

IJACT 24-9-27

Psychological and Physiological Stress Improvement Effect of Gardening Program

¹Seung-hoon Hong, ²Hyukjae Lee

¹Ph.D. Student, Graduate School of Landscape Architecture, Wise Campus, Dongguk University
E-mail: juckjp@naver.com

²Prof., Dept. of Landscape Architecture and Garden Design, Wise Campus, Dongguk University
E-mail: mulle75@dongguk.ac.kr

Abstract

This study aimed to propose a gardening program that can be introduced in elderly care facilities and is effective by inducing active activities of the elderly, conducting a gardening program that can lead to healing functions and social activities, and identifying psychological and physiological changes before and after the gardening program is implemented.

In order to achieve the above objectives, we conducted 30 gardening programs for 20 elderly people living at Chungju Senior Nursing Home from May 2023 to October of the same year to create three gardens. And as a result of evaluating the results of the gardening program, the psychological evaluation showed statistically improved results in most evaluation items, and the EEG improved to a statistically significant number as the gardening program was carried out in the measurement of mental and physical stress using EEG and pulse waves.

Keywords: Depression, Anxiety, Vitality, Life Satisfaction, Loneliness, Stress awareness, Brainwave, Pulse wave

1. INTRODUCTION

An aging population is a phenomenon in which the proportion of the elderly aged 65 or older gradually increases due to an increase in life expectancy and a decrease in the fertility rate. According to the United Nations (UN) standards, if the proportion of the elderly population, which is the proportion of people aged 65 or older, is 7% or more, it is classified as an aging society, if it is 14% or more, it is classified as an aged society, and if it is 20% or more, it is classified as a super-aged society (World Bank Group 2019).

In the case of Korea, the rate of aging is very fast, and the proportion of the elderly population reached 7.2% in 2000 and entered an aging society, followed by an aging society at 14.3% in 2018, and a super-aged society at 20.8% in 2026. A society suffering from an aging population is expected to suffer from slowing economic growth due to labor shortages and low productivity and bear economic burdens such as rising elderly support costs and increased medical and welfare costs (Ministry of Strategy and Finance, 2020).

According to data from the National Statistical Office, 11.3% of the population aged 65 or older in 2011 has already entered an aged society in 2001 and is steadily increasing, and the size is 14.4% of the total population

Manuscript received: June 11, 2024 / revised: July 13, 2024 / accepted: September 1, 2024

Corresponding Author: mulle75@dongguk.ac.kr

Tel: ***-***-**** Fax: +82-54-770-2521

Professor, Dept. of Landscape Architecture and Garden Design, Dongguk Univ. Wise Campus, Korea

in 2019 and 20% of the total population in 2026, which is expected to become a super-aged society [1, 2].

Compared to the cases of advanced welfare countries that have experienced aging ahead of Korea, France took 115 years to transition from an aging society with more than 7% of the population to an aging society with more than 14% of the population, took 40 years to transition from an aging society to a super-aged society, took 155 years to enter from an aging society to a super-aged society, and even Japan, known as the most rapidly aging society among the existing super-aged societies, took 24 years to transition from an aging society to an aging society and 12 years to transition from an aged society to a super-aged society [3, 4].

The term "Garden healing" means activities to restore, maintain, and promote physical and mental health by utilizing various functions and resources of the garden. Through the entire process of conceiving, creating, and managing a garden, the overall activity of cultivating social, educational, psychological, or physical adaptability through the garden and pursuing physical rehabilitation and mental recovery is defined as garden healing. Garden healing is carried out through various garden elements introduced into the garden, especially plants, and other factors such as water, rocks, soil, and artificial sculptures are the most important factors that enable garden healing [5, 6].

The healing garden's characteristics are that it uses life as a medium, and the subject has a different connection from inanimate objects through the changing appearance of plants such as growth, flowering, and fruit, and can stimulate the five senses of sight, hearing, taste, touch, and smell through various plants. And there is a characteristic that healing takes place through continuous interactions [6]. In addition, garden healing does not end with performing a certain work process but is done through interaction between the subject and the plant, and if the subject sows seeds, waters them, and carefully manages them, sprouts will come out, flowers will bloom, and fruits will bear, but if left indifferent, no results will be achieved. Finally, direct participation can increase the healing effect, and garden healing can be effective just by looking at the elements introduced into the garden, but it can have a higher effect by directly participating in garden creation and management [6-8].

The garden healing program is an easily accessible program to anyone, and its effect is relatively large, which can promote physical and mental health and provide opportunities for social relationships for the socially underprivileged, especially the patients with mild cognitive impairment and early dementia. However, the reality is that there are no results of how much physical labor is possible and whether new knowledge can be acquired, and there are no accurate data on the effectiveness of the program [5][6]. In particular, for patients in nursing homes who are living a life disconnected from society, the garden healing program can provide outdoor activities and contact with many people and can provide opportunities to talk to each other and revive memories while proceeding with the program. In addition, it is judged that the effect of the garden healing program can be maximized only when the continuity of the program is guaranteed by preparing not only the garden healing program for the socially underprivileged but also a maintenance technique. In addition, it is necessary to develop customized programs for the socially underprivileged so that they can enjoy garden culture without discrimination by gender, age, and disability, and provide garden healing services to various socially underprivileged people [6, 9].

