Effects of Horticultural Therapy Programs on Depression and Self-esteem in Released-Convicts

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Abstract
This study carried out to identify effect of horticultural therapy programs (HTP) on the changes of depression and self-esteem in released-convicts. HTP were conducted once a week total 4 times (each time 60 minutes) from 7 November to 28, 2016 on 13 released-convicts coming Korea rehabilitation agency Gwangju Jeonnam branch. Measurement methods were used scale of depression, scale of self-esteem, Form for evaluation of HTP. As a result, the mean value of depression was decreased to 11.2 after HTP compared with 17.4 before HTP and there was statistically significant difference (p=.013). And HTP in grade of self esteem was increased to 16.1 after HTP compared with 12.1 before HTP and there was statistically significant difference (p=.001). The result of this study indicated that the horticultural therapy programs has positive effects on depression and self-esteem in released-convicts.

Key words: plant growth, positive effects, social adaptation

I. Introduction

In this highly competitive society, those who fall behind the competition, or those who are relatively marginalized or maladjusted mostly live in poor surroundings or have weak foundations. In particular, those who are held in prison after violating social norms and committing crimes, and are spend years of rehabilitation face harsh reality after being released from prison, their adaptation to society is a very important issue in society (Lee, 2007).

It is necessary to reduce their criminal tendency, and help them adapt to their life in prison and be well socialized after being released, and to do so, various programs and therapies are provided to improve social rehabilitation skills such as interpersonal relation skills, communication skills, independence and sociality, positive self-esteem, and achievement motivation. Despite such efforts, when inmates are released and face reality, they have to face and deal with discrimination and many difficulties in society until they become independent as a member of society (Chi, 2010).

Released prisoners have motivation to newly adapt to society, but due to social stigma as criminals and failure to achieve economic independence, their self-esteem is lowered and they experience an inner conflict and depression. Such unresolved environmental and emotional issues make them get involved in another crime, and their escalating anger can be directed either themselves or society (Ahn et al., 2000).

Among social rehabilitation therapy programs, horticultural therapy programs are often used. Activities of growing and cultivating plants are effective to rehabilitate and heal people in pain. As people see changes in the flowers and plants they grow, they can be psychologically stable, and become free from anxiety and depression, which has been researched as an effective nursing intervention that can bring about positive changes in attitudes (Kim and Kim, 2001). Kong et al. (2015) found that the self-esteem and quality of life of institutionalized elderly people with dementia was improved through horticultural therapy programs, and Kim (2002) reported that the self-esteem of female victims of domestic violence living in refuges improved and their depression decreased through such programs. Kang et al. (2015) also found that green activities among other leisure activities were effective to reduce the stress and depression of the elderly, and Kwon et al. (2011) reported the...
positive effects of horticultural therapy programs on the depression and stress of hospice care patients. Jeon et al. (2016) also confirmed the significant effect of such programs on the self-esteem, ego resiliency and stress of low-income children.

Among earlier studies on inmates, Chi (2010) found that the positive effects of horticultural therapy programs on the interpersonal relations of male inmates were statistically significant. Bak and Jeong (2015) reported that the mental health of prisoners was improved through sweet potato hydroponic programs, and Kim and Suh (2001) conducted a study on the current status of vocational training and the introduction of horticultural therapy for inmates, and suggested as a vocational rehabilitation program managing a flower shop that can be set up without a large investment, special skills or marketing know-how. In addition, in a study on horticultural therapy programs on female inmates (Ahn et al., 2000), the positive effects of such programs on sociality and interpersonal relations were statistically significant. However, there was no study published in Korea on the effects of horticultural therapy on released prisoners. Against this backdrop, this study aimed to apply an indoor horticultural therapy program to released prisoners, to observe the effect of the program on their depression and self-esteem, and to analyze the possibility of utilizing the program for the social rehabilitation of released prisoners.

II. Research Methods

1. Research design

In this study, using a pretest-posttest design, a pretest and posttest were conducted before and after applying an indoor horticultural therapy program to identify its effect on the depression and self-esteem of released prisoners.

2. Research subjects

This study was conducted among 13 released prisoners who participated in an indoor horticultural therapy program in the Korea Rehabilitation Agency located in G city. There were 12 males (92.3%) and 1 female (7.7%). They were in the 30s to 60s, and the average age was 48.9±10.8 (Table 1).

