

## Group Horticulture Program on Psychiatric Symptoms in Patients with Chronic Schizophrenia

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**Background:** Schizophrenia is a devastating psychiatric disorder and its Positive and negative symptoms have negative effects on social functions. A combination of pharmacological and non-pharmacological treatments is considered more effective for this condition. The present study aimed to determine the effect of a group horticulture program on psychiatric symptoms in patients with chronic schizophrenia.

**Methods:** This quasi- experimental study was conducted from April 2014 to July 2014 in Sina Hospital in Chahar Mahal and Bakhtiari province in Iran. Fifty-two eligible patients with diagnosis of chronic schizophrenia were randomly assigned to two groups of horticulture and usual care (control). Both groups received similar medical and routine care. The patients in horticulture group participated in a group horticulture program for three months. The patients' psychiatric symptoms were evaluated at the beginning and at the end of the study by Andreasen's scales for assessment of negative and positive symptoms. The data was analyzed by student t test, paired t test and chi square.

**Results:** At the beginning of the study, the patients in both study groups were matched in terms of age, sex, marriage status, education, and average scores of positive and negative symptoms. At the end of the study, the horticulture group showed a significant improvement compared with control group in positive and negative symptoms ( $P < 0.05$ ), which indicated the effectiveness of the intervention on these symptoms.

**Conclusion:** Group horticulture program can be used as an effective non-pharmacological adjunctive treatment in patients with chronic schizophrenia.

**Keywords:** Horticulture, Schizophrenia, Patient

## Introduction

Schizophrenia is a devastating psychiatric disorder affecting 1% of population (1). The positive and negative symptoms of schizophrenic patients have negative effects on their social and occupational functions(2). A combination of pharmacological and non-pharmacological treatments is considered more effective for the treatment of these patients (3) and horticulture therapy is one of the non-pharmacological treatments that can be effective(4-6).

In a horticulture therapy program, the patients participate in some easy agriculture activities in active or non-active manners under staff supervision (7); implant vegetables, fruits, or flowers with therapeutic purpose (8) that can improve their creativity, physical, social and emotional functions (9).

This alternative therapeutic method is used in some disorders such as Alzheimer (10) and depression (11), but limited studies have been conducted on patients with schizophrenia in Iran. Ruiyi et al. (12) in their studies verified the effectiveness of gardening therapy on socialization, self-esteem, and rehabilitation of patients with schizophrenia.

Sina psychiatric Hospital as an important referral psychiatry center in Southwest of Iran has a suitable environment for horticultural activities.

Regarding the importance of non-pharmacological treatment methods in schizophrenia and the unique environment of this hospital, the present study was conducted with the aim of determining the effect of a group horticulture program as an adjunctive therapy on psychiatric symptoms in patients with chronic schizophrenia.

## Methods

This quasi- experimental, single center study was conducted from April 2014 to July 2014 in Sina Hospital in Chahar Mahal and Bakhtiari province in Iran.

**Ethical consideration:** The protocol of this study was approved by the ethical Committee of Shahrekord University of Medical Sciences and registered in the Iranian registry of clinical trials (IRCT201501042085N15).

**Sampling and randomization:** The study population consisted of the eligible patients with diagnosis of chronic schizophrenia. The

patients with the eligible physical ability, diagnosis of chronic schizophrenia, and aged above 18 were included in the study, while the patients with mental retardation, catatonic schizophrenia and changes in medication during the study period were excluded. At first, the population were selected by convenience methods after that getting a formal consent from patients' executor, sixty patients were randomly allocated to the group of horticulture program and the control group (30 in each group) using a computer-generated list of random numbers by SPSS 16 software (SPSS Inc., Chicago, IL, USA).

**Intervention:** The patients in both study groups received similar antipsychotic medication (4 mg Risperidone three times a day) and routine care (including basic nursing care, TV watching, family visiting, hiking, and the routine visit by a psychologist). However, the patients in the horticulture group participated in a group horticulture program for three months. In this group, some easy agriculture activities in proportion to patients' abilities were planned by an expert psychologist and a farmer who worked in the hospital. The land was divided into certain parts and in each part specific vegetables such as cucumber, tomato, chili, and eggplant were sown. The patients did daily activities in a group manner such as plowing, removing weeds, preparing farmland, seeding, watering, and harvesting. Finally, the products were consumed by the hospitalized patients. All the activities were performed in group format not individually.