The purpose of this study is to develop a garden healing program to induce active activities of patients with mild cognitive impairment and early dementia living in nursing homes, and to induce healing functions and social activities. In addition, the detailed objectives to achieve the above objectives are as follows.

First, a preliminary program is conducted for patients with mild cognitive impairment and early dementia to select a garden healing program in which socially disadvantaged people can participate.

Second, the garden healing program is operated in elderly care facilities, and the operating hours, duration, and contents of the garden healing program are selected by identifying the strengths and weaknesses of each program by participants and operators.

Third, by identifying the effects of garden healing programs psychologically and physiologically and identifying the results by long-term care level, garden healing programs and operating manuals suitable for the

level of participants are developed.

2. PRELIMINARY PROGRAM

The preliminary program was conducted to determine whether patients with mild cognitive impairment and early dementia can perform the garden healing program. In addition, if the garden healing program could be performed, it was intended to determine how many hours of the program would be conducted, and the purpose was to determine what manpower was required to proceed with the program.

Theme: Creating a healing farm with 1,000 kinds of wildflowers and a garden of memory using wildflowers

- Awareness: Programs for Recall and Short-Term Memory Recovery
- Physical: Physical treatment through walking programs along with walking and meditation
- Sociality: Interpersonal and social improvement programs
- Psychology: Psychological stability through proper breathing outdoors

The results of the preliminary program were evaluated for cognitive, physical, social, and psychological effects, and the evaluation method was surveyed before and after the program. As for the questionnaire, each evaluation factor was evaluated by a 5-step scale, and opinions on the program were heard.

The subjects were elderly people living in Yeosu City as early dementia elderly and wishing to participate in the program in cooperation with the Gyeonggi Metropolitan Dementia Center, the Dementia Relief Center in Yeosu-si, Gyeonggi-do, and the occupational therapy department of Yeosu University. The number of senior citizens who participated in the preliminary program was 13, with 4 people in the 3rd grade of long-term care, 4 people in the 3rd grade, and 5 people in the 5th grade.

It was possible to proceed with the program easily by learning and remembering various plant names. However, there were not many plant species, so it was judged as a simple task.

As a result of the 5-stage evaluation, the elderly in the 3rd and 4th grades of long-term care received a high evaluation of 4.2 points or more on average. On the other hand, the elderly in the 5th grade received a 4.0 evaluation. It was not possible to confirm whether the program using tubular plants improves cognitive ability. For use in this program, it is necessary to teach more professional knowledge to some extent, plant it yourself, and add actions such as designating one's own plant.

In the preliminary program, four programs were conducted for the purpose of improving cognitive ability, physical ability, sociality, and psychological improvement.

As shown in Figure1(a), it was found that the awareness ability improvement program using interglacial plants indoors was not very effective, and the participants were found to want to create a garden outdoors rather than indoor gardening, and it was judged that it would be effective to stimulate through professional lectures to some extent. Therefore, in this program, various herbaceous plants were decided to be used to improve cognitive ability, and cognitive ability was improved through actions such as planting and selecting and managing their own plants.

As shown in Figure1(b), the physical ability improvement program aimed at improving physical ability or breathing ability while walking on a forest road, but the effect was insufficient and the satisfaction of the program was not high, and participants were found to want a program to touch the soil and plant flowers. Therefore, in this program, to improve physical ability, physical ability was improved through physical work such as digging and picking the foundation, not walking.

As shown in Figure1(c), the sociality improvement program is an indoor vertical garden creation program that aims to improve sociality through communication among participants, but it is found that it is desirable to operate an outdoor garden creation program because there is a limit to growing sociality through simple work. Therefore, in this program, in order to improve sociality, it was jointly designed and jointly completed one garden.

As shown in Figure 1(d), the psychological improvement program was conducted through meditation in the garden, but it was found that the elderly who wanted something active lacked stimulation, and they were found to want more events such as a garden party. Therefore, in this program, we decided to attach name tags or name names to have a sense of accomplishment through a garden party, and to have the possessiveness of our own garden. It also gave us expectations for flowers to bloom in spring.



Figure 1(a) Awareness program, Figure 1(b) Physical program, Figure 1(c) Sociality program, Figure 1(d) Psychology program

3 RESEARCH METHOD

The type, detailed plan, and evaluation method of the garden therapy program in the third year were determined by reviewing the operation performance of the garden therapy program performed in the first and second years. The program lasted 3 hours per number of times and was operated with a 10-minute break after the 20-minute program.

Based on the results of the second year, the program aimed to create three gardens, and theoretical education on the outline and characteristics of the gardens was given priority, followed by space design and planting design to create a garden at the target site, and then three gardens were created. In addition, the program was repeatedly executed three times by dividing the entire target site into three zones rather than creating the entire site at once, as in the second year [5, 6].

The recruitment period for the study subjects began on April 1, 2023, and was recruited for 7 days and the recruitment site was selected according to the selection criteria after posting a notice on the nursing home information board, explaining the purpose of the study, and when the researcher asked about the intention to participate, the person who wished to participate was selected.

Chungju City Senior Nursing Home is an institution entrusted by Chungju City and has been operated since 2022, and the landscaping of the site has recently been completed. In the third year of the program, the program was carried out on the roof of the building to enable the program in the city center for the distribution of the garden healing program, and the Chungju Senior Nursing Home was designed to provide easy access to the rooftop, so there was no major problem in proceeding with the garden healing program. The program aimed to create three gardens based on the results of the second year, and theoretical education on the outline and characteristics of the garden was conducted, and then space design and planting design were conducted to create a garden on the target site, and three gardens were created.

