

# Horticultural Therapy as a Measure for Recovery Support of Regional Community in the Disaster Area: A Preliminary Experiment for Forty Five Women Who Living Certain Region in the Coastal Area of Miyagi Prefecture

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**ABSTRACT:** *Three years have passed since the earthquake, in the coastal areas in the disaster area, by population transfer or the like from the temporary housing, the importance of the regeneration and revitalization of the local community has been pointed out. This study performed a preliminary study to aim at the psychological inspection about an effect of the horticultural therapy as the means of the local community reproduction support of the disaster area. Forty five women who are living in the coastal area of Miyagi Prefecture participated in this study. They experienced the Great East Japan earthquake in 2011 and suffered some kind of damage caused by the earthquake. The participants were assigned to two groups, the intervention group and the control group, via a random draw using a computer. The HI group attended the horticultural therapy intervention (HT intervention) sessions for 16 weeks. The HT intervention was designed in collaboration with a horticultural therapist and clinical psychologists. This intervention comprised a total of 16 weekly sessions (120 min each) at the community center and 15 minutes per day at participants' homes. We used five psychological measures for an intervention evaluation. The HI group showed a significant increase in post- intervention SCI-2 total scores, post- intervention SCI-2 membership scores, post- intervention SCI-2 influence scores, post- intervention SCI-2 meeting needs scores, post- intervention SCI-2 shared emotional connection scores, and post-intervention RSES score. We believe that these results suggest the effectiveness of the horticultural therapy as the means of the local community reproduction.*

**Key words:** *Disaster area, regional community, earthquake victims, horticultural therapy, community consciousness, self-esteem*

## INTRODUCTION

Three years after the Great East Japan earthquake, it begins to work for the full-scale reconstruction of the disaster area. In particular, many people in the coastal area of the disaster area started to settle in a hill and collective relocation from temporary housing. Therefore, importance of regeneration and revitalization of the local community of a new disaster area has been pointed out. As a way of regeneration and revitalization of local community of a new disaster area, we have focused on horticultural therapy.

Horticultural therapy (HT) is a method of psychological care for treating post-traumatic stress disorder (PTSD) that was developed in the United States after World War II for the psychological care and social rehabilitation of disabled soldiers and war veterans showing PTSD symptoms (Detweiler et al., 2010). HT interventions are led by professionals trained to incorporate the use of plants and horticultural education into rehabilitation therapies (Detweiler et al., 2010). It has been reported that participants begin to identify with plant growth, and regain health and motivation. Through such experiences and their association with nature, participants are thought to experience improvement (Haller and Kramer, 2006). About the effectiveness of horticultural therapy for mild symptoms of PTSD caused by the Great East Japan Earthquake, previous studies of our group has demonstrated that there is effective intervention by a study of victims with mild PTSD symptom (Kotozaki, 2013a; Kotozaki, 2013b; Kotozaki, 2014). In the next stage of our research, we will conduct in the medium- to long-term about the effect of horticultural therapy as a means of local community regeneration or support in the disaster area and we are aim is to establish a methodology of horticultural

therapy as a regional community regeneration or support available in the disaster area.

The purpose of this study was to conduct a preliminary experiment prior to more extensive experiment for women in the coastal area of the disaster area and we examine the psychological change pre- and post- intervention.

## METHODS

### Participants

Forty five women who living certain region in the coastal area of Miyagi Prefecture participated in this study (mean age: 46.53 ± 8.40 years old). They experienced the Great East Japan earthquake in 2011 and suffered some kind of damage caused by the earthquake. All participants were right-handed working native Japanese speakers who had no serious mental disorder. Written informed consent was obtained from each subject in accordance with the Declaration of Helsinki (1991). This study was approved by the Ethics Committee of Tohoku University School of Medicine.

### Horticultural Intervention

The study was a randomized, double-blind, controlled, crossover trial that was registered at the University Hospital Medical Information Network Clinical Trials Registry (UMIN000006170). The participants were assigned to two groups, the intervention group (Horticultural Intervention [HI] group; n=22) and the control group (No Intervention [NI] group; n=23), via a random draw using a computer. The HI group attended the horticultural therapy intervention (HT intervention) sessions for 16 weeks. The HT intervention was designed in collaboration with a horticultural

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therapist and clinical psychologists. A horticultural therapist carried out the main instruction, and the Clinical psychologists were the part of support of a Horticultural therapist. This intervention comprised a total of 16 weekly sessions (120 min each) at the community center and 15 minutes per day at participants' homes. The sessions at the community center were comprised of interactive lectures and practical horticultural training. The participants then attended six horticultural lessons, including topics such as designing a garden planter, seeding, watering, weeding, and picking flowers. We really carried in combination these out every time. Participants filled out an HT intervention session checklist after each session as a self-assessment. Participants took care of plants for 15 min per day at their convenience with horticulture kits provided by the experimenters, and recorded the completion of this task daily on forms provided by the experimenters at the intervention sessions. On the other hands, the NI group did not undergo horticultural intervention and engaged in regular life over the 16 weeks. All participants underwent psychological measurements, both on the first day and at 16 weeks after the start of the intervention. This study design used a design same as our previous study (Kotozaki, 2013a, 2013b, 2014; Kotozaki et al., 2014).

## Psychological Measures

### *Sense of Community Index 2 (SCI-2)*

To measure of sense of community, we used the SCI-2 (Chavis et al., 2008). This index consists of 24 items and a perception with four elements: membership, influence, meeting needs, and a shared emotional connection. The coefficient alpha of the SCI-2 is 0.94 and subscale proved to be reliable with coefficient alpha scores of 0.79 to 0.80 (Chavis et al., 2008). The SCI-2 was administered pre- and post- intervention.

