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## Frontier of Psychiatry

### Effect of individualized occupational therapy on rehospitalization of patients with schizophrenia: A two-year prospective cohort study

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**Aim:** We evaluated the effect of individualized occupational therapy (IOT) compared to usual group occupational therapy (GOT) on the rehospitalization of patients with schizophrenia. **Methods:** A prospective cohort study included patients with schizophrenia who were newly hospitalized to a psychiatric hospital and discharged within 1 year. We compared the time to rehospitalization by treatment group (GOT+IOT or GOT alone) using Kaplan–Meier survival analysis. The Cox proportional hazards model was used to investigate factors associated with rehospitalization. **Results:** Of the 109 patients who met the eligibility criteria, 53 were in the GOT+IOT group and 56 in the GOT alone group. The overall rehospitalization rate during 2 years after discharge was 51.38 %. The GOT + IOT group demonstrated a significantly lower rehospitalization rate with 16 patients

(28.57 %) rehospitalized compared to 40 patients (71.43 %) from the GOT alone group. Time to rehospitalization was significantly longer for the GOT + IOT group compared to the GOT alone group ( $p < 0.01$ ). In the multivariate Cox proportional hazards model, type of inpatient occupational therapy [hazard ratio (HR) = 0.54, 95 % confidence interval (CI) = 0.35-0.84,  $p = 0.01$ ], medication adherence (HR = 0.34, 95 % CI = 0.21-0.57,  $p < 0.01$ ), co-resident support person (HR = 0.45, 95 % CI = 0.28-0.72,  $p < 0.01$ ), and executive function at discharge (HR = 0.74, 95 % CI = 0.59-0.93,  $p < 0.01$ ) were significantly associated with rehospitalization. Conclusion: This study suggests that in addition to good medication adherence, co-resident support person, and good cognition at discharge, IOT during hospitalization is associated with reducing risk of rehospitalization.

**Keywords** : Schizophrenia, Occupational Therapy, Rehospitalization, Psychosocial Treatment, Rehabilitation

### Introduction

In the inpatient treatment of schizophrenia, it is important to reduce psychiatric symptoms, improve cognition through rehabilitation, and prevent relapse and rehospitalization. In inpatient treatment and rehabilitation for schizophrenia, it is necessary to provide individualized support that takes into account the recovery status and life issues of each patient. However, the current medical fee system of psychiatric occupational therapy in Japan stipulate that the standard duration of treatment is two hours per patient per day and the number of patients treated per day is approximately 25 patients per unit, and the standard number of patients treated by one occupational therapist is 50 patients or less per two units per day.

The current medical fee system states that the number of patients treated by one occupational therapist should not exceed 50 patients per day for two units, with one unit for each patient. This system was formulated in 1974, when psychiatric occupational therapy was converted into medical fees, and it assumed group treatment for long-term hospitalized patients, which does not fit the reality of modern psychiatric treatment and rehabilitation that requires highly individualized support such as early intervention, discharge promotion, and support for school or work. Therefore, in the clinical practice of occupational therapy, individualized support is only partially implemented according to the need of each patient, based on the conventional group treatment. The effect of individualized

support in occupational therapy needs to be verified.

We developed an individualized occupational therapy (IOT) program for patients with schizophrenia with the aim of promoting their active participation in treatment and improving their outcomes. 43)45) A multicenter, randomized clinical trial was conducted to examine the effect of adding the IOT to the standard group occupational therapy (GOT) designed to improve cognition and other outcomes, including social functioning, intrinsic motivation, psychiatric symptoms, and treatment satisfaction, among patients with schizophrenia. The results showed that the GOT plus IOT group showed significant improvements in cognition and intrinsic motivation than the GOT alone group 45), which showed that IOT was effective in improving cognition and intrinsic motivation in patients with schizophrenia. 13)14)15)21)28)34) However, the effect of IOT on post-discharge outcomes was unclear. In this study, we followed the same sample as in the previous study 45) for 2 years after discharge and hypothesized that patients who received IOT during hospitalization would have a longer time to rehospitalization and a reduced risk of rehospitalization. We explored the impact of demographic data, including type of occupational therapy during hospitalization (GOT+IOT; GOT

alone), and clinical factors on rehospitalization.

