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Article

Effectiveness of a Woodworking Program on Psychosocial Health among Older Adults with Cognitive Impairment

Hyun-Joo Lee¹, Si-Woo Ban¹, Ha-Yun Chung¹, Myoung-Ok Jeon², Kye-Yean Kim¹, Ja-Eun Kim², Ki-Woung Lim², Chang-Ick Choi³, Don-Ha Choi⁴, Ui-Do Hwang⁴, Won-Chul Shin⁵, Hye-Ri Shin^{1,*} and Young-Sun Kim^{1,*}

¹ AgeTech-Service Convergence Major Graduate School of East-West Medicine Science, Kyung-hee University, Yong-in, 17104, South Korea; hyunjoo@khu.ac.kr

² Department of Gerontology, Graduate School of East-West Medicine Science, Kyung-hee University, Yong-in, 17104, South Korea; mijinkorea@khu.ac.kr

³ A+daycare center, 05604, Seoul, Korea; 1caredb@naver.com

⁴ Korea Association of Wood Culture, Seoul 08504, South Korea; dhchoi700@gmail.com

⁵ Department of Neurology, Kyung Hee University Hospital at Gangdong, 05278, Seoul, Korea; shin1chul@gmail.com

* Correspondence: zisoa@khu.ac.kr (H.L.S); ysunkim@khu.ac.kr (Y.S.K)

Abstract: Background: This study aimed to examine the effects of a woodworking program on psychosocial health in older adults who had mild cognitive impairment (MCI) or mild dementia (MD) in Korea. **Setting:** The study was carried out in a dementia center in Seoul in Korea. **Population:** A total of 61 participants who had MCI or MD were allocated into two groups: the experimental group (EG, $n = 35$) and the control group (CG, $n = 26$). **Methods:** This study was carried out using a nonequivalent control group pre-test–post-test design. The EG participated in the woodworking program a total of 10 times for 120 min per session twice a week for 5 weeks, and the CG did not participate in the woodworking program. Both groups completed the same survey before and after the intervention. In the survey, demographic characteristics, psychological health (life satisfaction, depression, self-efficacy, and resilience), and social health (social isolation and social support) were measured. **Results:** In the within-group comparison, there was no significant difference between any factors of the CG before and after the intervention. In contrast, the EG had a significant improvement before and after the woodworking program. Participants in the EG with MCI and MD significantly improved their social support ($p < 0.05$). Psychological factors (life satisfaction, depression, and self-efficacy) were positively changed, although not significantly. **Conclusions:** The woodworking program promoted psychosocial health, such as life satisfaction, resilience, and social support, among older adults with mild cognitive impairment and mild dementia.

Keywords: woodworking program; MCI; mild dementia; psychological health; social health; older adults

1. Introduction

Dementia, which begins with amnesia, progresses to behavioral, cognitive, and neuropsychiatric symptoms and is a serious clinical syndrome; when symptoms worsen, even incontinence and dysphoria can occur[1]. In 2020, more than 50 million of the world's population were diagnosed with dementia, and this number is expected to reach 82 million by 2030 and 152 million by 2050, almost doubling every 20 years[2]. Korea is expected to enter a super-aged society, as 16.5% of the population were aged 65 and over in 2021, and this is predicted to reach 20.3% in 2025 [3]. In 2021, the prevalence of dementia in the population aged 65 and over was 10.2%, which implies that 1 in 10 older adults suffered from dementia[4].

Mild cognitive impairment is a period when mild symptoms appear before the onset of dementia, and it is a cognitive stage between natural aging and early dementia[5]. Poor concentration as well as minor speech and short-term memory problems are common first

symptoms for older adults with mild cognitive impairment, but patients can gradually deteriorate, and it eventually becomes difficult for them to carry out daily activities on their own[6]. Mild dementia can be defined as dementia in which recently experienced and stored memory is reduced due to acquired brain damage and degeneration, but judgment or hygiene can be maintained independently[7-8]. In mild dementia, symptoms can be less severe, and older adults with mild dementia have higher cognitive ability than those with severe dementia, so they are able to live independently; their symptoms can be improved with continuous intervention[9-10].

The number of older adults with impaired cognitive function is increasing, but there is no cure for dementia[11-13]. Therefore, it is necessary to design intervention programs that improve the quality of life of older adults living with MCI and MD. Previous studies have shown that older adults with impaired cognitive function are more likely to have poor psychological and social health that directly affects their quality of life than normal older adults[14-15]. The effectiveness of improving psychological factors for older adults with MCI or MD through music, exercise, computer, and cognitive stimulation programs has been studied[16-18], but few studies have also examined the social factors. Therefore, this study aims to observe the effectiveness of a carpentry program to evaluate the effectiveness of handicraft activities in enhancing the psychosocial well-being of both a mild cognitive impairment group and a mild dementia group, which are high-risk groups for more severe dementia.

