognitive function was assessed using the MMSE. After completing the brain exercises, the MMSE assessment was repeated to determine any improvements in cognitive function.

The nursing care in this case study consisted of independent actions as planned, focusing on the Brain Gym Exercise Intervention to address dementia issues in the elderly, conducted from June 3 to June 9, 2024. Over the seven-day period, from June 3 to June 9, 2024, the expected results were achieved, with noticeable improvements in cognitive and intellectual function, as evidenced by the changes in the MMSE scores. On the first day, the score increased from 15 to 17; on the third day, it rose from 16 to 18; on the fourth day, from 17 to 20; on the fifth day, it remained at 20; and on the seventh day, it increased from 19 to 21. This indicates a significant enhancement in cognitive and intellectual function. Furthermore, Mrs. S was able to correctly answer five questions on the MMSE, demonstrating an increase in her intellectual function, as shown by the rise in the number of correct answers from the first to the seventh day. Related research by Al-Finatunni'mah & Nurhidayati (2020) on "Implementation of Brain Gymnastics to Improve Cognitive Function in Elderly People with Dementia" involved two elderly subjects with dementia, who also participated in brain gymnastics for seven days. Before starting the exercises, their scores were 11 (severe dementia) and 14 (severe dementia). After one week of treatment, the MMSE score for the first case improved from 11 to 12, while the second case improved from 14 to 16, indicating a positive, though not significant, effect of brain exercise therapy on elderly individuals with dementia.

Conclusion

The following conclusions can be drawn: Mrs. S is a 78-year-old elderly patient experiencing dementia. During the psychosocial examination, a decline in cognitive function was observed, as reflected in the interview assessment. There were difficulties in answering questions, and all data were obtained from both Mrs. S and her family. Neither Mrs. S nor her family knew how to effectively manage her condition. Based on the assessment and nursing diagnosis, Mrs. S required intervention to address her dementia. The nursing diagnosis was made according to the SDKI, identifying Memory Disorders (D.0062) related to the aging process. The intervention provided was a non-pharmacological technique, specifically brain gym exercises.The nursing implementation was carried out over seven days, during which Mrs. S was cooperative in following the prescribed interventions. As a result of implementing brain gym exercises to address dementia over the course of seven days, the MMSE score increased from 15 to 21, indicating an improvement in the client's cognitive function. The evaluation demonstrates that the nursing care provided to Mrs. S successfully achieved its goals. Non-pharmacological interventions have proven effective in treating dementia in Mrs. S. It is recommended that further scientific studies and information be added regarding nursing care involving the Brain Gym Exercise intervention to stimulate brain function and address dementia. This could also serve as material for future research development.

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