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# A Systematic Study on Cognitive-Based Intervention for the Elderly with Mild Cognitive Disabilities and Early Dementia\*

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## Abstract

This study evaluated the effectiveness of cognitive-based interventions for elderly individuals with Mild Cognitive Impairment (MCI) and early dementia over the past decade. A systematic review of 27 randomized controlled trials published from 2013 to 2023 focused on cognitive function, daily living activities, and quality of life improvements. The results showed that cognitive training and stimulation programs led to significant gains in memory, attention, and problem-solving skills. Additionally, improvements in daily functioning and overall quality of life were observed. Customized programs tailored to individual needs were found to be particularly effective, emphasizing the importance of personalized approaches. These findings suggest that cognitive interventions can help delay cognitive decline and maintain independence in older adults with MCI or early dementia. The review highlights the potential of such interventions in promoting healthy aging and improving the overall well-being of elderly individuals. Furthermore, these interventions can help older adults maintain meaningful social connections and enhance their emotional well-being in significant ways. Future research should aim to optimize and expand these programs for better outcomes and greater accessibility across various communities. This comprehensive review provides valuable insights for healthcare professionals and caregivers, demonstrating that cognitive-based interventions are a promising and effective approach for managing cognitive decline in older adults.

**Keywords:** Mild Cognitive Impairment, Early Dementia, Elderly, Cognitive-Based Intervention, Systematic Review

**Major Classification Code :** I10, I18, J14

## 1. Introduction

### 1.1. Significance of The Study

The number of dementia patients is increasing rapidly worldwide, and it is expected to reach 135.5 million by 2050 (Alzheimer's Disease International, 2022). In Korea, there were about 610,000 dementia patients in 2014, but it is

estimated to increase to 2.71 million by 2050 (Korean Dementia Association, 2020). This rapid increase in the incidence of dementia has highlighted the importance of early diagnosis and intervention, and in particular, there is a growing interest in Mild Cognitive Impairment (MCI).

Mild cognitive impairment is known to be a high-risk condition with a high likelihood of transitioning to dementia, and studies have shown that approximately 10 to 15 percent

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of patients with mild cognitive impairment progress to dementia every year (Seoul National University Medical Information Center, 2022). As of 2019, there were 276,045 patients treated with mild cognitive impairment, which is an increase of approximately 19 times from 2009 (Korean Alzheimer's Disease Society, 2020). In particular, mild cognitive impairment is common in older people aged 65 and older, and can also occur in relatively younger age groups, accounting for approximately 20 percent even under the age of 65.

It is important to delay the progression to dementia through early detection and appropriate intervention for mild cognitive impairment, which is recognized as a pre-stage of dementia. A 2012 study by the Ministry of Health and Welfare and Bundang Seoul National University Hospital reported that delaying the onset of dementia by two years can reduce the prevalence of dementia to 80%, and 56% when delaying the onset of dementia by five years (Ministry of Health and Welfare & Bundang Seoul National University Hospital, 2012). Therefore, there is a greater emphasis on the need for early management and treatment intervention for the elderly with mild cognitive impairment.

The purpose of this study is to analyze the current status and increasing trend of patients with mild cognitive impairment over the past 10 years and to find out the characteristics of mild cognitive impairment according to age and gender to develop intervention programs and seek policy countermeasures. To this end, we will systematically review existing studies related to mild cognitive impairment and propose future measures to prevent and treat mild cognitive impairment based on the medical status, gender and age characteristics of patients with mild cognitive impairment.

In addition, this study focuses on analyzing cognitive intervention and care programs for the elderly with mild cognitive impairment, focusing on domestic cases, and seeking the direction of successful dementia prevention and management. Through this, we propose community-based customized intervention programs and policy support measures, and aim to find ways to spread these programs nationwide in the future.

## 1.2. The Purpose of The Study

The main objectives of this study are as follows.

First, through randomized controlled studies from 2013 to 2023, we evaluate the impact of cognitive-based intervention programs on the improvement of cognitive function in elderly people with mild cognitive impairment and early dementia.

Second, it compares and analyzes the effects of

cognitive-based intervention in terms of cognitive function, ability to perform daily life, and quality of life.

Third, it derives the limitations of intervention research and suggests future research directions.

## 2. Research Method

This study was conducted as a systematic review to evaluate light cognitive damage prevention policies through literature research and case analysis and case analysis. The main research methods are as follows, and the research flowchart is shown in Figure 1(See Figure 1).