Previous studies have shown that handicraft activities are activities based on participation, with positive effects on psychosocial health, such as improved motivation and reduced social isolation and anxiety[19], as well as reduced depression in older adults; these activities also use the functions of the left and right brains naturally[14, 20]. In addition, the materials used in handicraft activities mean that users can express their inner self [21] and these handicraft activities have a positive effect on the happiness, self-efficacy, and life satisfaction of older adults[14].

Woodworking creates beautiful patterns and texture, which can give people a warm feeling, and it is easier to process than metal and plastic, making it suitable for use as a handicraft teaching tool[22]. Woodworking is closely related to spatial perception, i.e., the ability to manipulate one's body or an object skillfully[23]. Studies on infants and adolescents in regard to woodworking activities have shown improved motor coordination, spatial reasoning, recognition of form and foundation, and visual memory and recall in space [24-29]. In addition, dealing with various kinds of wood through woodwork can enhance sensory expansion and spatial perception[26-28], and this has a positive effect on the self-efficacy scales of confidence, resilience, and teamwork[28].

The effectiveness of woodwork activities on improving psychosocial health has been shown in previous qualitative studies[30-33]. For example, Lee et al. conducted a wood-working program twice a week for 5 weeks with nine older adults with mild cognitive impairment and then carried out individual phone interviews. As a result, it was found that confidence and self-esteem were improved through participation in the woodwork-ing program, vitality was gained through new experiences and memories, a desire for learning was identified, and social relationships were formed[32]. Ballinger conducted interviews with adults who regularly engaged in woodworking activities once per week for up to four years in a community center woodworking room. The participants reported that social roles were developed as a result of having a sense of purpose, a job, and somewhere to go, and that social interaction increased[30]. Mee et al. conducted woodwork activities for adults and it was found that the activities had a positive effect on the motivation generation and self-identity development of participants[33].

Thus, researchers claim that woodworking is effective in improving the psychological health and social development of older adults[26-27, 32, 34]. However, the effectiveness of woodworking on older adults has only been studied by Lee et al.[32], and others have studied the effectiveness of woodworking on adults[30-31, 33, 35]. This study aims to verify the effectiveness of woodworking activities on psychosocial health for older adults with mild cognitive impairment and mild dementia.

2. Materials and Methods

2.1. Study Design and Procedure

This study was conducted as a nonequivalent control group pre-test–post-test design to examine the effectiveness of a woodworking program on psychological and social factors in older adults with mild cognitive impairment and older adults with mild dementia. The experimental group participated in the woodworking program, the control group did not participate in the woodworking program, and both the experimental group and the control group performed the same survey before and after the intervention. In the survey, demographic characteristics (gender, age, education level, and cohabitation), psychological factors (life satisfaction, depression, self-efficacy, and resilience), and social factors (social isolation and social support) were measured.

The research was conducted for a total of one year from January to December 2021, and the woodworking program was conducted for a total of six months from June to November 2021. The experimental group participating in the woodworking program conducted living props-making and play activities using wooden teaching tools a total of 10 times for 120 min per session, twice a week for 5 weeks. The program was conducted with one main instructor and two assistant instructors, who were woodworking experts who had completed prior education for working with older adults with dementia, considering that the study participants were aged 65 and over. For smooth communication and response between the instructors and the research participants, there were a maximum of 6 people per group in 6 groups.

The program was divided into three cycles. Cycle 1 consisted of 12 older adults with mild cognitive impairment, Cycle 2 consisted of 12 older adults with mild dementia, and Cycle 3 consisted of 6 older adults with mild cognitive impairment and 6 older adults with mild dementia.

Table 1. Woodworking program research procedure.

Procedure		Period	Content
IRB submission and approval		2021.03~04	(masked for peer-review) Committee research review and approval
Selection of study subjects		2021.04~05	Recruitment and selection of study participants
Pre-Test	Cycle 1	2021.06	Introduction to the study and preparation of consent for participation; survey
	Cycle 2	2021.07	
	Cycle 3	2021.10	
Woodworking program progression	Cycle 1	2021.06~07	Twice a week, for 120 min per session; 10 sessions in total
	Cycle 2	2021.09~10	
	Cycle 3	2021.10~11	
Post-Test	Cycle 1	2021.07	Survey
	Cycle 2	2021.10	
	Cycle 3	2021.11~12	
Statistics and Results Processing		2021.11~12	Analysis of results

2.2. Participants

The subjects of this study were first selected and confirmed their participation at the Dementia Safety Center in Seoul. This is a research cooperative organization that conducts the woodworking program. The subjects were adults aged 65 or older who understood the research purpose and signed the consent form.

