

平成 30 年度学位申請論文

Effects of horticultural therapy on future  
perspective in patients with  
schizophrenia in chronic stage

(慢性期統合失調症患者を対象とした園芸  
療法の効果に関する研究：患者の未来展望  
に与える影響)

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## 要旨

【背景と目的】統合失調症患者において、未来への期待である希望がリカバリーの重要な要素とされている。園芸療法は植物が育つプロセスを用いることから未来への期待と関係するものであるが、両者の関連については明らかにされていない。本研究では、植物を育てる要素を主とする園芸療法介入が慢性期統合失調症患者の希望や症状、Quality of Life (QOL) に対して与える影響を明らかにすることを目的とした。

【方法】対象者 23 名を年齢、性別に偏りが生じないようにマッチングさせた 2 群に分けた。両群ともに通常の作業療法を実施し、介入群にのみ週 1 度、計 11 回、毎回 1 時間の園芸療法プログラムを実施した。評価は a) 陽性・陰性症状評価尺度 (Positive and Negative Syndrome Scale: PANSS) , b) Beck Hopelessness Scale (BHS) , c) The Schizophrenia Quality of Life Scale 日本語版 (JSQLS) を介入前後に実施した。

【結果】PANSS の得点を 5 項目に分類して分析した結果、対照群と比較して介入群のみ「抑うつ/不安因子」が有意に改善した。BHS および JSQLS は園芸療法実施前後において両群間に有意な差は見られなかった。

【考察】園芸療法介入群において抑うつや不安が改善しており、精神機能への影響が示唆された。一方で、希望や QOL の改善はみられなかった。このことは、長期入院に至っている慢性期統合失調症患者の希望のなさが非常に根強く、短期間の園芸療法介入による改善が困難である可能性を示しており、より長期間の介入が必要であることを示唆している。

**Key words** : 非薬物療法, 心理社会症状, 植物, 作業療法

## **Abstract**

We investigated 23 patients with chronic schizophrenia to investigate effects of horticultural therapy (HT) on psychiatric symptoms, feeling of hopelessness, and quality of life. HT with routine occupational therapy (OT) for three months was given to 11 in-patients with chronic schizophrenia, and they were assessed with the Positive and Negative Syndrome Scale (PANSS), Beck Hopelessness Scale (BHS), and Japanese version of The Schizophrenia Quality of Life Scale (J-SQLS) before and after the intervention. The scores were compared with those in control participants who solely received OT. The score for the depression/anxiety factor of PANSS decreased more in the group with HT and OT (experimental group) than when compared to those in the control group. Scores for BHS and J-SQLS were not changed by the HT intervention. Adding HT intervention for three months to routine OT intervention might be effective to decrease depression/anxiety symptoms in participants who had been hospitalized for more than 10 years. Their feeling of hopelessness and quality of life did not change. The long-term hospitalization and medication taken by the participants may have limited the effect of short-term intervention on such feelings. Factors relating to quality of life, such as hopelessness, may require interventions with longer duration.

Key words: non-pharmacological therapy, psychosocial symptom, plants, occupational therapy

## 1. Introduction

Schizophrenia is a chronic and severe mental disorder with positive and negative symptoms which cause disturbance in thinking, feeling, and behaviors (Tandon, Nasrallah, & Keshavan, 2009). Patients with schizophrenia may have distortion of reality, lack of coping skills, and social failings, which result in a low level of quality of life (Goldman, Gattozzi, & Taube, 1981; Lehman, 1983). Antipsychotics, including newly developed drugs, have been the first-choice treatment for the patients with schizophrenia (Azmanova, Pitto-Barry, Barry, 2018). However, antipsychotic drugs do not treat all symptoms in patients with schizophrenia, and the treatment with antipsychotics may cause a number of side effects, such as motor side-effects, weight gain, and sedation (Azmanova et al., 2018).

Horticultural therapy (HT), as a complementary and alternative treatment, has been applied for patients with schizophrenia (Sullivan, 1979). HT may provide effectors, which cannot be given by drugs, natural environment, personal relationship, cooperation, responsibility, and social interaction (Detweiler et al., 2012; Soga, Gaston, & Yamaura, 2016). In addition, HT has also been found to reduce stress and to increase feelings of calm and relaxation with no side effects (Rodiek, 2002). Therefore, HT was thought to be potentially effective for patients with schizophrenia from therapeutic to social aspects. However, the quantity and quality of reports regarding the effects of HT were still insufficient (Luk et al., 2011; Kamoiooka et al., 2014; Zhu et al., 2016; Lai et al., 2017).