**Measurements:** In the present study, the positive and negative symptoms were evaluated at the beginning and at the end of the study by Andreasen scale for assessment of negative symptoms (SANS) and Andreasen scale for assessment of positive symptoms (SAPS) by an expert psychiatrist. These scales are developed especially for research settings and rated on a 0–5 spectrum (0 = not present, 5 = severe). Therefore, the higher the score the severe the symptoms. The SANS consists of 24 items (range: 0-120) that are summarized in global ratings such as flattened affect, alogia, avolition/apathy, anhedonia/asociality, and attention, and the SAPS comprises of 35 items (range: 0-170)

summarized in four global ratings such as hallucinations, delusions, bizarre behavior, and positive formal thought disorder. These scales provide a comprehensive assessment of the symptoms of schizophrenia(13).

In the case of the SANS items, the mean, minimum, and maximum correlation coefficients were respectively 0.826, 0.539, and 0.958, and for the SAPS items 0.828, 0.314, and 1.000 (14). Cronbach’s alpha for these scales were estimated 0.89 in an Iranian population(15).

Moreover, in the present study, the personal characteristics of the patients such as age, sex, marriage status, and educational level were evaluated.

Statistical analysis: The data was reported as descriptive indices such as mean and standard deviation (SD) and analyzed using SPSS 16 software (SPSS Inc., Chicago, IL, USA). The results of Kolmogov-Smirnov test showed

that in terms of the means of SANS and SAPS, the distribution of data was normal; therefore, parametric and non-parametric tests such as Chi square, Student t-test, and paired t-test were used for comparing the variables. P value less than 0.05 was considered as significant.

**Results**

In this study, 60 patients with diagnosis of chronic schizophrenia participated in two study groups (30 in each group), but four patients in each groups left the study. Finally, 52 patients completed the study (figure 1). the average age of the participants in the horticulture group was 40.42 ±6.97 and in controls was 42.88±5.50 (P=0.16, t=1.412). Furthermore, other demographic data such as sex, marriage status, and educational level were matched at the beginning of the study (table 1).

Table 1: Demographic Characteristics of Patients in Two Study Groups

		Horticulture Group	Control Group	P value
Gender	Male	10(38.5%)	6(23.1%)	0.22
	Female	16(61.5%)	20(76.9%)	
Education	literate	3(11.5%)	0(0%)	0.07
	illiterate	23(88.5%)	26(100%)	
Marriage status	Married	14(53.8%)	11(42.3%)	0.40
	Unmarried	12(46.2%)	15(57.7%)	

P value less than 0.05 was considered as significant

According to the student t-test, the SANS and SAPS scores in both study groups were

matched at the beginning of the study (P>0.05) (table 2).

Table2: Comparison the Average Scores of the SANS and SAPS in Two Study Groups before the ntervention

Symptom	Horticulture Group		Control Group		t	P value
	Mean (Standard Deviation)		Mean (Standard Deviation)			
SAPS	Hallucinations	16.12(4.40)		15.62(3.29)	-0.463	0.64
	Delusions	30.50(4.15)		30.58(5.46)	0.057	0.95
	Bizarre behavior	10.46(2.17)		9.54(3.43)	-1.158	0.25
	Thought disorder	21.62(3.92)		23.08(3.62)	1.396	0.16
	Total SAPS	78.69(7.48)		77.46(8.18)	-0.566	0.57
SANS	Flattening of affect	15.50(4.58)		15.77(4.07)	0.224	0.82
	Alogia	10.85(3.10)		9.92(2.93)	-1.101	0.27
	Avolition/apathy	10.50(2.45)		11.31(2.51)	1.173	0.24
	Anhedonia	10.85(3.46)		10.31(3.87)	-0.528	0.60
	Attention	8.35(2.69)		8.12(2.43)	-0.324	0.74
Total SANS	56.04(7.52)		55.42(8.89)	-0.269	0.78	

P value less than 0.05 was considered as significant

In addition, the results of the student t-test indicated that at the end of the study, the

patients in the horticulture group had significantly better score than the control

group in terms of the positive symptoms expect for bizarre behavior, and also in terms of avolition/apathy and total score of SANS among the negative symptoms ( $P < 0.05$ ), which indicated the effectiveness of the

intervention on these symptoms. However, amongst the other symptoms the horticulture group had insignificantly better score than the control group ( $P > 0.05$ ) (table 3).

