



ORIGINAL ARTICLE

Risk factors for readmission in schizophrenia treated with combined psychoeducation and standard therapy

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Abstract

Background: We conducted a historical cohort study of patients with schizophrenia to identify more robust risk factors at discharge that contribute to readmission within a year.

Methods and Findings: The subjects underwent brief psychoeducation during hospitalization. Multivariate analysis was conducted using factors selected in the univariate analysis. Using logistic regression analysis, the number of hospital admissions ($P = .01$) and Schedule for Assessment of Insight Japanese version score ($P = .04$) were identified as risk factors for readmission, with odds ratios of 0.70 and 1.18, respectively.

Conclusions: These results suggest that improvement in insight and early intervention may lead to a more stable community life.

KEYWORDS

insight, psychoeducation, readmission, risk factors, schizophrenia

1 | INTRODUCTION

Schizophrenia is a chronic psychiatric disorder that involves psychosis. When symptoms worsen, there is a recurrence of psychosis and repeated hospitalization. A chronic course may involve social impairments, which make it difficult for patients to continue occupational employment, thereby requiring a supportive living environment with social resources. A number of factors have been reported as contributors to readmission. These include race, age, number of previous admissions, physical comorbidities, substance use, and healthcare

utilization.¹⁻⁵ Although the goals of treatment for schizophrenia include stable community living and prevention of readmission, a recent report by Chun et al found that a majority of patients were readmitted within 6 months.⁶ Similarly, a follow-up study of patients with schizophrenia revealed that the remission rate was recently improving, but the recovery rate was approximately 30%.⁷ We have been implementing a psychosocial approach as a new treatment modality to complement psychotherapy and pharmacotherapy, with the goal of helping schizophrenic patients continue to live in the community for more than one year after discharge. Since it is important to

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maintain a certain level of social functioning, as well as remission of psychiatric symptoms in order to maintain community life, the practice guideline published by the American Psychiatric Association (APA) recommends the implementation of psychoeducational programs as part of psychosocial interventions.¹ A systematic review reported that in addition to the usual care of patients with schizophrenia, psychoeducation reduces readmission rates.⁸ We have developed and implemented a general brief psychoeducation program for inpatients with schizophrenia, which is conducted in voluntary groups in accordance with these reports.^{9,10} However, even with the addition of a psychoeducational program to the standard treatment, the readmission rate within one year was 22%. Some factors, such as living environment, Global Assessment of Functioning (GAF), previous number of hospital admissions, social resources, and support, are risk factors for readmission in patients with schizophrenia who have been treated with psychotherapy and antipsychotics.¹¹ Because standard treatment with psychoeducational programs is expected to have different effects compared with psychotherapy and antipsychotic therapy, different risk factors may be involved regarding readmission.

We previously explored risk factors for readmission in patients with schizophrenia who underwent a psychoeducation program and reported multiple risk factors.¹⁰ However, the study did not research factors such as comorbidities, long-acting injection (LAI), and social resources and support on discharge that may have a significant impact on readmission. Additionally, that study only investigated the individual effects of several possible risk factors and did not adjust for confounding factors. To make psychoeducation programs more effective, we need to more broadly and accurately identify risk factors for readmission in patients who have received standard treatment, including psychoeducation. If risk factors for readmission could be identified at the time of discharge from the end of the psychoeducation program, healthcare workers would be able to provide patients with additional care during hospitalization and focused care after discharge, resulting in reduction in readmission. Therefore, we conducted a historical cohort study to identify robust risk factors for readmission within one year of discharge at the time of hospital discharge.

