

CHAPTER II

THEORETICAL REVIEW

A. Elderly Concept

1. Definition of Elderly

According to the World Health Organization (WHO), elderly refers to individuals who have reached the age of 60 years or older. This definition is reinforced nationally, where Law Number 13 of 1998 concerning the Welfare of the Elderly also specifically defines anyone who is at least 60 years old and above as elderly. Therefore, a person is categorized as elderly when they reach the age of 60 years or above, marking the natural and inevitable final phase in the human life journey. Although the classification of elderly is done based on chronological considerations (age), the fundamental understanding of elderly is actually more complex and is not limited to the number of years added alone. (Asharani et al., 2022).

2. Classification of the Elderly

According to the classification established by the World Health Organization (WHO, 2024), the elderly age limit is grouped into several categories, namely as follows:

- a. Middle Age : 45–59 years
- b. Elderly : 60–74 years
- c. Old Age : 75–90 years
- d. Very Old : 90 years or more

According to Yalasviva (2022) As quoted from the Ministry of Health of the Republic of Indonesia (Kemeskes RI), the age limits for the elderly are classified as follows:

- a. Young Elderly : 60–69 years.
- b. Middle-aged : 70–79 years.
- c. Old Elderly : 80 years and above.

3. Aging Theory

Aging is a natural, unavoidable process, the final stage after passing through childhood and adulthood. This process is essentially tissue degeneration that progressively reduces the body's ability to maintain normal structure and function. Consequently, a person's ability to adapt to the environment significantly decreases, thus reducing their resilience (survival). The changes that arise from this aging process are multidimensional, encompassing physical, bodily functions, mental, and psychosocial aspects.(Elfaria & Retnani, 2025).

As the human body ages, it naturally undergoes various physiological transformations that impact the health and quality of life of older adults. According to researchAminuddin et al. (2025)These changes in the elderly occur systemically in various organs of the body as follows:

a. Cardiovascular System

Heart health can be compromised due to less elastic blood vessels, potentially increasing the risk of hypertension (high blood pressure). Furthermore, the heart's pumping function may decline as the organ enlarges, leading to a decrease in physical capacity in older adults.

b. Musculoskeletal System

Progressive loss of muscle mass, known as sarcopenia, results in reduced strength and significantly increases the risk of falls. Concurrently, bone density decreases (osteoporosis), making older adults more susceptible to fractures.

c. Nervous System

Changes in the nervous system include the potential for cognitive decline in some individuals, although not all individuals will develop dementia. Furthermore, reflexes tend to slow, affecting older adults' ability to maintain balance and coordinate movement.

d. Sensory System

Older adults often face problems with their major sense organs, such as decreased vision (e.g., cataracts) and hearing impairment (such as

presbycusis), which can interfere with communication and interaction with the environment.

Understanding this natural series of physiological changes is crucial for healthcare professionals. This knowledge allows for targeted care through relevant interventions, such as good nutrition programs, regular physical activity, and regular health checkups, to help older adults manage these changes and maximize their well-being.

B. The Concept of Cognitive Function

1. Cognitive Definition

The term cognitive refers to everything related to the mental processes involved in understanding something, as defined in the Oxford Learner's Dictionaries. Thus, cognitive ability can be defined as a condition in which an individual is able to think and process information through various mental functions, including managing perception, attention, knowledge, and memory.(Aprilia et al., 2022).

The aging process naturally triggers mental changes, particularly in the cognitive function of older adults. This decline in cognitive abilities can stem from several problems in the central nervous system. The main contributing factors include reduced oxygen supply to the brain, cellular degeneration, Alzheimer's disease, and malnutrition.(Ramli & Fadhilah, 2021)These various issues collectively can interfere with optimal brain function. Even in the absence of neurodegenerative disease, individuals can experience a significant decrease in brain weight of around 10 to 20%, typically occurring between the ages of 30 and 70.(Aprilia et al., 2022).

2. Factors Affecting Cognitive Function

Cognitive function refers to a set of mental abilities fundamental to everyday life, including thinking, remembering, learning, evaluating information, and making decisions or solving problems. In the elderly population, cognitive decline is a direct consequence of the aging process, which causes changes in the central nervous system. These changes can lead

to limitations in remembering one's identity and difficulties in carrying out activities independently, making the elderly dependent on others.(Pragholapati et al., 2021).