The criteria for selecting the study subjects were as follows: communication, hearing, vision, and motor skills enough to follow basic instructions; not regularly participating in

other intervention programs within the study period; clinical dementia rating (CDR) of 0.5 to 1 point. The CDR is a screening test to determine the stage of dementia and is measured by clinicians. The possible outcomes are 0, 0.5, 1, 2, 3, 4, and 5 points, and a higher score means more severe dementia[36].

The criteria for the exclusion of study subjects were as follows: unable to perform an experimental task due to emotional instability and physical disability; diagnosed with diseases preventing them from engaging in active handicraft activities; regularly participating in other programs. Prior to the study, we explained to the participants in detail the background and purpose of this study, the progress process, and the evaluation contents before and after the study. In addition, the participants provided opinions on voluntary consent by signing a written consent form, which explained that they could discontinue any time during their participation in the study, the confidentiality of the study, and that information collected would not be used for other purposes. Considering that the subjects had mild cognitive impairment and mild dementia, the research assistants explained the purpose and contents of the study in detail to assure each subject's full understanding. Older adults who applied for support with their own will were re-confirmed, and additional protection documents were secured.

This study was conducted after research deliberation by the (masked for peer-review) committee for ethical protection of the study subjects, IRB No. KHGIRB-21-473.

A total of 72 subjects were assigned to 36 experimental groups and 36 control groups, but 1 in the experimental group and 10 in the control groups were excluded because they were unable to participate in the program or did not want to participate due to moving to other regions, which resulted in 35 experimental groups and 26 control groups included in the final analysis. The research design model of this study is shown in Figure 1.

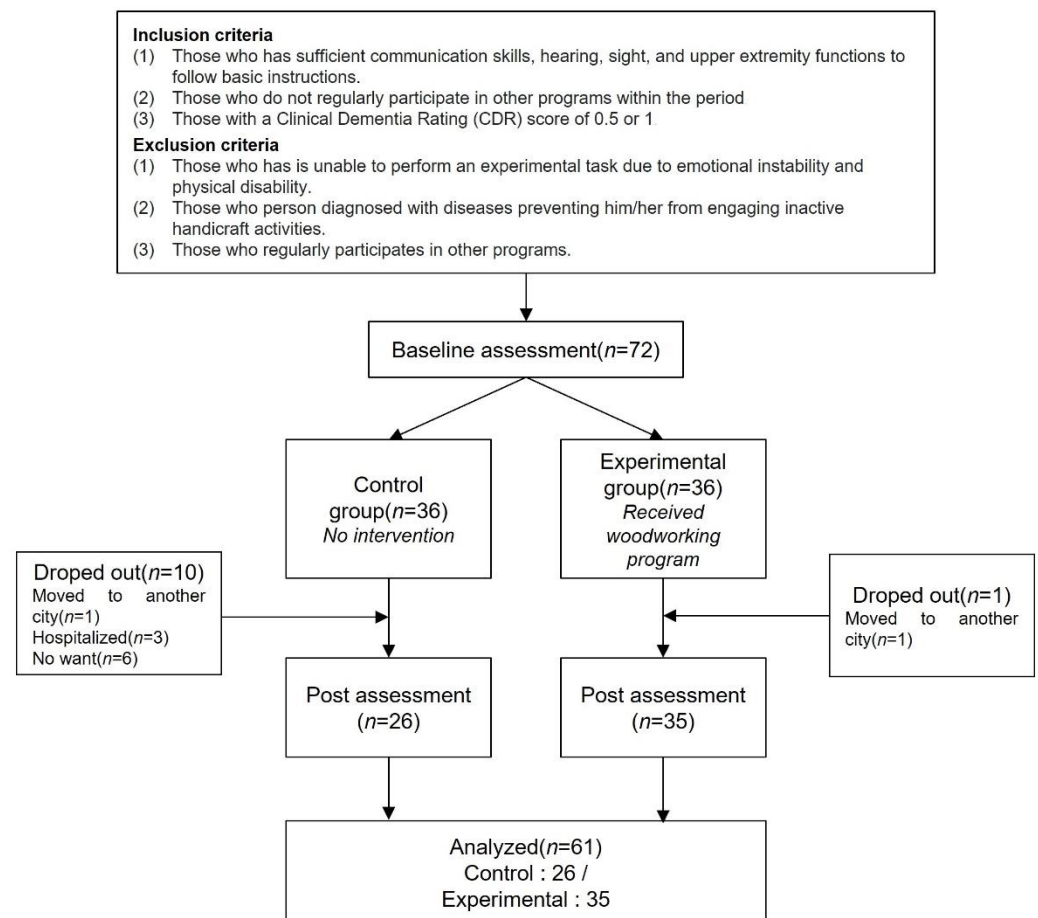


Figure 1. Flowchart of the current study.