2 | METHODS

2.1 | Subjects

The subjects of this study were patients who were diagnosed as schizophrenic by psychiatrists using the *International Classification of Diseases 10* between 2010 and 2016 at the Showa University Karasuyama Hospital. During hospitalization, the subjects underwent psychoeducation programs in addition to standard therapy and were discharged within one year after completing the programs. Exclusion criteria were as follows: (1) not participating in any of the psychoeducation programs, either disease (diagnosis, treatment, and prognosis) or pharmacotherapy, (2) transferred to another medical institution after discharge, (3) discharge without a valid reason, (4) discharge

with next scheduled hospitalization, and (5) more than three courses of psychoeducation programs before discharge. The program used in this study was prepared in accordance with the APA guideline.¹ Inclusion criteria for the psychoeducation program were as follows: patients who were admitted in the sub-acute phase and aimed to be discharged to the social community. Programs were held in the open space of the ward where other patients were present as spectators. The psychoeducation program consists of eight sessions, including a lecture and group discussion of 30 mins each.⁹ The psychoeducation program provides participants key information on symptoms, psychosocial interventions, medications, side effects, and relapse prevention, along with social skill training and visit to psychiatric day care service center. The psychoeducation program assessed in this study was based on a standard textbook of psychoeducation programs that have been found useful in previous reports. The quality of the psychoeducation program was ensured by limiting its availability only to staff members who had received adequate prior training and by operating each section of the program after sufficient discussions among the staff. This study complies with the provisions of the Declaration of Helsinki revised in 2013. This study was approved by the Institutional Review Board of Showa University Karasuyama Hospital.

2.2 | Measures

The outcome of the study was readmission for worsening of symptoms or suicide within a year after discharge. The risk factors listed in Table 1 were investigated before and after the program, and at discharge. The values of each factor were extracted from medical records. In cases where data were lacking, we directly interviewed a primary doctor. A conversion table prepared by Inada and Inagaki was used to convert doses of antipsychotics to Chlorpromazine (CPZ) equivalents.¹²

Several rating scales are used to objectively evaluate the patients in this study. Psychiatric symptoms were assessed using both the Positive and Negative Syndrome Scale (PANSS) and the Brief Psychiatric Rating Scale (BPRS), both of which are common rating scales for schizophrenia.^{13,14} The Schizophrenia Cognition Rating Scale Japanese version (SCoRS-J) was used to assess cognitive function. It was developed to evaluate the degree of cognitive impairment directly related to daily functioning of patients with schizophrenia.¹⁵ The Schedule for Assessment of Insight Japanese version (SAI-J) score, an objective rating scale, was used to assess insight.¹⁶ The SAI-J is a semi-structured interview used to measure three insight dimensions, such as awareness of illness, awareness of symptoms, and recognition of the need for treatment. Higher SAI-J scores indicate greater insight. Social functioning was measured with the objective and simple Global Assessment of Functioning (GAF), which covers all levels of functioning.¹⁷ GAF scale is used to measure psychological, social, and occupational functioning on a hypothetical continuum of mental health illness by determining how much a person's symptoms affect their day-to-day life on a scale of 0 to 100. Adherence was assessed using the subjective Drug Attitude Inventory 10-item

TABLE 1 Characteristics of the patients included in this study (n = 117)

Variables	Mean \pm SD, n (%)
Age [years]	42.4 \pm 11.5
Gender, male/female	53 (45.3)/64 (54.7)
Admitted, involuntary/voluntary	103 (88.0)/14 (12.0)
Number of hospital admissions	3.9 \pm 3.6
Diabetes mellitus, yes/no	6 (5.1)/111 (94.9)
History of substance use, yes/no	6 (5.1)/111 (94.9)
History of alcohol addiction, yes/no	12 (10.3)/105 (89.7)
PANSS	88.9 \pm 21.8
BPRS	49.5 \pm 14.5
GAF ^a	59.4 \pm 10.5
SAI-J ^a	15.5 \pm 4.0
DAI-10 ^a	4.8 \pm 4.9
SCoRS-J ^a	34.1 \pm 11.2
Clozapine, yes/no ^b	2 (1.7)/115 (98.3)
Electro Convulsive therapy, yes/no ^b	21 (17.9)/96 (82.1)
Long-acting injection use/not use ^b	28 (23.9)/89 (76.1)
Chlorpromazine equivalent dose [mg] ^b	958.8 \pm 565.7
Social resources and support	
Members in household, alone/with family ^b	60 (51.3)/57 (48.7)
Living arrangement, own home/residential care ^b	97 (82.9)/20 (17.1)
Psychiatric day care, use/not use ^b	57 (48.7)/60 (51.3)
Community occupational therapy, use/not use ^b	22 (18.8)/95 (81.2)
Employment Services, use/not use ^b	14 (12.0)/103 (88.0)
Psychiatric home-visit nursing care, use/not use ^b	62 (53.0)/55 (47.0)

Note: Measured at the beginning of psychoeducation.