## I. Methods and results of the study

### 1. Methods

#### 1) Design

The present study was a prospective cohort study conducted 2 years after discharge following a previous study 45) to evaluate the effect of inpatient occupational therapy (GOT+IOT; GOT alone) on rehospitalization. The follow-up period was determined as the time from index psychiatric hospital discharge to rehospitalization in a psychiatric hospital during the 2-year follow-up and was censored at psychiatric rehospitalization or day 730 after index psychiatric discharge, whichever came first. If patients were repeatedly hospitalized and discharged during the follow-up period, the number of days until the first rehospitalization was determined. The study was conducted from February 2016 to March 2019 at six psychiatric hospitals in Nagano prefecture. This study was approved by the ethics committees of: the School of Medicine, Shinshu University; Medical Corporation Seitakai Mental Support Soyokaze Hospital; North Alps Medical Center Azumi Hospital; Nagano Prefectural Mental Wellness Center Komagane; Social Medical Corporation Ritsuzankai Iida Hospital; Medical Corporation

Aiseikai Matsuoka Hospital; and Medical Corporation Akitsukai Nanshin Hospital.

## 2) Participants

Inclusion criteria were patients aged 20-65 years who were newly hospitalized to a psychiatric hospital, diagnosed with schizophrenia or schizoaffective disorder based on the diagnostic criteria of DSM-5 (3), and discharged within 1 year. Patients who had been hospitalized for more than one year were excluded from the study, because they were expected to face issues such as family acceptance and living environment maintenance, in addition to the disease level. (30) In addition, patients with a history of mental retardation, alcohol or drug dependence, and neurological disorder also excluded.

## 3) Occupational therapy interventions

In the GOT + IOT group, IOT was adjusted to account for more than half of the total occupational therapy time.

IOT is an intervention strategy designed to provide individualized support to inpatients in the early recovery stages of schizophrenia, with the aim of promoting cognition, proactive participation in treatment, and adaptive behavior. (43)(45) IOT consists of motivational interviewing, self-monitoring, individualized visits, craft activities, individualized psychoeducation, and discharge

planning, and aims to improve social adaptability, which is the overarching goal of occupational therapy. Interviews were conducted for each subprogram, and the motivational interview (11) encouraged patients' proactive participation in treatment and occupational therapy by confirming their subjective experiences of program effects and sharing future goals and plans. In the self-monitoring, we encouraged patients to pay attention to the changes in their bodily sensations due to the physical exercise program in the first half of the hospitalization (10) and to improve their sense of efficacy (51) and meta-cognition (36) by giving them positive feedback. In the second half of the hospitalization, outing support, use of social resources, and pre-discharge visit guidance were provided as needed. In the individualized psychoeducation, the illness management and relapse prevention program were implemented to examine individual relapse signs and coping strategies (37)(38)(52), and a crisis plan was shared with the patient, family, and other supporters (7)(39). In the discharge planning, a schedule for daily life and a care plan after discharge were created to promote a smooth transition from hospitalization to community life (12)(20). The most important feature of the IOT is the use of structured craft activities as training to enhance cognition by

setting up one-on-one time with the occupational therapist. The occupational therapist instructed the patient to understand the craft instructions, memorize the process, match the various parts to the instructional diagram, use the tools in a correct and safe manner, and perform the task correctly, so that the patient could experience self-help effort and success. In the IOT, the time, frequency, and place were individually managed according to each patient's condition. In order to control the implementation method of IOT among the research facilities, the IOT implementation manual was prepared, and a training session was held for the research collaborators in advance.

The GOT was an activity-oriented group treatment program that was already in place at each facility and included physical exercise, craft activities, cooking, music, recreation, and psychoeducation, etc. In the GOT program, patients voluntarily selected their preferred program from a weekly schedule and participated at their own pace, either in a group treatment program with about specific 10 participants or in a gathering of about unspecified 15 participants. In the GOT craft activities, patients worked in a voluntary manner, and the occupational therapist provided guidance and assistance as needed.

#### 4) Outcome measures

The primary outcomes were rehospitalization over time and time to rehospitalization. Other outcomes concerned demographics (baseline), assessment scores (pre- and post-occupational therapy during hospitalization), and outpatient treatment were evaluated.

Demographic data included age, sex, diagnosis, age of onset, number of hospitalization, cumulative length of hospitalization, education, employment, marital status, occupational therapy experience, time from hospitalization to start of occupational therapy, duration of most recent hospitalization, duration of inpatient occupational therapy, type of inpatient occupational therapy (GOT+IOT; GOT alone), and antipsychotic medication. In addition, information on living conditions after discharge was collected from interviews with patients and their supporters or from medical records, including information on supporters living with the patient, income, disability welfare services, outpatient treatment (outpatient occupational therapy, day care treatment, home-visit nursing), and medication adherence.