2.3. Woodworking Program

This woodworking program consist of 10 practical stages, and each session involved an introduction (10 min), deployment (30 min), rest (10 min), extended activities (40 min), and finishing (10 min). Table 2 shows the outline of the 10th woodworking program. Topics for various purposes were focused on from the start, such as helping the participants make friends with the people they had met by making a treasure box using photos of the faces of the study participants.

Table 2. Woodworking program research procedure.

Session	Topic	Play Activities	Tool
1	Introduction (My house sign)	Observe the tree's age	Tree exploring
2	Improving your physical health (Acupressure rod and ball)	Figure play (Geoboard)	Saw, sandpaper
3	Communicate with your family (Wood speaker)	Reading fairy tales	Hammer clamp, wood burning
4	Improving your physical health (Footrest)	Dice game	Nail, hammer, wood burning
5	Taking care of yourself (Health box)	Colorful stick play	Hammer, wood burning, coloring
6	Empathize with the emotions	3D puzzle of animals and plants	Hammer, driver, wood burning
7	Decorating myself (chest of drawers)	How do I feel today?	Hammer, driver, wood burning, painting (wood staining)
8			
9	Recalling, remembering (a treasure chest)	Wooden instruments	Hammer, driver, wood burning, painting (wood staining)
10			

2.4. Measures

2.4.1. Social Isolation

The Friendship Scale (a tool for measuring social isolation) is brief and simple to use. It assesses six factors that affect social connection and isolation, with scores ranging from 0 to 24 (0-11 for extremely social isolation, 12-15 for isolation, 16-18 for some social support, 19-21 for social connection, and 22-24 for extremely social connection)[37]. The respondents are asked to reflect on the past four weeks and provide feedback using this scale. (1) comfortable interacting with others, (2) seclusion from other people, (3) having someone with whom to express emotions, (4) it's simple to get in touch with people when you need to, (5) sensing alienation from other people, and (6) having no friends and feeling lonely.

2.4.2. Social Support

The Enhancing Recovery in Coronary Heart Disease (ENRICHD) study team created the ENRICHD Social Support Instrument (ESSI) to measure social support[38]. The Health and Retirement Study (HRS) is one long-term longitudinal study that uses the ESSI scale to measure the social support of older adults of local communities in foreign nations. The ESSI scale has also been used in Korea to measure the social support of elderly residents of local communities[39]. Each of the six categories on the ESSI scale—which includes emotional, instrumental, and informational support—is scored on a 5-point Likert scale (1 being never, and 5 being always). Higher scores suggest higher levels of social support. The total score ranges from 6 to 30.

2.4.3. Life Satisfaction

Life satisfaction was measured using the Satisfaction with Life Scale (SWLS) of Diener, Emmons, Larsen, and Griffin[40]. This scale consists of 5 items that judge how satisfied one is with their life overall. Each question is answered on a 7-point Likert scale ranging from “not at all” (1 point) to “very much” (7 points). The possible scores for the total score range from 5 to 35 points.

2.4.4. Depression

The Short Form Geriatric Depression Rating Scale (SGDS-K), which has been validated for senior people in Korea, is a self-reporting scale[41]. The 15 questions in the SGDS-K can each be answered with “yes” or “no.” It is made to be easily understood and responsive. These questions can be further broken down into subscales measuring cognition, hopelessness, and dysphoria. Reverse coding was used for the scale’s inverted elements, i.e., 1, 5, 7, 11, and 13. There are a total of 15 items and the higher the score, the more depressed the person is.

2.4.5. Resilience

The Brief Resilience Scale (BRS) consists of six items. There are three positive (1,3,5) and three negative questions (2,4,6). The range of each score is from 1 to 5, and negative scores are added in reverse. The more resilient the psychological state, the higher the total score[42].

2.4.6. Self-Efficacy

The Korean adaptation of the general self-efficacy scale (GSE) used the general self-efficacy scale developed by Schwarzer and Jerusalem[43] and the Korean version of the general self-efficacy scale standardized in Korea by Lee et al.[44]. This tool is a 10-item subjective evaluation for general children, on a 4-point Likert scale ranging from 1 point for “not at all” to 4 points for “strongly agree”. The total score, which is the sum of the scores for each question, ranges from 10 to 40, with higher scores indicating higher perceived self-efficacy.

2.5. Statistical Analysis

For statistical analysis, IBM SPSS Statistics, Version 26.0 (IBM, Armonk, NY, USA), was utilized. The baseline demographic differences between the two groups were examined using a one-way analysis of variance and chi-square testing. After examining the baseline descriptive characteristics of the variables' normal distribution, the means and standard deviations of the two groups' demographic characteristics were used to express them (SD).

The differences between the group's behavior before and after the intervention were confirmed using a paired t-test (t-test for dependent variables). After the intervention, the mean values of the two groups were compared using an independent sample t-test (95% confidence interval for t-test for in-dependent variables). The experiments were carried out to see how the wood working program curriculum affected social and psychological variables. For the normal evaluation of significant differences, a p-value of 0.05 was used, and a p-value of - 0.01 was used for obvious significant differences.

