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ORIGINAL ARTICLE

Factors Influencing Rehospitalisation of Patients with Schizophrenia in Japan: A 1-year Longitudinal Study

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Summary *Objective/Background:* This longitudinal study explored factors influencing the rehospitalisation of patients with schizophrenia in Japan.
Methods: Participants comprised patients with schizophrenia who were discharged from a psychiatric hospital in Japan. The investigations were conducted at the time of discharge and one year later. Demographics and clinical characteristics included the following: the type of occupational therapy (OT) interventions (group and individualized or group only); the assessment scales' scores on hospitalisation; the community living conditions after discharge; and the contents of outpatient treatment (outpatient OT, day-care treatment, home-visit nursing, and adherence to outpatient treatment and medication). All variables were examined in a binomial logistic regression analysis to identify the factors for rehospitalisation.
Results: The rehospitalisation rate was 31.8%, as 14 of 44 participants were rehospitalised within one year after discharge. The type of OT interventions (OR = 7.05, 95% CI = 1.36–36.69, p = .020) and the adherence to outpatient treatment and medication (OR = 9.48, 95% CI = 1.82–49.33, p = .008) were significant contributing factors to rehospitalisation.
Conclusion: This study provided preliminary support for the finding that individualized occupational therapy and proper adherence to outpatient treatment and medication are associated with reducing the rehospitalisation of patients with schizophrenia in Japan.

Conflicts of interest: The authors have no conflicts of interest relevant to this article.

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Introduction

Of the psychiatric inpatients in Japan in 2014, 62% were patients with schizophrenia, and the majority of these were repeated cases of hospitalisation (Ministry of Health, Labour and Welfare, 2015). Therefore, it is extremely important to prevent rehospitalisation and improve social functioning and functional outcomes in treatment for patients with schizophrenia.

The rehospitalisation rate is an important indicator of psychiatric care outcome; therefore, it is necessary to investigate the factors associated with rehospitalisation to improve the quality of psychiatric care. Previous studies in countries other than Japan have reported that various factors such as sex (Doering et al., 1998), age (Doering et al., 1998; Mortensen & Eaton, 1994), marital status (Wieselgren, Lindström, & Lindström, 1996), length of hospital stay (Lin et al., 2006; Mortensen & Eaton, 1994), symptoms (Wieselgren, Lindström, & Lindström, 1996), and medication adherence (Ascher-Svanum, Zhu, Faries, Lacro, & Dolder, 2006; Bodén, Brandt, Kieler, Andersen, & Reutfors, 2011) influenced the rehospitalisation of patients with schizophrenia.

In Japan, Koyama et al. (2004) examined 266 patients who had been discharged from psychiatric acute wards and reported that age, the Global Assessment of Functioning (GAF) scale (American Psychiatric Association, 2000) score at discharge, diagnosis of schizophrenia, history of hospitalisation, and complication of a personality disorder were factors that influenced rehospitalisation. In addition, Uchiyama et al. (2012) examined 3,706 discharged psychiatric patients with schizophrenia and reported that disease duration, the length of hospital stay, and the GAF score at discharge were factors that influenced rehospitalisation. However, these previous studies did not investigate the impact of treatment, including occupational therapy (OT), for inpatients on the rehospitalisation of patients with schizophrenia.

We previously developed the individualized OT programme (IOT) and examined its effects on neurocognition, symptoms, and social functioning of patients with schizophrenia at a hospital setting (Shimada, Kobayashi, & Tomioka, 2014). Our previous study was a quasi-experimental controlled trial using a non-randomized design to evaluate the effect of adding IOT to a group OT (GOT) programme. The patients were assigned to either the GOT + IOT or GOT alone groups based on voluntary selection according to their preferences.