Specifically, this decline affects memory, thinking skills, and language competence in the elderly. According to researchRatnawati (2023)Cognitive decline is influenced by a number of complex factors. Some of the main factors that play a role include the following:

a. Age

Increasing ageAge is a major trigger for structural and functional changes in the brain, which directly impact cognitive abilities. These changes involve modifications in neural structures, loss of synapses, and dysfunction of neural networks. Furthermore, diseases associated with aging accelerate the rate of neuronal dysfunction and loss, which can lead to severe cognitive impairment that interferes with daily functional abilities. Numerous studies have confirmed the correlation between age and cognitive function. One study that measured cognitive abilities in 48 healthy older adults (ages 60 to 74) definitively concluded that age has a significant influence on cognitive abilities.(Maulana et al., 2023).

b. Gender

Genderalso contributes significantly to variations in cognitive function, particularly in the memory domain. One study revealed differences in brain structural size: men tend to have a larger amygdala and thalamus than women, while women have a larger hippocampus (the memory center). Furthermore, another study showed that women have a higher risk of developing cognitive impairment. This higher risk is believed to be related to the decline in estrogen levels that occurs during menopause.(Maulana et al., 2023).

c. Health Status

Overall health is strongly correlated with cognitive ability. Various protective factors, such as the absence of depressive symptoms and insomnia, the absence of chronic diseases like hypertension and heart

failure, adequate nutritional status, and the absence of functional disabilities, are collectively associated with improved cognitive ability in older individuals. Furthermore, older adults who report greater life satisfaction and quality of life also tend to have superior cognitive function.(Pengpid et al., 2019).

d. Education Status

Years of education are an important predictor of higher cognitive levels. Individuals with higher education generally demonstrate superior performance on a variety of cognitive tasks. Education serves to enhance cultural competence, hone basic skills such as reading, mathematics, and reasoning, while also strengthening one's ability to cope with cognitive tests or evaluations.(Pengpid et al., 2019).

e. Physical Activity

Physical activity is recognized as a factor that has a positive and proven significant relationship with cognitive function. A study showed that when physical activity levels were divided into active and inactive categories, elderly people in the active group showed substantially higher cognitive function compared to those in the inactive group.(Maulana et al., 2023).

4. Aspects that Influence Cognitive Function

According toEkasari et al. (2022)Cognitive function in the elderly is influenced by several main aspects. Cognitive assessment is conducted by considering the following domains.

a. Language Aspects

In the language domain, there are four specific parameters that must be evaluated to determine a person's communication skills:

- 1) Fluency: A person's ability to speak using complete sentences, appropriate rhythm, and appropriate intonation or melody.
- 2) Comprehension: An individual's capacity to understand and interpret instructions and words received from others.

- 3) Repetition: Relating to a person's ability to reproduce words or statements that have previously been said by the person they are talking to.
- 4) Naming: Refers to a person's cognitive ability to identify and name an object or thing, including the specific parts of the object.

b. Orientation Aspect

The Orientation aspect involves several benchmarks used to assess a person's awareness of themselves and their environment:

- 1) Personal Orientation: Focuses on an individual's ability to recognize and state his or her own name and basic information about himself or herself.
- 2) Place Orientation: This awareness is evaluated through questions regarding the name of the area or region, current residence, or identification of the building currently occupied.
- 3) Time Orientation: Assessment is carried out by asking what day, date, month and year is currently taking place.

c. Aspects of Attention, Concentration, and Remembering

These domains are vital in the information processing process:

- 1) Attention is an individual's capacity to specifically respond to certain stimuli while effectively ignoring other distracting stimuli.
- 2) Immediate Recall is an ability that refers to a person's capacity to retain a piece of newly received information for a short duration (about 30 seconds) and then reproduce it again.
- 3) Concentration: The ability to focus fully and deeply on a particular thing or task without being disturbed by other stimuli around it.

d. Memory Aspects

Memory aspects are categorized based on the type of information input remembered:

- 1) Verbal Memory: A person's capacity to recall information or messages obtained through verbal media, such as a series of words or sentences.

2) Visual Memory: The ability to reconstruct the image or shape of an object or thing that has been previously seen.

e. Constructive Function Aspect

The constructive function aspect is a person's practical ability to build or make something (for example, draw, assemble) appropriately and in accordance with predetermined goals or needs.

f. Reasoning Aspect

Reasoning Aspect: This cognitive capacity is related to a person's ability to make judgments in distinguishing between good and bad (ethical or logical decisions), as well as the ability to carry out abstract or conceptual thinking (MF Ekasari et al., 2018).

g. Calculation Aspect

Calculation Aspect: This aspect includes a person's ability to perform mathematical arithmetic operations, which include basic functions such as addition, subtraction, multiplication, and division.