Table 1. Demographic characteristics of clients.

| Item   | Sub-item | Frequency | Mean (SD) | (%) |
|--------|----------|-----------|-----------|-----|
| Sex    | Male     | 12        |           | 92.3|
| (n=13) | Female   | 1         |           | 7.7 |
| Age    | 30~39    | 4         | 30.7      |     |
| (n=13) | 40~49    | 3         | 48.9 (10.8)|   23.1|
|        | 50~59    | 3         |           | 23.1|
|        | 60~69    | 3         |           | 23.1|

Participants were selected among those who were released from prison, consented to participate in the program, can read and understand questionnaires written in Korean and communicate in Korean, had difficulties in social rehabilitation (without a place to live, unable to afford basic living costs, afraid of the legal duty to expose their criminal records), and wanted to return to society.

3. Research tools

1) Design of horticultural therapy program

The horticultural therapy program used in this study was designed based on the program developed by Koh (2000) to reduce depression and enhance self-esteem. In consultation with the Korean Rehabilitation Agency, the program was comprised of 4 sessions, and the first and second sessions included individual activities to raise their interest and motivation, and the third and fourth sessions focused on group activities to encourage participants to feel a sense of accomplishment on the outcome of interactions and cooperation. Considering the characteristics of participants, the program was designed to focus on indoor activities rather than outdoor activities, and the beginning time of a session was decided by reflecting the opinions of participants (Table 2).

The process and expected effects of each session were as follows. In the first session, as an orientation course, group rules and goals were set up. Participants introduced themselves to others, and made a bouquet of flowers and presented it to themselves. In the process of setting up group rules and goals, rapport between participants was created and motivation was provided to create interest in the program.

In the second session, participants planted hydroponic plants,
Table 2. Horticultural therapy program performed for this study.

| Session | Program               | Plants used in programs              |
|---------|-----------------------|-------------------------------------|
| 1       | Pre-test              | Chrysanthemum morifolium            |
|         | Making a bouquet      | Rosa canica                         |
| 2       | Planting hydroponic   | Dracaena fragrans                   |
|         | plant                 |                                     |
| 3       | Making a dish garden  | Crassula ovata                      |
|         |                       | Echeveria Hanatsukiyo               |
|         |                       | Echeveria Derenbergii               |
|         |                       | Crassula ovata ‘Gollum’             |
| 4       | Post-test             | Chamaedorea elegans                 |
|         | Making a dream garden | Ardisia japonica                    |
|         |                       | Hedera helix                        |

and they were encouraged to connect their own strengths with the strengths of each plant by understanding the names and characteristics of the plants. The session focused on enhancing the self-esteem of participants by encouraging them to find and support the strengths of others.

In the third session, participants made a dish garden as a group activity. They selected the species of plants and locations where they planted them together to create a harmonized miniature garden. This session was designed to promote interactions and sociality, and to ensure participants to feel a sense of satisfaction and accomplishment after creating a miniature garden together. Like various species of plants harmonized together in the miniature garden, participants were encouraged to express their negative feelings and view their weakness not from negative aspects, but from positive aspects of diversity.

In the last session, a garden was created with three species including Chamaedorea elegans, Ardisia japonica and Hedera helix. Participants had time to share their future dreams and the happiest moment in their life, imagine the future when the plants grow to bear fruits, and discover their value through the realization of their dreams. In each session, every participant was given an opportunity to express their feelings and opinions.

2) Process of horticultural therapy program

The horticultural therapy program was held once a week from November 7 to 28, 2016, and a total of 4 sessions were held. The duration of a session was 60 minutes, and each session was comprised of introduction (10 min), development (40 min), and summary (10 min). The program was led by a mental health nurse who had the second degree of welfare horticultural therapist. It was held within a conference room that can accommodate 20 people in the Korea Rehabilitation Agency, from 7pm to 8pm.

3) Measurement tools

(1) Depression scale (CES-D)

To measure the depression level of participants, the Center for Epidemiological Studies Depression Scale (CES-D) was used. The CES-D, as a primary screening test, was developed by the National Institute of Mental Health (NIMH) in the United States for community epidemiological surveys, and the self-reporting scale was composed of 20 questions (Radloff, 1977). The scale was translated into different languages and used very widely. In Korea, Cho and Kim (1993) translated the CES-D into Korean and confirmed its reliability and validity. Depending on the frequency of depression symptoms experienced during the past week, their depression symptoms were divided into 4 levels. On the questions about the severity of depression symptoms, the answers of each question were scaled as follows: rarely (0 point), some or a little of the time (1 point), occasionally or a moderate amount of time (2 points), and most or all of the time (3 points). All points are totaled (0-60 points), and the higher the total, the higher the level of depression. In Korea, those who score 16 points or higher are categorized into a “potential” depression group, and those who score 25 points or higher, into a “clear” depression group. The reliability of the tool was found to be Cronbach’s α=0.91 in the group of general people (Cho and Kim, 1993), and in this study, it was Cronbach’s α=0.94.