In this study, a psychological evaluation of experienced persons was conducted to evaluate the garden healing program. For psychological evaluation, the scales of depression, anxiety, vitality, life satisfaction, loneliness, and stress perception were used.

In the evaluation of the program, physiological evaluation was conducted using Omni Fit Mind care. Omni Fit Mind care can check mental health status at once by simultaneously measuring brain waves and pulse waves through a dedicated headset. The data extracted through pulse waves are autonomic nerve age, stress, cumulative fatigue, heart health, physical vitality, sympathetic nerve activity, parasympathetic nerve activity,

autonomic nerve balance, and autonomic nerve health. Brain waves measurement results include basic brain waves, concentration, brain activity, brain stress, and sin-right brain imbalance.

4. RESULTS

4.1 Implementation of gardening program

In the case of the program target site, a place where the rooftop space of the building could be used was selected with the aim of developing a program to enable garden healing programs in the city center. In addition, Chungju Senior Nursing Home (40 Wolhyeon-gil, Sancheok-myeon, Chungju-si, Chungcheong Buk-do) was selected by selecting places that could actively participate in the garden healing program with a nursing grade of 3 or lower as in the first and second sessions. Chungju Senior Nursing Home is a newly opened senior nursing home in 2022 and is currently operating at the same time as a day and night care center, with 200 elderly people with dementia living, and 40 elderly people using it day and night. The area is relatively large at 8,200 m², and it is equipped with an indoor program room for conducting theoretical lectures. As shown in Figure 2, it is easy to access and has two unused rooftops, making it suitable for operating garden healing programs.

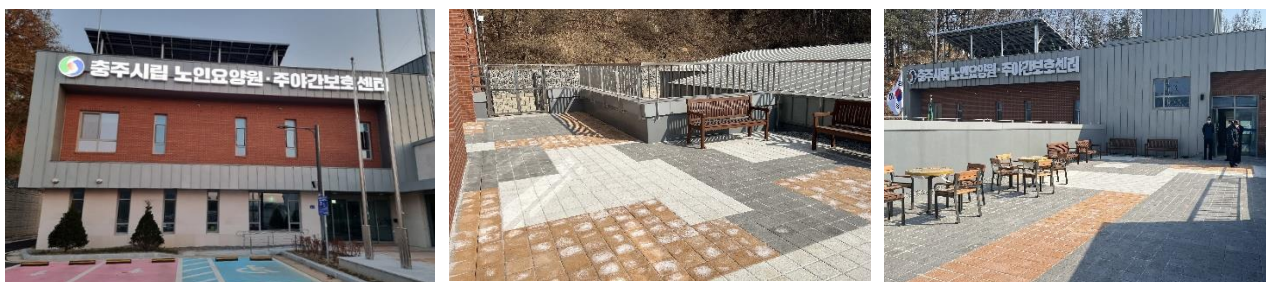


Figure 2(a) Chungju Senior Nursing Home, Figure 2(b) Rooftop 1, Figure 2(c) Rooftop 2

All participants selected for the program consisted of disability grades 3 or lower, with 4 disability grades, 6 disability grades, and 10 disability grades, and 7 men and 13 women, with a large number of female participants. In terms of age group, there were 3 people in their 60s, 3 people in their 70s, 10 people in their 80s, and 4 people in their 90s.

Starting in June 2023, until November, a gardening program was conducted at Chungju Senior Nursing Home for patients with mild cognitive impairment and early dementia. Based on the results conducted in 2021, the Gardening Program created three gardens in 2023 based on the results that it is better to repeat short-term programs rather than conducting 30 different programs and that repeated program operations conducted in 2022 were effective. In addition, the first round was a large-scale garden built with the management team, and the second and third rounds were led by the elderly. In accordance with the low effectiveness of the theoretical education conducted in 2021 and 2022, and experts' opinions on the combination of enjoyable programs, in 2023, we added programs such as a birthday party, garden creation reminding, and garden singing.



Figure 3(a) Lecture Program, Figure 3(b) Design Program, Figure 3(c) Gardening Program

4.2 Psychological Stress Improvement Effect

4.2.1 Korean-style mental health screening tool, depression

During psychological evaluation, a one-way analysis of variance (ANOVA) was conducted on the results of pre-evaluation, interim evaluation, and post-evaluation on the evaluation items related to depression to confirm whether there was any change in the operation of the program. The analysis was conducted by dividing it by nursing grade (grades 3, 4, 5). In addition, a t-test (pair comparison) was performed on the group identified as having a change in the one-way analysis of variance (ANOVA) to determine at what stage the change occurred.

As show in Figure 4, it was found that the evaluation of depression did not change even if the gardening program was conducted in the 3rd grade of nursing grade and the 5th grade of nursing grade. However, when judged numerically, there was a tendency to be slightly higher in the interim evaluation than in the pre-evaluation, and it was found that most of them tended to improve during the post-evaluation.

On the other hand, in the case of nursing grade 4, it was statistically recognized that the evaluation of depression was improved by the gardening program ($P < 0.01$). As a result of the t-test (pair comparison) conducted to determine at what stage the evaluation of depression improves, it was found that it did not improve in the results of the interim evaluation but improved in the final evaluation. In other words, it was found that the evaluation of depression improved only when the gardening program lasted for a certain period of time, and although theoretical education was concentrated indoors in the beginning, events such as garden creation and garden parties in the second half were also considered to have affected the results.

