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Effects of Occupational Therapy on Hospitalized Chronic Schizophrenia Patients with Severe Negative Symptoms

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The aim of this study was to determine whether occupational therapy (OT) can improve the interpersonal relationships and negative symptoms of hospitalized chronic schizophrenia patients with severe negative symptoms. Subjects were 38 patients with chronic schizophrenia. They were randomly divided into an OT group and a control group. Patients in the OT group participated in cooking activities once a week for 15 weeks, while patients in the control group did not. During this period, both groups had the usual treatment except for the cooking activities. In interviews, the patient was asked to place a chair toward the interviewer (a therapist). The angle and distance from the interviewer were taken as indicators of an ability to have interpersonal relationships. Negative symptoms were evaluated with the Scale for the Assessment of Negative Symptoms (SANS). Patients who received OT were able to sit at the smaller angle and shorter distance from the interviewer than before OT (p=0.015 and p=0.013, respectively). The total SANS score was lower after OT than before OT (p=0.033). In the control group, the distance from the interviewer also decreased during the experimental period (p=0.040) but the seating angle and the SANS scores did not change. The results suggest that OT can help to improve a relationship allowing the patient to face the therapist and that it might improve negative symptoms of schizophrenia.

INTRODUCTION

Difficulty in interpersonal relationships is a characteristic of patients with schizophrenia and negatively influences their activities of daily living (11). This difficulty is one of the most important issues of treatments for schizophrenia. Schizophrenia patients tend to keep their distance from others. The space taken by each person is referred to as personal space (27) and becomes wider as perception of fear becomes stronger (12). A study on seating locations of schizophrenia patients relative to physicians (interviewers) showed that patients seated themselves far from the physicians (22). The severity of the symptomatology of schizophrenia plain closely related to personal space (5, 26). Nechamkin et al. reported that

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interpersonal relationships of schizophrenia patients with others and disease severity could be investigated based on seating locations with respect to interviewers (23).

Negative symptoms of schizophrenia are difficult to treat (13). Antipsychotics improve the positive symptoms of schizophrenia, but are less effective for negative symptoms (17). Patients with severe negative symptoms tend to become socially withdrawn and avoid others because their negative symptoms are accompanied by other symptoms: high mental strain, vulnerability to changes in conditions, and difficulty in getting used to new conditions. These patients are beset with anxiety and a feeling of persecution when they are in unfamiliar places and gatherings. Their autism is thought to protect their sensitive and vulnerable ego (10). Thus, patients with severe negative symptoms cannot easily construct and maintain interpersonal relationships with others, and the severity of negative symptoms of inpatients with schizophrenia can lead to prolonged hospitalization (24).

The primary goal of occupational therapy (OT) is to enable people to participate in the activities of everyday life. Activities in OT provide opportunities to experiment with ways of relating, connecting and communicating (9). Thus, OT is likely to exhibit a broad therapeutic effect, even for patients with difficulty in establishing verbal communication and in making personal relationship with others. Cook et al. (3) observed that individual OT was related to social functionalization and improvement of negative symptoms of schizophrenia in a community setting. It was also reported that life skills training in OT was effective for negative symptoms of patients with schizophrenia (19). However, the effects of participation in activities and doing activities in OT have not been fully verified for schizophrenia patients with severe negative symptoms (14, 28).

In this study, we examined the effect of OT on interpersonal relationships and negative symptoms in a randomized study in hospitalized patients with severe negative symptoms of schizophrenia. For OT, we selected cooking. The objectives of the study were to determine whether OT helps the patient to [1] build a relationship with a therapist, as measured by the patient's seating preference, and [2] decrease the negative symptoms of schizophrenia, as measured by the Scale for Assessment of Negative Symptoms (SANS).

MATERIALS AND METHODS

Study design

A small-scale randomized controlled study in schizophrenia patients was performed to investigate the effect of OT. The cooking activity was added to the usual treatment in the experimental group (OT group).