3. Results

3.1. Descriptive Statistics of Socio-Demographic Information

A total of 60 participants were included in this study; 34 were selected to be in the experimental group (MCI: 19, MD: 28), and 26 in the control group (MCI: 13, MD: 13). The average age of all participants was 78.5 years and the proportion of females was higher than that of males.

For MCI, there were no significant differences between the EG and the CG regarding gender, age, education level, or living alone ($p > 0.05$). However, for MD, there were significant differences regarding gender ($p < 0.05$) and age ($p < 0.01$). More detailed statistics of the participants' characteristics are presented in Table 3.

Table 3. Descriptive statistics of socio-demographic information of MCI and MD; $n = 60$.

Division	MCI (<i>n</i> = 32)				MD (<i>n</i> = 28)			
	EG (<i>n</i> = 19)	CG (<i>n</i> = 13)	<i>X</i> ² / <i>t</i>	<i>p</i>	EG (<i>n</i> = 15)	CG (<i>n</i> = 13)	<i>X</i> ² / <i>t</i>	<i>p</i>
Gender								
Male	8 (42.1)	4 (30.8)	0.423	0.515	9 (60)	3 (23.1)	3.877	0.049
Female	11 (57.9)	9 (69.2)			6 (40)	10 (76.9)		
Age	78.31 ± 6.61	79.15 ± 5.61	−0.391	0.698	74.53 ± 8.06	83.30 ± 3.35	−3.650	0.001
Education level								
No education	2 (10.5)	1 (7.7)	9.129	0.104	1 (6.7)	1 (7.7)	1.771	0.880
Elementary school graduate	9 (47.4)	1 (7.7)			5 (33.3)	2 (15.4)		
Middle school graduate	3 (15.8)	1 (7.7)			3 (20)	4 (30.8)		
High school graduate	2 (10.5)	6 (46.2)			3 (20)	4 (30.8)		
College graduate	1 (5.3)	1 (7.7)			2 (13.3)	1 (7.7)		
Over university graduate	2 (10.5)	3 (23.1)			1 (6.7)	1 (7.7)		
Living alone								
Yes	3 (15.8)	5 (38.5)	2.116	0.146	1 (6.7)	3 (23.1)	1.532	0.216
No	16 (84.2)	8 (61.5)			14 (93.3)	10 (76.9)		

Note. MCI : mild cognitive impairment, MD : Mild Dementia, CG : Control Group, EG : Experimental Group

3.2. Psychological Factors among the Participants of the Study

3.2.1. Psychological Factors of MCI

For participants with MCI, there were no significant differences in the pre-test scores obtained for life satisfaction, depression, resilience, and self-efficacy between the EG and the CG ($p > 0.05$). In the post-test, the levels of life satisfaction, depression, and self-efficacy decreased slightly in the CG group, whereas the scores increased in the EG group for life satisfaction and self-efficacy. However, these changes were not statistically significant ($p > 0.05$) (Figure 2).