3. Cognitive Disorders in the Elderly

According to Ekasari & Riasmini (2022) Cognitive decline in the elderly can manifest in several different levels of impairment including:

a. Forgetfulness

Forgetfulness is the mildest form of cognitive impairment. Statistics show that this symptom affects approximately 39% of individuals between the ages of 50 and 60, with the prevalence rate increasing significantly to 85% by the age of 80. Typical characteristics of mild cognitive impairment include slowed thinking, difficulty concentrating, failure to use effective memory strategies, being easily distracted, taking longer to learn new information, and requiring repeated instructions.

b. Mild Cognitive Impairment (MCI)

Individuals with MCI exhibit impaired memory function that significantly limits their ability to engage in various activities. The majority of patients with MCI are generally aware of their memory problems. MCI is positioned as a transitional condition between dementia

and age-related memory impairment (AAMI). Research indicates that a significant percentage, between 50 and 80 percent of individuals with MCI, will eventually progress to dementia. Therefore, prompt and effective treatment intervention is needed to prevent further cognitive decline.

c. Dementia

Dementia is a condition characterized by a gradual decline in cognitive and functional abilities. This disorder causes a progressive decline in a person's intellectual abilities. Dementia can seriously impair social engagement and a person's ability to perform activities of daily living.

4. Measuring Cognitive Function in the Elderly Using MMSE

To test and confirm cognitive decline in older individuals, the Mini Mental State Examination (MMSE) is often used as the primary evaluation instrument. The MMSE is a quick, score-based test that is easy to administer. This instrument consists of several subtests that measure essential cognitive domains, such as orientation, working and episodic memory, language comprehension, pronunciation, and word repetition. The total score obtained from the MMSE is used to classify the degree of cognitive impairment in older adults.(Manungkalit et al., 2021), with the following categories:

Table 2.1MMSE Score

MMSE Score	Category	Note:
24-30	Normal	Cognitive function that is within normal or good limits.
18 - 23	Light	Elderly people in this category show symptoms of forgetfulness, tend to neglect housework, have difficulty completing simple tasks, but are still friendly with others, can remember their own address, and have limited but still understandable speaking abilities.
≤ 17	Heavy	This condition is characterized by the inability to remember one's own address, as

well as experiencing significant impairment in speech ability.

5. Management

There are 2 types of management for cognitive dysfunction, namely:

a. Pharmacological Therapy

Pharmacological therapy for cognitive impairment in the elderly is primarily aimed at cases of severe cognitive impairment such as Alzheimer's and vascular dementia. The medications used aim to slow the progression of cognitive decline, reduce behavioral symptoms, and improve quality of life. Examples of pharmacological therapy drugs according to Alamri et al. (2021), namely as follows:

1) Cholinesterase Inhibitors (AChEI)

This class of drugs increases acetylcholine levels in the brain, which plays a key role in learning and memory. Examples of commonly used drugs include:

2) NMDA Receptor Antagonist (Memantine)

Memantine works by modulating the neurotransmitter glutamate, which plays a role in learning and memory. This medication is used to treat moderate to severe Alzheimer's dementia.

b. Non-Pharmacological Therapy

Non-pharmacological therapy management of cognitive dysfunction in the elderly involves interventions designed to slow cognitive decline, increase brain stimulation, and support the quality of life of the elderly. Forms of non-pharmacological therapy that can be implemented are as follows:

1) *Cognitive Stimulation Therapy*(CST)

CST is a non-pharmacological therapy performed in groups with the goal of improving cognitive function and quality of life for older adults, particularly those with mild to moderate cognitive impairment. This therapy trains older adults to be more oriented to

time and current events by asking for information such as the date and day, and encouraging social interaction through storytelling, singing, and sharing memories.(Elmiyanti & Salamung, 2023).

2) *Brain Gym*

Brain Gym is a physical exercise and movement designed to improve brain function through sensory and motor stimulation. This therapy is popular as a supportive therapy in the form of movements that stimulate coordination and general brain function.(Karim & Puspita, 2025).

3) Play Therapy

Play therapy for the elderly is a form of intervention that uses play or games as a medium to improve cognitive, motor, psychological, and social function in older adults. This therapy aims to help older adults overcome psychological problems such as stress and depression, improve motor or physical abilities, and support cognitive recovery through mental and social stimulation.(Plold et al., 2022).

4) Music Therapy

Music therapy for the elderly is the systematic use of music, whether through listening, singing, or playing musical instruments, as a medium to improve the physical, mental, emotional, and social health of the elderly.(Herlisah et al., 2025).

C. The Concept of Reminiscence Therapy

1. Definition of Reminiscence Therapy

Reminiscence is an effective method of expressing feelings, capable of triggering feelings of self-confidence and feelings of being appreciated in the elderly.(Gultom et al., 2021)*Reminiscence Therapy*(RT) is a form of therapy modality that involves remembering and recounting past events. RT is a psychosocial intervention that aims to encourage older adults to recall pleasant events from the past, a process that is essential for

strengthening their sense of meaning and recognition of their role as important individuals.(Syifak & Noventi, 2024).