The study plan was approved by the Medical Ethics Committee of Kobe University Graduate School of Medicine.

Participants

The study facilities were an urban private psychiatric single-department hospital (306 beds) and a psychiatric ward (173 beds) of an urban general hospital in Japan. The subjects were inpatients diagnosed with schizophrenia based on DSM-IV criteria. The inclusion criteria were a disease duration of 10 years or longer; the absence of working experience after onset due to the disease condition; rejection or negative involvement in treatments including programs in an OT room, psychological education, and social skills training; and approval for participation in the study given by the attending physician. Patients with severe dietary restrictions, difficulty in swallowing (patients on minced diets were accepted), disability of independent walking, dementia or brain injury were excluded. Those under a major change of psychotic medication were also excluded.

The study was explained to 65 patients, but 17 refused to be interviewed. Of the 48 patients interviewed, 5 did not want to participate in the study. Written and signed consent for participation was obtained from 43 patients, but 5 were subsequently excluded because of severe symptoms of mood disorder (2 patients), dementia (2) and unstable disease condition (1).

The remaining 38 patients were randomly divided into two groups: 19 patients were allocated to the OT group and participated in the cooking program, and the other 19 patients were allocated to the control group. The intervention was discontinued in 3 patients in the OT group due to the following reasons: one for an ocular tumor surgery and two for deterioration of psychiatric symptoms, and in one patient in the control group due to discharge into an elderly nursing home. Thirty-four patients participated in the study program and completed the final interview (Figure 1).

Characteristics of patients

Gender, age, duration of current hospitalization, years of education, and dose of medication were evaluated as background factors. Patients in the OT group were 57.6 ± 12.8 (mean ± SD) years old, with a current hospital stay of 6.0 ± 9.9 years. In the control group, the patients were aged 57.7 ± 14.1 years old, with a current hospital stay of 7.6 ± 10.7 years. The mean chlorpromazine equivalent in the dose of medication was 641.3 ± 667.0 mg in the OT group and 716.1 ± 443.1 mg in the control group. There were no significant differences in these characteristics between the 2 groups (Table 1).