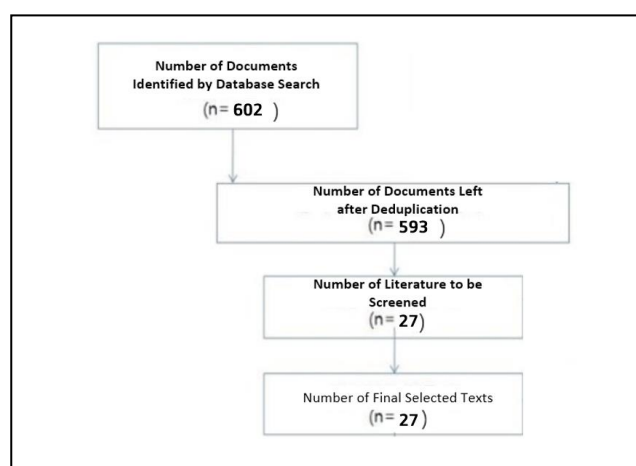


Figure 1: Research Flow Chart

### 2.1. Literature Research

The literature search in this study was performed using major academic databases(e.g., KCI, RISS, and DB pia), and the search keywords were “Mild Cognitive Impairment”, “Early Dementia”, “Cognitive Intervention”, “Randomized Controlled Trial”. The search period was set from 2013 to 2023, and 10 related research papers published during this period were included. Among the searched papers, a study was selected that had a clear purpose and method of the study and evaluated the effectiveness of cognitive-based intervention programs for mild cognitive impairment and early dementia. The core results of each study were extracted, and the effects were analyzed in terms of improving cognitive function, performing daily life, and improving quality of life. In addition, the reliability and validity of the study were evaluated in consideration of the research methodology, sample size, and research design(See Table 1).

**Table 1:** Cognitive-Based Intervention Programs and Effects Included in the Study

Author	Year	Intervention Program	Sample Size	Main Effects
Kim, S.J., Kim, S.H., & Park, J.H	2015	Montreal Cognitive Assessment	120	Validated MoCA as a useful diagnostic tool for MCI.
Kim, J.Y., Lee, S.K., & Oh, S.J	2020	MoCA vs. MMSE-K	200	MoCA more sensitive in detecting cognitive decline compared to MMSE-K.
Park, J.W., Kim, H.S., & Song, J.H	2018	Acupuncture Treatment	50	Significant improvement in memory and attention in MCI patients.
Lee, M.K., & Cho, S.M	2019	Cognitive Rehabilitation Training	60	Positive impact on memory improvement, with various training methods showing complementary effects.
Lee, J.Y., Jeong, S.H., & Lee, J.H	2019	Neuroimaging Techniques	40	Identified structural and functional brain network changes associated with cognitive decline.
Jeong, H.S., Kim, J.Y., & Park, K.H	2020	Functional MRI (fMRI)	45	Decreased functional connectivity in specific brain regions, indicating key physiological markers of cognitive decline.
Choi, J. Y., Kim, S. H., & Lee, J. Y	2020	Family Support Programs	100	Significant improvement in quality of life with emotional and practical support from family.
Yoon, J. Y., & Park, S. Y	2021	Stress Management and Social Support	80	Social support effectively reduced psychological stress and highlighted the need for stress management programs.
Yujin, S., Kim, Y., & Hong, J	2017	Senior Employment Programs	70	Increased life satisfaction and enhanced social participation among MCI patients.
Kim, H. J., & Lee, S. J	2021	Environmental Adaptation Programs	65	Improved daily living functions and supported independent living among MCI patients.

## 2.2. Policy Research

Based on data provided by the Central Dementia Center and the Ministry of Health and Welfare, this study systematically analyzed nine domestic policy and program randomized control studies for the prevention of mild cognitive impairment and dementia from 2013 to 2023. Policy research was conducted based on the results of literature research. Policy research includes the following steps. First, an effective intervention plan is derived based on the results of literature research. Second, we analyze the policy needs of intervention programs for patients with mild cognitive impairment and early dementia. Third, policy proposals and future research directions are presented.

## 3. Results of The Study

### 3.1. Literature Research

#### 3.1.1. Development of Cognitive Function Evaluation Tools

In the development and evaluation of the usefulness of the Korean translation Montreal Cognitive Assessment (MoCA) for the diagnosis of mild cognitive impairment (MCI), MoCA translated into Korean has proven to be a useful tool for the diagnosis of mild cognitive impairment. The study confirms the reliability and validity of MoCA and has shown that the Korean translation can be effectively utilized for the diagnosis of MCI (Kim et al., 2015). A comparative study on the cognitive function assessment of Mini-Mental State Examination-K (MMSE-K) and MoCA

analyzed the diagnostic usefulness of both tools. In our study, MoCA has been shown to be able to detect cognitive decline more sensitively than MMSE-K, and to provide higher diagnostic accuracy, especially in the early stages of mild cognitive impairment (Kim et al., 2020).

### 3.1.2. A Study on the Evaluation of Cognitive Rehabilitation and Treatment Program Effectiveness

Studies on the effect of acupuncture on the improvement of cognitive function in patients with mild cognitive impairment have shown that acupuncture treatment improves cognitive function in patients with mild cognitive impairment statistically significantly. In particular, it has been confirmed that it is effective in improving memory and attention (Park et al., 2018). Studies on the effects of different cognitive rehabilitation training programs on memory enhancement in older adults with mild cognitive impairment have shown that cognitive rehabilitation training programs have positive effects on memory enhancement, and that different training methods work complementarily to derive effective cognitive improvement (Lee & Cho, 2019).