The following scales, measured at pre- and post-inpatient occupational therapy, were evaluated; the Brief Assessment of Cognition in Schizophrenia (BACS) (23)(26) and the

Schizophrenia Cognition Rating Scale (SCoRS) 24)27)29) for assessing cognition; the Global Assessment of Functioning (GAF) 2) for assessing global functioning; the Intrinsic Motivation Inventory (IMI) 6) for assessing intrinsic motivation; the Positive and Negative Syndrome Scale (PANSS) 25) for assessing psychiatric symptoms; and the Client Satisfaction Questionnaire-8 (CSQ-8) 4)48) for assessing treatment satisfaction.

#### 5) Statistical Analysis

The sample size was set at 150 patients (75 patients in each group) based on our pilot study 44), assuming a required sample size of 130 patients ( $\alpha$  error = 0.05,  $\beta$  error = 0.20) and a dropout rate of 20 %. Time to rehospitalization by treatment group during the follow-up phase was evaluated with Kaplan–Meier survival analysis, and the log–rank test was used to assess the differences in survival curves. To explore factors associated with rehospitalization, we extracted factors associated with rehospitalization at  $p < 0.10$  in univariate analysis and performed multivariate Cox proportional hazards analysis using the forced imputation method, adding age, sex, and number of hospitalizations as adjustment factors. Statistical significance was set at two-sided  $p < 0.05$ . Statistical analyses were performed using JMP 13.2.1 for

Microsoft Windows (SAS Institute, Cary, NC, USA).

## 2. Results

### 1) 2.1. Patient disposition

The patient disposition including the previous study 45) is shown in Figure 1. Of the 260 patients assessed for eligibility, 136 met the criteria of the previous study 45) and 68 were assigned to the GOT + IOT group and 68 to the GOT alone group. A total of 7 patients, 2 in the GOT + IOT group and 5 in the GOT alone group, dropped out of the study before discharge. In the post-discharge follow-up, 18 patients (12 in the GOT + IOT group and 6 in the GOT alone group) were excluded from the study due to the hospitalization for more than one year or the changing residence, and 111 patients (54 in the GOT + IOT group and 57 in the GOT alone group) met the criteria for this follow-up study. Two patients in each group dropped out during the study period, and a total of 109 patients (53 in the GOT + IOT group and 56 in the GOT alone group) completed the 2-year follow-up.

### 2) Patient characteristics

Of the total 109 patients, 55 (50.46 %) were male, mean age was 42.07 [standard deviation (SD) = 10.66] years, 92 (84.40 %) were diagnosed with schizophrenia, 53 (48.62 %) had received GOT + IOT during their

hospital stay, 62 (56.88 %) had access to resident support persons, and 81 (74.31 %) had good medication adherence. The mean age of patients in the GOT alone group was 44.18 (SD = 10.20), which was significantly higher than 39.89 (SD = 10.78) in the GOT + IOT group ( $p < 0.05$ ). The number of patients with poor medication adherence was 20 (35.71 %), which was significantly more than 8 (15.09 %) in the GOT + IOT group ( $p < 0.05$ ). There were no significant differences in other demographic data (Table 3). In the comparison of assessment scales measured pre- and post- inpatient occupational therapy, the GOT + IOT group indicated significant improvements than the GOT alone group in BACS (composite score), IMI (total), and PANSS (total) ( $p < 0.01$ ) (Table 4).

### 3) Time to rehospitalization

Of the 109 patients, 56 (51.38 %) were rehospitalized, and the time to rehospitalization was 287.90 (SD = 214.20) days. Of the 56 patients who were rehospitalized, 16 (28.57 %) were in the GOT + IOT group and 40 (71.43 %) were in the GOT alone group ( $\chi^2 = 18.54$ ,  $p < 0.01$ ). The time to rehospitalization was significantly longer in the GOT + IOT group (log-rank  $\chi^2 = 25.49$ ,  $p < 0.01$ ; Figure 2).

### 4) Factors associated with rehospitalization

In a multivariate Cox proportional hazards model, type of inpatient occupational therapy [hazard ratio (HR) = 0.54, 95 % confidence interval (CI) = 0.35-0.84,  $p < 0.01$ ], medication adherence (HR = 0.34, 95 % CI = 0.21-0.57,  $p < 0.01$ ), support person living with the patient (HR = 0.45, 95 % CI = 0.28-0.72,  $p < 0.01$ ), and BACS executive function at discharge (HR = 0.74, 95 % CI = 0.59-0.93,  $p < 0.01$ ) were significantly associated with rehospitalization (Table 5).

## II. Discussion - Significance of this paper, difficulties and innovations

This was a multicenter, prospective cohort study to evaluate the impact of inpatient occupational therapy (GOT + IOT; GOT alone) on rehospitalization of patients with schizophrenia. The main findings of the study were that the addition IOT to usual inpatient treatment prolonged the time to rehospitalization and reduced the risk of rehospitalization, which may be the result of the beneficial effect of inpatient IOT on post-discharge outcomes.