(2) Self-esteem

To measure the self-esteem level of participants, the translated and revised version (Jeon, 1974) of the self-esteem scale developed by Rosenberg (1965) was used. The tool was composed of a total of 10 questions: 5 questions on positive self-esteem and 5 questions on negative self-esteem, and a 4-point Likert scale was used. The higher the score, the higher the level of self-esteem. The reliability of the tool was Cronbach's α=0.85 when it was first developed. In another study conducted by
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Jeon (1974), it was Cronbach’s α=0.84, and in this study, it was Cronbach’s α=0.76.

4. Data processing and analysis methods

The collected data was analyzed using SPSS WIN 22.0, and the reliability (Cronbach’s α) of the tools were presented in the section of measurement tools. The Kolmogorov-Smirnov test was carried out to check the normal distribution of the collected pretest data. The Wilcoxon signed-rank test was conducted to compare the differences between the average values of pretest and posttest results before and after offering the program.

III. Results and Discussion

1. Normality verification

In this study, the Kolmogorov-Smirnov was conducted to check the normal distribution of the depression and self-esteem of participants before offering the horticultural therapy program, and the results showed that both depression (p=.200) and self-esteem (p=.128) were normally distributed (Table 3).

2. Changes in depression

The average depression level of participants before participating in the horticultural therapy program was 17.4 points, and the level was reduced to 11.2 points after the program, indicating a statistically significant difference (p=.013) (Table 4).

This result coincided with those of earlier studies on horticultural therapy programs including that of Dannenmaier (1995) on the effects of horticultural therapy programs on depression symptoms; those of Han et al. (2009) and Kim (2010) conducted among the elderly; that of Oh (2001) conducted among elderly people suffering from hemiplegia after stroke, and from degenerative arthritis; those of Kim et al. (2006) and Song (2009) conducted among hospice care patients; that of Kim (2008) conducted among terminal cancer patients; and that of Kwon et al. (2011) conducted among institutionalized hospice care patients.

The depression score of participants before participating in the horticultural therapy program was 17.4 points, categorized as a potential depression group, but after the program their depression symptoms were reduced. For the reasons behind the decrease in depression symptoms, Han et al. (2009) suggested that elderly people with dementia or general elderly people who were isolated and marginalized could have chances to communicate with others and to express the issues they faced. In the study of Kim (2010), it was attributed to the positive attitudes and active participation of female elderly participants, and the interest in and a sense of closeness between participants within a group. Kwon et al. (2011) pointed out that the active participation in and concentration on growing plants kept participants emotionally calm and reduced their depression symptoms. In this study, the program was scheduled at a time when everyone can participate in the program, and thus no one was absent from the 4-week program. Participants became more engaged in the program over the course of the program, and the awkward atmosphere of the first session changed into a kind of camaraderie and closeness between those who were in the same circumstances through interactions. In this process, negative feelings were replaced with positive feelings, which can be attributable to the decrease in depression symptoms.

Although released prisoners had participated in a wide range of programs of social adaptation training in prison, they were categorized into a potential depression group in the results of their depression level before participating in the program. This indicates the importance of providing opportunities for released prisoners to turn the pressure and negative emotions that they feel before fully adapting themselves to

Table 3. Normality of pre-score for depression and self-esteem.

| Item       | Pre-score Mean (SD) | p    |
|------------|---------------------|------|
| Depression | 17.4 (14.6)         | 0.200NS |
| Self-esteem| 12.1 (4.4)          | 0.128NS |

NS: Non-significant by Kolmogorov-Smirnov test at p<.05.

Table 4. Change in depression of the subjects before and after the horticultural therapy program.

| Item       | Pre-HTP Mean (SD) | Post-HTP Mean (SD) | z    | p    |
|------------|-------------------|--------------------|------|------|
| Depression | 17.4 (14.6)       | 11.2 (9.5)         | -2.47| .013 |

HTP: Horticultural therapy programs. 
SD: Standard deviation. 
NS: Non-significant at p<.05 by Wilcoxon signed-rank test.
society after being released into positive ones. In this regard, the horticultural therapy program developed in this study seems to be suitable for this period.

3. Changes in self-esteem

The average self-esteem level of participants before participating in the horticultural therapy program was 12.1 points, and the level was increased to 16.0 points, indicating a statistically significant difference ($p=.001$) (Table 5).