### 3.1.3. Neuroimaging and Physiological Studies

Analysis of brain networks related to mild cognitive impairment through brain imaging (2019). This study analyzed brain networks related to mild cognitive impairment through brain imaging. As a result of the study, it was found that mild cognitive impairment is closely related to structural and functional changes in specific brain networks (Lee et al., 2019).

Analysis of changes in brain function in patients with mild cognitive impairment using functional magnetic resonance imaging (fMRI). This study analyzed changes in brain function in patients with mild cognitive impairment using fMRI. As a result of the study, it was suggested that patients with mild cognitive impairment had a decreased functional connectivity in certain brain regions compared to the normal elderly, which may act as an important physiological indicator of cognitive decline (Jeong et al., 2020).

### 3.1.4. A Study of Social and Psychological Factors

The Effect of Family Support on the Quality of Life of the Elderly with Mild Cognitive Disabilities (2020). This study investigated the effect of family support on the quality of life of the elderly with Mild Cognitive Disabilities. As a result of the study, the emotional and practical support of the family significantly improved the quality of life of the elderly with Mild Cognitive Disabilities, and the family support strongly correlated with positive quality of life indicators (Choi et al., 2020).

Analysis of the relationship between psychological stress and social support and suggestion of stress reduction measures (2021). This study analyzed the relationship between psychological stress and social support and suggested measures to reduce stress in the elderly with mild cognitive impairment. As a result of the study, social support was effective in reducing psychological stress, and the need for stress management programs was emphasized (Yoon et al., 2021).

### 3.1.5. Environmental Adaptation and Support Research

The Effect of the Elderly Job Program on Life Satisfaction of the Elderly with Mild Cognitive Disability (2017). This study evaluated the effect of the elderly job program on the life satisfaction of the elderly with Mild Cognitive Disabilities. As a result of the study, it was found that the elderly job program significantly improved the life satisfaction of the elderly with Mild Cognitive Disabilities and contributed to the promotion of economic independence and social participation (Yoo et al., 2017). Effect of environmental adaptation support program on the daily life function of elderly people with mild cognitive impairment (2021). This study studied the effect of environmental adaptation support program on the daily life function of elderly people with mild cognitive impairment. As a result of the study, it was revealed that the environmental adaptation support program was effective in improving the daily life function and had a particularly positive effect on supporting an independent life (Kim et al., 2021).

### 3.1.6. Comprehensive Consideration and Implications

A comparative study of Montreal Cognitive Assessment (MoCA) and Mini-Mental Stat Examination-K (MMSE-K) suggests that MoCA is more useful for the early detection and accurate diagnosis of mild cognitive impairment. Research results from acupuncture and various cognitive rehabilitation training programs demonstrate the need for several approaches that positively affect the improvement of cognitive function. This suggests that an integrated and multifaceted rehabilitation approach rather than a single treatment may be effective for improving cognitive function. Brain network analysis and functional magnetic resonance imaging (fMRI) findings The use of neuroimaging techniques plays an important role in understanding the physiological mechanisms of cognitive impairment and providing baseline data for early diagnosis and customized treatment. Studies that have found positive effects of family emotional and practical support on the quality of life in the elderly with mild cognitive impairment emphasize that family role and support are important factors in the treatment process. This indicates the need for strengthening family and social support networks, as social

support is an important resource that can provide practical assistance to patients with mild cognitive impairment. The results of studies analyzing the relationship between psychological stress and social support emphasize the need for stress management programs. Patients with mild cognitive impairment suggest that appropriate stress management strategies and support are essential to mitigate the negative effects of psychological stress on cognitive function. Studies showing the positive effects of job programs for the elderly and environmental adaptation support programs on life satisfaction and daily life functions of the elderly with mild cognitive impairment emphasize the need for programs that promote economic independence and social participation. This means that it is important to develop and support various environmental adaptation measures to support the independent life and social participation of the elderly. The results of various studies on mild cognitive impairment suggest that a multi-faceted approach such as cognitive function evaluation, treatment and rehabilitation, neuroscientific analysis, social and environmental support is needed. This shows that a comprehensive and integrated approach rather than a single approach can contribute to the effective management and prevention of mild cognitive impairment. The current research results provide important basic data for the development of policies and programs for patients with mild cognitive impairment and their families. For future research and policy development, it is necessary to prepare practical intervention strategies and support plans based on existing research results. These implications provide an important direction for research and policy development on mild cognitive impairment and suggest key factors to be considered in future research and program development.