The IOT consisted of a combination of effective psychosocial treatment programmes: motivational interviewing, self-monitoring, individualized visits, handicraft activities, individualized psychoeducation, and discharge planning (Table 1). Motivational interviewing (Miller & Rollnick, 2002; Schulz et al. 2013) was regularly implemented to improve treatment adherence and maintain motivation for treatment. A self-monitoring programme was implemented to train patients to direct attention to their *self-body* and identify their subjective experiences. Activation of self-body sense was promoted through physical exercises such as stretching on an one-on-one basis by an occupational therapist. Metacognitive training (Moritz, Veckenstedt, Randjbar, Vitzthum, & Woodward, 2011) was implemented to enhance participants' self-efficacy and improve insight and metacognitive deficits with appropriate feedback. Individualized visits comprised of assisting with activities of daily living (ADL) during the first half of the hospitalisation through visits to the hospital wards and providing support with going out and social resource utilization during the second half of the hospitalisation. Moreover, occupational therapists provided home visits prior to discharge and coached in ADL after discharge. The therapeutic use of handicraft activities was an OT feature.

Constructive handicraft activities with clear procedures and good feasibility such as Japanese paper collages, plastic models, Japanese paper crafts, and jigsaw puzzles were used in the IOT. In order to promote cognitive

Table 1 Summary of the Individualized Occupational Therapy Programme.

Programme	Description
Motivational interviewing	• Regular implementation of motivational interviewing • Intervention for improving motivational deficits • Promoting occupational therapy independence by agreeing the individual's challenges while in hospital & after discharge
Self-monitoring	• Physical exercise on a one-to-one basis with an occupational therapist • Positive feedback for improving subjective experience deficits • Metacognitive training
Individualized visit	• Support strategy for performing the activities of daily living away from the hospital room • Support with going out, utilization of social resources, & home visits prior to discharge were performed as necessary
Handicraft activities	• Utilization of constructive activities • Providing guidance on the accuracy of occupational performance & efficient use of instruments & materials • Bridging between improvements in cognitive impairment & daily functioning
Individualized psychoeducation	• Illness management programme • Relapse prevention programme • Development of a crisis planning
Discharge planning	• Living activities schedule • Care planning after discharge [a] • Skills training

[a] Occupational therapy manual: occupational therapy for acute mental disorders and discharge support program (Japanese Association of Occupational Therapists, 2011) was referred to for care planning development.

functioning, the patients were asked to attend to, concentrate on, precisely perform, and efficiently use the craft tools. Occupational therapists implemented interventions bridging improvements in cognitive impairment and daily functioning (Medalia, Revheim, & Herlands, 2002; Wykes, Huddy, Cellard, McGurk, & Czobor, 2011). Individualized psychoeducation included the implantation of illness management and a relapse prevention programme. Crisis planning (Murphy, Irving, Adams, & Waqar, 2015) was developed and shared with family members and other support persons through care conferences. Occupational therapists supported each participant to identify relapse signs and find practical coping methods (Morriss, Vinjamuri, Faizal, Bolton, & McCarthy, 2013). Care planning after discharge and implementation of an ADL schedule in a community setting were developed to promote a smooth transition to community living. In addition, skills training was implemented to improve each participant's daily functioning (Kreyenbuhl, Buchanan, Dickerson, & Dixon, 2010).

The GOT was activity-oriented group treatment implemented on a weekly basis. GOT included the following programmes: a physical fitness programme (stretching exercises and relaxation techniques); a handicraft activities programme, where participants choose and make desired activities programmes; a cooking programme; a music programme (music appreciation and singing); a recreation programme; and a group psychoeducation programme. The participants voluntarily selected any desired programme among these. These programmes were held either in hospital wards or in OT departments; from 10 to 15 patients simultaneously participated in each programme.

The previous findings provided preliminary support for the effectiveness of the IOT in improving neurocognition and symptoms in patients with schizophrenia. However, the impact of OT interventions on the rehospitalisation of patients with schizophrenia have not yet been evaluated.

Therefore, we conducted this longitudinal study to explore factors influencing the rehospitalisation of patients with schizophrenia in Japan, including the OT interventions, and examined whether IOT was associated with reducing rehospitalisation rates among patients with schizophrenia in Japan.