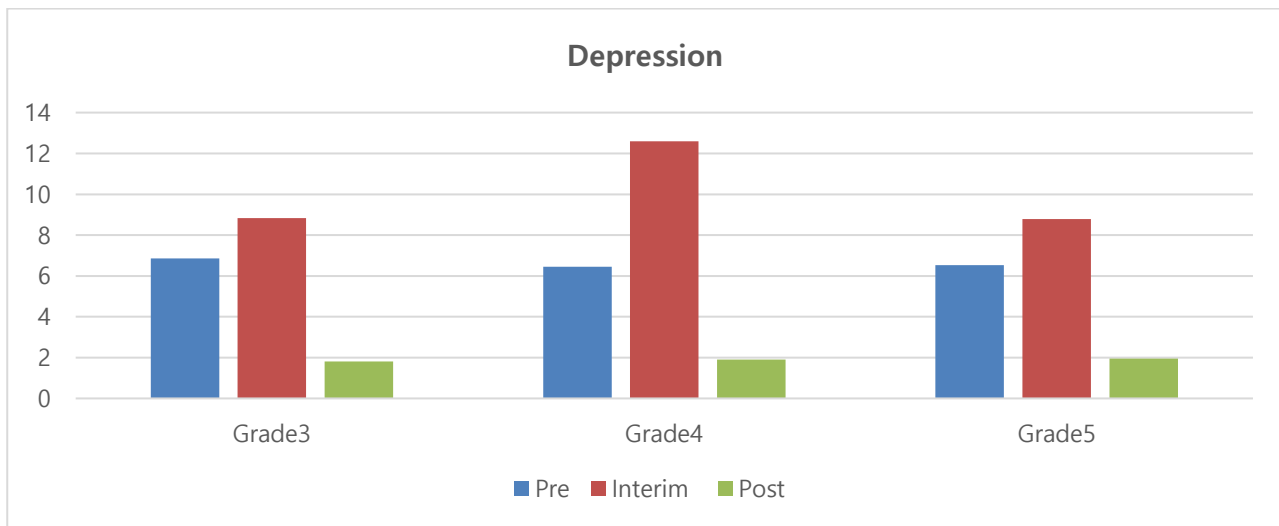


Figure 4. Changes in Depression

4.2.2 Korean-style mental health screening tool, anxiety

During psychological evaluation, the results of pre-evaluation, interim evaluation, and post-evaluation were evaluated for evaluation items related to anxiety, as described above.

As show in Figure 5, it was found that the evaluation of anxiety did not change even if the gardening program was conducted in the 3rd grade of nursing grade and the 5th grade of nursing grade. However, when judged numerically, there was a tendency to be slightly higher in the interim evaluation than in the pre-evaluation, and it was found that most of them tended to improve during the post-evaluation. On the other hand, in the case of the 4th grade of nursing grade, it was statistically recognized that the evaluation of anxiety was improved by the gardening program ($P<0.01$). As a result of the t-test (pair comparison) conducted to determine at what stage the evaluation of anxiety is improved, it was found that it was improved in the final evaluation, but not in the result of the interim evaluation.

In other words, it was found that the evaluation of anxiety improves only when the gardening program lasts for a certain period or longer. In addition, although theoretical education indoors was concentrated in the beginning, it is believed that the fact that a number of events such as garden creation and garden parties were held in the second half may have influenced the results.

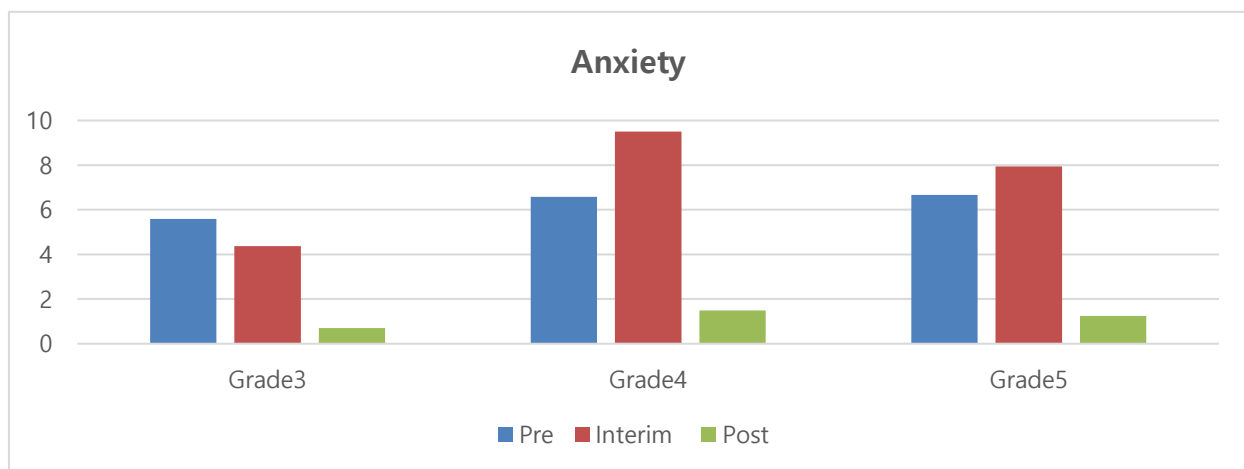


Figure 5. Changes in Anxiety

4.2.3 Korean Mental Health Screening Tool, Vitality

During psychological evaluation, the results of pre-evaluation, interim evaluation, and post-evaluation were evaluated for evaluation items related to vitality. The evaluation method is as above.