## 3.2. Policy Research

### 3.2.1. Domestic Policy Research

According to the 'Best Practices for Dementia Management Project' of the Central Dementia Center in 2023, Korea announced its national dementia policy for the first time in 2008 (See Table 2). This policy formalized a comprehensive national approach to dementia, laying the foundation for a policy that encompasses dementia prevention, diagnosis, treatment, and care services. The second comprehensive dementia management plan was announced in 2012, and during this period, specific goals and strategies were set to strengthen the foundation for dementia management and promote a more systematic policy. At this point, social interest in dementia management increased, and the scope of the policy expanded. The 3rd initiated in 2017 that aims to clarify the responsibility of the government for dementia management and to manage dementia prevention, early diagnosis, treatment and care

Comprehensive Dementia Management Plan announced in 2015 emphasized an integrated approach of prevention, early diagnosis, and treatment. This plan included the development and support of various programs and services to improve the quality of life of dementia patients and families. The Dementia National Responsibility System Promotion Plan announced in 2017 is a policy that emphasizes national responsibility for dementia management and aims to provide more systematic and comprehensive support for dementia patients and families. This plan aimed to establish an integrated dementia management system at the national level. The 4th Comprehensive Dementia Management Plan was announced in 2020, further emphasizing the importance of dementia prevention and early diagnosis. This plan aims to strengthen customized support and services for dementia patients and families, and continues efforts to evaluate performance and continuously improve the effectiveness of the policy. Next, Dementia Relief Village is a policy that supports dementia patients and their families to live in a better environment in the community, and has been promoted in earnest since 2014. The main goal of this policy is to establish an integrated community-based dementia care system and improve the quality of life of dementia patients and their families. In particular, Dementia Relief Village is focusing on providing practical support to dementia patients and their families through the participation of local residents. Dementia Relief Village operates a dementia prevention education and awareness improvement program for local residents. These programs contribute to enhancing understanding of dementia and promoting early diagnosis. It provides professional care services to dementia patients, through which it strengthens support in daily life. Dementia care experts in the region participate and provide customized services. It promotes emotional support and social participation by operating social activities and support groups for dementia patients and their families. These activities play an important role in reducing social isolation of dementia patients and their families. The Dementia Relief Village policy had a positive effect on improving the quality of life of dementia patients and their families. In particular, community-based support is providing practical help to dementia patients and their families. However, in the process of implementing the policy, imbalances and lack of resources between regions arise, and in some regions, it is difficult to receive practical benefits due to low access to services. In addition, continuous financial support and policy improvement are needed to meet the various needs of dementia patients and their families. Lastly, the dementia national responsibility system is a policy services in an integrated manner. This policy is operating various programs to increase the consistency of dementia management at the national level and to support dementia



patients and families. A consistent dementia management system is established by integrating dementia prevention, early diagnosis, treatment, and care services. Through this, all services necessary for dementia patients are effectively linked. It is increasing the efficiency of dementia management by strengthening the financial support required for dementia management and improving related infrastructure. In addition, support for research and education related to dementia is expanding. The overall support system for dementia management is strengthened by providing mental health counseling and support services for dementia patients and their families. The dementia national

responsibility system has contributed to clarifying national responsibility for dementia management and improving the quality of life of dementia patients and their families through integrated service provision.

However, in the process of implementing the policy, problems such as an imbalance in resource allocation between regions and a lack of manpower for effective implementation of the policy are occurring. In addition, the effectiveness of dementia management may be limited in areas where the policy is not properly implemented, and policy improvement is needed to solve this problem.

**Table 2:** Direction and Implementation of the National Dementia Management Comprehensive Plan

Sortation	The First Round National Dementia Management Comprehensive Plan	The Second Round National Dementia Management Comprehensive Plan	The Third Round National Dementia Management Comprehensive Plan
<b>Policy Objectives and Basic Direction</b>	<ul style="list-style-type: none"> <li>· Promotion of Connection with Health Promotion Projects</li> <li>· Customized Management for Each Type of Dementia</li> <li>· Reducing the Burden of Supporting Dementia Patients and Improving Negative Perceptions</li> </ul>	<ul style="list-style-type: none"> <li>· Building a Systematic Foundation for Prevention–Discovery–Treatment–Protection of Dementia</li> <li>· Improving the Quality of Life of Dementia Patients and Their Families</li> <li>· Better Understanding and Social Interest in Dementia</li> </ul>	<ul style="list-style-type: none"> <li>· Treatment and care of dementia by severity of dementia centered on the community</li> <li>· Establishment of a support system Focused on protecting the rights and safety of dementia patients and reducing the burden on their Families</li> </ul>
<b>Business Objectives and Task to be Carried Out</b>	<ul style="list-style-type: none"> <li>· Early Detection of Dementia and Strengthening Prevention</li> <li>· Establishment of Comprehensive and Systematic Dementia Management System</li> <li>· Establishment of Infrastructure for Effective Dementia Management</li> <li>· Reducing the Burden of Supporting Dementia Patients and Improving Negative Perceptions</li> </ul>	<ul style="list-style-type: none"> <li>· Improvement of Dementia Screening and Diagnosis rates</li> <li>· Strengthen prior Management of Risk factors for Dementia</li> <li>· Enhanced Customized Treatment and Protection</li> <li>· Expansion of Infrastructure for Effective Dementia Management</li> <li>· Strengthen family support and Improve social awareness</li> </ul>	<ul style="list-style-type: none"> <li>· Community-centered dementia Prevention and management</li> <li>· Diagnosis, treatment, and care of Dementia patients comfortably and Safely</li> <li>· Reducing the burden of supporting Families with dementia patients</li> <li>· Support Through Research, Statistics and Technology</li> </ul>

### 3.2.2. Domestic Program Research (4 programs)

Research in domestic dementia management programs is supporting dementia patients and their families through various approaches. The Healing Farm Care Farm at the Dementia Relief Center in Seo-gu, Incheon, is a program that aims to improve physical and cognitive functions for early dementia patients and their families through agricultural activities. It is operated in conjunction with community resources and contributes to improving the quality of life of dementia patients and their families and reducing caring stress through self-directed activities. In the future, this program plans to develop in the direction of strengthening the caring capacity of the community and increasing the registration and management rate of new

dementia patients through systematic dementia caring education for workers in welfare facilities for the elderly (Central Dementia Center, 2023).

