The Application of Crossword Puzzle Therapy (CPT) to Improve Cognitive Function in Older Adults in Griya Lansia Garut: A Case Study

Amalla Pataya, Witdiawati, Sheizi Pristasari
Faculty of Nursing, Padjadjaran University
Email: amalla20001@mail.unpad.ac.id

Abstract

Introduction: Older adults are an age group that is vulnerable to a decline in cognitive function as they age. One of the efforts to slow down the process is through the provision of fun and structured cognitive stimulation, such as crossword puzzle games or Crossword Puzzle Therapy (CPT). Objective: : To determine the effectiveness of the application of CPT on improving cognitive function in older adults who experience mild cognitive function impairment. Methods: This study used a case study method with a nursing approach to a 74-year-old older adult with mild cognitive function impairment at Griya Lansia Garut. Cognitive function was measured using a questionnaire with the intervention given was Crossword Puzzle Therapy (CPT) for six times in ten days. Results: There was an increase in cognitive scores (from 18 to 21) before and after the intervention, especially in aspects of orientation and short-term memory. Clients can perform CPT exercises with assistance and only in the easiest CPT level. Conclusion: This study shows that CPT intervention can be an effective alternative nonpharmacological therapy to stimulate and improve cognitive function in older adults. A longer time and increase the sample size with various characteristics to determine the broader effectiveness of this intervention are recommended. The activity should begin with a low level of difficulty and be tailored to the individual's ability in order to achieve more optimal outcomes.

Keywords: Cognitive Function, Crossword Puzzle Therapy (CPT), Older Adult

Introduction

Older adults are the last phase in the human life cycle that occurs naturally and cannot be avoided by every individual (Munawarah et al., 2018). Referring to Law Number 13 of 1998 concerning the Welfare of older adults, older adults are defined as individuals who are more than 60 years old. Globally, the number of older adult populations continues to increase. Based on the World Health Organization (2024), it shows that the global population aged 60 years and over has increased significantly, from 1 billion people in 2020 to 1.4 billion people in 2024. Meanwhile, according to Badan Pusat Statistik (2024), older adults in Indonesia account for 12% of the total population, with an older adult dependency ratio recorded at 17.76. A total of 21 provinces have entered the old population structure phase because the percentage of older adults is already above 10 percent, one of which is West Java Province with a total of 11.25% (Badan Pusat Statistik, 2024). This increase in numbers has a significant impact, especially related to diseases associated with the aging process.

In the aging process, older adults will experience natural degenerative changes, characterized by a decrease in physical, psychological, social, and spiritual conditions, so that previously healthy and independent individuals become more vulnerable to various health conditions and diseases (Susilowati et al., 2023). One of them is a decrease in cognitive function (Al-Finatunni'mah & Nurhidayati, 2020). Cognitive function refers to the ability to effectively receive, process, store, and reuse information received through the senses. This function includes several important components, such as memory (ability to remember), attention (ability to focus and concentrate), language (ability to communicate), motor (ability to move), and the ability to plan and make decisions (Nugroho & Pratiwi, 2021). This can be influenced by various factors, including age, gender, education level, disease history, social engagement and activity, both physical activity and cognitive activity.

The decline in cognitive function is characterized by a decline in word and language management skills, irrelevant or incoherent thinking, disorientation about time, place, and person, memory ability, and intelligence development (Dewi, 2016). Over time, this condition can develop into dementia, which is characterized by a progressive loss of cognitive abilities. The impact can affect daily activities, ranging from difficulty communicating to increased dependence on others (Nugroho & Pratiwi, 2021). These impacts can directly affect the quality of life of older adults (Susilowati et al., 2023). Therefore, special attention needs to be given to older adults as a step to prevent and overcome the decline in cognitive function.