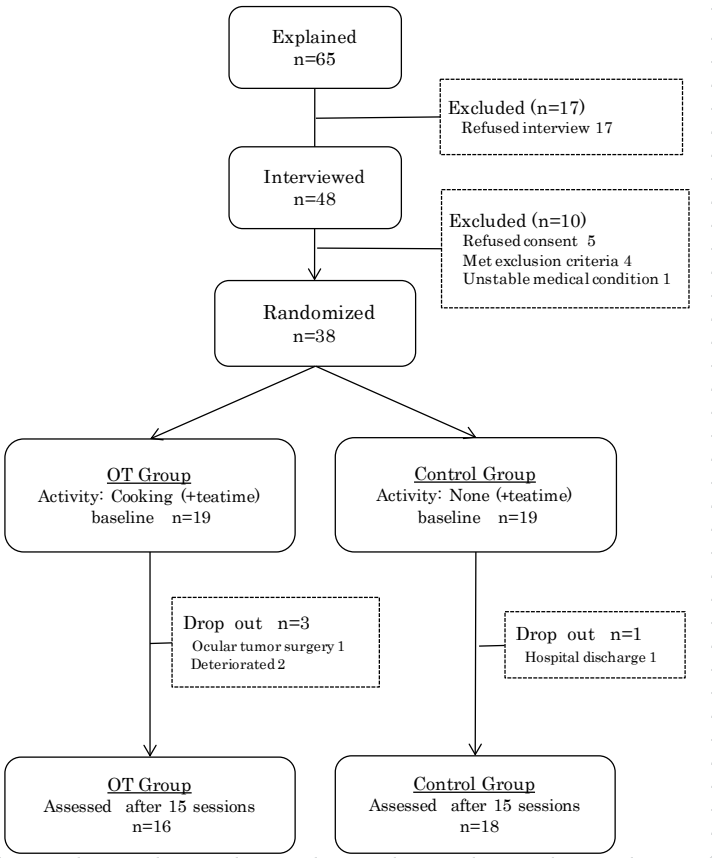

Figure 1. Flow chart of subject status

Table I. Characteristics of subjects

	OT Group Mean ± SD	Control Group Mean ± SD	*p-value*
Numbers (Male, Female)	16 (7,9)	18 (11, 7)	
Age, yr	57.6 ± 12.8	57.7 ± 14.1	*1.000*
Duration of illness, yr	33.1 ± 13.3	32.9 ± 12.9	*.986*
Length of hospitalization, yr	6.0 ± 9.9	7.6 ± 10.7	*.403*
Length of education, yr	10.4 ± 1.6	10.5 ± 1.9	*.905*
Antipsychotic medication, mg (Chlorpromazine equivalent)	641.3 ± 667.0	716.1 ± 443.1	*.313*

Interventions

The intervention for the OT group was designed by experienced occupational therapists (OTs), with reference to the psychiatric rehabilitation methods (8).

Differences in the therapeutic structure between the two groups are shown in Table 2. Patients in the OT group did cooking activities while patients in the control group did not. The cooking activities had the following three factors; [1] participation in activities, [2] having a goal, and [3] doing step by step. For cooking, snacks that could be prepared in less than half an hour were selected. Snacks could be prepared using 2 or 3 procedures such as mixing and baking. Completed snacks that were prepared by the OTs were given to the patients at the start of the program as a sample. The therapist first demonstrated the cooking model. The therapist provided support and worked with the patients to allow them to participate in the cooking activities and exhibit their ability. A series of the OT interventions were independently done three times from September 2007 to August 2009.

Except for the cooking activities, the OT and control groups had usual treatments and therapists verbally communicated with both groups during the intervention periods.

Assessment

The patients were evaluated twice: before the intervention and after completion of 15 sessions of OT. The Brief Psychiatric Rating Scale (BPRS) (25) and Scale for Assessment of Negative Symptoms (SANS) (1) were used to evaluate psychotic symptoms; the Rehabilitation Evaluation Hall and Baker (Rehab) scale (2) was used to evaluate social skills; and the Profile of Mood States (POMS) scale (21) was used for evaluation of subjective mood. The attending psychiatrists evaluated BPRS and SANS under blinded conditions for each intervention. The nurse or OTs in charge performed Rehab evaluation. Patients answered the questionnaire of POMS.

Seating preference was used to evaluate a patient's personal space, and thus ability to have a personal relationship with the therapist (22). The layout of the interview room is shown in Figure 2. The interviewer (a therapist) stood by a desk. The floor contained inconspicuous tapes that described a radial grid, in which zero degree was defined as the direction directly in front of the interviewer. The patient's chair was initially placed at 90° and 400cm from an interviewer. An assistant asked a patient to enter a room for an interview with the therapist. The interviewer looked at the patient and said ‘hello, please bring the chair over here and sit where you want’ and then sat at a desk looking in the zero degree direction. After the patient moved the chair and a brief interview were done, the position of the chair was recorded.

Statistical methods

The background characteristics of the patients and results of evaluations before intervention were compared between the OT and control groups. Student's t-test was used to compare age and disease duration, and a Mann-Whitney U-test was used to compare duration of hospitalization, years of education, and dose of medication. Inter-group comparison of

Table II. Comparison of therapeutic structures

	OT Group	Control Group
1. Activity	Cooking (+teatime)	None (+teatime)
①Participation in activities	Yes	No
②Having a goal	Yes	No
③Doing step by step	Yes	No
2 .Communication	Nonverbal and verbal	Verbal
3. Frequency	Once a week, 1 hour, 15 sessions	Once a week, 1 hour, 15 sessions
4. Place	OT room	OT room
5. Size of Group	Around 6 persons	Around 6 persons
6. Number of OTs	3	3