The 'Artificial Intelligence Dementia Care Service Using AI Speakers' at the Okcheon County and Chungcheongbuk-do Provincial Dementia Safety Center provides dementia care programs using AI speakers, and supports services such as medication guidance and emergency rescue requests for patients with mild cognitive impairment and early dementia. The program is establishing an integrated community-based dementia management model through cooperation between local residents and the public and private sectors, and plans to expand early dementia screening and management projects through

cooperation with other local governments in the future (Central Dementia Center, 2023).

The 'Dementia Care Platform' of the Jindo County Dementia Relief Center provides a play-type program for preventing dementia and improving cognitive abilities by utilizing virtual reality and 2D-based cognitive development systems. It is creating a dementia-friendly environment by incorporating ICT technology from the 4th industry and strengthening the effectiveness of digital healthcare services by inducing the participation of local residents. This program presents an innovative model of dementia prevention and management in the community, and similar programs are expected to be introduced in other regions (Central Dementia Center, 2023).

The Korea Cognitive Psychotherapy Center's 'Cognitive Training and Community Program for Brain Health Promotion' is a cognitive training program for the elderly and individuals with cognitive impairment. This program provides participants with a variety of services for managing cognitive impairment and improving the quality of daily life, and contributes to improving their cognitive function and social participation. The program also contributes to improving the overall quality of life by providing the necessary knowledge and confidence to families and caregivers.

### 3.2.3. Foreign Policy Research

As of 2021, the elderly aged 65 and over in Germany account for 22% of the total population, and it is expected to reach about 30% by 2050. As of 2014, there were about 1.5 million dementia patients in Germany, accounting for 8.8% of the population aged 65 and over, and two-thirds of dementia patients are aged 80 and over, and 70% are women. It is predicted that the number of dementia patients will increase by 40,000 every year with the extension of their life expectancy, reaching 3 million by 2050. Accordingly, Germany decided to establish a national dementia strategy from September 2019 to June 2020, and to implement it from September 2020 to 2026. The main contents of the national dementia strategy consist of four key areas, 27 detailed goals, and 160 measures. Field 1 aims to develop local communities to support dementia patients' social participation, build networks, develop concepts of mobility, and raise public awareness, and Field 2 includes improving counseling and support for dementia patients and their families, expanding support for early-onset dementia, support for family conflict, and end-of-life care support. Field 3 deals with the promotion of medical and long-term care services, strengthening short-term care for outpatients and partial inpatients, promoting dementia sensitive design and long-term care facilities, and supporting cooperation in the health service network. Germany's national dementia strategy provides better support to dementia patients and

their families and provides a comprehensive and systematic approach to improving the quality of dementia care.

France has more than 1,175,000 patients with Alzheimer's disease, and more than 200,000 people are newly diagnosed each year. France developed the first national plan to address Alzheimer's disease in Europe, and its goals include improving diagnosis, improving support, and accelerating research. The First National Dementia Plan (2001-2005) contributed to the establishment of a diagnostic system for Alzheimer's disease and policy visualization of problems related to dementia with a budget of 910 million euros. Since then, memory treatment centers and resource research centers have been established in stages, enabling professional support. After the 2nd Plan (2004-2007) and the 4th Plan (2014-2019), France announced the 2021-2022 Roadmap for Neurodegenerative Diseases. This roadmap centers on the integration of early diagnostic pathways, countermeasures against mental behavioral disorders, solutions for young dementia patients, improved access to research, adaptation to hospital treatment, adaptation to pathways for Parkinson's disease patients, performance promotion and exchange of best practices, prevention, social care, and healthy democracy. France's National Dementia Plan has been continuously developing to improve the quality of dementia diagnosis and treatment, and to provide better support to patients and their families.

The United States passed the National Alzheimer's Project Act (NAPA) in 2011 and released the National Plan for Alzheimer's Disease Management in 2012. This plan established five major goals and 23 detailed performance goals. First, it aims to prevent and effectively treat dementia by 2025, and includes regular research meetings, expansion of research by organizations under the Ministry of Health and Welfare, promotion of early diagnosis by means of biomarkers and video identification, and reinforcement of international cooperation. Second, in order to improve the quality and efficiency of care for dementia patients, it promotes strengthening of care manpower, development of diagnosis and diagnosis tools, support for education services, establishment of care service guidelines and evaluation tools, and cost-effectiveness evaluation. Third, it expands support for dementia patients and their families, and includes development of educational materials, support for guardians, establishment of future care plans, financial exploitation and abuse prevention, and housing support. Fourth, it aims to strengthen public education on dementia, review of model initiatives, and international cooperation to improve public awareness and strengthen participation. Finally, it promotes data advancement and strengthening government capabilities for monitoring the progress of policy implementation. The U.S. National Dementia Management Plan aims for a systematic and comprehensive approach in various aspects such as dementia research, diagnosis,

treatment, and support.