Table3: Comparison the Average Scores of the SANS and SAPS in Two Study Groups After the intervention

Symptom	Horticulture Group Mean (Standard Deviation)	Control Group Mean (Standard Deviation)	t	P value
Hallucinations	13.58(3.38)	15.42(3.12)	2.043	0.04
Delusions	27.62(3.77)	30.38(5.17)	2.206	0.03
Bizarre behavior	9.27(2.08)	9.38(3.08)	0.158	0.87
SAPS Thought disorder	19.85(3.34)	22.92(3.39)	3.294	0.002
Total SAPS	70.31(6.16)	78.12(8.06)	3.920	<0.001
SANS Flattening of affect	13.88(4.17)	15.73(3.99)	1.630	0.10
Alogia	9.31(2.63)	9.96(2.82)	0.864	0.39
SANS Avolition/apathy	9.27(1.99)	11.19(2.28)	3.239	0.002
Anhedonia	9.65(3.07)	10.42(3.12)	0.895	0.37
Attention	7.69(2.36)	7.96(2.06)	0.437	0.66
Total SANS	48.81(7.21)	55.27(8.74)	2.457	0.01

P value less than 0.05 was considered as significant

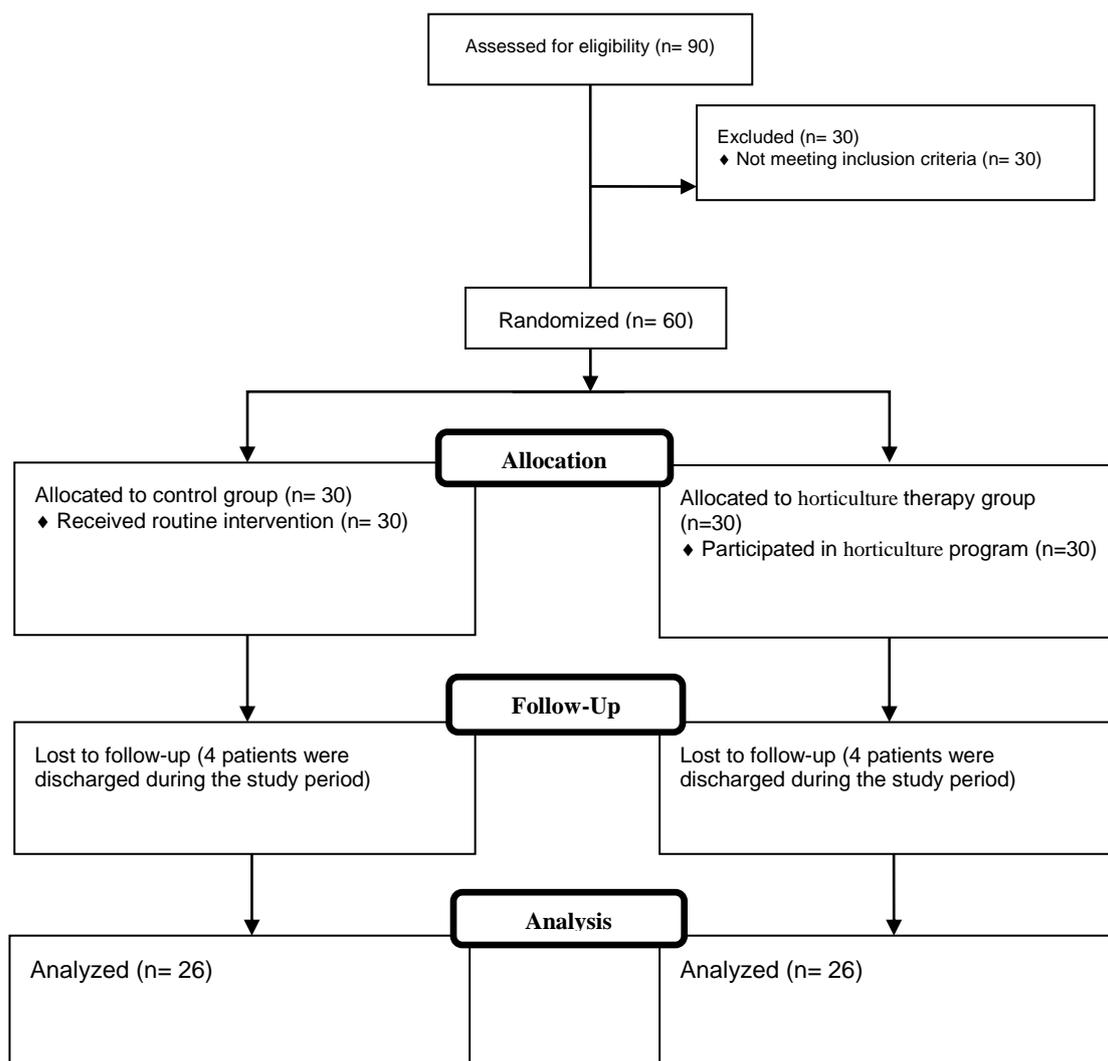


Figure 1: CONSORT Flow Diagram

## Discussion

In the present study horticulture activities in a group manner were effective on the positive symptoms expect for bizarre behavior, and also avolition/apathy and total score of the negative symptoms. The underlying mechanism of the effect of the horticulture therapy on psychiatric symptoms in patients with schizophrenia is complex. our result is in consistent with some studies, namely the study conducted by Ruiyi et al.(12) showed that horticultural therapy as an alternative treatment could be used in improving psychological, emotional and social problems of patients with schizophrenia.