Figure 2.1 *Reminiscence Therapy*
Source :(Sidor & Dubin, 2024)

2. The Purpose of Reminiscence Therapy

RT primarily aims to be a non-pharmacological psychotherapeutic intervention that encourages older adults to review positive life experiences, thereby maintaining and enhancing their life satisfaction and self-esteem. Clinically, this therapy is effective in two main domains: first, psychosocial goals, namely reducing negative symptoms such as depression and anxiety, especially in institutionalized older adults.(Taylor & Thompson, 2023). Then another goal is that RT directly improves and maintains long-term memory function and communication skills in the elderly, including those at the Mild Cognitive Impairment stage.(Syifak & Noventi, 2024).

3. Benefits of Reminiscence Therapy

The primary benefit of RT for older adults is its ability to focus on maintaining and improving cognitive function through structured stimulation. This psychosocial intervention directly trains autobiographical and long-term memory, which are crucial for slowing the rate of cognitive decline.(Cammisuli et al., 2022). Furthermore, RT has been shown to be effective in alleviating symptoms of depression and anxiety. These improvements in mood and increased social support create an ideal psychological environment, ultimately contributing significantly to overall

improvements in cognitive performance in the elderly population.(Wira Bakti & Khairari, 2024)

4. Types of Reminiscence Therapy

According to Kennard (2006) RTs are grouped into three main types, each with a different focus and purpose:

a. *Simple or Positive Reminiscence*

This type focuses on reflecting on past information, experiences, and pleasant feelings. The technique used to explore these memories involves direct questions presented in a way that mimics a social interaction between the older person and the therapist. The primary goal of simple reminiscence is to help older people adapt to loss and maintain their self-esteem.

b. *Evaluative Reminiscence*

This type has a deeper level than the first type. Evaluative Reminiscence is often compared to life review therapy or an approach aimed at resolving unresolved conflicts from the past.

c. *Offensive Defensive Reminiscence*

This type is also known as a sometimes-periodic and unpleasant process. In this type, unpleasant information may emerge, potentially triggering or producing certain negative behaviors or emotions. However, this type can also encourage resolution of such conflicting and unpleasant information or memories.

These three types can be applied alternately or integrated in the overall implementation of reminiscence therapy activities.

5. Stages of Implementing Reminiscence Therapy

According to Taylor & Thompson, 2023 RT implementation is generally structured into three main, systematic phases: orientation, work, and termination. This framework aims to facilitate older adults in retracing their life experiences while also providing them with space to emotionally interpret each event they have experienced.

a) Orientation Stage

This phase focuses on building a therapeutic alliance between the researcher and the elderly. The session begins with introductions, a presentation of the objectives, and an explanation of the intervention procedures. Furthermore, the researcher provides space for the elderly to share their current condition. This process is crucial for creating a supportive and conducive atmosphere, ensuring the elderly feel safe and motivated to actively participate throughout the therapy.

b) Working Phase

As the core of the entire RT series, this stage involves a gradual process of memory stimulation. Seniors are invited to reflect on their life experiences based on structured themes, such as childhood, school, adolescence, work experiences, family life, and the most memorable experiences in their lives. Researchers facilitate this process through open-ended questions designed to trigger long-term memory recall. Through these cognitive activities, seniors are trained to construct, understand, and communicate past information, simultaneously serving as an effective means of stimulating their cognitive function.

c) Termination Stage

This final stage serves as an integrative closure. The researcher and respondents evaluate the session, provide positive feedback, and summarize the main points discussed. As a token of appreciation, the researcher reinforces the elderly's involvement and reviews their post-activity affective state. This termination is carried out to ensure that the elderly leave the session feeling comfortable, with increased motivation, and taking home a positive psychological experience.

Comprehensively, the implementation of structured and sustainable RT not only serves as a means of cognitive stimulation for the elderly, but also plays an important role in strengthening self-identity, improving psychosocial well-being, and optimizing their overall quality of life.

6. Influence *Reminiscence Therapy* Towards Improving Cognitive Function

RT is a non-pharmacological therapy that involves encouraging older adults to recall and recount past life experiences. This therapy aims to stimulate long-term memory, improve recall, and maintain cognitive function in older adults. Through the process of recalling meaningful life experiences, older adults are encouraged to activate brain functions related to memory, attention, language, and orientation, thereby helping to improve overall cognitive abilities.