### *Rosenberg Self-Esteem Scale (RSES)*

To assess self-esteem, we used the RSES (Rosenberg, 1965; Mimura & Griffiths, 2007). This scale consists of 10 items and is evaluated in four grades (Rosenberg, 1965). It can be said that the higher your test score is, the self-esteem is high. The RSES was administered pre- and post- intervention.

### *The General Health Questionnaire (GHQ)*

To assess general health, we used the GHQ (Goldberg, 1972; Nakagawa & Daibo, 1981). This scale consists of 30 items and uses a four-point Likert scoring method. The GHQ was administered pre- and post- intervention.

### *The Center for Epidemiologic Studies Depressive Symptoms Scale (CES-D)*

To assess depression symptoms, we used the CES-D (Radloff, 1977; Shima et al., 1985). This scale consists of 20-item. Scores for each item are summed to give a range of total scores from 0 to 60. A higher score indicates a greater tendency toward depressive

symptoms. A score of 16 points or higher suggests the presence of clinical depressive symptoms. The CES-D was administered pre- and post- intervention.

## Statistical Analyses

The data were analyzed using PASW statistical software (ver. 18 for Windows; SPSS, Inc., Chicago, IL, USA). One-way analysis of covariance was conducted with differences between the pre- and post- intervention scores included as dependent variables and pretest scores as covariates for each psychological measure. Because our primary point of interest was the beneficial effect of intervention training, test-retest changes were compared between the HI and NI groups using one-tailed tests ( $p < 0.05$ ), in the same manner as in previous studies (Kotozaki, 2013a, 2013b, 2014; Kotozaki et al., 2014).

## RESULTS

Table 1 shows the comparisons of pre- and post- intervention psychological changes between the two groups. The HI group showed a significant increase in post- intervention SCI-2 total scores ( $F[1,43]=6.66, p < 0.01$ ), post- intervention SCI-2 membership scores ( $F[1,43]=7.57, p < 0.01$ ), post- intervention SCI-2 influence scores ( $F[1,43] = 14.46, p < 0.01$ ), post- intervention SCI-2 meeting needs scores ( $F[1, 43] = 8.94, p < 0.01$ ), post- intervention SCI-2 shared emotional connection scores ( $F[1,43]=2.99, p < 0.05$ ), and post-intervention RSES score ( $F[1,37] = 3.18, p < 0.05$ ).

## DISCUSSION

This study was to conduct a preliminary experiment prior to more extensive experiment for women in the coastal area of the disaster area and we examine the psychological change pre- and post- intervention. As a result, the HI group showed significantly increased post-intervention community consciousness score and self-esteem score.

As for improving community consciousness, previous study reported that horticultural activity may be a useful tool for community based programs (Chalker-Scott & Collman, 2006; Hayashi et al., 2008). Additionally, previous studies suggested that the emotional intelligence improved by HT (Kim & Park, 2010; Park & Huh, 2010; Kotozaki, 2014). In this intervention, people in the HI group took horticultural-related lessons together and done horticultural activities each time. We think that they can be improved new communication skills and interpersonal relationship skills because this intervention was a long term and they have performed together. Therefore, we also think that their community awareness improved.

In the result of this study, self-esteem of people in the HI group has also improved after the intervention. Some previous studies suggest that the HT improved self-esteem (Williams & Mattson, 1988; Martin-Yates, 1990; Gigliotti et al., 2004; Mattson et al.,

**Table 1.**  
Comparisons of Pre- and Post- Intervention Psychological Changes.

	HI group		NI group		P value
	Pre	Post	Pre	Post	
SCI-2 total	49.09 ± 12.84	56.95 ± 9.41	54.04 ± 14.94	52.78 ± 15.96	0.007
SCI-2 membership	11.18 ± 3.80	13.86 ± 2.42	12.96 ± 3.72	12.83 ± 4.15	0.005
SCI-2 influence	11.64 ± 2.75	14.68 ± 3.26	13.40 ± 3.80	12.70 ± 3.70	0.001
SCI-2 meeting needs	15.50 ± 3.36	16.18 ± 3.62	14.00 ± 4.11	13.78 ± 4.07	0.003
SCI-2 shared emotional connection	12.77 ± 4.40	14.45 ± 4.00	13.78 ± 4.54	13.09 ± 4.69	0.046
RSES	30.95 ± 3.30	32.36 ± 3.92	32.43 ± 3.78	32.04 ± 3.39	0.041
GHQ	4.82 ± 4.60	2.14 ± 3.52	6.52 ± 6.71	4.87 ± 6.76	0.086
CES-D	7.59 ± 4.62	4.41 ± 4.34	10.57 ± 7.46	8.96 ± 7.88	0.154

2004; Um et al., 2002; Clatworthy et al., 2013). Additionally, self-esteem was suggested to be a preventive factor for PTSD and factors that predict the recovery of changes in brain morphology (Sekiguchi et al., 2014). We think that it overlaps with one's growth to bring up a plant and it will feel confident about oneself by bringing up a plant. We also think that PTSD symptoms have gotten quite better by self-esteem is improved.

From the above results, it can be said that it can be said that it has can indicate the effectiveness of horticultural therapy as a method of improving the local community consciousness by our intervention. In the future, we will move forward with full-scale experience in the disaster area and will address the impact of regeneration and revitalization of local community.

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