The concept of intervention by therapists for mental disorders has changed over the past few decades. Slade et al. (2014) emphasized recovery-oriented intervention for patients with mental illness. A feeling of hopelessness is one of the core symptoms of patients with schizophrenia; such a feeling causes patients to delay discharge, leading to long-term hospitalization (Hoffmann, Kupper, & Kunz, 2000; Isohanni et al., 2005). We thought that HT could be helpful as a recovery-oriented intervention, if the feeling of hopelessness in patients with schizophrenia could be alleviated through HT. HT using growing plants may promote participants' future perspectives and hopes. Previous studies reported that participants could realize the growth of plants and waited for blooming and harvesting with expectancy (Jarrott, Kwack, & Relf, 2002) and HT interventions improved the hopes of women in a rural area (Kang, Min, Ha, & Kang, 2014). However, to our knowledge, we could not find any study which reported HT effects on future perspectives and hopes in patients with schizophrenia. Therefore, the objective of the present study was to investigate the possible effect of HT on psychiatric symptoms and future perspectives and hopes of patients with chronic schizophrenia.

In the present study, changes in scores for psychiatric and psychological symptoms after HT in patients with schizophrenia were assessed, including patients' feeling of future perspective and hopes.

## **2. Methods**

The present study involved a pretest-posttest design with experimental and

control groups of patients with schizophrenia in the chronic stage. This study was approved by a local ethical committee in the Graduate School of Medicine, Nagoya University (No. 16-602) and Hinaga General Center for Mental Care. Written informed consent was obtained from each participant prior to the study.

## 2.1. Participants

All participants met the following inclusion criteria: 1) diagnosis of schizophrenia was confirmed based on International Classification of Diseases and Related Health Conditions 10<sup>th</sup> version (ICD-10) (World Health Organization, 2016), 2) symptoms of schizophrenia were considered to be stable by the attending doctor, 3) aged younger than 65 years old with hospitalization of longer than 3 years, 4) no difficulty in verbal communication, 5) ability of decision-making in daily life in the hospital was preserved, and 6) those who were willing to participate in the present study. The exclusion criteria were: 1) permission not obtained from the attending doctor, and 2) patients with dementia.

Participants in both groups were engaged in routine occupational therapy (OT) program in the hospital. For participants in the experimental group, a 60-minute HT program was provided once a week for 3 months. Assessment of the psychological condition was performed twice during the period of the study: before the experimental period, and at the end of the period, which was 3 months after the initial assessment.

## 2.2. Interventions

### 2.2.1. Horticultural therapy (HT)

A horticultural therapist with more than 10 years of clinical experience provided the HT program. The HT program was given in a specific room (27.7 m<sup>2</sup>) designed for HT and OT. The present HT program focused on the growth and harvesting of plants. Plants used for HT were cucumber (*Cucumis sativus* L.), Boston lettuce (*Lactuca sativa*), and white radish (*Raphanus sativus* var. *longipinnatus*), which could be eaten at the end of intervention. Participants cultivated these plants in planters. Three planters (at about 0.15 m<sup>2</sup>) for cucumber, one for Boston lettuce, and one for white radish were prepared outside the room. Before each intervention session, the horticultural therapist brought these planters inside the room. We aimed for HT to facilitate feelings of expectation and hope in participants, through which they looked forward to harvesting.

The HT program involved 11 sessions, starting from seeding, then planting, watering, and fertilizing, and finally a harvesting session. Details of the HT program are shown in Table 2. Each session of HT took 60 minutes, including: 1) warm-up (10 minutes), 2) review of the previous session with photos of plants and reports written by participants (10 minutes), 3) observation of plants and hands-on activities (25 minutes), 4) review and discussion of the day's session while drinking tea (15 minutes). In the last session, participants harvested, cooked and ate the vegetables. All activities were conducted inside the room designated for HT except for those involving cucumber during sessions 6-11. Since the cucumber grows on a climbing plant, the planter was fixed outside after the session 5 finished.