As show in Figure 6, it was found that the evaluation of vitality did not improve even if the gardening program was conducted in the 3rd grade of nursing grade. However, when judged numerically, it tended to be slightly higher in the interim evaluation than in the pre-evaluation and higher again in the post-evaluation, and it was found that there was an improvement effect.

On the other hand, in the case of nursing grades 4 and 5, it was statistically recognized that the evaluation of vitality was improved by the gardening program ($P<0.05$). As a result of the t-test (pair comparison) conducted to determine at what stage the evaluation of anxiety improves, both grades 4 and 5 did not improve in the results of the interim evaluation, but it was found that they improved in the final evaluation.

In other words, it was found that the evaluation of vitality improved only when the gardening program continued for a certain period of time or longer. In addition, although theoretical education indoors was concentrated in the beginning, it is believed that the creation of gardens and garden parties outdoors in the second half would have affected the vitality of the results. In particular, for the elderly who are isolated from society and live only indoors, such as nursing homes, it is believed that the fact that the gardening program conducts programs outdoors with several people increases vitality

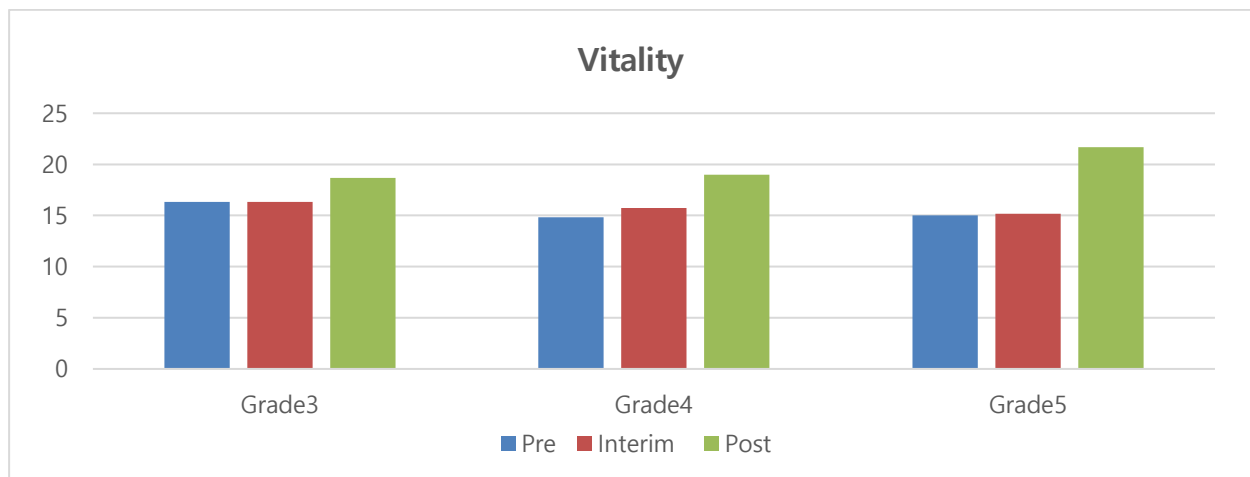


Figure 6. Changes in Vitaliy

4.2.4 A Korean Life Satisfaction Scale

During psychological evaluation, the results of pre-evaluation, interim evaluation, and post-evaluation were evaluated for evaluation items related to life satisfaction.

As show in Figure 7, it was found that the evaluation of life satisfaction did not improve even if the gardening program was conducted in the 3rd and 4th grades of nursing grade.

When judged numerically, the 3rd grade was slightly lower in the interim evaluation than before and tended to increase again in the post-evaluation, making it difficult to evaluate life satisfaction. The 4th grade of nursing grade tended to increase gradually, and the quality of life tended to increase as participating in the gardening program, but statistically significant changes were not recognized. On the other hand, in the case of the 5th grade of nursing grade, it was statistically recognized that the evaluation of life satisfaction was improved by the gardening program ($P < 0.05$).

As a result of the t-test (pair comparison) conducted to determine at which stage the evaluation of anxiety improves, it was found that the result of the interim evaluation improved. In other words, it was found that the gardening program can increase life satisfaction even in a short period of time.

However, in order to increase life satisfaction, it was found that it was more effective to operate a gardening program for the elderly who did not develop mild cognitive impairment or early dementia.