Methods

This longitudinal study evaluated factors influencing the rehospitalisation of patients with schizophrenia who were discharged from a psychiatric hospital in Japan. This study was conducted between January 2010 and November 2013 at the Mental Support Soyokaze Hospital, Nagano, Japan. This study was approved by the Ethics Board of the Mental Support Soyokaze Hospital. Study participants provided their written informed consent for all study procedures.

Participants

The inclusion criteria for this study were: age 20—65 years, recently hospitalized patients in a psychiatric hospital and discharged within 1 year, and having a diagnosis of schizophrenia or schizoaffective disorder according to the Structured Clinical Interview for DSM-IV-TR criteria (American Psychiatric Association, 2000). The exclusion criteria included: a diagnosis of mental retardation; diagnosis of any current or past histories of neurological disorders, including head injury, cerebral vascular disorders, epilepsy, or dementia; diagnosis of alcohol or drug disorders (abuse or dependence); and the need for individual intervention for physical dysfunction. Referrals to this study were made by occupational therapists.

Measurements

Demographics at discharge included age, sex, age of onset, number of hospital stays, total length of hospital stay, marital status, experience of work, OT experience, length of time to start OT after hospitalisation, length of last hospital stay, length of OT interventions, type of OT interventions (GOT and IOT or GOT only), and antipsychotic medication (chlorpromazine equivalent dose). This information was drawn from medical records.

Assessment scores were also drawn from medical records. These included the Brief Assessment of Cognition in Schizophrenia—Japanese version (BACS-J; Kaneda et al., 2007), the Positive and Negative Syndrome Scale (PANSS; Kay, Fiszbein, & Opler, 1987), and the Global Assessment of Functioning (GAF) scale before OT interventions and at discharge, or 3 months after hospitalisation (if the hospitalisation period was $>$ 3 months).

We investigated community living conditions after discharge (whether receiving support at home or in a facility), source of income (salary, utilization of disability pension or welfare, and pecuniary assistance from family), and outpatient treatment content (outpatient OT, day-care treatment, and home-visit nursing, and adherence to outpatient treatment and medication) through a 1-year follow-up after discharge. The psychiatrists in-charge obtained information from participants, support persons, and visiting staff concerning adherence to outpatient treatment and medication, and made determinations based on regular hospital visits without interruptions or self-adjustment of medications within 1 year following discharge.

OT interventions

The IOT aimed at facilitating proactive participation in treatment and improving functional outcomes. It consisted of a combination of effective psychosocial treatment programmes: motivational interviewing, self-monitoring, individualized visits, handicraft activities, individualized psychoeducation, and discharge planning. In addition, some of its components were very relevant to OT practice. The IOT was provided on a one-on-one basis with the occupational therapist in-charge of the case during hospitalisation and was tailored to each participant. Therapeutic structure factors such as time, frequency, and place were set for each individual.

The GOT was made up of activity-oriented group programmes. The participants voluntarily select any desired programme among those that were available. Time and

frequency of the OT programmes for both the GOT + IOT and GOT alone groups were adjusted according to recovery condition; however, these were generally for 1–2 hours at a time and from three to five times per week. Notably, more than half of the OT time was devoted to IOT in the GOT + IOT group. Our previous study (Shimada, Kobayashi, & Tomioka, 2014) demonstrated that there were no significant group differences in the length of OT interventions (GOT + IOT: 70.50 ± 20.77 days vs. GOT alone: 74.91 ± 16.71 days, $p = .424$) or the number of OT sessions (GOT + IOT: 31.93 ± 7.15 times vs. GOT alone: 34.76 ± 5.79 times, $p = .070$). The occupational therapists in-charge of the cases during hospitalisation were continuously involved and implemented personalized support according to each recovery state and living condition for the outpatient OT. Occupational therapists provided support such as consultations concerning living challenges, preparation support for discharge, provision of information concerning available social resources and community services for all participants. In addition, support personnel other than occupational therapists provided general support to all the participants.