The horticultural therapist took photographs of plants, and described the behaviors of participants at the end of each session of HT. Participants also reported their feelings and impressions about the plants to the therapist. At the beginning of the subsequent HT session, the photos and participants' reports taken in the previous HT session were shown to the participants. Participants asked to observe the actual plants, comparing the photos taken with their reports in the previous HT session.

### 2.2.2. Occupational therapy

OT according to the standard program in the hospital was provided for all participants both in the experimental and control groups 1-2 hours per week. Participants in the HT and control groups were similarly provided with the OT program. OT was provided as group programs for all in-patients of the hospital, and the members of groups were not decided based on the HT and control groups in the present study. Occupational therapists set individual goals for the patients in activities during OT, including sports, recreation, music, and handcrafts. The OT program did not include any activity related to HT, such as gardening.

### 2.3. Data collection and statistical analysis

Data were collected over the three months between June to August in 2016. Assessment was applied twice, before starting the first session (pre-intervention) and just after the last session (post-intervention). Three clinical assessment tools, The Positive and Negative Syndrome Scale (PANSS) (Kay,

Fiszbein, & Opler, 1987), Beck Hopelessness Scale (BHS) (Beck, Weissman, Lester, & Trexler, 1974), and Japanese version of The Schizophrenia Quality of Life Scale (J-SQLS) (Kaneda, Imakura, Fujii, & Ohmori, 2002) were used. The attending doctors, who were blinded to the experimental groups in the present study, evaluated the severity of schizophrenia in each participant using PANSS.

The PANSS is one of reliable scales commonly used for measuring symptom severity of patients with schizophrenia in the previous studies (Salyers et al., 2001; Hatton et al., 2005). The scores of PANSS were calculated based on Lindenmayer's model (Lindenmayer, Bernstein-Hyman, & Grochowski, 1994). Each item in five factors was scored from 1 to 7 and a higher score indicated a more severe symptom of schizophrenia. Negative factor has 6 items (range of scores, 6-42), excite factor has 4 items (4-28), cognitive factor has 5 items (5-35), positive factor has 4 items (4-28), and depression/anxiety factor has 5 items (5-35) (Lindenmayer et al., 1994).

Participants' perspective on the future was evaluated by BHS (Beck et al., 1974). The BHS has been used in previous studies (Ringer, Buchanan, Olesek, & Lysaker, 2014; Lysaker, Buck, Hammoud, Taylor, & Roe, 2006), and we used the Japanese version of BHS (J-BHS) that comprises 3 domains, as in the original version (Tani et al., 2002): feelings about the future, loss of motivation, and future expectations. The original version of BHS asks subjects to answer questions by responding true or false, but in J-BHS, the subjects answer using 4 rank scales: strongly disagree, moderately disagree, moderately agree, and strongly agree (Tani, 2002). The range of the total score of J-BHS was between

0-60, with a higher score indicating a more marked loss of hope.

The quality of life was assessed by J-SQLS (Kaneda et al., 2002). The original version of SQLS was produced by Wilkinson et al. (2000), which evaluates the quality of life (QOL) specific to persons with schizophrenia. Both the original SQLS and J-SQLS include 3 domains: psychosocial (15 items), motivation and energy (7 items), and symptoms and side-effects (8 items), and they have been equally validated regarding reliability (Kaneda et al., 2002). The range of the total score was between 0 and 100, and a higher score indicated a lower quality of life.

Data were analyzed using SPSS (Ver. 24.0) for statistical analysis. To standardize the changes of scores after HT, relative to the control condition with OT, the difference between each score,  $\Delta$ score, before and after the intervention was obtained in both groups. The  $\Delta$ score in each assessment was compared between the intervention and control groups by one-way (groups) factorial analysis of variance (ANOVA). A p-value of less than 0.05 was considered significant.

### **3. Results**

Twenty-three patients with schizophrenia participated in the present study. They were in-patients in the chronic stage of schizophrenia. The 23 patients participated in the study. They were randomly divided into two groups: experimental (n = 11) and control (n = 12). The age, sex, and experiences of participating in HT were matched between the two groups. Profiles of the

participants are summarized in Table 1.