Abbreviations: BPRS, Brief Psychiatric Rating Scale; DAI-10, Drug Attitude Inventory-10 items; GAF, Global Assessment of Functioning; PANSS, Positive and Negative Syndrome Scale; SAI-J, Schedule for the Assessment of Insight Japanese version; SCoRS-J, Schizophrenia Cognition Rating Scale Japanese version.

^aMeasured at the end of psychoeducation.

^bMeasured at discharge.

(DAI-10) scale.¹⁸ For the PANSS and BPRS, which are the rating scales for psychiatric symptoms, the values at the beginning of the program were used to evaluate the effects of psychiatric symptoms at the time of program participation on the outcomes. For the GAF, SAI-J, DAI-10, and SCoRS-J, the values at the end of the program were used to evaluate the impact of the improved condition on outcomes. For other items, data at the time of discharge were used.

2.3 | Statistical analysis

Subjects who met the outcome were defined as the readmission group and those who did not were defined as the nonreadmission

group. A univariate analysis was conducted to exclude factors that were not clearly relevant to maintain the detection sensitivity of a multivariate analysis. In the univariate analysis, $P < .10$ was set to ensure that related factors were not missed. The difference in each factor between the two groups was evaluated using univariate analysis ($P < .10$), in which t test was used for continuous variables and chi-square or Fisher's test was used for nominal variables. Multivariate analysis was subsequently conducted using the factors selected in the univariate analysis. In the multivariate analysis, we performed logistic regression analysis (stepwise method) with readmission as the dependent variable and the factors selected in the univariate analysis as covariates. We calculated the factors and odds ratios that independently contributed to readmission ($P < .05$). SPSS Statistics 25 (IBM Japan) was used to perform statistical analysis.

3 | RESULTS

A total of 117 subjects were included in this study. Table 1 shows the characteristics of the subjects. The mean age of the subjects was 42.4 ± 11.5 years. Twenty-eight patients were admitted for the first time. Twenty-eight subjects (23.9%) received LAI, and 98 (83.8%) were discharged from the hospital using social resources and support. Thirty-one patients (26.5%) were readmitted within one year. The 31 patients in the readmission group and 86 patients in the non-readmission group were analyzed.

Table 2 shows the results of the univariate analysis. Significant differences were found in the number of hospital admissions ($P < .01$), BPRS score ($P = .09$), SAI-J score ($P = .01$), SCoRS-J score ($P = .01$), and LAI ($P = .09$). However, there was no significant difference regarding the use of social resources and support.

Since there was no multicollinearity among the factors extracted in the univariate analysis, multivariate analysis was performed including all factors. Table 3 shows the results of multivariate analysis. Logistic regression analysis identified the number of hospital admissions ($P = .01$) and SAI-J score ($P = .04$) as risk factors for readmission, with odds ratios (95% Confidence Interval) of 0.70 (0.53-0.93) and 1.18 (1.01-1.40), respectively. This means that the risk of readmission increases 1.43 times for each additional previous hospitalization and 1.18 times for each decrease in the SAI-J score.

4 | DISCUSSION

We extensively studied risk factors for readmission in patients with schizophrenia who underwent a psychoeducation program. We found that the number of hospital admissions and SAI-J score were independently associated with readmission. The number of hospital admissions has been reported as a risk factor in several studies with different patient settings,¹¹ and our results support these reports. The number of previous admissions was shown to be a robust factor associated with readmission, regardless of the psychoeducational program or current treatment.