Japan's dementia policy was promoted in earnest starting with the Gold Plan ahead of entering an aging society in 1989, and has since developed into the Gold Plan, the New Gold Plan, the Gold Plan, the Gold Plan 21, the Orange Plan, the New Orange Plan, and the Cognitive Policy. The Gold Plan has become part of the welfare policy for the elderly, and the Orange Plan has developed into an independent dementia policy. The basic ideology of the New Gold Plan is to realize a society in which all elderly people can maintain dignity and become independent even if they have mental and physical disabilities, and to this end, it aims to establish an independent service system and comprehensively implement measures for the elderly with dementia. Japan's policy focuses on improving the quality of dementia management and strengthening social support through the establishment of a comprehensive support system for the elderly and dementia patients.

#### 3.2.4. Overseas Program Study (5 programs)

The Dementia Friends program in the UK is operated to increase understanding of cognitive impairment and encourage supportive attitudes. The core goal of the program is to help individuals provide better understanding and support to people with cognitive impairment from friends, family, and neighbors. To this end, we provide information sessions, conduct various activities that promote community participation, and continue to strive to improve awareness within the community. Participants acquire basic knowledge about cognitive impairment, learn practical support methods, and contribute to spreading positive attitudes toward cognitive impairment within the community.

The Memory Cafes program in the U.S. provides a community-based cafe space for individuals with cognitive impairments and their families. The program provides opportunities to socialize in comfortable environments while drinking coffee, and volunteers from the community participate in the operation. Participants share each other's experiences, have opportunities to receive emotional support, and help strengthen connectivity with the community. Memory Cafes play an important role for dementia patients and their families to form support networks without feeling lonely. The Cognitive Stimulation Therapy (CST) in Australia is a group-based cognitive rehabilitation program designed for individuals with cognitive impairment. The program offers a variety of activities to improve memory, attention, reasoning, and language skills. CST enhances brain function through cognitive stimulation, and supports participants to maintain cognitive abilities through social interaction. Group-based activities provide participants with positive stimulation through interactions with colleagues, and help

improve cognitive function.

Canada's Alzheimer's Society operates a variety of programs to support individuals and their families with cognitive impairment. These programs include education on cognitive impairment, counseling services, and activities to improve quality of life. These supports focus on helping patients and their families respond effectively to cognitive impairment-related challenges and improving their quality of life through continuous information and emotional support.

Japan's be slow-witted program provides an activity program that combines community-friendly integrated nursing care services and cognitive rehabilitation. This program operates a day care service and a variety of activity programs for those with early onset dementia and severe brain dysfunction, and provides a wide range of options such as going out, hobbies, cleaning, and volunteering. In addition, by creating an environment in which individual cognitive function training and communication practice are possible, participants can live independently. The program is an integrated service linked to the community, providing customized care to dementia patients and their families, and focusing on supporting an independent and meaningful life.

#### 3.2.5. Comprehensive Consideration and Implications

The dementia safety village policy is designed to support dementia patients and their families at the community base, and its main characteristic is to provide practical support through the participation of local residents. This policy has contributed to improving the quality of life of dementia patients and their families by operating various programs such as dementia prevention education, professional care services, and social activities. A successful example of the policy is that the active participation and community activities of local residents have contributed to reducing social isolation of dementia patients and enhancing the understanding of dementia in the community.

The dementia national responsibility system is a policy that clarifies the responsibility of dementia management at the national level and manages prevention, early diagnosis, treatment and care services in an integrated manner. This policy aimed to improve the quality of life of dementia patients and their families by establishing an integrated management system, strengthening financial support, and providing mental health support services. The national responsibility system has clarified national responsibility for dementia management and increased the efficiency of policy through consistent service provision, but it is experiencing imbalances in resource allocation between regions and lack of policy execution.

The UK's Dementia Friends program focuses on improving community awareness and promoting understanding and support for people with cognitive



impairment. Through information sessions and community engagement activities, local residents are encouraged to have a better understanding and supportive attitude toward cognitive impairment. This program has contributed to raising social awareness of dementia and strengthening the support network in the community.

Memory Cafe in the United States is a program that provides a support environment through coffee and socializing to individuals with cognitive impairment and their families. By providing opportunities to share experiences and receive mutual support through collaboration with volunteers, it has contributed to enhancing emotional stability and social solidarity between dementia patients and their families.

Australia's Cognitive Stimulation Therapy (CST) program focuses on improving memory, attention, reasoning, and language skills by providing group-based cognitive rehabilitation. CST is evaluated as an effective cognitive rehabilitation method, and it has contributed to improving the cognitive function and quality of life of participants through group activities.