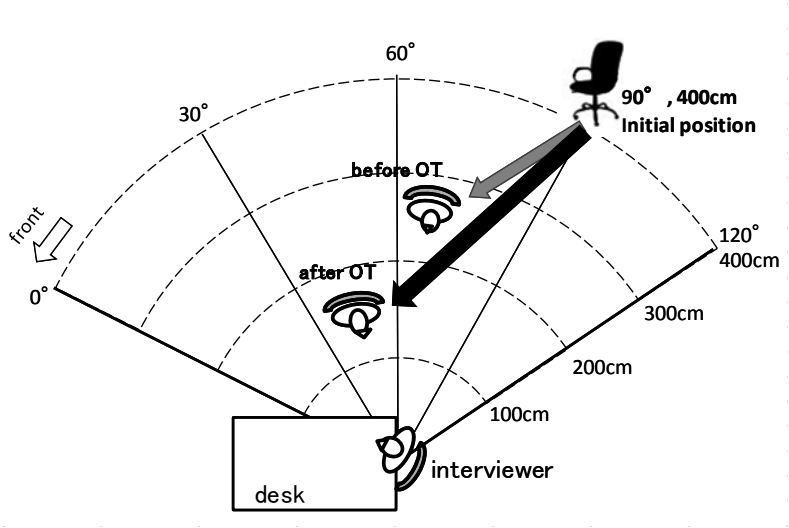

Figure 2. The layout of the interview room. The position where patient placed the chair was recorded in radial coordinates, in which 0 degree is the direction that the interviewer faces.

BPRS, SANS, Rehab, and POMS scores before and after the intervention were compared by Mann-Whitney U-test, and the angle and distance from interviewer were compared by Student's t-test. Within-group comparisons of data before and after the intervention were compared by Wilcoxon signed-ranks test. The relationship between SANS scores and seating location was investigated using a Pearson correlation coefficient analysis. Analyses were performed using PASW Statistics Base 18 for Windows (PASW is a registered trademark of SPSS Inc.), and the significance level was set at $p<0.05$ in all tests.

RESULTS

For the POMS, 7 and 5 patients in the OT group and 2 and 3 patients in the control group did not give consent to or were unable to fill in the questionnaire before and after the intervention, respectively. Regarding seating location, 2 patients before intervention in the OT group and 2 patients after intervention in the control group had difficulty sitting on the chair. All results that could not be obtained were handled as missing data.

Table III. BPRS, SANS, Rehab, and POMS scores in OT and control groups

	OT Group n=16					Control Group n=18				
	Baseline		post-intervention			Baseline		post-intervention		
	Median	(IQR)	Median	(IQR)	*p-value*	Median	(IQR)	Median	(IQR)	*p-value*
1.BPRS										
Total	39.5	(29.0)	41.5	(12.5)	*.712*	44.0	(21.8)	45.0	(17.8)	*.266*
2.SANS										
Total	**96.0**	**(23.8)**	**92.5**	**(31.0)**	***.033*** *	88.5	(42.0)	88.5	(45.0)	*.550*
Affective Flattening-Blunting	25.5	(13.0)	26.0	(16.8)	*.527*	22.5	(12.3)	23.5	(13.0)	*.860*
Alogia	19.0	(9.0)	18.5	(11.5)	*.057*	16.5	(9.5)	17.5	(11.3)	*.959*
Avolition-Apathy	**17.5**	**(4.8)**	**15.5**	**(7.0)**	***.022*** *	17.0	(8.5)	16.5	(10.3)	*.673*
Anhedonia-Asociality	**20.5**	**(4.8)**	**18.5**	**(8.5)**	***.016*** *	18.0	(6.8)	17.5	(9.5)	*.379*
Inattention	12.0	(4.0)	13.5	(4.0)	*.450*	12.0	(9.5)	12.0	(11.3)	*.588*
3.Rehab										
Total	70.0	(53.3)	70.0	(61.0)	*.090*	68.5	(32.3)	64.0	(37.5)	*.586*
4.POMS										
Total	**26.0**	**(49.0)**	**12.0**	**(47.0)**	***.018*** *	20.0	(15.0)	16.0	(34.0)	*.975*
Tension-Anxiety	6.0	(8.5)	5.0	(7.0)	*.088*	3.0	(5.0)	5.0	(9.0)	*.723*
Depression-Dejection	7.0	(13.0)	4.0	(6.0)	*.058*	4.0	(2.5)	5.0	(7.0)	*.361*
Anger-Hostility	**7.0**	**(10.5)**	**5.0**	**(8.0)**	***.028*** *	3.0	(3.0)	2.0	(5.0)	*.759*
Fatigue	5.0	(9.0)	3.0	(12.0)	*.395*	4.0	(8.0)	2.0	(12.0)	*.893*
Confusion	7.0	(6.0)	5.0	(9.0)	*.156*	6.0	(4.5)	7.0	(7.0)	*.909*
Vigor	5.0	(9.5)	4.0	(5.0)	*.104*	2.0	(6.0)	5.0	(4.0)	*.092*