A potential strategy that can be done to overcome cognitive impairment is to train or provide stimulation to the brain (Wang et al., 2025). Stimulation of the brain can be done with cognitive stimulation therapy such as physical activity, brain exercises, reminiscence therapy, music therapy, art therapy, puzzle therapy, crossword puzzles or playing games that require concentration, attention, orientation (place, time, and situation), and memory. Crossword puzzle therapy (CPT) is one of the puzzle therapies that provides stimulation to the brain that involves memory, language, logic, and complex reasoning (Mutyah et al., 2024). This therapy is believed to stimulate and train large parts of the brain to think and remember so that it can slow down the process of cognitive decline. As health professionals who have direct and intense involvement with clients, nurses have a strategic position to implement crossword puzzle therapy as a form of non-pharmacological intervention that can stimulate cognitive abilities. The more often stimulation is given, the more the brain will optimize its performance. Therefore, nurses not only act as care provider but also as educators, companions, and evaluators to monitor the client's response to therapy and ensure the client can perform activities correctly so that the client gets optimal benefits.

The results of the assessment of cognitive function in the Garut Griya Lansia Service Unit (SPGL) conducted using the Mini Mental Status Examination (MMSE) Scale instrument show that out of 85 older adults, there are 10 people with mild cognitive

function impairment, 28 people have severe cognitive function impairment, 44 people have good cognitive function, and 3 people cannot be assessed because they are speechless and have psychiatric disorders. This impaired cognitive function can affect the behavior of older adults, for example becoming more quiet or tending to withdraw from the social environment. This situation has the potential to accelerate the decline in cognitive function in older adults, because older adults who prefer to be alone or not engage in activities that stimulate their brain abilities will make their brains less trained and tend to become passive in thinking (Komsin & Isnaini, 2020). Therefore, Crossword puzzle therapy (CPT) intervention is expected to support in improving the cognitive abilities of older adults, especially in older adults who have shown symptoms of decreased cognitive function.

Based on this background, this study aims to discuss and further describe whether the application of Crossword Puzzle Therapy can effectively improve the cognitive function of older adults who experience mild cognitive impairment at Griya Lansia Garut.

Research Method

This study was prepared using a case study approach that refers to the stages of the nursing care process. The main focus of this study is to discuss the implementation of nursing care by highlighting one particular aspect of the case raised, namely memory impairment in older adutls with the intervention provided is memory training namely Crossword Puzzles Therapy (CPT). During the intervention process, improvements were also made in orientation errors.

This case study was conducted on February 4-13, 2025 at Griya Lansia in Garut Regency, West Java. Data were collected through observation, direct interviews with clients, physical examination, and secondary data obtained from medical records. The instrument used in this assessment was the Mini Mental State Examination (MMSE) which aims to identify the category of cognitive function in older adults before and after the intervention. The instrument consists of eleven question items or simple tasks regarding time and place orientation (10 points), registration (3 points), calculation and attention (5 points), memory or recall (3 points), language (naming objects, repeating words, and commands (9 points) with a total score of 30. The measurement results are grouped into three categories, namely a score ≥ 23 indicates the cognitive aspects of good mental function, a score of 18-22 indicates mild mental function damage, and ≤ 17 indicates severe mental function damage.

The intervention applied in this study is Crossword Puzzle Therapy (CPT). The CPT exercise procedure begins with giving the crossword puzzle book to the client and explaining the procedure for filling it out. Then the client is asked to fill in the answers in the horizontal and descending boxes according to the number of questions available. The first step in filling is to read the questions from the crossword puzzle, understand the instructions given (analysis), and try to remember and guess possible answers then decide which answer is correct and start filling in the answers in the boxes that are already available (Astuti et al., 2023). This exercise is carried out 3-5 times a week, in one session lasting 15-30 minutes (Komsin & Isnaini, 2020). In this study, the exercises were performed six times in ten days, with each session lasting 15-30 minutes.