In general, patients with schizophrenia have a low adherence rate with antipsychotic medication (33), and it has been pointed out that the increase in the rehospitalization rate increases the psychological and social burden on patients and their families (17)(47)(50). In addition, repeated

rehospitalizations are known to affect functional outcomes 9)35), and the prevention of rehospitalization is an extremely important issue in the schizophrenia treatment 8)42)49)50). In the present study, we found that cognitive improvement and medication adherence were important factors in reducing the risk of rehospitalization in patients with schizophrenia. 5)16)18)19)22)32)40)41) Individualized method of relapse prevention is discussed in a psychoeducation program of IOT and a crisis plan is developed. The improvement of cognition with IOT and the improvement of illness management skills with individualized psychoeducation may have contributed to the improvement of patients' medication adherence and the reduction of rehospitalization rate.

The significance of this study is that it demonstrated that the addition of IOT based on individualized support to the conventional GOT based on group treatment reduced the rehospitalization rate of patients with schizophrenia. In order to minimize the disparity among facilities, we prepared the IOT implementation manual and held a training session in advance.

### **Conclusion - Issues and directions for the future**

Our results demonstrate that inpatient IOT prolongs the time to

rehospitalization, and the comprehensive approach of receiving IOT, possessing a good cognition at discharge, and maintaining favorable medication adherence is beneficial for reducing the risk of rehospitalization. The results of this study indicate that IOT is effective in preventing rehospitalization, and have clinical significance that GOT centered occupational therapy should be changed to IOT to reduce the rehospitalization rate of patients with schizophrenia, and social significance that the results is the evidence to revise the medical fee system for psychiatric occupational therapy in Japan.

IOT is unique in that it provides individualized comprehensive support, including motivational interviewing, self-monitoring, individualized visits, craft activities, individualized psychoeducation, and discharge planning, and not simply a one-on-one time setting. However, it is not possible to identify which elements of the subprograms had the greatest impact on reducing rehospitalizations in this study design. There are only manuals for individualized subprograms, which limits the ability to standardize the fidelity of practices. In order to disseminate and enlighten the IOT to more psychiatric hospitals, it is necessary to brush up the IOT implementation manual by introducing



a fidelity scale to evaluate the implementation of subprograms. We hope that the current medical fee system for psychiatric occupational therapy will be revised as a result of verifying the effectiveness of IOT, and we hope to make further contributions to the promotion of patients' recovery.

This paper is a rewrite of a recent research paper (46) published in PCN by one of the authors in Japanese at the request of the editorial board, with additional comments on the significance and prospects of the paper.

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Table 1. Comparison of features between IOT and GOT groups

	IOT	GOT
Basic policy	Goal-oriented individualized intervention in line with the goal assuming life after discharge	Activity-oriented intervention in which patients participate in desired activities and programs
Treatment goal and planning	Sharing the goals and plans based on assessment results Facilitating proactive participation in treatment and improving outcomes	Patients voluntarily select any desired program among group occupational therapy programs and participate at each pace
Implementation form	One-on-one basis with the occupational therapist that is tailored to each patient	Group treatment
Time and frequency	Set according to the patients' condition Gradual increase from a short time to 2 hours, 3 to 5 times a week	Set by the patients on a voluntary basis
Interview	Implementation for each subprogram Confirming subjective experiences and effects, sharing new goals and plans, and promoting proactive participation in treatment and occupational therapy	Implementation as necessary
Craft activities	Craft activities with individualized coaching by the occupational therapist Intensive intervention in which cognition is frequently used	Craft activities with patients' voluntary participation

GOT, group occupational therapy; IOT, individualized occupational therapy.

(Japanese translation from Reference 46)