Procedures

This longitudinal study recruited participants based on referrals from their occupational therapists. These therapists started recording OT interventions and measurements in 1-year follow-up after discharge and outpatient phases. Eligible participants were assigned to groups based on whether they were or were not rehospitalised at the 1-year follow-up. The time points of the investigation were at discharge and at 1 year following discharge. Baseline data at discharge were drawn from medical records, which included information of demographics, BACS-J, PANSS, and GAF scores, and antipsychotic medication taken during hospitalisation. Follow-up data at 1 year after discharge were obtained for each participant regarding community living conditions after discharge and outpatient treatment content at outpatient hospital visits throughout the follow-up period. The occupational therapists and psychiatrists in-charge of the case collected this information.

Statistical analyses

First, we made between-group comparisons of the demographics; the scores of the BACS-J, PANSS, and GAF measures of hospitalisation; the community living conditions after discharge; and the contents of outpatient treatment using t tests for continuous variables and χ^2 analyses for categorical variables. Variables that satisfied the significance condition $p < .05$ were selected for further analysis using logistic regression analysis. Second, we calculated Pearson's correlation coefficient between each variable that had significant differences in the previous univariate analyses in order to exclude the influence of multicollinearity, for variables with $r > .4$. Third, we conducted a binomial logistic regression analysis to determine the factors influencing rehospitalisation and to calculate the odds ratio (OR) and 95% confidence interval (95% CI) after controlling simultaneously for potential confounders, with rehospitalisation as the dependent variable and the variables that were selected in previous analyses as the independent variable. Statistical analyses were performed with Ekuseru–Toukei 2010 (Social Survey Research Information Co., Ltd., Tokyo, Japan). The level of significance was set at $p < .05$.

Results

Demographics at discharge are shown in Table 2. The number of recently hospitalized patients with schizophrenia was 72. Of these, 51 met the inclusion criteria and participated in our previous study, and seven were excluded from the analyses. Five patients had > 1 year of hospitalisation, and two patients emigrated to other regions after discharge; therefore, 44 patients were included in the final analyses.

The rehospitalisation rate was 31.8%, as 14 participants were rehospitalised within 1 year after discharge. Participants who were not rehospitalised demonstrated a significantly shorter length of last hospital stay ($t = 1.70$, $p = .048$), received more IOT during their hospital stay ($\chi^2 = 9.31$, $p = .002$), and had better adherence to outpatient treatment and medication after discharge ($\chi^2 = 11.31$, $p = .001$) compared to the participants who were rehospitalised.

BACS-J, PANSS, and GAF scores concerning hospitalisation are shown in Table 3. There were no significant differences in the assessment scales' scores between participants who were not rehospitalised and those who were before the OT intervention. Participants who were not rehospitalised demonstrated significant improvements in verbal fluency on the BACS-J ($t = 1.90$, $p = .032$) compared to those who were rehospitalised at discharge.

The correlation between variables including length of last hospital stay, type of OT interventions, adherence to outpatient treatment and medication, and verbal fluency at discharge showed significant differences in univariate analyses (Table 4). There was a significant positive but mild correlation of adherence to outpatient treatment and medication and verbal fluency at discharge ($r = .324$). Therefore, all these variables were used as independent variables for a binomial logistic regression analysis.

The results of a binomial logistic regression analysis with rehospitalisation as the dependent variable and the length of last hospital stay, type of OT interventions, adherence to outpatient treatment and medication, and verbal fluency at discharge as the independent variables are shown in Table 5. The type of OT interventions (OR = 7.05, 95% CI = 1.36, 36.69, $p = .020$) and the adherence to outpatient treatment and medication (OR = 9.48, 95% CI = 1.82, 49.33, $p = .008$) significantly contributed to rehospitalisation over 1 year after discharge.

Discussion

The main finding of this study is that the type of OT intervention and the adherence to outpatient treatment and medication were factors influencing the rehospitalisation of

Table 2 Comparison of the Demographics and Clinical Characteristics of Patients who were and were not Rehospitalised.