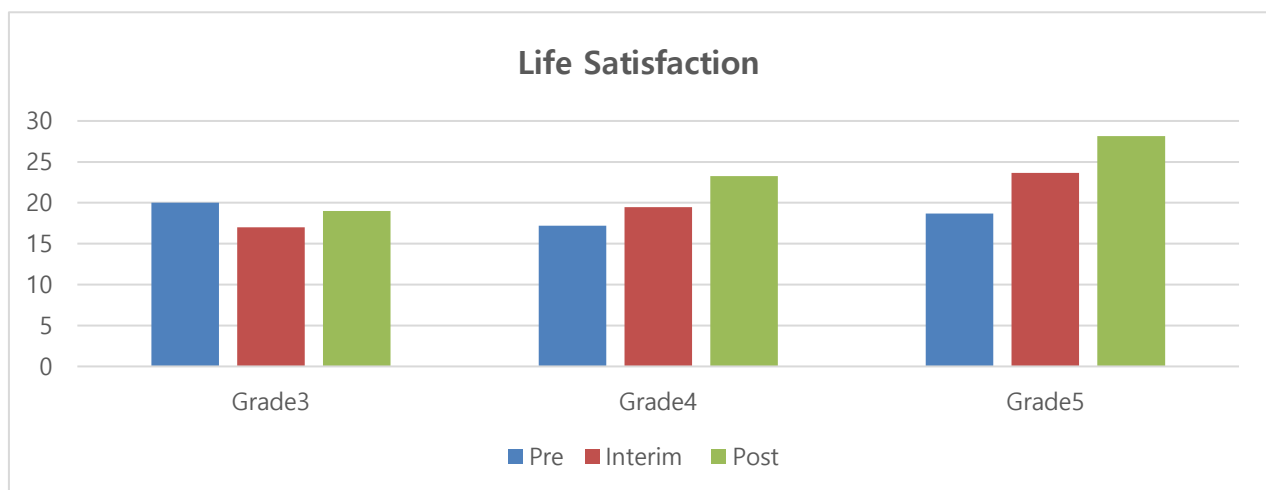


Figure 7. Changes in Life Satisfaction

4.2.5 Korean Version Shortened UCLA Loneliness Scale

During psychological evaluation, the Korean version of the shortened UCLA loneliness scale was conducted twice before and after, so a t-test (pair comparison) was used to statistically check whether differences occurred before and after the gardening program.

As show in Figure 8, through the gardening program, there was no statistically significant difference in the loneliness scale in all nursing grades, but the overall improvement trend was found. In other words, it was thought that the elderly who participated in the gardening program relieved loneliness by communicating and talking with many people through gardening. In addition, there was an opinion that the gardening program created the will to overcome loneliness by recalling the youth. Therefore, if the gardening program is conducted more continuously, it is judged that loneliness, one of the biggest problems of the elderly living in nursing homes, can be alleviated.

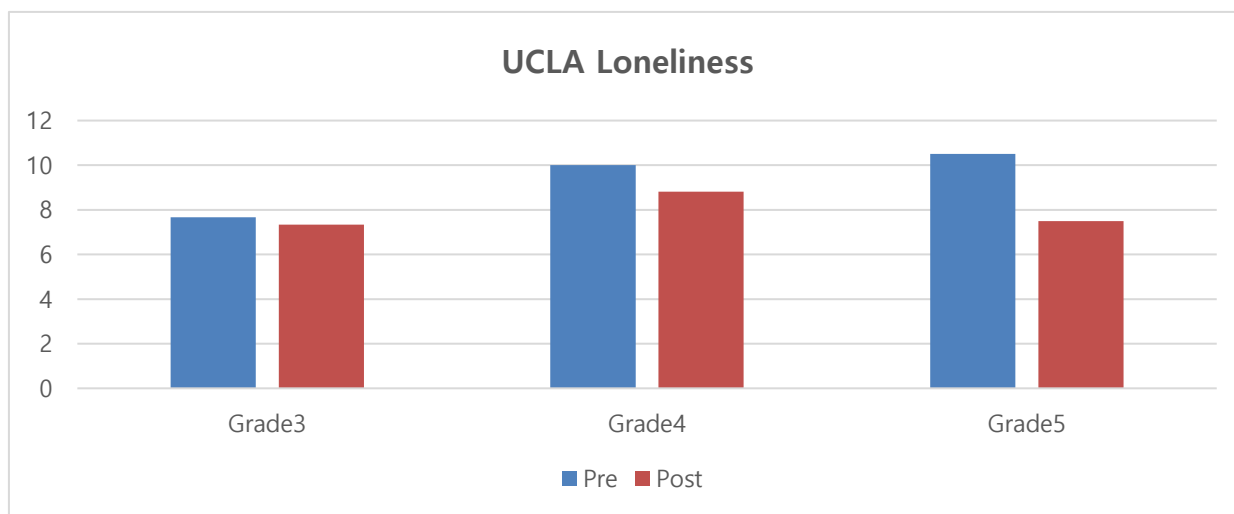


Figure 8. UCLA Loneliness

4.2.6 Korean version of stress awareness scale

During psychological evaluation, the Korean version of the stress perception scale was conducted twice before and after, so a t-test (pair comparison) was used to statistically check whether there was a difference between the two figures.

As show in Figure 9, it was found that through the gardening program, the level of the stress perception scale was significantly lowered ($P < 0.05$) in all nursing grades. In other words, it means that the stress perceived by the elderly who participated in the gardening program is decreasing.

Elderly people living in nursing homes generally have very high stress from being alone and fear of death, but it was found that stress was improved through about 3 to 4 months of gardening program. The gardening program needs to be operated continuously to relieve the stress of the elderly.