TABLE 2 Univariate analysis of risk factors for candidate readmission

Variables	Readmission (n = 31)	Non readmission (n = 86)	P
	Mean ± SD, n (%)	Mean ± SD, n (%)	
Age [years]	42.7 ± 12.4	42.3 ± 11.3	.85
Gender, male/female	13(41.9)/18(58.1)	40(46.5)/46(53.5)	.66
Admitted, involuntary/voluntary	27(87.1)/4(12.9)	76(88.4)/10(11.6)	1.00
Number of hospital admissions	6.0 ± 4.9	3.1 ± 2.7	<.01 [*]
Diabetes mellitus, yes/no	3(9.7)/28(90.3)	3(3.5)/83(96.5)	.19
History of substance use, yes/no	3(9.7)/28(90.3)	3(3.5)/83(96.5)	.19
History of alcohol addiction, yes/no	5(16.1)/26(83.9)	7(8.1)/79(91.9)	.30
PANSS	88.7 ± 19.3	88.9 ± 22.7	.97
BPRS	53.5 ± 16.9	48.1 ± 13.5	.09 [*]
GAF ^a	56.7 ± 8.4	60.3 ± 11.1	.14
SAI-J ^a	13.8 ± 3.7	16.1 ± 4.0	.01 [*]
DAI-10 ^a	3.8 ± 5.4	5.2 ± 4.6	.18
SCoRS-J ^a	39.3 ± 12.1	32.2 ± 10.4	.01 [*]
Clozapine, yes/no ^b	0(0.0)/31(100.0)	2(2.3)/84(97.7)	1.00
Electro convulsive therapy, yes/no ^b	7(22.6)/24(77.4)	14(16.3)/72(83.7)	.43
Long-acting injection use/not use ^b	4(12.9)/27(87.1)	24(27.9)/62(72.1)	.09 [*]
Chlorpromazine equivalent dose [mg] ^b	1027.3 ± 602.2	934.1 ± 553.5	.43
Social resources and support			
Members in household, alone/with family ^b	17(54.8)/14(45.2)	43(50.0)/43(50.0)	.64
Living arrangement, own home/residential care ^b	28(90.3)/3(9.7)	69(80.2)/17(19.8)	.20
Psychiatric day care, use/not use ^b	15(48.4)/16(51.6)	42(48.8)/44(51.2)	.97
Community occupational therapy, use/not use ^b	7(22.6)/24(77.4)	15(17.4)/71(82.6)	.53
Employment services, use/not use ^b	3(9.7)/28(90.3)	11(12.8)/75(87.2)	.76
Psychiatric home-visit nursing care, use/not use ^b	15(48.4)/16(51.6)	47(54.7)/39(45.3)	.55

Note: Measured at the beginning of psychoeducation.

Abbreviations: BPRS, Brief Psychiatric Rating Scale; DAI-10, Drug Attitude Inventory-10 items; GAF, Global Assessment of Functioning; PANSS, Positive and Negative Syndrome Scale; SAI-J, Schedule for the Assessment of Insight Japanese version; SCoRS-J, Schizophrenia Cognition Rating Scale Japanese version.

^aMeasured at the end of psychoeducation.

^bMeasured at discharge.

* $P < .1$ vs. readmission; n = 31 (26.5%) for readmission, n = 86 (73.5%) for nonreadmission.

TABLE 3 Multivariate analysis of factors associated with readmission

	B	OR	(95% CI)	P
Number of hospital admission	-0.36	0.70	(0.53-0.93)	0.01
SAI-J	0.17	1.18	(1.01-1.40)	0.04
Long acting injection	-2.17	0.11	(0.01-1.18)	0.07

Note: $P < .1$ vs. readmission.

Abbreviations: B, Regression coefficient; CI, confidence Interval; OR, odds ratio; SAI-J, Schedule for the Assessment of Insight Japanese Version.