Variable	Rehospitalisation				Group differences	*p*
	No (n = 30)		Yes (n = 14)			
Demographics at discharge						
Age (years), mean (SD)	39.93	(10.95)	44.21	(7.14)	$t = 1.332$	.095
Sex, *n* (%)						
Male	14	(46.7)	8	(57.1)	$\chi^2 = 0.419$	.517
Female	16	(53.3)	6	(42.9)		
Age at onset (years), mean (SD)	21.93	(4.16)	23.57	(3.59)	$t = 1.268$	.106
Number of hospitalisations, mean (SD)	3.03	(3.67)	4.93	(3.83)	$t = 1.573$	.062
Total length of previous hospitalisation (months), mean (SD)	24.49	(44.72)	33.96	(36.55)	$t = 0.691$	.247
Marital status, *n* (%)						
Single	23	(76.7)	10	(71.4)	$\chi^2 = 1.117$	.773
Married	4	(13.3)	2	(14.3)		
Separated or divorced	2	(6.7)	2	(14.3)		
Widowed	1	(3.3)	0	(0)		
Experience of work, *n* (%)						
Yes	6	(20.0)	0	(0)	$\chi^2 = 3.242$	.072
No	24	(80.0)	14	(100.0)		
Experience of OT, *n* (%)						
Yes	12	(40.0)	9	(64.3)	$\chi^2 = 2.257$	.133
No	18	(60.0)	5	(35.7)		
Starting OT from hospitalisation (days), mean (SD)	10.13	(6.64)	11.64	(13.55)	$t = 0.499$	.310
Length of last hospitalisation (days), mean (SD)	124.13	(96.74)	181.29	(118.33)	$t = 1.699$	.048*
Length of intervention (days), mean (SD)	69.53	(21.29)	76.93	(12.36)	$t = 1.204$	.118
Type of OT intervention, *n* (%)						
GOT + IOT	23	(76.7)	4	(28.6)	$\chi^2 = 9.313$	.002**
GOT only	7	(23.3)	10	(71.4)		
Living conditions after discharge						
Resident support persons, *n* (%)						
Yes	19	(63.3)	6	(42.9)	$\chi^2 = 1.631$	.202
No	11	(36.7)	8	(57.1)		
Incomes						
Yes	27	(90.0)	12	(85.7)	$\chi^2 = 0.174$	.677
No	3	(10.0)	2	(14.3)		
Outpatient treatment content						
Outpatient OT, *n* (%)						
Yes	18	(60.0)	4	(28.6)	$\chi^2 = 3.771$	.052
No	12	(40.0)	10	(71.4)		
Day-care treatment, *n* (%)						
Yes	8	(26.7)	5	(35.7)	$\chi^2 = 0.375$	.540
No	22	(73.3)	9	(64.3)		
Home-visit nursing, *n* (%)						
Yes	8	(26.7)	3	(21.4)	$\chi^2 = 0.140$	.709
No	22	(73.3)	11	(78.6)		
Adherence to outpatient treatment & medication, *n* (%)						
Good	27	(90.0)	6	(42.9)	$\chi^2 = 11.314$	.001**
Poor	3	(10.0)	8	(57.1)		
Antipsychotic medication, mean (SD)						
Pre-OT interventions (mg/d)	671.60	(212.12)	786.71	(313.20)	$t = 1.434$	.079
Post-OT interventions (mg/d)	674.40	(264.60)	763.57	(309.85)	$t = 0.986$	.165

Note. GOT = group occupational therapy; IOT = individualized occupational therapy; SD = standard deviation.
* $p < .05$, ** $p < .01$.

patients with schizophrenia within 1 year after discharge from a psychiatric hospital. This study provides preliminary support for the idea that IOT is useful for the prevention of rehospitalisation, in addition to supporting positive adherence to outpatient treatment and medication. To the best of our knowledge, this is the first study to show that IOT is useful in preventing the rehospitalisation of patients with schizophrenia in Japan.

Table 3 Comparison of BACS-J, PANSS, and GAF Scores Before Hospitalized OT and at Discharge among Patients who were and were not Rehospitalised.