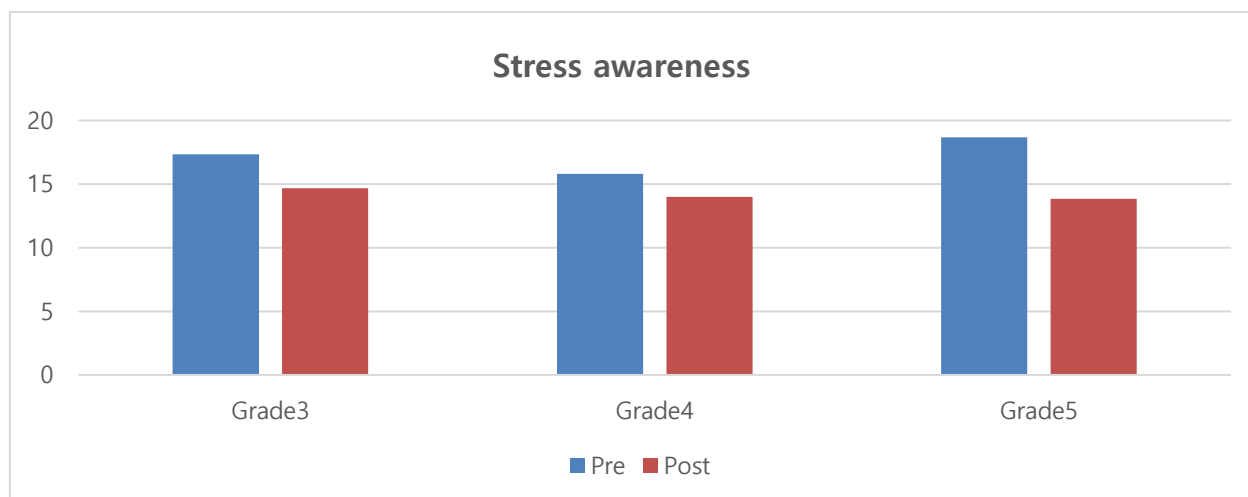


Figure 9. Stress awareness

4.3 Physiological I Stress Improvement Effect

4.3.1 Brainwave measurement

Brain waves (brain condition score) were examined before the start of the program using an Omni Fit EEG (Electro Encephalo Graphy) meter and after the program was performed 16 times, and as a result of performing variance analysis (one-way placement) with the result, no significant change was observed. In other words, it was found that the condition of the brain did not improve due to the gardening program. However, there was a tendency to increase to a certain level in the post-evaluation.

Concentrated data is data that appears higher as concentration increases, and it can be observed that it has changed significantly before and after the gardening program ($P < 0.01$). However, the highest concentration was shown at the start of the gardening program, and then the concentration tended to decrease, but the concentration tended to recover again in the future. Since it is believed that the concentration was slightly lowered by the program that was conducted over a long period of time, it is judged that it is necessary to shorten the 3 hours of the gardening program.

SEF (Spectral Edge Frequency)-90 represents brain activity, and high indicates a lot of brain activity, and low indicates a decrease in brain activity. In other words, the improvement of the SEF-90 level can be said to be a very positive effect for the elderly with early dementia or mild cognitive impairment. As a result of conducting an analysis of variance based on the results conducted before and after the gardening program, it was observed that it increased significantly ($P < 0.05$). In other words, it can be confirmed that brain activity becomes active as the gardening program is implemented, and it was found that the gardening program has the effect of improving early dementia or mild cognitive impairment.

The H-beta value represents stress, and when it is high, it is judged to be stressful, and as a result of implementing this program, it was found that it was lowered to a significant level ($P < 0.01$). In other words, it was found that the stress reduction effect of the elderly living in nursing homes can be reduced through the gardening program. The stress reduction effect showed the same result in psychological evaluation, so the stress reduction effect by the gardening program could be quantitatively identified.

The relative left brain power value is a value representing psychological anxiety and tends to decrease to a statistically significant value ($P < 0.01$) after the program is conducted. Psychological evaluation also showed a significant difference in anxiety, and it was confirmed that anxiety was resolved by the gardening program. In other words, it was possible to know the effectiveness of the gardening program, which proceeds with the anxiety of the mentally disabled elderly with various people and is protected by social workers

4.3.2 Pulse wave measurement

The pulse wave (age of autonomic nerves) was tested using an Omni Fit pulse wave meter before the start of the program, after the 16th program was performed, and after the 30th program was performed. As a result of conducting the result through analysis of variance, it was found that it rose to a statistically significant value ($P < 0.05$). In other words, as the age of the pulse wave was improved due to the gardening program, it was confirmed that it became physically healthy.

The higher the heart health, the better the data, and it was confirmed that it was continuously improved ($P < 0.05$) with the implementation of the gardening program. In other words, heart health can also be improved by the gardening program, and most of the gardening program is due to physical labor, which can be said to be very effective in maintaining physical health for the elderly living in nursing homes.

The higher the heart health, the better the data, and it was confirmed that it was continuously improved ($P < 0.05$) with the implementation of the gardening program. In other words, heart health can also be improved by the gardening program, and most of the gardening program is due to physical labor, which can be said to be very effective in maintaining physical health for the elderly living in nursing homes.

The higher the sympathetic nerve activity, the more vital it is. However, it was found that the gardening program did not affect the activation of the sympathetic nervous system. There was no tendency to decrease or increase, and almost the same value was shown.

It is known that the activation of the parasympathetic nervous system increases when a person rests and is activated when a person maintains a comfortable state. In addition, if the parasympathetic nervous system activity is high, it is a value indicating that one can easily rest. As a result of grasping the effect of the gardening program, there was no significant change by the gardening program, resulting in the same result as the sympathetic nervous system.

The activation of the sympathetic and parasympathetic nerves is a factor that is greatly affected by the measurement time and the psychological state at the time of measurement. The higher the autonomic nerve activity, the better the result, and it tended to be slightly lowered through the gardening program, but it was not statistically significant. In other words, it was found that the activation of the autonomic nerve was not performed by proceeding with the gardening program.