The SAI-J score is a novel factor that was identified in this study as an independent risk factor associated with readmission. Poor insight has been found to be associated with higher risks of relapse and readmission.¹⁹ Insight has also been reported to be associated with adherence and community functioning.²⁰ Lysaker et al concluded that lack of insight can lead to worsening symptoms secondary to

poor treatment adherence and therapeutic alliance. This results in impaired community functioning.²¹ In this study, both the DAI-10, a measure of medication adherence, and the GAF, a measure of social functioning, tended to score lower in the readmission group, but the differences were not significant. The SAI-J score includes a comprehensive and objective assessment of need and insight regarding



treatment and medication, and is thought to have been extracted to sensitively indicate readmission. We previously reported that SCoRS-J after a psychoeducation program may be associated with readmission.¹⁰ In this study, SCoRS-J was significantly different in the univariate analysis, but was not identified as a risk factor in the multivariate analysis. As a report suggested that clinical insight is associated with cognitive functions,²² we examined the multicollinearity of both factors, but found no correlation. The results suggest that the SAI-J may be more sensitive regarding readmission than the SCoRS-J.

On the one hand, LAI of antipsychotics use was thought to be a factor that reduced readmission, but was not shown to be associated with it. LAI of antipsychotics has continued effect for 2-4 weeks with a single intramuscular injection. LAIs have been reported to be partially superior to oral medications in preventing relapse and reducing number of hospitalizations.²³ The APA guidelines suggest the use of LAIs for patients with a history of poor or uncertain adherence.²⁴ We previously reported a significant increase in DAI-10 scores after attending a psychoeducational program.¹⁰ In the present study, we hypothesized that the psychoeducation program—similar to the LAI—may have improved medication adherence.

Based on the PANSS and the CPZ-equivalent dose of antipsychotic drugs, the subjects of this study are likely to be similar to the general Japanese schizophrenic population.^{25,26} The one-year readmission rate in our study was 26.5%, which seems to be comparable to the approximately 30% readmission rate in Japan. The subjects were mostly middle-aged, had less physical comorbidities, and used substances at a lower rate than the Western population. This difference may be attributed to the different approach in Japan regarding health promotion and drug regulation compared with Western countries. On the other hand, the utilization rate of social resources and support was high (83.8%). Donisi et al reported that receiving benefits (pension, a service-connected disability, or other welfare benefits) influence readmission.¹¹ Therefore, we assessed whether lack of social resources and support can be considered as a risk factor; and our observations ruled out this possibility.

One of the limitations of this study, which is a problem associated with historical cohort studies, is that we were unable to adequately track the outcomes of patients who were transferred to other medical institutions after discharge. We attempted to follow these subjects as closely as possible, but were unable to do so completely. The reasons for transferring patients after discharge were mostly geographical. The exclusion of these subjects would have had little effect on the results of the analysis. The results of this study can be universally adapted if their reproducibility is validated in another population. Second, while assessing the risk associated with the lack of social resources and support, we did not prescribe any content. Most of the subjects received social resources and support; however, differences in the content may have influenced the results. Additional research may be needed to assess the detailed impact of social welfare services. Third, the psychoeducation

program in this study was conducted as a part of the inpatient treatment and we only included patients who had experienced an outcome that required hospitalization. Therefore, it is not applicable as a risk factor for patients who have never been hospitalized. Further study is needed to examine the efficacy of the psychoeducation program in reducing hospitalization and risk factors when it is used in an outpatient setting early in life for patients who have never been hospitalized.

In this study, the PANSS or BPRS, which shows the psychiatric symptoms of the subjects, adopted the total score as a factor. However, the individual effects of the PANSS or BPRS constructs were not examined to avoid the risk of multiple analyses and multicollinearity in the statistical analysis. Further research may be needed to examine how each component affects the outcome. In this study, understanding of the psychoeducation program by the subjects was not directly assessed. In the psychoeducation program, subjects were given a questionnaire after each section, and individual support was provided to subjects who had an insufficient understanding. Following-up with the subjects helped us achieve a level of understanding of the psychoeducation program to a certain degree. Furthermore, it was our understanding that the same quality of effect was achieved. Additional studies may be needed to examine the effect of the subjects' understanding of the program on their readmission.

Since insight subsequent to the implementation of a psychoeducational program is important for its effectiveness, it may be useful to modify the content of the program to focus on insight. Furthermore, the program could be made even more useful by incorporating individualized responses, such as implementing additional programs for patients with low SAI-J scores after psychoeducation.

In this study, we found that the number of hospital admissions and SAI-J score may be robust risk factors for readmission in patients with schizophrenia who underwent a psychoeducation program. Based on these results, improvements to the psychoeducation program and its early introduction in treatment may lead to a more stable community life for patients with schizophrenia.