Table 3 shows the results in each assessment. In the assessment by PANSS, the score for the depression/anxiety factor significantly decreased after the intervention period in the experimental group with HT ( $p = 0.011$ , ANOVA) compared with that in the control group. Cognitive function based on PANSS tended to be lower ( $p = 0.051$ ) in the experimental group with HT compared with the control group. There was no significant change in BHS or J-SQLS between the groups.

#### **4. Discussion**

The present study investigated the changes in psychological symptoms and feelings of hope for the future hope after HT for 3 months in patients with schizophrenia in the chronic stage. The score for the depression/anxiety factor in PANSS was improved in the experimental group with HT. However, the HT intervention did not change feelings of future perspectives or the QOL.

Improvement in the symptom of depression/anxiety was noted after the combination of OT with HT for three months in the present study. The results indicate that the score changes were probably due to HT or the combination of OT and HT. This result is in line with those in previous reports which conducted short term within 2 weeks (Kam & Siu, 2010), middle term for 6 weeks (Kelley, Waliczek, & Le Duc, 2017), and long term over three months (Son, Um, Kim, Song, & Kwack, 2004) of HT. From the results of the previous studies, the effect of HT conducted for short to long terms was significant to

decrease depression/anxiety among the participants.

We considered that HT, possibly with OT, affected the emotional state the participants with chronic schizophrenia, as well as persons with dementia (Blake & Mitchell, 2016). HT, as well as OT, was aimed to provide a wide-range of interventions, from physical to psychosocial factors, for participants (Wichrowski, Whiteson, Haas, Mola, & Rey, 2005; Kamioka et al., 2014). However, we should consider some specific factors in patients with chronic schizophrenia, which might restrict the change of scores after HT.

There was no significant change in BHS and J-SQLS, which indicated participants' perspective and hopes on the future and their QOL, respectively. One of the possible reasons for participants' refractoriness of those scores after HT intervention may be their long-term hospitalization. Long-term hospitalization might make participants inactive regarding psychosocial performance as reported in the previous papers (Wing, 1962; Harvey, Reichenberg, Bowie, Patterson, & Heaton, 2010). Intervention for participants who have stayed in the hospital for years has to overcome such inactiveness caused by long-term hospitalization. Among the factors assessed in the present study, depression/anxiety might be modified by HT for three months.

Another factor to consider was the effects of prescription drugs on participants. Prescription drug effects could not be excluded for ethical reasons inherent to any studies on patients with chronic schizophrenia. The mean chlorpromazine-equivalent dose of medication was more than 800 mg in both experimental and control groups in the present study. Sedative effects of drugs might inhibit the change in the activeness of participants.

The present setting of HT might be effective on depression/anxiety symptoms of the participants with schizophrenia. The depression and anxiety were common symptoms in people with schizophrenia (American Psychiatric Association, 2013), and those symptoms increased other symptoms such as persecutory delusions and sleep disruption (Freeman, 2007; Morphy, Dunn, Lewis, Boardman, & Croft, 2007). The primary effects of HT on depression/anxiety symptoms may be important to prevent or decrease other comorbid symptoms. Recent studies (Zhu et al., 2016; Oh, Park, & Ahn, 2018) and systematic reviews (Kamioka et al., 2014) reported positive effects of HT on patients with schizophrenia, although the number and quality of reports is still limited. Since HT can be combined other therapies, including antipsychotics (Zhu et al., 2016), we considered that HT could be an effective intervention to make patients with schizophrenia happier in a hospital setting.

## **5. Limitation**

We compared two groups receiving OT and OT with HT. Since OT intervention has been the main and routine intervention for participants with schizophrenia in hospitals in Japan, we investigated the additive modulation of participants' symptoms after HT on the basic effect of OT on the participants. The effect of solely HT should be assessed in other series of studies; i.e. sufficiently powered randomized controlled trials. Liu et al. (2014) reported that the number of systematic studies regarding HT for participants with schizophrenia is still limited, as well as the number of participants, as in

the present study. Basic and clinical studies will be accumulated to obtain evidence on HT in the near future. Although we observed changes in score for depression/anxiety by HT, further studies were required to confirm the effects of HT on other symptom-related factors with more participants and longer intervention.

## **Conclusion**

In conclusion, adding HT intervention for three months to routine OT intervention might be effective to decrease depression/anxiety in participants with chronic schizophrenia with hospitalization of more than 10 years. However, their feeling of hopelessness and quality of life did not change. Long-term hospitalization and medication required by participants might have limited the effect of intervention.