The patients with schizophrenia simultaneously suffer from anxiety and depressive symptoms and their positive and negative symptoms may be related to these symptoms. Lysaker et al. in their study confirmed that higher level of anxiety is associated with more hallucination, isolation, depression, hopelessness, and inappropriate functioning of patients with schizophrenia (16). Also, depressive symptoms are common in patients with schizophrenia with a significant impact on disease(17).

On the other hand, some studies demonstrated the therapeutic effects of horticultural activities on depression, anxiety, self-esteem, rumination, attention, concentration (7) and stress (18). Therefore, the alleviation of anxiety and depression may be related to the efficacy of horticulture program on positive and negative symptoms in the present study.

In addition, the patients with schizophrenia are less active than healthy ones, and motivation deficit is the main core of the schizophrenia (19); motivation deficit strongly disturbs their social functions, independent living, and interpersonal relationships (20). In the study of Fujimaki et al. the negative symptoms, psychological problems, and psychosocial dysfunction were related to schizophrenic patients' motivation and energy(21). In the present study, improvement of the negative symptoms in the horticulture group could be explained by efficacy of horticultural activities on patients' mood and motivation and group nature of this program.

Horticulture therapy is a nature-center intervention influencing social and behavioral functions of patients. In this intervention, participants do some pleasant activities, while the level of physical activities is moderate and enjoyable (11). In addition, the participation in a group activity can provide a social environment in which group therapeutic factors such as hope, cohesion, identification, interpersonal learning, and altruism can impact on patients psychiatric symptoms.

Different studies have shown the efficacy of physical activities on positive and negative symptoms of schizophrenic patients (22, 23). Fogarty et al. indicated that physical activity could be effective on physical health, adaptation, increasing the energy, cooperative sense, social and cognition skills in schizophrenic patients (24). It seems that physical activity can change the neurotransmitters levels such as norepinephrine (25, 26). On the other hand, some studies confirmed the effectiveness of occupational therapy on positive and negative symptoms of schizophrenic patients (5, 27). Horticulture therapy can be considered as an occupational therapy method, and its efficacy may be related to patient, therapist, and functional triangle that provides a creative and productive environment. In this condition, the patients realize their deficits and improve their social interaction (28). In this program, the patients learn new skills; improve their self-efficacy, responsiveness and physical activity, especially in a natural environment; and creates a sense of peace in the patients.

## Conclusion

Regarding the findings of the present study, horticultural activities can be used as an effective non-pharmacologic method in treatment of patients with chronic schizophrenia especially in a group manner.