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CONFLICT OF INTEREST

The authors of the present study declare that they have no conflicts of interest.

AUTHOR CONTRIBUTIONS

SS, TK, TT, TI, AI, and AI conceptualized the study. SS, TK, YN, HK, and TN designed the study. SS, YN, TT, HK, TN, and NF acquired the data. SS and YN analyzed the data. SS, TK, YN, TT, AI, and AI interpreted the data.

APPROVAL OF THE RESEARCH PROTOCOL BY AN INSTITUTIONAL REVIEWER BOARD

This study was approved by the Institutional Review Board of Showa University Karasuyama Hospital.

PATIENT CONSENT STATEMENT

This study is an observational study and is posted on the institution website as a clinical study using opt-out. <https://www.showa-u.ac.jp/albums/abm.php?d=505&f=abm00010513.pdf&n=a1498797931725.pdf>.

REGISTRY AND THE REGISTRATION NO. OF THE STUDY/TRIAL

B-2016-042.

ANIMAL STUDIES

Not available.

PERMISSION TO REPRODUCE MATERIAL FROM OTHER SOURCES

We do not duplicate material from other sources.

DATA AVAILABILITY STATEMENT

The raw data belonged to the present study cannot be made publicly available, because the disclosure of personal data was not included in the research protocol of the present study.