The subject in this study was Mr. M, 74 years old, male. The last education is elementary school. The client has lived at Griya Lansia since July 2024. The client has never been married and does not have a job. The client has a history of hypertension and smoking. Based on the results of the interview, the client said that the client rarely interacts with other people, his daily activities are bathing, eating, and walking around the nursing home environment. The results of vital signs examination were blood pressure 145/90 mmHg, pulse 78x/min, respiration 19x/min, oxygen saturation 98%, and body temperature 37.1°C. Anthropometric examination obtained height 150 cm, weight 53 kg, and BMI 23.6 (ideal weight). Based on the Katz index assessment, the client is independent in carrying out daily activities. The results of the client's cognitive status assessment obtained a Mini Mental Status Exam (MMSE) score of 18, which is in

mild cognitive function impairment. Clients experience disorientation to aspects of time and place orientation, decreased ability to count, and remember. Evaluation is carried out by reassessing the client's cognitive function using the MMSE instrument after the intervention is given, to determine any changes or improvements in cognitive abilities that occur.

Results

The crossword puzzle therapy intervention was given for six meetings over a ten-day period and used crossword puzzle book media with a light level of difficulty. Each intervention session lasted for 15-30 minutes. Clients were evaluated with the following developmental details:

Table 1. Daily Progress of CPT Intervention

Session Number	Date	Progress
1	February 5, 2025	The client can answer the questions but has not been able to fill in the appropriate box, so he is still guided in filling the answers into the box. At the first meeting, the client was only able to answer and fill in three questions out of 27 crossword questions. The client is still unable to answer questions related to orientation.
2	February 7, 2025	The client can answer questions, but still needs help to explain the meaning of the question again. At this meeting, the client was still confused about filling in the answers according to the horizontal or downward box numbers so that they were still guided in filling them in. At the second meeting, the client was able to answer and fill in four questions correctly on the same sheet as the previous day. The client still cannot mention the orientation correctly but can remember and mention the researcher's name.
3	February 8, 2025	The client can participate in the activity with more enthusiasm than before. The client can answer and fill in four questions correctly. In addition, the client has also begun to get used to determining the horizontal or downward box according to the question number. In this session, the client was able to name and repeat the three previously requested objects correctly.
4	February 10, 2025	In the fourth meeting, the client can answer and fill in five questions correctly and according to instructions. At this meeting, the total number of questions that the client could answer correctly on the first sheet of the crossword was 16 out of 27 questions. In this session, the client was able to correctly mention place orientation, including the country, province, and district where he lives.
5	February 12, 2025	On the fifth meeting, the client went to the next sheet of questions as the client was no longer able to answer the remaining questions on the first sheet. On this sheet, the client was able to answer and complete three questions correctly and as instructed, followed by being able to correctly name the year, season, and day. Client still had difficulty in remembering the date.

6	February 13, 2025	At the last meeting, the client was able to answer and fill in three questions correctly and as instructed. Measurements were taken with the MMSE instrument and a score of 21 was obtained. There was improvements in aspects of orientation (day and district) and short-term memory (registration).

Based on table 1, the evaluation results show good progress from the first to the last meeting. There was an increase in cognitive function in the client even though he was unable to complete the crossword as a whole. Of the 27 questions on the first sheet, the client was only able to fill in and answer 16 questions. Then on the second sheet, the client could only fill in 6 questions out of 30. This was due to the client's limited ability to understand and answer some of the questions. After six interventions, on February 13, 2025, the client's cognitive function was measured again using the MMSE questionnaire and a score of 21 was obtained from the previous score of 18. Cognitive aspects that experienced an increase in scores after being given an intervention were aspects of time orientation with an increase in score of +1, place orientation +1, and aspects of remembering +1. Thus, it can be concluded that there is an increase in cognitive function, especially in the aspects of orientation and short-term memory, after an intervention in the form of crossword puzzle therapy six times within ten days.

Discussion

Effectiveness of Crossword Puzzle Therapy (CPT) on Cognitive Function of Older Adults

Cognitive function decline is a common condition that occurs with age and progresses slowly. It occurs due to genetic changes that result in a decrease in beta amyloid protein in extracellular neuron cells and protein abnormalities or in intraneurons so that nerve impulses to the brain are impaired (Komsin & Isnaini, 2020). One of the effects of aging is to affect the structure and function of the brain. As a complex organ that acts as the center of control of body systems and cognitive functions, the brain is one of the most vulnerable organs to the effects of the aging process (Wibowo & Sakti, 2017). The number of brain cells decreases every day, which causes the brain to atrophy, where the weight of the brain decreases by 5 - 10%. The grooves in the brain become shallower and wider, the number of neurons and neurotransmitters also decreases. As a result, connections between brain cells (synapses) weaken and the brain becomes less effective in conveying information. This leads to memory impairment (Abdillah & Octaviani, 2018; Komsin & Isnaini, 2020).