Table 2. IOT program summary

Subprogram	Description
Motivational interviews	<ul style="list-style-type: none"> <li>• For improving motivational deficits</li> <li>• Promote independence by addressing the challenges encountered by the individual while in hospitalization and after discharge</li> </ul>
Self-monitoring	<ul style="list-style-type: none"> <li>• Improvement of physical sensation through physical exercise</li> <li>• Provision of positive feedback for improving subjective experience and self-efficacy</li> <li>• Metacognitive training</li> </ul>
Individualized visits	<ul style="list-style-type: none"> <li>• Visit to the patient's room from the early stage of hospitalization to support getting out of bed and activities during the first half of hospitalization</li> <li>• Support for socializing, utilizing social resources, and home visits within a community setting during the second half of hospitalization</li> </ul>
Handicraft activities	<ul style="list-style-type: none"> <li>• Utilization involves engagement in simple constructive activities with clear procedures, such as pasting pictures, coloring pictures, Japanese paper crafts, and jigsaw puzzles</li> <li>• Provision of guidance that involves asking patients to attend to, concentrate on, precisely perform, and efficiently use instruments and materials</li> <li>• Bridging interventions to link cognition and daily functioning</li> </ul>
Individualized psychoeducation	<ul style="list-style-type: none"> <li>• Illness management and relapse prevention programs</li> <li>• Development of a crisis plan and sharing with the patient, family, and other supporters</li> </ul>
Discharge planning	<ul style="list-style-type: none"> <li>• Development of a post-discharge life schedule and care plan</li> <li>• Skill training for daily living activities, education, and work as needed</li> </ul>

(Japanese translation from Reference 46)

Table 3. Demographics and clinical characteristics

	Total (n=109)		GOT+IOT (n=53)		GOT alone (n=56)		P§
<b>Demographics†</b>							
Age (years), mean (SD)	42.07	(10.66)	39.89	(10.78)	44.18	(10.20)	0.034*
<b>Sex, n (%)</b>							
Male	55	(50.46)	27	(50.94)	28	(50.00)	0.926
Female	54	(49.54)	26	(49.06)	28	(50.00)	
<b>Diagnosis, n (%)</b>							
Schizophrenia	92	(84.40)	44	(83.02)	48	(85.71)	0.698
Schizoaffective disorder	17	(15.60)	9	(16.98)	8	(14.29)	
Age at onset (years), mean (SD)	22.47	(3.85)	21.90	(3.93)	23.14	(3.69)	0.125
Number of hospital stays, mean (SD)	5.018	(9.75)	3.63	(3.52)	6.36	(13.14)	0.143
Total hospital stays period (months), mean (SD)	29.29	(44.54)	26.26	(43.10)	32.21	(46.09)	0.486
Education (years), mean (SD)	11.60	2.12	11.39	(2.03)	11.80	(2.20)	0.486
<b>Marital status, n (%)</b>							
Ever married	18	(16.51)	8	(15.09)	10	(17.86)	0.697
Never married	91	(83.49)	45	(84.91)	46	(82.14)	
<b>Experience of work, n (%)</b>							
Yes	31	(28.44)	14	(26.42)	17	(30.36)	0.647
No	78	(71.56)	39	(73.58)	39	(69.64)	
<b>Experience of occupational therapy, n (%)</b>							
Yes	50	(45.87)	24	(45.28)	26	(46.43)	0.901
No	59	(54.13)	29	(54.72)	30	(53.57)	
Period of hospitalization to hospital and start of occupational therapy (days), mean (SD)	9.48	(8.98)	11.19	(9.75)	7.84	(7.91)	0.050
Recent hospitalization period (days), mean (SD)	127.79	(93.82)	115.30	(88.99)	139.84	(97.54)	0.171
Duration of inpatient occupational therapy (days), mean (SD)	70.73	(19.08)	69.13	(20.16)	72.27	(18.03)	0.391
Number of inpatient occupational therapy sessions (times), mean (SD)	33.35	(8.67)	31.37	(9.00)	35.25	(7.96)	0.018*
<b>Antipsychotic medication (CP), mean (SD)</b>							
Pre-inpatient occupational therapy (mg/day)	668.34	(250.52)	690.11	(245.99)	647.34	(255.25)	0.373
Post-inpatient occupational therapy (mg/day)	650.57	(256.17)	654.67	(257.14)	646.63	(257.51)	0.870
<b>Living conditions after discharge‡</b>							
<b>Resident support persons, n (%)</b>							
Yes	62	(56.88)	32	(60.38)	30	(53.57)	0.482
No	47	(43.12)	21	(39.62)	26	(46.43)	
<b>Income</b>							
Yes	104	(95.41)	52	(98.11)	52	(92.86)	0.272
No	5	(4.59)	1	(1.89)	4	(7.14)	
<b>Health and welfare services for persons with disabilities</b>							
Yes	41	(37.61)	22	(41.51)	19	(33.93)	0.419
No	68	(62.39)	31	(58.49)	37	(66.07)	
<b>Outpatient treatment‡</b>							
<b>Outpatient OT, n (%)</b>							
Yes	56	(51.38)	26	(49.06)	30	(53.57)	0.637
No	53	(48.62)	27	(50.94)	26	(46.43)	
<b>Day care treatment, n (%)</b>							
Yes	29	(26.61)	13	(24.53)	16	(28.57)	0.632
No	80	(73.39)	40	(75.47)	40	(71.43)	