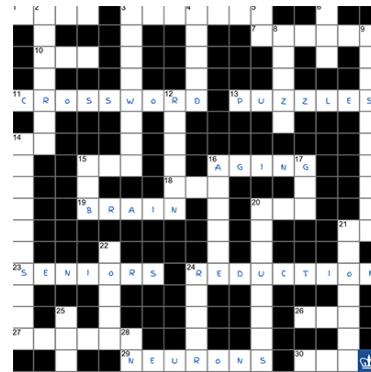
According to research conducted by Martina et al. (2024) RT administration has been shown to significantly improve cognitive function in the elderly with a p-value of 0.000 ($p < 0.05$). Before therapy, the average cognitive function score of respondents was 16.63, and after therapy, it increased to 23.52. These results indicate that RT is effective in re-stimulating memory, improving thought processes, and strengthening the cognitive abilities of the elderly through activities that involve remembering pleasant and meaningful life experiences. This therapy helps improve memory function, orientation, and concentration, thus positively impacting the quality of life of the elderly.

D. Crossword Puzzle Therapy Concept

1. Definition of Crossword Puzzle Therapy

Crossword Puzzle Therapy Crossword puzzles (CPT), also known as word games, are a type of cognitive intervention that utilizes word games in the form of boxes or grids consisting of rows and columns. In a therapeutic context, this activity requires participants to fill in the boxes with letters to form the correct word, which must correspond to specific instructions or definitions provided.

CPT serves as a structured stimulation method that trains verbal memory, attention, and problem-solving skills in the elderly.(Theresia et al., 2025).



evaluate, and integrate words that correspond to given instructions.(Ulfiana et al., 2023).

3. Benefit *Crossword Puzzle Therapy*

CPT provides comprehensive benefits for seniors, including improvements in cognitive structure and emotional well-being. From a cognitive and neuropsychological perspective, CPT intensively trains semantic memory and verbal fluency, which are crucial for maintaining cognitive abilities in old age. Furthermore, this activity stimulates executive functions such as planning and problem-solving, which also enhances self-discipline. Biologically, regular engagement in CPT can activate vital brain areas that produce the neurotransmitter acetylcholine, a mechanism that supports a reduced risk of neurodegenerative diseases such as Alzheimer's and dementia. Meanwhile, from a psychosocial perspective, CPT effectively reduces stress and promotes a sense of well-being, as well as increasing self-confidence through self-mastery. It also indirectly helps overcome social isolation through group collaboration.(Ulfiana et al., 2023)

4. Types *Crossword Puzzle Therapy*

There are several types of CPT according to Goldberg & Min Qian, (2022) namely as follows.

- a. Standard Crossword Puzzle (American/Indonesian Style Standard Crossword Puzzle):
 - 1) Structure: Uses black boxes to separate words, with separate instructions for Horizontal and Descending.
 - 2) Instructions: Be direct or a simple definition (e.g., “The Capital of Indonesia”).
 - 3) Cognitive Function: Train semantic memory and speed of information retrieval.
- b. Cryptic Crossword:
 - 1) Structure: similar to a standard crossword, but very complex.

- 2) Hint: be complex, combine definitions with word play (such as anagrams, homophones, or puns), require multiple code breaking.
 - 3) Cognitive Function: trains high cognitive flexibility and complex analysis (executive function).
- c. Uniquely Structured Crossword Puzzle:
- 1) Fill-in Crosswords: The clues are a list of words that must be inserted into an empty or semi-empty grid, challenging visual-spatial processing and layout planning.
 - 2) Picture Crosswords (Swedish Style): Clues are presented directly within the grid itself, sometimes using pictures.
- d. Thematic Crossword Puzzle:
- 1) Custom-made ones where all the prompts and answers focus on one specific theme (e.g., classical music or historical figures), are often used in a therapy context to suit the participant's interests.

5. Stages of Implementing Crossword Puzzle Therapy

CPT is a non-pharmacological cognitive stimulation modality that utilizes crossword puzzles as an instrument to train thinking capacity, memory, attention, language skills, and problem-solving skills in the elderly. Pataya & Pristasari, 2025 The implementation of this therapy is systematically designed to ensure that respondents can follow the entire process, thus providing optimal impact on improving cognitive function. Numerous empirical studies have demonstrated the effectiveness of CPT in maintaining and optimizing cognitive status in older adults as a clinical intervention. CPT implementation consists of three main stages:

a) Orientation Stage

This phase serves as a preparatory stage for building a therapeutic alliance between the researcher and the elderly. The researcher begins the session by greeting, introducing herself, and transparently explaining the objectives and procedures of the activity. During this phase, a brief assessment is conducted to ensure the respondents are physically and psychologically ready. The researcher also provides a

work guide and simple examples to ensure the respondents have a complete understanding of the crossword puzzle mechanics.