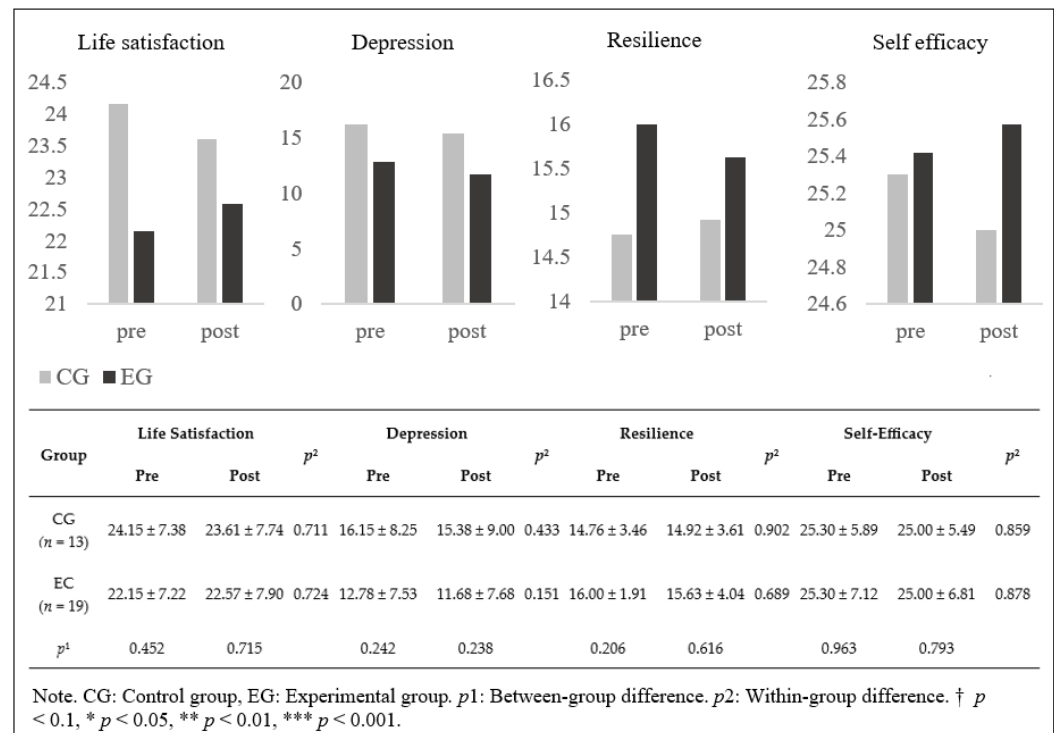


Figure 2. Change of Psychological factors between two groups of MCI

3.2.2. Psychological Factors of Mild Dementia

For participants with MD, there were no significant differences in the pre-test scores obtained for life satisfaction, depression, and resilience between the EG and the CG ($p > 0.05$), but the self-efficacy of the control group was higher than that of the experimental group ($p < 0.01$). In the EG, life satisfaction, resilience, depression, and self-efficacy positively changed after participating in the program, although these results were not significant ($p > 0.05$). For the control group, it was found that self-efficacy significantly changed in a negative manner ($p < 0.05$) (Figure 3).

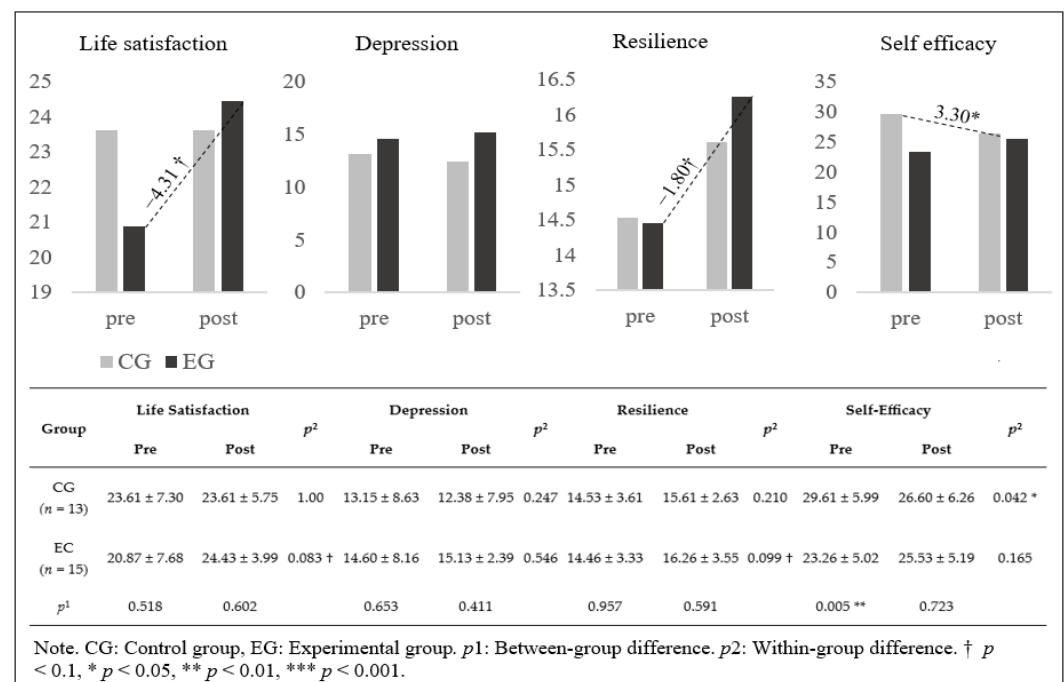


Figure 3. Change of Psychological factors between two groups of MD

3.3. Social Factors among the Participants of the Study

3.3.1. Social Factors of MCI

For participants with MCI, there were no significant differences in the pre-test scores obtained for social isolation between the EG and the CG ($p > 0.05$), but the social support of the control group was higher than that of the experimental group, so there was a difference between the groups ($p < 0.05$). For the CG, all social factors changed negatively after the intervention, whereas in the EG, the social support score significantly increased ($p < 0.05$) after participating in the program, and the social isolation score decreased, although it was not significant ($p > 0.05$) (Figure 4).