Home-visit nursing, <i>n</i> (%)							
Yes	21	(19.27)	11	(20.75)	10	(17.86)	0.704
No	88	(80.73)	42	(79.25)	46	(82.14)	
Medication adherence, <i>n</i> (%)							
Good	81	(74.31)	45	(84.91)	36	(64.29)	0.017*
Poor	28	(25.69)	8	(15.09)	20	(35.71)	

\*P<0.05, \*\*P<0.01  
† at the baseline  
‡ at the end of the follow-up  
§ Comparison of GOT + IOT and GOT alone was conducted using the Student's t-test for continuous variables and  $\chi^2$  analyses for categorical variables  
CP: chlorpromazine equivalent dose, GOT: group occupational therapy, IOT: individualized occupational therapy  
(Japanese translation from Reference 46)



Table 4. Assessment scores at pre- and post-inpatient operational therapy

Measure	Time	Total (n=109)		GOT+HOT (n=53)		GOT alone (n=56)		P†
		Mean	(SD)	Mean	(SD)	Mean	(SD)	
BACS								
Verbal memory	Before OT	-2.32	(1.23)	-2.21	(1.35)	-2.42	(1.09)	0.365
	Discharge	-1.77	(1.25)	-1.38	(1.20)	-2.14	(1.21)	0.001**
Working memory	Before OT	-1.87	(1.18)	-1.92	(1.09)	-1.82	(1.27)	0.648
	Discharge	-1.31	(1.20)	-1.14	(0.99)	-1.46	(1.36)	0.162
Motor speed	Before OT	-3.31	(1.69)	-3.34	(1.68)	-3.27	(1.71)	0.834
	Discharge	-2.72	(1.50)	-2.58	(1.44)	-2.86	(1.55)	0.321
Verbal fluency	Before OT	-1.37	(1.06)	-1.41	(1.13)	-1.33	(1.00)	0.698
	Discharge	-1.13	(1.00)	-0.94	(1.00)	-1.31	(0.97)	0.052
Attention	Before OT	-2.65	(1.32)	-2.68	(1.32)	-2.62	(1.33)	0.793
	Discharge	-2.12	(1.17)	-1.93	(1.10)	-2.31	(1.21)	0.089
Executive function	Before OT	-2.45	(2.15)	-2.23	(1.98)	-2.65	(2.29)	0.304
	Discharge	-1.32	(1.34)	-1.11	(1.28)	-1.52	(1.37)	0.113
Composite score	Before OT	-2.33	(1.02)	-2.30	(1.00)	-2.34	(1.04)	0.839
	Discharge	-1.73	(0.88)	-1.51	(0.79)	-1.95	(0.91)	0.009**
SCoRS								
Total	Before OT	54.64	(11.71)	54.52	(11.91)	54.75	(11.62)	0.918
	Discharge	47.60	(10.10)	46.43	(9.68)	48.73	(10.44)	0.233
Patient global rating	Before OT	6.13	(1.87)	6.02	(1.89)	6.23	(1.87)	0.552
	Discharge	5.03	(1.83)	4.54	(1.66)	5.50	(1.88)	0.005**
Interviewer global rating	Before OT	6.65	(1.39)	6.46	(1.45)	6.84	(1.32)	0.157
	Discharge	5.51	(1.48)	5.28	(1.41)	5.73	(1.53)	0.108
GAF								
GAF score	Before OT	41.25	(11.01)	42.57	(11.20)	39.96	(10.78)	0.216
	Discharge	51.85	(10.30)	53.87	(8.81)	49.91	(11.30)	0.043
IMI								
Interest/enjoyment	Before OT	24.95	(6.53)	24.37	(6.36)	25.52	(6.71)	0.360
	Discharge	30.05	(7.40)	32.02	(7.67)	28.16	(6.67)	0.006**
Value/usefulness	Before OT	23.32	(8.17)	23.22	(8.48)	23.41	(7.93)	0.904
	Discharge	28.68	(7.38)	30.28	(7.35)	27.14	(7.14)	0.025*
Perceived choice	Before OT	24.11	(6.93)	23.57	(7.26)	24.63	(6.61)	0.429
	Discharge	28.69	(6.27)	30.50	(6.37)	26.95	(5.70)	0.003**