Instrument	Time	Rehospitalisation				Group differences	*p*
		No (n = 30)		Yes (n = 14)			
		Mean	(SD)	Mean	(SD)		
BACS-J							
Verbal memory	Before OT	−2.12	(1.37)	−2.47	(1.07)	t = 0.833	.205
	Discharge	−1.47	(1.25)	−1.84	(1.19)	t = 0.929	.179
Working memory	Before OT	−2.07	(1.03)	−2.12	(1.09)	t = 0.149	.441
	Discharge	−1.26	(0.97)	−1.40	(1.08)	t = 0.408	.343
Motor speed	Before OT	−3.51	(1.44)	−3.65	(1.67)	t = 0.278	.391
	Discharge	−2.71	(1.30)	−2.76	(1.46)	t = 0.119	.453
Verbal fluency	Before OT	−1.31	(1.00)	−1.64	(1.01)	t = 1.003	.161
	Discharge	−0.97	(0.88)	−1.51	(0.88)	t = 1.903	.032*
Attention	Before OT	−2.78	(1.13)	−3.05	(1.42)	t = 0.659	.257
	Discharge	−2.09	(1.07)	−2.16	(1.23)	t = 0.191	.425
Executive function	Before OT	−2.53	(2.01)	−2.66	(2.40)	t = 0.187	.426
	Discharge	−1.12	(1.07)	−1.21	(1.01)	t = 0.269	.395
Composite score	Before OT	−2.39	(0.94)	−2.60	(1.06)	t = 0.663	.256
	Discharge	−1.59	(0.80)	−1.81	(0.87)	t = 0.838	.203
PANSS							
Positive	Before OT	29.47	(5.53)	29.43	(5.06)	t = 0.022	.491
	Discharge	22.73	(5.67)	22.71	(6.50)	t = 0.010	.496
Negative	Before OT	26.80	(4.49)	27.57	(5.49)	t = 0.494	.312
	Discharge	21.63	(4.18)	21.50	(4.82)	t = 0.094	.463
General psychopathology	Before OT	62.70	(11.07)	64.36	(9.15)	t = 0.487	.314
	Discharge	48.50	(8.87)	52.07	(9.58)	t = 1.214	.116
Total	Before OT	118.97	(18.25)	121.36	(17.54)	t = 0.410	.342
	Discharge	92.90	(17.12)	97.14	(19.11)	t = 0.738	.232
GAF							
GAF score	Before OT	38.00	(11.45)	41.00	(11.90)	t = 0.800	.214
	Discharge	51.97	(11.41)	50.36	(12.60)	t = 0.422	.338

Note. BACS-J = Brief Assessment of Cognition in Schizophrenia—Japanese version; GAF = Global Assessment of Functioning scale; OT = occupational therapy; PANSS = Positive and Negative Syndrome Scale; SD = standard deviation.
* $p < .05$.

Table 4 Pearson's Correlations of Variables with Significant Differences among the Demographic and Clinical Variables (n = 44).

	1	2	3	4
1. Length of last hospitalisation	1.000			
2. Type of OT interventions	−0.165	1.000		
3. Adherence to outpatient treatment and medication	−0.039	0.189	1.000	
4. Verbal fluency at discharge	−0.134	0.164	0.324*	1.000

* $p < .05$.

Table 5 Odds Ratios (OR) and 95% Confidence Intervals (CI) for Rehospitalisation Associated with Demographics and Clinical Variables Following Discharge (n = 44).

Variable	OR	95% CI	*p*
Length of hospitalisation	0.99	0.99—1.00	.074
Type of OT interventions	7.05	1.36—36.69	.020*
Adherence to outpatient treatment and medication	9.48	1.82—49.33	.008**
Verbal fluency at discharge	1.66	0.74—3.76	.220

Note. OR = odds ratio; CI = confidence interval.
* $p < .05$, ** $p < .01$.