Wilcoxon signed-rank test, *p<0.05
IQR: Inter Quartile Range

Comparison of the two groups showed no significant differences in total BPRS, SANS, Rehab, or POMS score or seating location. In an intragroup data comparison before and after the intervention, we found significant changes in the OT group (Table 3, 4).

The total SANS score for negative symptoms significantly improved from 96.0 (23.8) (median (inter quartile range)) points before the intervention to 92.5 (31.0) points after the intervention in the OT group (p=0.033). The scores for the SANS sub-items of avolition/apathy and anhedonia/asociality were 17.5 (4.8) and 20.5 (4.8) points, respectively, before the intervention, and these significantly decreased to 15.5 (7.0) and 18.5 (8.5) points, respectively, after intervention in the OT group (p=0.022 and p=0.016, respectively). In contrast, there were no significant changes in the total score or the score for any item in the control group.

The total POMS score significantly decreased from 26.0 (49.0) points before the intervention to 12.0 (47.0) points after the intervention in the OT group (p=0.018), showing stabilization of mood. The score for ‘anger/hostility’ also significantly decreased from 7.0 (10.5) points before the intervention to 5.0 (8.0) points after the intervention (p=0.028),

showing reduction of this emotion. In contrast, no changes were noted in the total score or the score for any item in the control group.

There were no significant differences in the total BPRS score or the score for any of the 4 sub-items from before to after the intervention in either group. Similarly, the total Rehab score or any sub-item score did not change significantly from before to after the intervention in either group (Table3).

Table IV. Seating location in OT and control groups

	OT Group n=16			Control Group n=18		
	Baseline	post-intervention		Baseline	post-intervention	
	Mean ± SD	Mean ± SD	*P-value*	Mean ± SD	Mean ± SD	*P-value*
Seating location						
Angle	**65.3 ± 27.0**	**48.7 ± 20.2**	***.015*** *	60.8 ± 32.9	44.7 ± 27.3	*.410*
Distance	**220.6 ± 157.4**	**111.0 ± 81.0**	***.013*** *	**248.9 ± 150.1**	**135.3 ± 103.8**	***.040*** *

T-test , *p<0.05

The angle of the seating location from the interviewer significantly decreased from 65.3 ± 27.0 (mean ± SD) degrees before the intervention to 48.7 ± 20.2 degrees after the intervention in the OT group (p=0.015). The distance from the interviewer also showed a significant reduction from 220.6 ± 157.4 cm before the intervention to 111.0 ± 81.0 cm after the intervention in the OT group (p=0.013). In the control group, the distance from the interviewer significantly decreased from 248.9 ± 150.1 cm before the intervention to 135.3 ± 103.8 cm after the intervention (p=0.040), but with no significant change in the angle with respect to the interviewer (p=0.410) (Table 4). In all subjects before the intervention, the angle of seating showed a significant correlation with negative symptoms (total SANS score) in a Pearson correlation analysis (r=0.413, p=0.012), but the distance of the seating location was not significantly correlated with the total SANS score (r=0.197, p=0.249).