Total	Before OT	72.38	(18.75)	71.17	(18.27)	73.55	(19.30)	0.507
	Discharge	87.45	(18.22)	92.83	(17.48)	82.25	(17.53)	0.002**
PANSS								
Positive	Before OT	27.23	(6.37)	25.57	(6.12)	28.82	(6.23)	0.007**
	Discharge	22.78	(5.49)	20.48	(5.18)	25.00	(4.85)	0.000**
Negative	Before OT	26.30	(5.22)	26.06	(5.87)	26.54	(4.53)	0.632
	Discharge	22.30	(4.83)	21.39	(5.24)	23.18	(4.27)	0.052
General psychopathology	Before OT	58.75	(12.62)	56.04	(12.63)	61.38	(12.15)	0.026*
	Discharge	49.31	(10.25)	46.30	(10.31)	52.21	(9.39)	0.002**
Total	Before OT	112.16	(20.96)	107.69	(21.33)	116.48	(19.84)	0.027*
	Discharge	94.46	(18.30)	88.54	(19.00)	100.18	(15.75)	0.001**
CSQ-8								
CSQ-8 score	Discharge	24.80	(3.69)	25.81	(3.46)	23.82	(3.67)	0.004**

\*P<0.05, \*\*P<0.01

† Comparison of the GOT + IOT and GOT alone groups was conducted using the Student's t-test for continuous variables and  $\chi^2$  analyses for categorical variables

BACS: Brief Assessment of Cognition in Schizophrenia, CSQ-8: Client Satisfaction Questionnaire, GAF: Global Assessment of Functioning, GOT: group occupational therapy, IMI: Intrinsic Motivation Inventory, IOT: individualized occupational therapy, OT: occupational therapy, PANSS: Positive and Negative Syndrome Scale, SCoRS: Schizophrenia Cognition Rating Scale  
(Document 46: Translation)

Table 5. Results of multivariate Cox proportional hazards model (n = 109)

	$\beta$	SE	HR	95%CI	Wald	<i>P</i>
Occupational therapy type (GOT + IOT vs GOT)	-0.611	0.221	0.543	0.350 — 0.836	7.622	0.006**
Medication adherence	-1.071	0.251	0.343	0.211 — 0.565	18.262	0.000**
Resident support persons	-0.799	0.241	0.450	0.280 — 0.720	11.019	0.001**
SFS independence-performance	0.004	0.025	1.000	0.956 — 1.054	0.027	0.871
PANSS total at baseline	0.006	0.008	1.006	0.991 — 1.021	0.543	0.461
BACS verbal fluency at discharge	-0.014	0.203	0.986	0.660 — 1.465	0.005	0.946
BACS attention at discharge	-0.054	0.159	0.947	0.692 — 1.294	0.115	0.735
BACS executive function at discharge	-0.301	0.115	0.740	0.592 — 0.929	6.887	0.009**
BACS composite score at discharge	0.257	0.297	0.773	0.733 — 2.352	0.749	0.387
SCoRS patient global rating at discharge	0.098	0.063	0.906	0.972 — 1.247	2.394	0.122
PANSS total at discharge	-0.001	0.008	1.001	0.982 — 1.015	0.020	0.888
CSQ-8 at discharge	-0.031	0.033	0.970	0.909 — 1.036	0.842	0.359

\*\**P*<0.01

Multivariate Cox regression was used after controlling simultaneously for potential confounders; adjustment for rehospitalization was based on age, sex, and number of hospital stays; log-likelihood  $\chi^2=59.06$ , Sig(*p*)=0.00, d.f.=15, and Akaike Information Criterion=893.07

BACS: Brief Assessment of Cognition in Schizophrenia, CI: confidence interval, CSQ—8: Client Satisfaction Questionnaire, GOT: group occupational therapy, HR: hazard ratio, IOT: individualized occupational therapy, PANSS: Positive and Negative Syndrome Scale, SCoRS: Schizophrenia Cognition Rating Scale, SE: standard error, SFS: Social Functioning Scale (Japanese translation from Reference 46)