Alzheimer's Society in Canada operates a variety of programs including education related to cognitive impairment, counseling services, and activities to improve quality of life. These programs provide comprehensive support to patients with cognitive impairment and their families, and contribute to providing a comprehensive approach to treatment and management. The be slow-witted program in Japan provides regional-oriented integrated nursing care services and operates a variety of activity programs for early-onset dementia and severe brain dysfunction.

It provides customized rehabilitation services to participants through individual cognitive functional training and communication practice, and contributes to strengthening social participation and self-reliance support. Both domestic and foreign policies and programs emphasize the importance of an integrated approach to cognitive impairment.

### 3.3. Practical Research

#### 3.3.1. Comparative Analysis of Economic Efficiency

The economic efficiency of cognitive-based intervention programs is an important factor in establishing effective long-term care plans for the elderly with dementia and mild cognitive impairment (MCI). These programs can be costly in the short term, but in the long term they result in reduced care costs and improved quality of life. To analyze cost-effectiveness, it is necessary to compare the economic effects of various intervention programs. Based on key studies, some important comparative analysis results can be derived.

First, Cognitive Stimulation Therapy (CST). Knapp et al. (2017) demonstrated that Cognitive Stimulation Therapy (CST) is not only effective in patients with mild cognitive impairment and dementia, but also an excellent program in terms of cost-effectiveness. Studies have shown that CST can contribute to reducing social costs in the long term, as well as improving patients' cognitive function. In particular, it reduces costs by reducing the rate of admission to nursing homes, and helps patients to live more independently at home. The Cost-Effectiveness Ratio of this program was evaluated as relatively superior when compared to other intervention programs.

Second, cognitive training programs have been evaluated as cost-effective in many studies in preventing and managing dementia. A study by Valenzuela et al. (2020) revealed that cognitive training can contribute to long-term medical cost savings by improving memory and problem-solving skills of patients with mild cognitive impairment. This study emphasized that the improvement of cognitive function obtained by patients through training is cost-effective as it contributes to delaying admission to nursing homes in the long term and maintaining their ability to perform daily lives.

Third, Customized Cognitive Rehabilitation Programs. Customized Cognitive Rehabilitation programs are programs tailored to the individual conditions of patients, mainly in small groups or in a 1:1 manner. Kim et al. (2019)'s study reported that customized Cognitive Rehabilitation programs are particularly effective in patients with early dementia and show higher cost-effectiveness compared to other Cognitive Training programs. These programs are positively evaluated in terms of cost-performance, as patients respond quickly in the early stages.

Putting the above studies together, cognitive stimulation therapy (CST) and cognitive training programs have been shown to be highly efficient in reducing dementia care costs in the long term. Customized cognitive rehabilitation programs are also cost-effective with personalized interventions. The economic analysis emphasizes that these programs provide long-term health care cost savings that can offset the costs incurred in the short term. In particular, the need for policy support is highlighted in that the earlier the intervention program is involved, the greater the effect of reducing nursing costs and improving the patient's quality of life.

#### 3.3.2. Long-Term Follow-Up Study Results

Studies that have evaluated the effectiveness of cognitive-based intervention programs in the long term have demonstrated that intervention programs provide lasting cognitive improvement in patients with mild cognitive impairment and dementia. Long-term follow-up studies

have highlighted that these programs have a positive effect on patients' cognitive function, ability to perform daily lives, and emotional stability, not only in the short term, but also in the long term.

In the study by Park et al., patients with mild cognitive impairment underwent a 2-year follow-up after applying the cognitive stimulation program for 12 months. As a result, patients who participated in the program experienced a significantly slower rate of decline in cognitive function and a higher rate of maintaining independence in their daily lives. This study has shown that cognitive stimulation programs are effective in maintaining patients' quality of life and independence in the long term.

Valenzuela et al. conducted a 5-year cognitive training program in patients with mild cognitive impairment and early dementia, and followed up their cognitive functional changes. As a result of the study, patients who participated in the program performed better in memory, attention, and problem-solving skills than non-participants, and these achievements were maintained after 5 years. This study demonstrated the long-term effectiveness of cognitive training programs, highlighting the importance of early intervention.

The study by Kim et al. reported that patients who received a customized cognitive rehabilitation program exhibited positive changes in their emotional stability and daily living abilities as well as their cognitive function over the long term. The study found that patients' cognitive function improvement was sustained in the three-year follow-up study, and that the rate of cognitive decline was significantly reduced in patients who underwent intervention, especially in the early stages, compared to non-participants.

Long-term follow-up studies have demonstrated the long-term efficacy of cognitive-based intervention programs in patients with mild cognitive impairment and early dementia, highlighting the greater effectiveness of early intervention in these programs. These long-term effects can contribute not only to improving individual quality of life, but also to reducing health care costs at the national level, further highlighting the need for policy assistance.

## 4. Conclusion and Discussion

### 4.1. Conclusion

This study evaluated the effectiveness of cognitive-based intervention programs for the elderly with mild cognitive impairment (MCI) and early dementia, drawing insights from domestic and international policies. The findings indicate that cognitive-based interventions

positively impact cognitive function, daily living abilities, and quality of life, with long-term benefits continuously confirmed. Notably, cognitive training and stimulation programs enhance memory, attention, and problem-solving skills.