This result coincided with the results of earlier studies including those of Nam et al. (2010) and Yun and Yoo (2011) on the self-esteem of children; those of Chon (2008), Jeong et al. (2010), Kim (2014) and Kong et al. (2015) on the self-esteem of the elderly; that of Jeon et al. (2016) conducted among adolescents; and that of Son et al. (2000) conducted among patients with chronic schizophrenia. However, it did not coincide with the results of the study of Kim et al. (1999) that reported no statistically significant difference in self-esteem after offering a supportive group therapy program, and those of the study of Chi (2010) conducted on inmates.

In the study on the relations between horticultural therapy programs and self-esteem (Jeon et al., 2016), it was reported that self-esteem was enhanced by opportunities to experience the joy of planting, to understand the importance of plants, to finish their own work and to express their feelings. Kong et al. (2015) pointed out that participants started to recognize the importance of their role in growing plants, and that their confidence and self-esteem were increased. In this study, it is also believed that the self-esteem of participants was improved by their attitude of wishing that plants in the dish gardens and the gardens of dreams they made grow well, by a sense of accomplishment and satisfaction that were obtained by completing their own work, and by the importance of their efforts and role in growing plants well. The results of this study were different from those of a study of Chi (2010) that reported that the frequency and time length of the horticultural program held twice a week for 4 weeks was not enough. The reason why this study showed the positive effects of the horticultural therapy program on the self-esteem of released prisoners despite its less frequent activities (once a week for 4 weeks) is because the study of Chi (2010) was conducted among inmates who had to continue to serve their sentences in prison even after the program, but this study was conducted among released prisoners who could take their work back home and continue to grow the plants in free environments unlike inmates.

This study was conducted among few released prisoners requested by the Korea Rehabilitation Agency located in G city, and thus it would be difficult to generalize the results of the small number of samples. However, the results of this study still indicate that the horticultural therapy program is effective to reduce depression symptoms and enhance the self-esteem of participants. In the study of Kim (2002) on the effects of horticultural therapy programs on the self-esteem and depression of female victims of domestic violence who lived in refuges, the self-esteem and depression of the participants were surveyed again after 45 days to test the lasting effects of the programs, and the results showed that their self-esteem decreased while their depression level increased. In this regard, it is important to provide social rehabilitation programs for inmates, but at the same time it is also important to provide repetitive and active education for released prisoners who have to face an urgent task of adapting themselves to society.

### Table 5. Change in self-esteem of the subjects before and after the horticultural therapy program.

| Item       | Pre-HTP $^1$ | Post-HTP $^1$ | z    | p     |
|------------|--------------|---------------|------|-------|
| Self-esteem| Mean (SD)    | Mean (SD)     |      |       |
|            | 12.1 (4.4)   | 16.0 (3.4)    | -3.19| .001  |

$^1$Horticultural therapy programs.

$^2$Standard deviation.

$^3$Significant at $p<.01$ by Wilcoxon signed-rank test.

IV. Conclusions

In this study, a horticultural therapy program was held once a week for 4 weeks from November 7 to 28, 2016 in order to observe changes in the depression and self-esteem levels of released prisoners. The depression level of participants was reduced from 17.4 points before participating in the program to 11.2 points after the program, indicating a statistically significant difference ($p=.013$), and their self-esteem level was increased from 12.1 points to 16.0 points, also indicating a statistically significant difference ($p=.001$). These results show...
that horticultural therapy programs have a positive impact on the depression and self-esteem of released prisoners. Therefore, positive changes can be brought about by utilizing horticultural therapy programs regularly and repetitively to enhance their ability to adapt to society.

V. References

Ahn, K.S., J.Y. Lee, M.S. Kim, S.M. Lee, J.R. Rhee, and J.K. Suh. 2000. A study of change for sociality and interpersonal relationship on female prisoner through horticultural therapy. J. Korean Soc. People Plants Environ. 3(4):17-24.

Bak, G.S. and S.G. Jeong. 2015. A study on the effects of horticultural therapy programs for inmates–focusing research on the Cheonan prison potato hydroponics. J. Correct. Rev. 68(5):147-175.

Chi, S.H. 2010. Effect of horticultural therapy on the change of interpersonal relationship and self-esteem in male prisoner. J. Korean Soc. People Plants Environ. 13(6):25-32.

Cho, M.J. and K.H. Kim. 1993. Diagnostic validity of the CES-D (Korean Version) in the assessment of DSM-III-R major depression. J. Korean Neuropsychiatr. Assoc. 32(3):381-399.

Chon, S.Y. 2008. Effect of horticultural therapy on the small muscles and emotional stability of senile dementia for long-term. MS thesis, Wonkwang Univ., Iksan, Korea.

Dannenmaier, M. 1995. Healing gardens. Landsc. Archit. 85(1):56-59.