DISCUSSION

This study investigated the effects of 15 weeks of OT intervention in the form of cooking activity on interpersonal relationships and negative symptoms of schizophrenia patients. Negative symptoms of schizophrenia before the intervention were correlated with the angle of the chosen seating location with respect to the interviewer, suggesting that patients with severe negative symptoms seated themselves at higher angles in order to avoid eye contact with the interviewer. Nechamkin *et al*. (23) found that interpersonal distance and negative symptoms were correlated in schizophrenia. Both these studies suggest that difficulty with interpersonal relationships in schizophrenia patients with negative symptoms can be evaluated based on seating location. Differences in results of the two studies, angle or distance, might be due to the different experimental settings or the different culture backgrounds.

In our study, the distance of the seating location from the interviewer was significantly reduced after intervention in both the OT (cooking and teatime) and control (teatime) groups, showing that the usual treatments including verbal interventions may be effective for improvement in the symptom which lets schizophrenia patients keep a long distance from others. The angle of the seating location significantly moved toward the front of the interviewer in the OT group, but not in the control group. This suggests that OT intervention is effective in allowing patients to seat themselves at a location that does not avoid the eye

contact with therapists, i.e., a location that allows natural communication, such as conversation.

The total SANS score was significantly decreased after intervention in the OT group. Clozapine and novel antipsychotics are currently thought to be effective for negative symptoms (16, 29), but this is still controversial (13, 17). Preliminary studies suggested that life skills training in OT and individual OT in the community were effective for negative symptoms (3, 19). In the present study, the total SANS score was reduced after OT intervention, suggesting that OT might improve negative symptoms. Among SANS sub-items, the scores for 'a volition-apathy' and 'anhedonia/asociality' were significantly reduced. It was previously reported that improvement of 'a volition-apathy' was associated with improvement of Quality of Life (QOL) and improvement of 'anhedonia/asociality' increased performance of activities of daily living (ADL) (7, 20). Therefore, our results raise the possibility that OT intervention improves QOL and ADL in patients with schizophrenia.

The POMS score for 'anger-hostility', which is evaluated subjectively by patients, significantly decreased after intervention in the OT group. Negative emotions including 'anger-hostility', but excluding 'vigor', on POMS were improved by yoga (15), and 'anger-hostility' was decreased by music therapy in patients with mental disorder (18). Since patients performed this OT with others as well as in both yoga and music therapy programs, working with others may reduce anger and hostility, i.e., OT may reduce hostile emotions against therapists and others.

There were no significant changes on the BPRS in OT group, suggesting that the OT intervention was not effective for the symptoms measured by the BPRS. There were also no significant changes in the overall behavior score on Rehab, showing that OT did not change behavior in daily life. Eack *et al.* (6) observed significant progression of social skills among schizophrenia patients exposed to OT in a 2-year follow-up. Our 15-week intervention seems to be too short to achieve distinct changes in daily life.

In the control patients, no improvement was observed in the evaluated scores, suggesting that the patients with severe negative symptoms did not respond well to the usual treatments. Patients with schizophrenia are very vigilant of other people (4). In this study, the OT group showed a significant improvement in the angle of the seating location and total SANS score. Our results suggest that participation in activities and doing activities in an OT setting could reduce vigilance, construct relationship with respect to therapists, and improve the severe negative symptoms of patients with schizophrenia.

Generalization of our results obtained in this study was limited because the inter-group comparisons showed no significant difference. The small sample size was another limitation of this study. Moreover, the observed interpersonal relationship of the patients was only that with the therapist, which also limits generalization of the findings. However, results obtained in this study provide a foundation for further studies to verify the effectiveness of OT intervention on the interpersonal relationships and negative symptoms of schizophrenia patients.

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