Mr. M is a 74-year-old older adult man who has mild cognitive function impairment. In this case, the client was given a non-pharmacological intervention in the form of crossword puzzle therapy (CPT) exercises. After six interventions, the client's cognitive function was re-measured using the Mini Mental Status Exam (MMSE) on the last day to determine changes from the exercises that had been given. The MMSE score after training obtained a score of 21 from the initial score of 18. This shows an increase in the client's cognitive function score which is still in the mild cognitive impairment category, but shows improvement. These results are in line with research conducted by Komsin & Isnaini (2020), namely there is a significant increase in MMSE scores in older adults who received five CPT exercises a week compared to older adults who do not receive CPT exercises. Evident from the mean MMSE value before the CPT intervention was 22.83 in the experimental group and 22.33 and the mean MMSE value after the CPT intervention was 28.11 in the experimental group and 22.22 in the control group.

Cognitive decline in older adults may result from a lack of concentration and insufficient cognitive stimulation (Prahasasgita & Lestari, 2023). Crossword Puzzle Therapy (CPT) is a non-pharmacological intervention designed to enhance cognitive function, particularly in older adults (Komsin & Isnaini, 2020). CPT is designed vertically or horizontally as a grid. The purpose of these puzzles is to encourage individuals to compose words or

phrases that lead to specific answers. Through this stimulation, the brain is encouraged to be active in the process of receiving, processing, and interpreting information, as well as helping the brain to retain and remember the information that has been obtained (Komsin & Isnaini, 2020). During the process, the brain is involved in the process of reading, understanding and analyzing clues, trying various possible answers, to determining the most appropriate answer. This process includes several cognitive abilities including memory, verbal knowledge, language skills, focus and concentration, speed of processing information, and executive function (Wang et al., 2025). The simultaneous involvement of these abilities is what makes this exercise more effective in providing cognitive benefits (Petrella et al., 2023).

Correlation Between Crossword Puzzle Therapy and Cognitive Aspects on MMSE

CPT activities are of course closely related to the aspects assessed in the Mini Mental State Examination (MMSE). When doing a crossword puzzle, one exercises the orientation aspect by understanding and remembering the context of time and place that could be part of the clues. Registration and recall aspects by remembering information that could be a possible answer. Filling in a crossword puzzle requires focus, concentration, accuracy, and reasoning which trains the attention and concentration aspects. In addition, CPT also heavily involves language skills, such as understanding clues and word meanings, finding synonyms, and arranging letters appropriately. Indirectly, the game also trains visual-spatial skills, as the client must place the letters precisely in a horizontal or descending grid and must estimate the location of the letters and the relationship between words. These activity will activate a broad parts of the brain, namely the frontal, occipital, temporal, parietal lobes, including the hippocampus and entrohinal cortex which then triggers the production of acetylcholine. This acetylcholine plays an important role in the formation of a memory so that it can improve cognitive function and prevent dementia (Komsin & Isnaini, 2020). Cognitive stimulation obtained during work can provide a supportive effect to improve and maintain cognitive function that is still owned (Komsin & Isnaini, 2020).

The results of this study are also in line with the research of Devanand et al. (2022) which shows that older adults with mild cognitive impairment who routinely do crossword puzzles for 12 weeks and are followed by reinforcement sessions until week 78, show improved cognitive function characterized by worsening average ADAS-Cog scores for video-based cognitive games (9.53 to 9.93) and improving for crossword puzzles (9.59 to 8.61). This improvement was not only seen in cognitive aspects, but also in the ability to perform daily activities. In addition, MRI imaging showed that there was less brain shrinkage in the crossword group, with a decrease in hippocampal volume and cortical thickness. This indicates a clinically significant benefit.