b) Working Phase

As the core of the intervention, the work phase involved intensive cognitive activity in which older adults completed crossword puzzles, either independently or with scaffolding. This process simultaneously activated various cognitive domains, such as memory, linguistic comprehension, attention retention, and problem-solving skills to find relevant answers. During this phase, the researcher acted as a facilitator, providing motivation and guidance to respondents who encountered difficulties, ensuring that the cognitive stimulation remained effective and maintained its quality.

c) Termination Stage

This stage is the closing phase, aimed at consolidating the respondents' learning experiences. Researchers and respondents evaluated the process, reviewed the prepared answers, and provided feedback and appreciation for the elderly's active participation. Furthermore, researchers concluded by inquiring about the respondents' post-activity affective state and providing motivational reinforcement to ensure they consistently engage in cognitive stimulation exercises in the future.

Comprehensively, CPT, implemented through structured stages of orientation, work, and termination, provides comprehensive cognitive stimulation. Through these challenging yet educational activities, seniors not only develop memory and language skills but also receive significant support to maintain and improve cognitive function throughout aging.

6. Influence Crossword Puzzle Therapy Towards Improving Cognitive Function

According to research conducted by Komsin & Isnaini (2020), the implementation of CPT at the Sudagaran Banyumas Elderly Social Service Center has a significant impact on improving cognitive function in the

elderly, with a $p\text{-value} = 0.000$ ($p < 0.05$). Before receiving therapy, the average MMSE score of respondents in the experimental group was at 22.83, and after the intervention it increased to 28.11. These findings indicate that Crossword Puzzle Therapy is able to provide optimal cognitive stimulation through puzzle-solving activities, thereby helping to strengthen the memory, attention, and overall thinking processes of the elderly.

E. Brain Gym Concept

1. Definition of Brain Gym

Brain Gym, or brain gymnastics, is a series of simple body movements designed to integrate brain and body functions through specific movement coordination. These movements aim to stimulate both hemispheres of the brain, increase blood and oxygen flow to the brain, and help optimize learning, concentration, memory, and thinking skills. In the elderly, Brain Gym is used as a non-pharmacological intervention that can help maintain cognitive function through light physical activity that is easy to do and safe for various health conditions. (Setiawan et al., 2025).



Figure 2.3 Brain Gym

Source: (Cano-estrada et al., 2022)

According to Hamzah et al., 2021 Brain Gym involves a combination of cross-body movements, hand-foot coordination, balance exercises, and movements that stimulate concentration and attention. These activities are believed to activate neural networks that play a role in cognitive processes, thereby helping improve memory, focus, problem-solving, and executive function in older adults. Although some studies have shown improvements in cognitive function scores after Brain Gym, its effectiveness is still being

studied, and it is generally used as an easy-to-implement complementary therapy to maintain cognitive health in older adults.

2. Brain Gym Goals

Brain Gym Brain Gym, or brain gymnastics, aims to stimulate brain function through a series of simple movements that involve body-mind coordination. These movements are designed to improve communication between the right and left brain, thereby helping to improve concentration, memory, attention, and thinking skills in older adults. Furthermore, Brain Gym also aims to improve blood and oxygen flow to the brain, enabling optimal nerve cell function. This allows older adults to maintain cognitive function and reduce the risk of cognitive decline due to aging.

In addition to improving cognitive function, Brain Gym also aims to enhance motor coordination, balance, and the ability of older adults to perform daily activities. Regularly practicing Brain Gym can help older adults become more focused, responsive, and confident in interacting with their surroundings. Therefore, Brain Gym can be used as a non-pharmacological intervention that is easy, safe, and effective in supporting physical and cognitive health in older adults.(Cheng et al., 2022).

3. Benefits of Brain Gym

Brain Gym Brain Gym offers various benefits for the elderly, particularly in maintaining and improving cognitive function. Regularly practicing Brain Gym can help improve memory, concentration, attention, and thinking skills by stimulating both hemispheres of the brain. The movements performed in Brain Gym can also increase blood and oxygen flow to the brain, supporting nerve cells in processing information. Several studies have shown that older adults who participate in Brain Gym programs experience improved cognitive function scores, characterized by improved memory, understanding instructions, and maintaining focus during daily activities.