The current rehospitalisation rate (31.8%) was comparable to that of previously published studies in Japan using similar methodologies (33.4%, Uchiyama et al., 2012; 28.9%, Inagaki et al., 2010). Participants who were not rehospitalised demonstrated a significantly shorter length of last hospital stay, they more often received IOT during their hospital stay, had better adherence to outpatient treatment and medication, and showed better verbal fluency on the BACS-J at discharge compared to those who were rehospitalised. Previous studies also reported that length of hospital stay (Lin et al., 2006; Mortensen & Eaton, 1994) and treatment and medication adherence (Ascher-Svanum, Zhu, Faries, Lacro, & Dolder, 2006; Bodén,

Brandt, Kieler, Andersen, & Reutfors, 2011) were factors for rehospitalisation. Therefore, they are considered to be important factors influencing the rehospitalisation of patients with schizophrenia.

One intriguing finding is that the type of OT interventions (GOT + IOT or GOT only) was found to be a significant contributing factor to rehospitalisation. Therefore, IOT may be effective at preventing the rehospitalisation of patients with schizophrenia. The IOT consisted of a combination of motivational interviewing, self-monitoring, individualized visits, handicraft activities, individualized psychoeducation, and discharge planning. It was not possible to identify clearly how or what components of the IOT prevented rehospitalisation in this study design. However, the overall findings may provide useful avenues for future studies and for clinical implications.

We previously reported that IOT was effective at improving the cognitive impairment experienced by patients with schizophrenia (Shimada, Kobayashi, & Tomioka, 2014). The IOT might have significantly influenced a better score on verbal fluency at discharge among participants who were not rehospitalised compared to those who were. Cognitive functioning in schizophrenia is strongly associated with social functioning and functional outcomes (Green, 1996; Szöke et al., 2008), and affected insight (Aleman, Agrawal, Morgan, & David, 2006) and treatment adherence (Ascher-Svanum, Zhu, Faries, Lacro, & Dolder, 2006; El-Missiry et al., 2015). This study also provided preliminary support for the idea that the improvements to cognitive impairment during IOT contributed to reduced rehospitalisation.

Previous studies have reported that psychoeducation and discharge planning, which constitute part of the IOT, are useful for improving insight and treatment adherence and may help prevent rehospitalisation in patients with schizophrenia (Lincoln, Wilhelm, & Nestoriuc, 2007; Xia, Merinder, & Belgamwar, 2011). This study's results confirm these previous findings. In this study, interventions with individualized psychoeducation and discharge planning may improve insight and treatment adherence and effectively prevent rehospitalisation.

A number of limitations should be noted. First, participants included only patients with schizophrenia who were discharged within 1 year after hospitalisation; therefore, long-term inpatients with $>$ 1 year of hospitalisation were not included. Consequently, the factors influencing the rehospitalisation of long-term inpatients should be investigated further. Second, there is a need for more long-term follow-up in future studies, because the follow-up length was only 1 year after discharge in this study. Third, there is a need for a randomized controlled trial design for the GOT+IOT versus the GOT alone group to reduce selection biases and more vigorously examine the relationship between IOT and rehospitalisation, because our previous study design was a non-randomized controlled trial in which group allocation was based on voluntary selection according to the participants' preferences. Fourth, the lower rehospitalisation rate among those who received GOT + IOT might be due to the cumulative effect of both GOT and IOT, not only IOT alone, because this study design did not implement measurements at 1 year after discharge. Therefore, it is necessary to investigate these issues with a study design that partials out the effect of GOT. Fifth, this study's results are limited because it was a single-site study, and the sample size was small. Therefore, it is necessary to investigate other factors for rehospitalisation, including community mental health services, with a larger number of patients with schizophrenia in a multicentre study.

Conclusion

This study investigated factors influencing the rehospitalisation of patients with schizophrenia after discharge from a psychiatric hospital in Japan. Results revealed that the type of OT interventions and the adherence to outpatient treatment and medication were significant contributing factors to rehospitalisation. This study also provided preliminary support for the effects of IOT on reducing rehospitalisation of patients with schizophrenia in Japan.

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