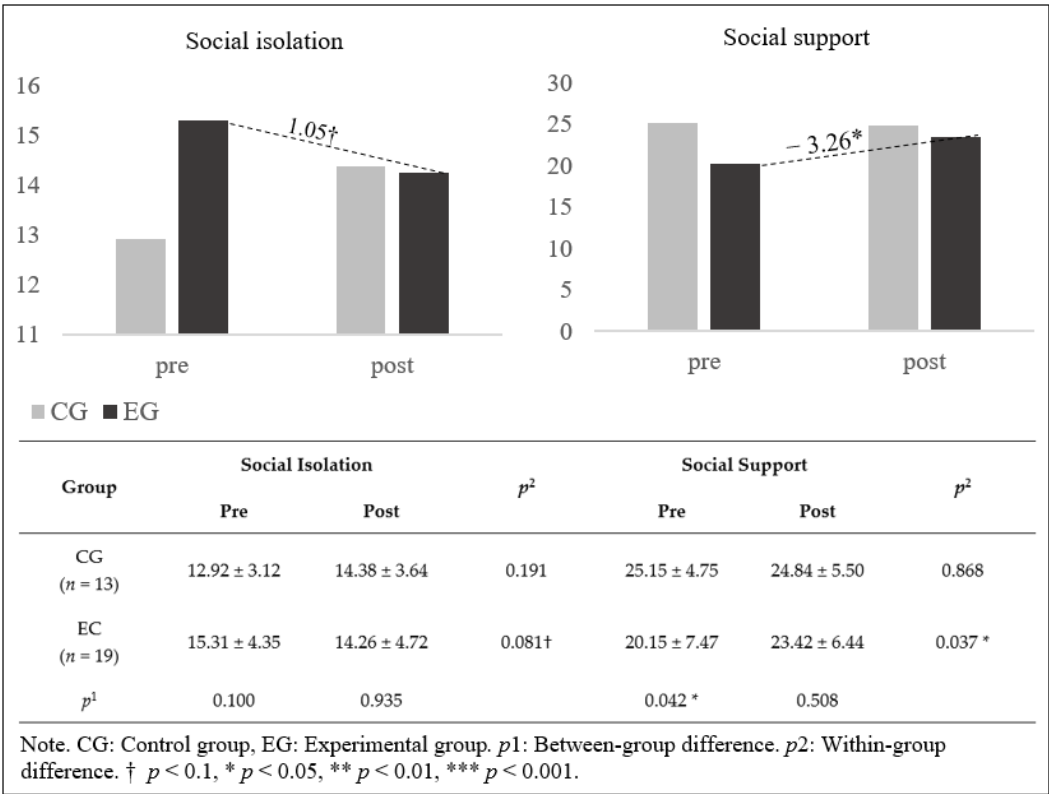


Figure 4. Change of Social factors between two groups of MCI.

3.3.2. Social Factors of Mild Dementia

For participants with MD, there were no significant differences in the pre-test scores obtained in social isolation and social support between the EG and the CG ($p > 0.05$). After the intervention, in the case of social isolation, the score of the EG was similar and the score of the control group decreased, although this was not significant. In the case of social support, the score of the CG decreased, while the score of the EG increased significantly ($p < 0.05$) (Figure 5).