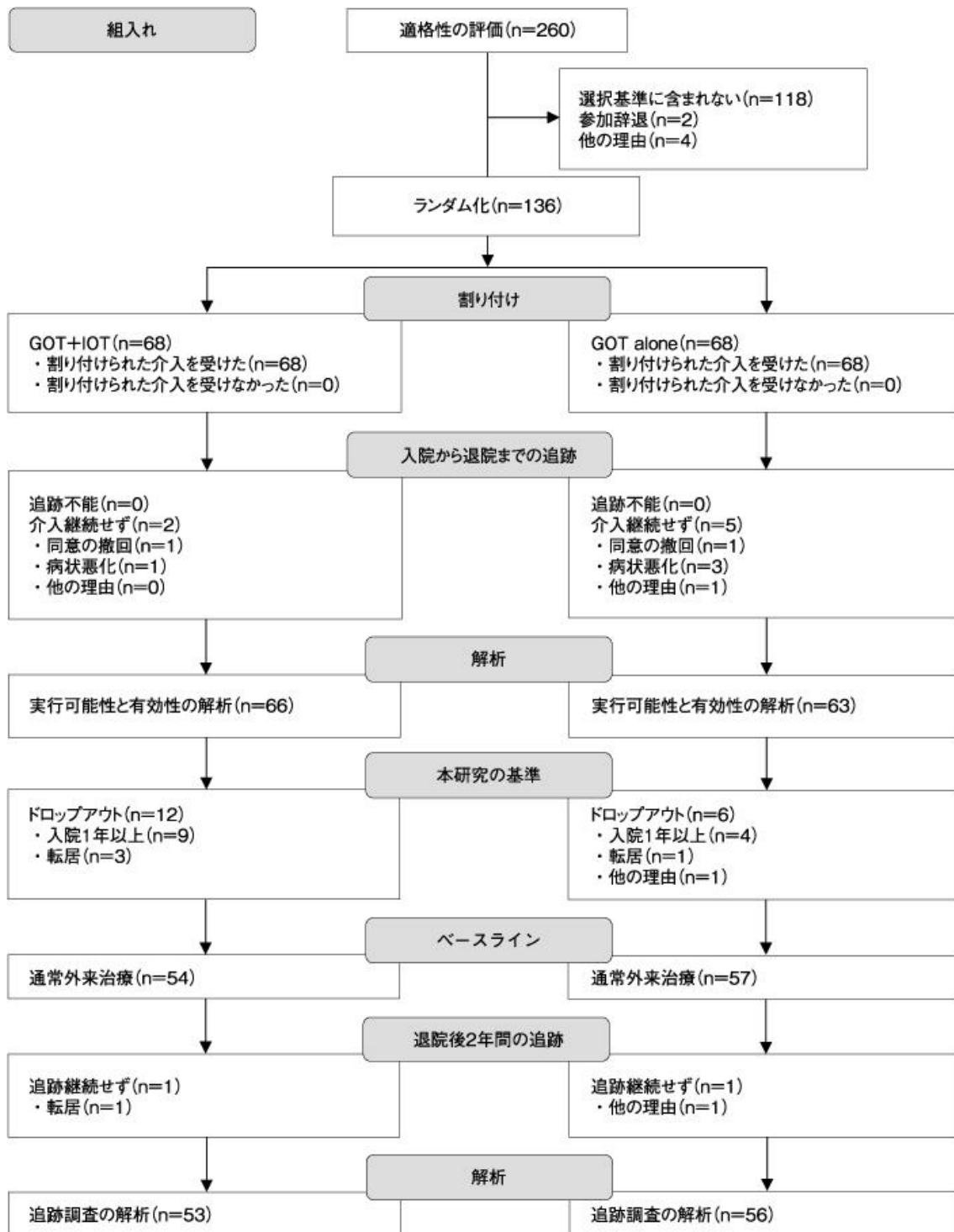


Figure 1 Flowchart of patient allocation and study.  
(Adapted from Reference 46)

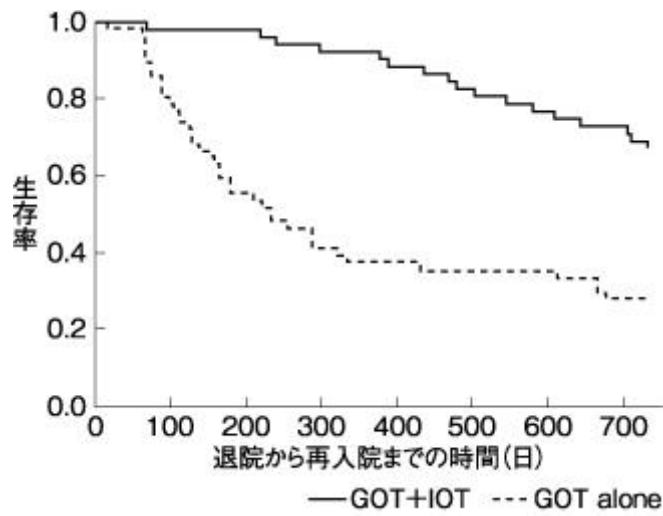


Figure 2 Time to rehospitalization (days) over the 2-year follow-up period after hospital discharge

The Kaplan-Meier survival curves (log-rank  $\chi^2 = 25.49$ ,  $P < 0.01$ ) show the time to readmission for the GOT+IOT group ( $n = 53$ ) and the GOT group ( $n = 56$ ). Follow-up was terminated either from discharge to readmission to a psychiatric hospital or 730 days from discharge.

(Adapted from Reference 46)