4. Types of Brain Gym

According to Hamzah et al (2021) There are several types or categories of brain gym movements that are often used in interventions for the elderly to improve cognitive function:

- a. Midline movements are movements that aim to integrate the right and left hemispheres of the brain to improve coordination, concentration, and comprehension. Examples include the Cross Crawl (a cross-legged movement, like walking in place, with your hands touching your opposite knee) and Lazy 8s (drawing a figure eight in the air).
- b. Energy Exercises focus primarily on restoring mental energy and relaxing the nervous system, enabling seniors to better respond to cognitive stimulation. Popular exercises include Water (drinking water regularly) and Hook-ups (crossing the legs and arms to stabilize emotions and focus).
- c. Deepening Attitudes is a movement designed to help older adults feel calmer, more relaxed, and more connected to themselves, thereby reducing the anxiety that often hinders cognitive function. For example, the Positive Points movement (gently touching points on the forehead) helps older adults think more clearly.

5. Brain Gym Management Stages

According to Yulisetyaningruma et al. (2023) The implementation of this intervention is carried out with a structured approach to ensure that the elderly can follow instructions well without feeling burdened.

- a. Preparation Stage (Orientation)
 - 1) Respondent Position: The elderly person is positioned sitting comfortably upright in a stable chair. This position is important so that the elderly person's focus is fully on hand movements and is not distracted by physical discomfort.
 - 2) Brief Explanation: The researcher provides instructions in simple, friendly language. For example: "Sir/Madam, today we will be doing

brain gymnastics exercises to train our focus and hand coordination.
Follow my movements."

- 3) Demonstration: The researcher demonstrates the movement slowly (thumb and little finger position) right in front of the elderly person's view.

b. Core Stage (Movement Implementation)

Researchers guide the elderly to do the movements in stages:

- 1) Step A: The right hand forms the "Thumbs" symbol (thumb upright, other fingers clenched), while the left hand forms the "Little finger" symbol (little finger upright, other fingers clenched).
- 2) Step B: Once the position is established, instruct the elderly to change positions simultaneously.
- 3) Step C: The position changes to the right hand forming the "pinky" symbol and the left hand forming the "thumb" symbol.
- 4) Rhythm: The researcher gives counting commands (such as: "One... two... one... two...") so that the movements have a consistent rhythm.
- 5) Mentoring: If an elderly person makes a mistake, the researcher provides motivation with a reassuring sentence, "It's okay, let's try again slowly." This is done to maintain the elderly person's motivation and self-confidence.

c. Termination Stage (Closing)

- 1) Evaluation of Success: Researchers appreciated the efforts of the elderly in completing the movements, regardless of how quickly or accurately they did them.
- 2) Reflection: Ask the elderly how they feel after doing the movements, for example "How do you feel after trying the finger exercises? Do you feel fresher?"
- 3) Providing Reinforcement: The researcher provides closing motivation so that the elderly feel happy with the activity and are willing to do it again in the next session.

7. The Effect of Brain Gym on Improving Cognitive Function

Brain Gym's effect on improving cognitive function in the elderly is rooted in its ability to stimulate synchronization of the right and left hemispheres of the brain through coordinated physical movements. This activity effectively increases cerebral blood flow, thus maintaining optimal oxygen and glucose supply to nerve cells. Research conducted by Cano-estrada et al. (2022) showed that brain gymnastics interventions carried out routinely for four weeks were proven to be significant in improving the cognitive function scores of the elderly with a p value < 0.05 . This finding is supported by a study from Mahfud & Jelita (2025) which confirms that structured exercise triggers neuroplasticity, which is crucial in slowing the rate of cognitive decline in the aging population.

In addition to the neurological benefits, the fine motor movements in Brain Gym, such as thumb-pinky coordination, train the frontal lobe, which controls executive function. This exercise requires high levels of concentration and self-control, directly improving working memory and attention. In line with this, research results Setiawan et al. (2025) reported a significant difference between the intervention and control groups in increasing elderly attention, with a p value of 0.028. Thus, this intervention has been scientifically proven to be an effective cognitive stimulation in maintaining the overall thinking capacity of the elderly during the aging process.

F. The Effect of Reminiscence Therapy and Crossword Puzzle Therapy on Cognitive Function

Reminiscence Therapy (RT) and Crossword Puzzle Therapy (CPT) provide a holistic and comprehensive approach to cognitive function in older adults, as they stimulate complementary domains. RT focuses on memory activation through storytelling and reflection. Its impact on cognition is direct, affecting both episodic memory (memories of past events) and long-term memory, and it is highly effective in improving verbal fluency and communication skills in older adults. (Kim et al., 2018). Furthermore, RT's

greatest benefit lies in its psychosocial support. By helping older adults achieve self-integration, reduce depressive symptoms, and overcome social isolation, RT indirectly creates an optimal internal environment. This reduction in stress and improvement in mood supports neuroplasticity, which is vital for maintaining overall cognitive function.(Mokhtari et al., 2024)

CPT exerts its effects through specific and challenging cognitive training. This intervention intensively targets semantic memory (knowledge and vocabulary) and information retrieval speed. Furthermore, CPT stimulates executive functions, particularly planning, selective attention, and problem-solving, which are necessary for completing complex tasks.(Devanand et al., 2022). Neurobiologically, CPT is a strong evidence-based intervention. Randomized Controlled Trial results show that crossword puzzle exercises are significantly superior in improving cognitive function and helping reduce brain shrinkage in older adults with Mild Cognitive Impairment (MCI) compared to other cognitive games.(Goldberg & Min Qian, 2022). Thus, RT creates a conducive internal environment, while CPT provides sharp tools for honing specific cognitive abilities, resulting in more substantial increases in cognitive reserve.