5. DISCUSSION

Despite the combination with various programs, there is possibilities for improvement as it does not show good results in satisfaction or psychophysiological evaluation. As a result of the evaluation by nursing grade, the 3rd grade of nursing grade did not show an improvement effect in most figures, while the 4th and 5th grades of nursing grade showed a significant improvement effect. In other words, in the results of 2021 and 2022, grades 1 and 2 were excluded from the program due to safety problems, but even in the case of grade 3, the effect was found to be insufficient, so it needs to be reviewed. In 2021 and 2022, we decided that the burden and safety of bending down could be a problem as the garden is built on the natural ground, and since the target site for 2023 is the rooftop of a building, we created a garden using a planter. As a result, the degree of bending of the elderly when planting or maintaining plants improved a lot, it was possible to create wheelchairs even when sitting in wheelchairs, and it was easy to enter wheelchairs.

However, there is a limit in terms of design, and considerable effort and money were required to install planters to create a rooftop garden, so the program should be operated in consideration of the level of care of the subjects and the space composition of the nursing home in the future. The psychological evaluation showed statistically improved results in most evaluation items, and compared to the control program, the number of elderly participants in the gardening program improved compared to the control program participants. In measuring mental and physical stress using brain waves and pulse waves, brain waves and pulse waves improved to statistically significant values with the gardening program. The results showed that most of the participants' age groups were older than 70s, and both mentally and physically improved by the gardening

program. Regarding the above analysis results, it should be noted that there are differences in each nursing level, although it is somewhat predictable, such as the improvement effect of gardening in previous studies, and it is found that it is necessary to proceed with the program by nursing level when operating a gardening program for the socially underprivileged in the future

6. CONCLUSION

In the case of the elderly with early dementia and mild cognitive impairment, we found that memory is limited, so running simple and easy programs repeatedly rather than running various programs can lower anxiety. Therefore, it can be effective to proceed with the program by dividing the target site into small units. Since the 3rd grade of nursing grade is a group whose stress perception effect can be improved to an effective level by the gardening program, it is desirable to plan programs focusing on outdoor activities, but since wheelchairs are often used, it is necessary to develop a gardening program in the form of using a planter or creating a vertical garden indoors. The 4th grade of nursing grade was the group that received the highest improvement effect, and overall, the evaluation was improved in all items such as depression, anxiety, and vitality. Most of them can participate in the gardening program at their own judgment. In the 5th grade of nursing grade, it is possible to participate in the gardening program that follows physical labor and has a high understanding of education, but since a simple gardening program may not have an improvement effect, it is possible to operate more diverse gardening programs in the 5th grade group.

ACKNOWLEDGEMENT

This paper was carried out with the support of the Forest Service in 2023

REFERENCES

- [1] M. S. Kang, "A Study on Process of Psychological Resident Adjustment in Skilled Nursing Home," UCI(KEPA), Vol. 2012, No. 2, pp. 58-80, Feb 2012.
- [2] Y. W. Kang, D. R. Na, and S. H. Han, "A Validity Study on the Korean Mini-Mental State Examination(K-MMSE) in Dementia Patients," Journal of the Korean Neurological Association, Vol. 15, No. 2, pp. 300-308, 1997.
- [3] J. H. Kang, "Exploring Social Relationships of Elderly Female Residents Living in a Nursing Home," Family and culture, Vol. 25, No. 1, pp. 180-210, 2013. DOI: <http://dx.doi.org/10.21478/family.25.1.201303.007>
- [4] Kwon, S., The Experience of Adult Children Caregivers Caring for their Institutionalized Demented Parents in Korea. Ph.D. Thesis. Kosin University, Korea, 2013.
- [5] H. J. Lee, and S. H. Hong, "Effect of Gardening Program as a Mental Rehabilitation Program," - For the Elderly in Aged Care Hospitals – Journal of Korea Institute of Garden Design, Vol. 9, No. 3, pp. 171-181, 2023. DOI: <http://dx.doi.org/10.22849/jkigd.2023.9.3.004>
- [6] K. P. Hong, H. Y. Jin, and H. J. Lee, "Gardening Program as Cognitive Rehabilitation Program for Mild Cognitive Impairment," Journal of the convergence on culture technology, Vol. 8, No. 2, pp. 59-67, 2022. DOI: [10.17703/IJACT.2022.8.2.59](https://doi.org/10.17703/IJACT.2022.8.2.59)
- [7] Lee, J., Design of rooftop landscape of senior welfare facilities with introduction of a healing environment, Master Thesis. Hongik University, Korea, 2009.
- [8] Cha, I., Possibility of introducing the Healing Garden and the status of spatial and using programs in the outdoor space of Elderly Care Facilities, Master Thesis. Chonnam National University, Korea, 2012.
- [9] Kim, H., Study on the utilization of space for horticultural therapeutic environment in facilities for elders, Ph.D. Thesis. Seoul Women's University, Korea, 2004.
- [10] K. P. Hong, and H. J. Lee, "The Effect on Scenic Impression by Different Construction Methods of Green Wall," International Journal of Advanced Culture Technology (IJACT), Vol. 7, No. 1, pp. 133-142, 2019. DOI: <http://dx.doi.org/10.17703/IJACT.2019.7.1.133>