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## References

1. Bonnot O, Dumas N. [Schizophrenic disorders in adolescence]. *La Revue du praticien*. 2014;64(4):499-504.
2. Tandon R, Nasrallah HA, Keshavan MS. Schizophrenia, "just the facts" 4. Clinical features and conceptualization. *Schizophrenia research*. 2009;110(1):1-23.
3. Gaszner P. [Complex therapy of schizophrenia]. *Neuropsychopharmacologia Hungarica: a Magyar Pszichofarmakologiai Egyesület lapja= official journal of the Hungarian Association of Psychopharmacology*. 2009;11(1):41-5.
4. Twamley EW, Jeste DV, Lehman AF. Vocational rehabilitation in schizophrenia and other psychotic disorders: a literature review and meta-analysis of randomized controlled trials. *The Journal of nervous and mental disease*. 2003;191(8):515-23.
5. Foruzandeh N, Parvin N. Occupational therapy for inpatients with chronic schizophrenia: a pilot randomized controlled trial. *Japan Journal of Nursing Science*. 2013;10(1):136-41.
6. York M, Wiseman T. Gardening as an occupation: a critical review. *The British Journal of Occupational Therapy*. 2012;75(2):76-84.
7. Gonzalez MT, Hartig T, Patil GG, Martinsen EW, Kirkevold M. Therapeutic horticulture in clinical depression: A prospective study. *Research and Theory for Nursing Practice*. 2009;23(4):312-28.
8. Liu Y, Bo L, Sampson S, Roberts S, Zhang G, Wu W. Horticultural therapy for schizophrenia. *Cochrane Database Syst Rev*. 2014;5.
9. Wichrowski M, Whiteson J, Haas F, Mola A, Rey MJ. Effects of horticultural therapy on mood and heart rate in patients participating in an inpatient cardiopulmonary rehabilitation program. *Journal of Cardiopulmonary Rehabilitation and Prevention*. 2005;25(5):270-4.
10. Jarrott SE, Gigliotti CM. Comparing responses to horticultural-based and traditional activities in dementia care programs. *American journal of Alzheimer's disease and other dementias*. 2010;25(8):657-65.
11. Gonzalez MT, Hartig T, Patil GG, Martinsen EW, Kirkevold M. A prospective study of existential issues in therapeutic horticulture for clinical depression. *Issues in Mental Health Nursing*. 2011;32(1):73-81.
12. Ruiyi B. Rehabilitation Effect of Gardening Therapy to Treat Chronic Schizophrenia Patients [J]. *Shanxi Nursing Journal*. 2001;6.
13. Andreasen NC. The Scale for the Assessment of Negative Symptoms (SANS): conceptual and theoretical foundations. *The British journal of psychiatry Supplement*. 1989(7):49-58.
14. Emsley RA, Niehaus DJ, Mbanga NI, Oosthuizen PP, Stein DJ, Maritz JS, et al. The factor structure for positive and negative symptoms in South African Xhosa patients with schizophrenia. *Schizophr Res*. 2001;47(2-3):149-57.
15. Ahmad Zadeh GH, Karim Zadeh T. Positive and negative symptoms in Iranian Schizophrenic patients. *Journal of Research in Medical Sciences* 2002; 7(1): 12-9.
16. Lysaker PH, Salyers MP. Anxiety symptoms in schizophrenia spectrum disorders: associations with social function, positive and negative symptoms, hope and trauma history. *Acta psychiatrica Scandinavica*. 2007;116(4):290-8.
17. Castle DJ, Slott Jensen JK. Management of depressive symptoms in schizophrenia. *Clinical schizophrenia & related psychoses*. 2015;9(1):13-20.
18. Kam MC, Siu AM. Evaluation of a horticultural activity programme for persons with psychiatric illness. *Hong Kong Journal of Occupational Therapy*. 2010;20(2):80-6.
19. Tremeau F, Goldman J, Antonius D, Javitt DC. Inpatients with schizophrenia report impaired situational motivation but intact global and social motivation. *Psychiatry research*. 2013;210(1):43-9.
20. Harvey PD, Velligan DI, Bellack AS. Performance-based measures of functional skills: usefulness in clinical treatment studies. *Schizophrenia bulletin*. 2007;33(5):1138-48.
21. Fujimaki K, Morinobu S, Yamashita H, Takahashi T, Yamawaki S. Predictors of quality of life in inpatients with schizophrenia. *Psychiatry research*. 2012;197(3):199-205.
22. Scheewe TW, Backx FJ, Takken T, Jorg F, van Strater AC, Kroes AG, et al. Exercise therapy improves mental and physical health in schizophrenia: a randomised controlled trial. *Acta psychiatrica Scandinavica*. 2013;127(6):464-73.
23. Acil AA, Dogan S, Dogan O. The effects of physical exercises to mental state and quality of life in patients with schizophrenia. *Journal of psychiatric and mental health nursing*. 2008;15(10):808-15.
24. Fogarty M, Happell B. Exploring the benefits of an exercise program for people with schizophrenia: a qualitative study. *Issues Ment Health Nurs*. 2005;26(3):341-51.
25. Dishman RK. Brain monoamines, exercise, and behavioral stress: animal models. *Medicine and science in sports and exercise*. 1997;29(1):63-74.
26. Gorczyński P, Faulkner G. Exercise therapy for schizophrenia. *Cochrane Database Syst Rev*. 2010(5):Cd004412.
27. Hoshii J, Yotsumoto K, Tatsumi E, Tanaka C, Mori T, Hashimoto T. Subject-chosen activities in occupational therapy for the improvement of psychiatric symptoms of inpatients with chronic schizophrenia: a controlled trial. *Clinical rehabilitation*. 2013;27(7):638-45.
28. Buchain PC, Vizzotto AD, Henna Neto J, Elkis H. Randomized controlled trial of occupational therapy in patients with treatment-resistant schizophrenia. *Revista brasileira de psiquiatria (Sao Paulo, Brazil : 1999)*. 2003;25(1):26-30.