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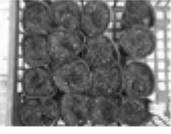
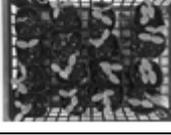
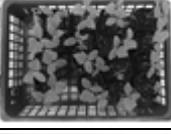
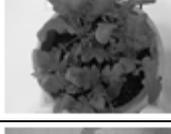
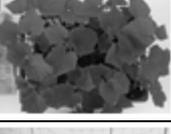
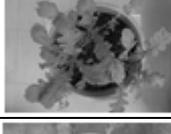
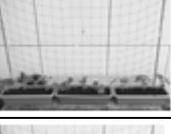
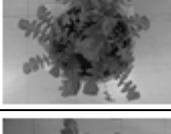
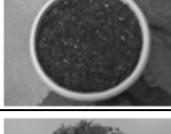
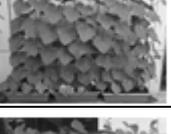
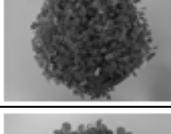
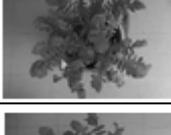
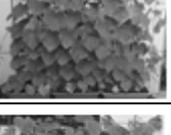
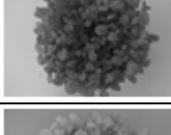
Table 1: Profiles of the participants at baseline

Group	Experimental (n = 11)	Control (n = 12)	Difference
	mean (SD)	mean (SD)	p <sup>b)</sup>
Age (years)	55.8 (7.5)	53.0 (8.9)	0.74
Male : female	4 : 7	4 : 8	
CP <sup>a)</sup> equivalent medication (mg)	881.6 (401.3)	870.1 (232.7)	0.79
Hospitalization (days)	5,089.6 (2,080.9)	5,268.6 (3,572.4)	0.70

a) CP: chlorpromazine

b) p: one-way factorial analysis of variance (ANOVA)

Table 2: Horticultural therapy (HT) intervention program for the experimental group

Sessions <sup>a)</sup>	Contents	White radish	Cucumber	Boston lettuce
1	Introduction, seeding (White radish and Cucumber)			
2	Observation			
3	Fertilizing, thinning Adding soil (White radish)			
4	Fertilizing and thinning			
5	Transplanting to planters (Cucumber)			
6 <sup>b)</sup>	Thinning and watering			
7	Observation and watering			
8	Seeding (Boston lettuce) Harvesting (Cucumber) Watering			
9	Observation Harvesting and eating (Cucumber)			
10	Observation Harvesting and eating (Cucumber)			
11	Harvesting, cooking, and eating (all vegetables)			

<sup>a)</sup> Each session once weekly. Each session took 60 minutes.

<sup>b)</sup> Cucumber planter was fixed outside after the session 5 finished.

Table 3: Score changes between groups before and after intervention (mean (SE))

	Groups		Statistics	
	Experimental (n=11)	Control (n=12)	F <sup>d)</sup>	p <sup>e)</sup>
PANSS <sup>a)</sup>				
Negative	-1.91 (1.32)	-0.58 (1.27)	0.52	0.48
Excitement	-1.00 (0.90)	0.75 (0.86)	1.96	0.17
Cognitive	-2.00 (1.07)	1.08 (1.03)	4.29	0.051
Positive	-1.36 (0.97)	0.50 (0.94)	1.89	0.18
Depression/anxiety	-2.54 (0.94)	1.08 (0.90)	7.72	0.011*
J-SQLS <sup>b)</sup>				
Psychosocial	-7.88 (6.00)	-9.72 (5.75)	0.049	0.83
Motivation/Energy	1.30 (4.33)	-1.50 (4.15)	0.22	0.64
Symptoms /Side effect	-6.23 (4.36)	-14.82 (4.18)	2.02	0.17
BHS <sup>c)</sup>	2.82 (2.43)	1.50 (2.32)	0.15	0.67

a) PANSS: Positive and negative syndrome scale

b) J-SQLS, Japanese Schizophrenia Quality of Life Scale

c) BHS: Beck Hopelessness Scale

d) F: F value for one-way factorial analysis of variance (ANOVA)

e) p: ANOVA, \* p< 0.05