G. Theoretical Framework

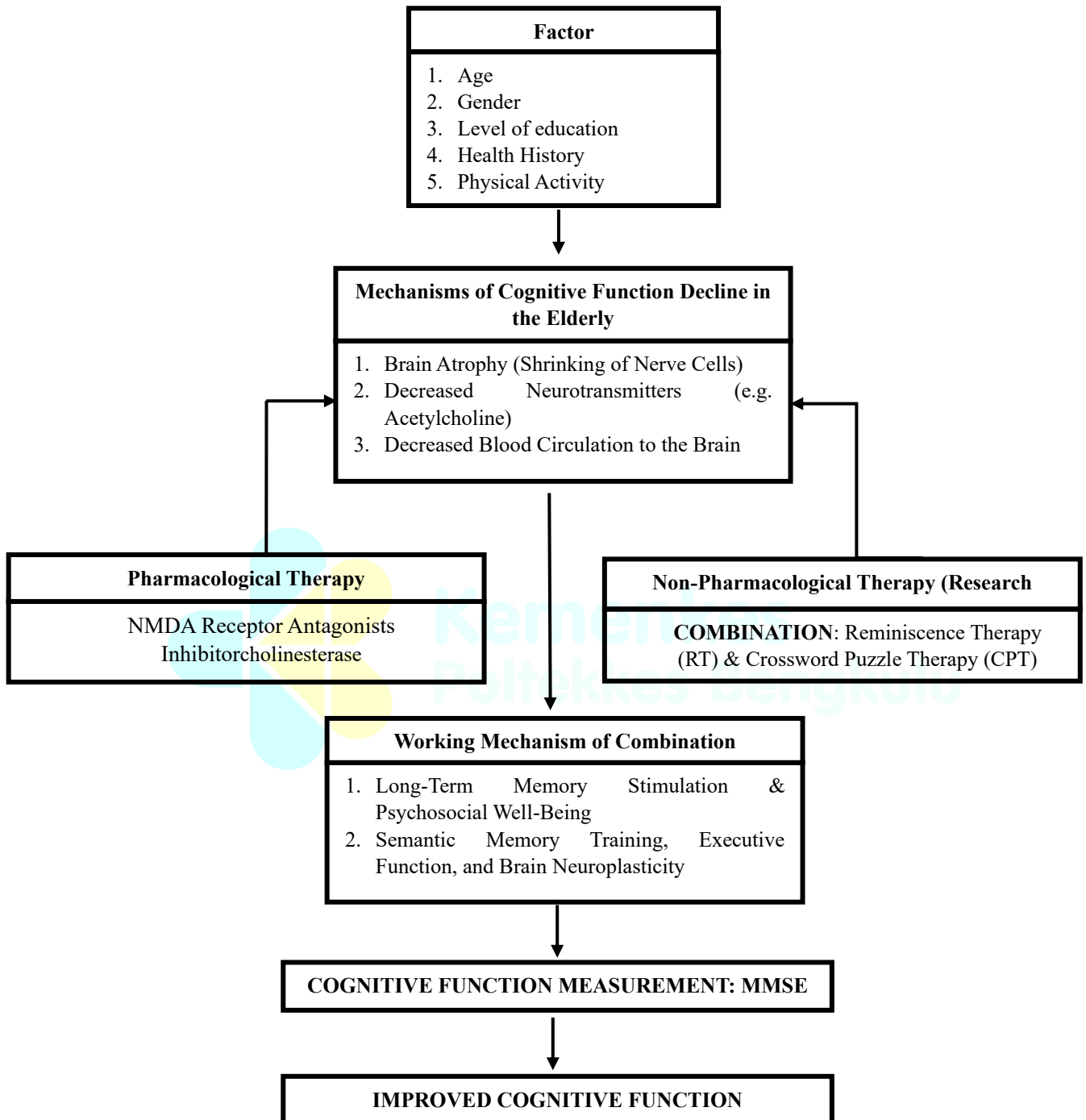


Chart 2.1 Theoretical Framework

Source : (Mutyah et al., 2024)