Han, K.H., S.M. Lee, and J.G. Seo. 2009. Effect of group horticultural therapy on the change of depression and self-esteem in older adult. J. Korean Soc. People Plants Environ. 12(4):1-12.

Jeon, B.J. 1974. Self-esteem; a test of it’s measurability. Yonsei Nonchong. 11:107-129.

Jeon, I.S., S.Y. Yun, and B.J. Choi. 2016. Effects of horticultural activity based on self-growth group counseling on the self-esteem, ego-resilience, and stress of adolescents for educational welfare. J. Korean Soc. People Plants Environ. 19(4):269-275.

Jeong, H.O., O.S. Lee, and Y.G. Yoo. 2010. Effects of horticultural therapy on the depression and self-esteem in old woman of day-care center. J. Korean Soc. People Plants Environ. 13(6):53-61.

Kang, H.K., S.J. Back, and J.G. Kim. 2015. The impact of green activities of stress and depression in senior citizens. J. Korean Soc. People Plants Environ. 18(1):21-28.

Kim, B.Y. and J.S. Kim. 2001. Study review of horticultural therapy as a nursing intervention. J. Korean Acad. Adult Nurs. 13(3):409-419.

Kim, H.K. 2010. The horticulture’s effect on the reduction of elderly women’s depression. J. Soc. Work Pract. 9:119-145.

Kim, H.K. 2008. Development of horticultural therapy program using flower color harmony for the terminal cancer patients. PhD Diss., Paichai Univ., Daejeon, Korea.

Kim, K.H., H.R. Lee, M.O. Song, H.S, Chung, and H.J. Chung. 2006. Effects of horticultural therapy program on serum cortisol, pain, anxiety and depression of the hospice patients. Korean J. Hort. Sci. Technol. 24(1):95-103.

Kim, K.S., O.I. Park, and H.J. Chung. 1999. Family violence from a patriarchal perspective focused on wife abuse. J. Fam. Relat. 4(2):213-239.

Kim, M.R. 2014. The influence of horticulture activities on reducing depression and improving self-esteem focused on elderly low income. MS thesis, Chungang Univ., Seoul, Korea.

Kim, M.S. 2002. A study on effects of horticultural therapy on self-esteem and depression of family violence women victims at shelter. MS thesis, Dankook Univ., Seoul, Korea.

Kim, M.S. and J.K. Suh. 2001. Job-training status and introductions of horticultural therapy for the prisoners. J. Korean Soc. People Plants Environ. 4(2):37-43.

Koh, E.H. 2000. Effect of horticultural therapy on the rehabilitation of mentally retarded and physical disorder persons. MS thesis, Konkuk Univ., Seoul, Korea.

Kong, J.H., S.Y. Yun, and B.J. Choi. 2015. The effects of reminiscence-based horticultural therapy on institutionalized demented elders’ self-esteem and quality of life. J. Korean Soc. People Plants Environ. 18(4):305-309.

Kwon, Y.H., M.O. Song, and C.N. Kim. 2011. Effects of horticulture therapy on depression and stress in patient of hospice unit. J. Korea Academia-Industrial Coop. Soc. 12(10):4394-4402.

Lee, H.R. 2007. Effect of five senses stimulating horticultural therapy on the mental social function of schizophrenic patients. MS thesis, Catholic Univ. of Daegu, Gyeongsan, Korea.

Nam, J.E., E.J. Jang, and C.H. Park. 2010. Effect of the ecological horticultural activity program of the nature school on elementary school student’s self-esteem and sociality. Kor. J. Hort. Sci. Technol. 28(2):314-318.

Oh, E.K. 2001. Effect of horticultural therapy on the depression and self-esteem of hemiplegia after stroke and retrograde arthritis in day-care center. MS thesis, Konkuk Univ., Seoul, Korea.

Radloff, L.S. 1977. The CES-D Scale: A self-report depression scale for research in the general population. Applied Psychological Measurement 1(3):385-401.

Rosenberg, M. 1965. Society and the adolescent self-image. Princeton, NJ: Princeton University Press.

Son, K.C., S.J. Um, S.Y. Kim, J.E. Song, and K.Y. Paek. 2000. Effect of horticultural therapy on the changes of self-esteem and sociality of the chronic schizophrenia. Res. Cent. Dev. Adv. Hortic. Technol. 5:112-123.

Song, M.O. 2009. Development and effects of horticultural therapy program for hospice patients. PhD Diss., Keimyung Univ., Daegu, Korea.

Yun, E.J. and Y.K. Yoo. 2011. Effects of horticultural activity on the mental health, self-esteem, and sociality in children from low income family. J. Korean Soc. People Plants Environ. 14(1):17-22.