Risk Factors associated with Cognitive Decline

Cognitive function decline is influenced by several factors, namely age, genetic factors, gender, activity and social involvement, and education level (Zainurridha et al., 2021). The client is a 74-year-old man and is included in category of older adults who can increase the risk of dementia. Individuals over the age of 60 have a higher risk of developing dementia, which is associated with the gradual death of brain cells and reduced vascular elasticity. These changes contribute to a decline in both cognitive and intellectual functions in older adults (Komsin & Isnaini, 2020). Although decreased cognitive function is more at risk for women, older male adults are still at risk of dementia. In this case, it is supported by the client's lack of activity and social interaction. Based on the client's statement, the client rarely interacts with other people. This leads to low cognitive and emotional stimulation that should be obtained through physical and social activities (Hutasuhut et al., 2020).

The client has only completed primary school, which is one of the factors contributing to cognitive decline. This is consistent with the findings of Hidayaty (2012, as cited in Komsin & Isnaini, 2020), which indicate that older adults with lower levels of education

are at a higher risk of developing dementia compared to those with higher educational attainment. Low levels of education can have an impact on limitations in acquiring, storing, remembering, and utilizing knowledge in old age, thus contributing to a decrease in cognitive function. Conversely, individuals with higher levels of education tend to have more maintained cognitive abilities because brain activity is continuously stimulated through various daily activities, so that the risk of dementia can be minimized (Zaliavani et al., 2019).

Implications and Limitations

The results of this study have implications for nursing practice, suggesting that crossword puzzle therapy can be applied as a non-pharmacological intervention in older adlut care settings such as nursing homes, community-based elderly services (e.g., Posyandu Lansia), and home care. This therapy can help maintain and improve cognitive function in older adults. Furthermore, supervision and assistance are essential to ensure older adults perform the activities correctly and receive optimal benefits. Nurses play a crucial role in motivating and guiding older adults throughout the therapy process.

The results of applying the CPT exercise six times show positive developments in clients, but have not yet achieved optimal results. There are several limitations that need to be considered, including that not all riddle questions are answered and filled in. The questions that cannot be answered by clients are questions and answers with words that are foreign or rarely heard by clients. This can cause frustration and decrease motivation in older adults (Wang et al., 2025). Crossword puzzles require language, memory and concentration skills which are often already declining in older adults with impaired cognitive function so they may have difficulty following instructions. Therefore, the selection of themes or topics in crossword puzzles needs to be tailored to the client's education level, interests, age, and cultural background in order to generate stronger motivation, engagement, and memory. In addition, only one subject was involved with an intervention duration of only ten days. As a result, the findings cannot be generalized to a wider population of older adults, so further research is needed with a larger sample and longer intervention duration to see the long-term effects of crossword puzzle therapy in improving cognitive function in older adults. The successful application of CPT is highly dependent on how consistently the exercises are performed (Komsin & Isnaini, 2020).

Conclusion

Based on the results of the application of CPT for six times in ten days, it can be concluded that the MMSE score has increased from 18 to 21 on the last day which is still in the category of mild cognitive impairment, but shows improvement. This study shows that regularly engaging in crossword puzzle therapy can help improve cognitive function in older adults with mild cognitive impairment, making it a potentially effective therapeutic alternative for maintaining and enhancing cognitive function in older adults. This activity is not only simple and can be done anywhere, but is also able to involve various aspects of cognitive function such as memory, language, concentration, and problem solving.

For future researchers, it is recommended to conduct interventions over a longer intervention period and increase the samples size with various characteristics in order to provide a broader understanding of the effectiveness of crossword puzzle therapy in improving cognitive function in older adults. In addition, the design and content of crossword puzzle therapy should be adapted to the educational background and cognitive abilities of older adult participants. This adaptation will help optimize the effectiveness of the intervention and ensure that it remains engaging and accessible for the target population.

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