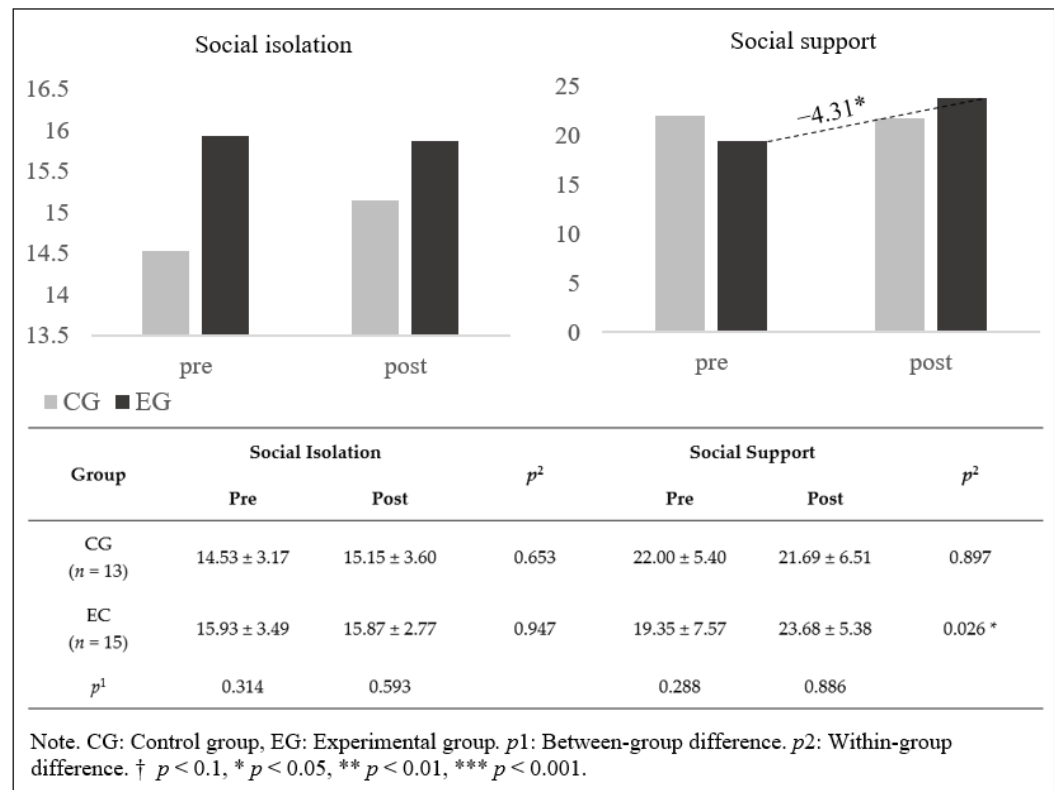


Figure 5. Change of Social factors between two groups of MD.

4. Discussion

In this study, the possibility of using a woodworking program as an intervention to improve the psychological health of older adults with MCI and/or MD was explored through quantitative analysis, and its effectiveness on certain psychosocial factors was confirmed. Positive changes were observed in the social health and psychological health in both a MCI group and a MD group participating in a total of 10 woodworking lessons over 5 weeks. On the other hand, no improvement was observed in the control group.

Thus, the woodworking program was found to have a positive effect on the social factors of older adults with MCI and MD. The control group showed a decrease in the degree of social support, while older adults with MCI and MD who participated in the woodworking program showed a significant increase in the degree of social support, which was the most significant component. After participating in the woodworking program, the degree of social isolation in both groups decreased, although this was not significant; in the group that did not participate in the program, the degree of social isolation increased remarkably. This woodworking program showed similar results to those of the studies[31-32], which qualitatively examined the effectiveness of a woodworking program for adults who had experienced surgery, accidents, and diseases, and older adults with mild cognitive impairment, respectively. In these studies it was found that participation reduced the subjects' social isolation and had a positive effect on the formation of social relationships.

Furthermore, the woodworking program was found to have a positive effect on the psychological factors of older adults with MCI and MD and there was a difference between the two groups. The older adults with MCI showed positive changes in life satisfaction, depression, and self-efficacy. In the case of older adults with MD, positive changes were observed in life satisfaction, depression, resilience, and self-efficacy, although these were not significant. For the control group, self-efficacy was noticeably decreased. These results are the same as those from previous studies that showed that the woodworking experience of adults and older adults gave a sense of accomplishment and satisfaction through project completion, and that they boosted their skills and increased their self-esteem. It was found that the participants in the woodworking program gained a sense of

accomplishment from creating their own products and felt great satisfaction as they or their family members used the finished product[30, 32-33].

These results confirm that participating in the woodworking program had a positive impact on the psychosocial health of older adults with MCI and MD. It has been said that new learning in old age enhances the desire and curiosity of older adults, thereby promoting the growth of an active and independent attitude[45]. As such, in order to widen the opportunities for beneficial experiences for older adults, it is necessary to prepare a public support plan for disseminating programs such as these to local communities, thereby reducing the difficulties in operating programs such as this woodworking program due to high material and equipment costs. In addition, it is necessary to develop high-quality handicraft programs in which participants can feel the joy of learning and psychological satisfaction and that strengthens the accessibility of older adults to a wider community. Second, for the participants with mild cognitive impairment, the woodworking program was not just about woodcraft work, but was also a place to participate in society. In particular, the positive attitude of the instructors, who were of different generations, was found to be a factor that maximized the positive experience of the program. Therefore, instructors need not only technical competency but also the ability to interact with the participants based on their understanding of older adults with dementia.

4.2. Limitations

This study has two limitations in terms of data. It was conducted for the purpose of improving the psychosocial health of older adults with mild cognitive impairment and older adults with mild dementia, but it was difficult to collect a large-scale sample due to the characteristics of the subjects. Therefore, since this cross-sectional study was conducted on a small number of older adults with mild cognitive impairment and mild dementia using a single institution, there is a limit to its generalization due to the small number of samples. A longitudinal study is required to confirm the lasting effect of the woodworking program.

5. Conclusions

This study verified the psychosocial effectiveness of a woodworking program by applying a quantitative research method to older adults with mild cognitive impairment and older adults with MCI and MD.

Looking at previous studies, most studies on woodworking programs have been conducted on children and adolescents, and there have been few studies on adults and older adults. There have been some studies targeting older adults, but only to the extent of conducting interviews with adults, including older adults who have attended carpentry workshops. Our study was significant in that it presented results through data collected after developing and implementing a customized program for older adults with mild cognitive impairment and mild dementia.

In future work, it will be necessary to conduct a study targeting older adults with mild cognitive impairment and mild dementia using related institutions in various communities, and in order to confirm the continuous effectiveness of a woodworking program, it is necessary to extend the program participation period and to increase the number of participants.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

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