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REFERENCES

- Psychiatry.org [internet]. The American Psychiatric Association practice guideline for the treatment of patients with schizophrenia (3rd ed.). Washington, DC: American Psychiatric Association, Washington, DC.: American Psychiatric Association. <https://doi.org/10.1176/appi.books.9780890424841>. [cited 1 Aug 2021]
- Lee SY, Kim KH, Kim T, Kim SM, Kim J-W, Han C, et al. Outpatient follow-up visit after hospital discharge lowers risk of rehospitalization in patients with schizophrenia: a nationwide population-based study. *Psychiatry Investig*. 2015;12(4):425–33.
- Ortiz G. Predictors of 30-day postdischarge readmission to a multi-state national sample of state psychiatric hospitals. *J Healthc Qual*. 2019;41(4):228–36.
- Rømer Thomsen K, Thylstrup B, Pedersen MM, Simonsen E, Hesse M. Drug-related predictors of readmission for schizophrenia among patients admitted to treatment for drug use disorders. *Schizophr Res*. 2018;195:495–500.
- Shafer A. Hospitalization patterns over 30 years across a statewide system of public mental health hospitals: readmission predictors, optimal follow-up period, readmission clusters and individuals with statistically significant high healthcare utilization. *Psychiatr Q*. 2019;90(2):263–73.
- Wong CYT. Predictors of psychiatric rehospitalization among elderly patients. *F1000 Res*. 2015;4:926.
- Lally J, Ajnakina O, Stubbs B, Cullinane M, Murphy KC, Gaughran F, et al. Remission and recovery from first-episode psychosis in adults: systematic review and meta-analysis of long-term outcome studies. *Br J Psychiatry*. 2017;211(6):350–8.
- McDonagh MS, Dana T, Selph S, Devine EB, Cantor A, Bougatsos C, et al. Treatments for schizophrenia in adults: a systematic review. Agency for healthcare research and quality (US); 2017. Report No.: 17(18)-EHC031-EF.2017.
- Ikeda T, Hori K, Inamoto A, Nakatsubo T, Koike J, Sugisawa S, et al. Study of cognitive functions efficaciously affected by psychoeducational program for patients with schizophrenia. *Brain Diso Ther*. 2016;5 (3).
- Tsuneoka T, Hori K, Inamoto A, Sugisawa S, Ikeda T, Iwanami A, et al. The effect of multi-disciplinary psycho-education for hospitalized schizophrenia patients: the key factors for re-hospitalization. *Brain Diso Ther*. 2015;4 (4).
- Donisi V, Tedeschi F, Wahlbeck K, Haaramo P, Amaddeo F. Pre-discharge factors predicting readmissions of psychiatric patients: a systematic review of the literature. *BMC Psychiatry*. 2016;16(1):1–7.
- Inada T, Inagaki A. Psychotropic dose equivalence in Japan. *Psychiatry Clin Neurosci*. 2015;69(8):440–7.
- Hashimoto N, Takahashi K, Fujisawa D, Aoyama K, Nakagawa A, Okamura N, et al. A pilot validation study of the Japanese translation of the Positive and Negative Syndrome Scale (PANSS). *Asian J Psychiatr*. 2020;54:102210.
- Tajiri M, Suzuki Y, Sugai T, Tsuneyama N, Someya T. Effects of olanzapine on resting heart rate in Japanese patients with schizophrenia. *PLoS One*. 2018;13(7):e0199922.
- Higuchi Y, Sumiyoshi T, Seo T, Suga M, Takahashi T, Nishiyama S, et al. Associations between daily living skills, cognition, and real-world functioning across stages of schizophrenia; a study with the Schizophrenia Cognition Rating Scale Japanese version. *Schizophr Res: Cognition*. 2017;7:13–18.
- Gerretsen P, Takeuchi H, Ozzoude M, Graff Guerrero A, Uchida H. Insight into illness and its relationship to illness severity, cognition and estimated antipsychotic dopamine receptor occupancy in schizophrenia: an antipsychotic dose reduction study. *Psychiatry Res*. 2017;251:20–5.
- Eguchi S, Koike S, Suga M, Takizawa R, Kasai K. Psychological symptom and social functioning subscales of the modified Global Assessment of Functioning scale: reliability and validity of the Japanese version. *Psychiatry Clin Neurosci*. 2015;69(2):126–7.
- Hori H, Ueda N, Shiozuka H, Igata R, Miki T, Atake K, et al. The Nursing Assessment of Medication Acceptance: the reliability and validity of a schizophrenia medication adherence scale. *Ther Adv Psychopharmacol*. 2017;7(1):11–6.
- Raveendranathan D, Joseph J, Machado T, Mysore A. Neurocognitive and clinical correlates of insight in schizophrenia. *Indian J Psychiatry*. 2020;62(2):131–6.
- Kalkan E, Kavak BF. The effect of insights on medication adherence in patients with schizophrenia. *Perspect Psychiatr Care*. 2020;56(1):222–8.
- Lysaker PH, Pattison ML, Leonhardt BL, Phelps S, Vohs JL. Insight in schizophrenia spectrum disorders: relationship with behavior, mood and perceived quality of life, underlying causes and emerging treatments. *World Psychiatry*. 2018;17(1):12–23.
- Larabi DI, Marsman J-BC, Aleman A, Tijms BM, Opmeer EM, Pijnenborg GHM, et al. Insight does not come at random: Individual gray matter networks relate to clinical and cognitive insight in schizophrenia. *Prog Neuro-Psychopharmacol Biol Psychiatry*. 2021;109:110251.
- Peters L, Krogmann A, von Hardenberg L, Bödeker K, Nöhles VB, Correll CU. Long-acting injections in schizophrenia: a 3-year update



- on randomized controlled trials published January 2016-March 2019. *Curr Psychiatry Rep.* 2019;21(12):124.
24. Keepers GA, Fochtman LJ, Anzia JM, Benjamin S, Lyness JM, Mojtabai R, et al. The American Psychiatric Association Practice Guideline for the treatment of patients with schizophrenia. *Am J Psychiatry.* 2020;177(9):868–72.
 25. Shimada T, Ohori M, Inagaki Y, Shimooka Y, Sugimura N, Ishihara I, et al. A multicenter, randomized controlled trial of individualized occupational therapy for patients with schizophrenia in Japan. *PLoS One.* 2018;13(4):e0193869.
 26. Dong M, Zeng L-N, Zhang Q, Yang S-Y, Chen L-Y, Najooan E, et al. Prescription of antipsychotic and concomitant medications for adult Asian schizophrenia patients: findings of the 2016 Research

on Asian Psychotropic Prescription Patterns (REAP) survey. *Asian Journal of Psychiatry.* 2019;45:74–80.

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