For instance, Kim et al. (2015) demonstrated the usefulness of the Korean version of the Montreal Cognitive Assessment (MoCA) for diagnosing MCI, while Kim et al. (2020) found that MoCA is more sensitive than the MMSE-K in detecting cognitive decline. Additionally, Park et al. (2018) showed that acupuncture effectively improves memory and attention in MCI patients. Studies by Lee and Cho (2019) confirmed the positive impact of cognitive rehabilitation training on memory improvement. Neuroimaging research by Lee et al. (2019) identified structural and functional brain changes associated with MCI, while Jeong et al. (2020) highlighted decreased brain connectivity as an indicator of cognitive decline.

On the policy front, Korea's dementia relief village and state responsibility system support dementia patients and their families, though challenges like resource allocation imbalances persist. Internationally, programs such as Dementia Friends (UK), Memory Cafes (US), Cognitive Stimulation Therapy (CST) (Australia), and others demonstrate effective support for dementia management. Economically, cognitive-based interventions are deemed cost-effective. According to Knapp et al. (2017), CST reduces social costs by delaying cognitive decline and lowering nursing home admissions, a conclusion echoed by Valenzuela et al. (2020), who noted long-term medical cost reductions linked to cognitive training.

Long-term follow-up studies reveal that these interventions not only delay cognitive decline but also improve daily living and emotional stability. Park et al. (2018) found that cognitive stimulation programs significantly slow cognitive decline and maintain independence over two years, while Valenzuela et al. (2020) confirmed the long-term effectiveness of cognitive training over five years.

In summary, cognitive-based intervention programs are vital for enhancing cognitive function, daily performance, and emotional stability in the elderly. Policymakers should prioritize these programs due to their long-term cost-saving benefits.

### 4.2. Discussion

Through literature studies, this study has identified the positive effects of cognitive-based intervention programs on patients with mild cognitive impairment (MCI) and early dementia. Several prior studies have demonstrated that cognitive training and stimulation are effective in improving memory, attention, and problem-solving skills, which are

consistent with the results of this study. These results further emphasize the need for cognitive rehabilitation and suggest the need to establish a systematic system that continuously monitors and evaluates the effects of various cognitive-based interventions. In particular, based on the effectiveness of training on specific cognitive domains found in previous studies, it will be necessary to seek ways to optimize cognitive training through more in-depth studies in the future.

In policy research, the importance of an integrated approach to dementia management has been prominent. Korea's dementia relief village and national dementia responsibility system are evaluated as successful models based on the community, but it has been pointed out that the imbalance in resource allocation is hindering the implementation power of the policy. In particular, differences in resource accessibility between urban and rural areas can undermine the fairness of dementia management. To solve this problem, customized policies that reflect the characteristics and needs of the community are needed, and continuous financial support and policy improvement are essential for these policies to be implemented in practice. Policymakers should redesign their policies in a way that increases effective resource allocation and feasibility by referring to overseas cases.

The need for customized intervention programs has been emphasized through practical studies. Since patients with mild cognitive impairment and early dementia have different cognitive and emotional needs, interventions to satisfy them are essential. The results of this study showed that customized cognitive rehabilitation programs had a positive effect on daily life performance ability and emotional stability, which emphasizes the importance of a personalized approach in policy and program development. Therefore, analyzing each individual's characteristics and needs, and designing customized interventions based on them, will lead to effective interventions. The continuous expansion of practical research will contribute to increasing the effectiveness of these programs.

As a result of a comprehensive analysis of literature, policy, and practice studies, an integrated approach has been identified as an important factor in increasing the effectiveness of dementia management. Cognitive-based intervention programs can exert greater effects through social participation and community support as well as improving individual cognitive function. Therefore, it is necessary to reflect this integrated approach in future policy development and program design, and to establish a more comprehensive and effective dementia management system through cooperation between experts in various fields. It is necessary to establish a research system to continuously evaluate and monitor the effectiveness of cognitive-based intervention programs. Through this, it is possible to

contribute to policy improvement by confirming the effectiveness of the program and deriving improvements. In particular, it is important to understand the sustainability and effectiveness of interventions through long-term follow-up studies.

Policymakers should address the imbalance in resource allocation through an integrated approach that reflects the characteristics and needs of the community. For this, data-based policy design is required, and customized policies that reflect the opinions of local residents must be realized.

It is necessary to develop customized cognitive rehabilitation programs to meet the diverse needs of the elderly. By analyzing each individual's condition and needs, intervention based on this should be made, and this customized approach can maximize the effectiveness of intervention.

We need to find ways to maximize the effectiveness of cognitive-based intervention programs by strengthening community-based support systems. Through this, we can improve the quality of life of dementia patients and their families and contribute to improving awareness of the community as a whole.

Medical, psychological, and social support should be integrated through a multidisciplinary approach in the management of cognitive impairment, which will lead to more effective dementia management. Cooperation and information sharing among professionals are essential, and through this, a comprehensive management system should be established.

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