Timely follow-up visits after psychiatric hospitalization and readmission in schizophrenia and bipolar disorder in Japan

Yasuyuki Okumura[a,b,*], Naoya Sugiyama[c], Toshie Noda[d]

[a] Research Department, Institute for Health Economics and Policy, Association for Health Economics Research and Social Insurance and Welfare, Tokyo, Japan
[b] Department of Psychiatry and Behavioral Science, Tokyo Metropolitan Institute of Medical Science, Tokyo, Japan
[c] Numazu Chuo Hospital, Fukkokai Foundation, Shizuoka, Japan
[d] Atami Chuo Clinic, Fukkokai Foundation, Shizuoka, Japan

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ABSTRACT

The study objective was to investigate the association between timely follow-up visits after psychiatric hospitalization and the risk of readmission in patients with schizophrenia or bipolar disorder. A retrospective cohort study was conducted using a nationwide claims database in Japan. Between April 2014 and March 2015, all psychiatric hospitalization data were obtained and patients with a principal diagnosis of schizophrenia or bipolar disorder were followed up from 180 days before admission to 210 days after discharge. The primary outcome of this study was psychiatric readmission during the 180-day period (between 31 and 210 days) after the index discharge. A total of 48,579 eligible patients were identified. After psychiatric hospitalization, 15% of patients received no follow-up visits to a psychiatrist within 30 days. Patients who received follow-up visits had lower readmission rates during the subsequent 180 days (21.7% vs. 37.5%; adjusted risk ratio, 0.54 [95% confidence interval, 0.52–0.57]) than those who did not. Timely follow-up visits after discharge could be helpful for reducing the readmission risk in patients.

1. Introduction

Timely follow-up visits after psychiatric hospitalization are considered an important component in the clinical process for promoting further recovery and preventing relapse (Hermann et al., 2004). However, it remains unclear whether timely follow-up visits after psychiatric hospitalization are associated with a reduced risk of readmission (Beadles et al., 2015; Kurdyak et al., 2018; Lin and Lee, 2008; Marcus et al., 2017).

A cohort study of 24,934 Medicaid patients, aged 22–64 years, reported no association between follow-up visits within 30-days after discharge and readmission within the subsequent 6-months in a depression cohort and a small association in a schizophrenia cohort (Beadles et al., 2015). A recent cohort study of 71,776 commercially and Medicaid insured patients, aged 18–64 years, showed that receipt of a follow-up visit within 30 days after discharge was associated with slightly lower odds of readmission within the subsequent 90 days in schizophrenia (odds ratio [OR], 0.88) and in bipolar (OR, 0.91) cohorts (Marcus et al., 2017). A recent cohort study of 19,132 patients with schizophrenia in Canada also found small associations (hazard ratio,

0.83–0.88) between follow-up visits within 30 days after discharge and readmissions within the subsequent 180 days (Kurdyak et al., 2018). However, a cohort study of 15,607 patients with schizophrenia in Taiwan found strong associations (OR, 0.33) between follow-up visits within 60 days after discharge and readmission within the subsequent 120 days after discharge (Lin and Lee, 2008).

Thus, the strength of the association between timely follow-up visits after discharge and subsequent readmission may vary by diagnosis and country. In the present study, we aimed to investigate the association between timely follow-up visits after psychiatric hospitalization and the risk of readmission in patients with schizophrenia and bipolar disorder in Japan.

2. Methods

2.1. Design

A retrospective cohort study was conducted using the National Database of Health Insurance Claims and Specific Health Checkups of Japan (NDB). The NDB includes almost all claims in Japan (Ministry of

Health, Labour and Welfare, 2016; Okumura et al., 2017), with the exception of claims solely covered by public funds. The NDB includes information on patient identification number, sex, and age group, along with medical practice codes, administration dates, and diagnostic codes.

The institutional review board at the Institute for Health Economics and Policy reviewed and approved the study protocol. Acquisition of informed consent was waived because of the anonymous nature of the data.

2.2. Setting

Japan has had a universal healthcare system since 1961. Japan had 330,694 psychiatric beds in 1599 hospitals in 2014 (Ministry of Health, Labour and Welfare and National Center of Neurology and Psychiatry, 2016). Hospitals with psychiatric beds are mainly private hospitals rather than public ones. There is no obligation for the hospitals to follow-up patients after discharge. In general, the universal health insurance system pays for 70% of the outpatient treatment costs, the System of Medical Payment for Services and Supports for Persons with Disabilities pays for approximate 20%, and patients are responsible for the remaining amount (approximately 10%).

2.3. Patient selection

We identified all patients aged < 65 years who were admitted to any psychiatric unit between April 2014 and March 2015. The psychiatric units included in the present study are presented in Table S1. To increase traceability, we used patient identification numbers, called "ID0" (Kubo et al., 2018). Initial admissions to psychiatric units during the period were identified as index admissions. Planned admissions for electroconvulsive therapy with a hospital stay of ≤ 3 days were excluded. Patients with a principal diagnosis of schizophrenia and related psychoses (International Classification of Diseases, Tenth Edition [ICD-10]: F20–F29) or bipolar affective disorder (F30–F31) were included using the algorithm defined by the Ministry of Health, Labour and Welfare (Ministry of Health, Labour and Welfare, 2015). Patients with a secondary diagnosis of dementia (F00–F03, F05.1, and G30–G31) or intellectual disability (F70–F79) in addition to the principal diagnosis of schizophrenia or bipolar disorder were excluded. Patients hospitalized for longer than 180 days were excluded as including these patients would have meant that some patients would not have the required follow-up period of 210 days. Patients discharged to a non-psychiatric unit or deceased were excluded. Patients who enrolled in the database at least 180 days before the index admission and 210 days after the index discharge were included. Patients admitted to any type of hospital unit within 30 days after the index discharge were excluded because of the time window for the exposure status. All patients were followed up from 180 days before the index admission to 210 days after the index discharge.

2.4. Exposure

The exposure of interest was a timely follow-up visit to a psychiatrist. A timely follow-up visit was defined as an outpatient visit to a psychiatrist within 30 days after the index discharge (the medical practice codes for psychiatric visits are listed in Table S2). Our definition of follow-up visit included passive outpatient visits as well as home-visit services by psychiatrists. In addition, the definition included psychiatric consultation for at least 5 min delivered in an individual-based format rather than a group-based format.

2.5. Outcomes

The primary outcome of this study was psychiatric readmission during the 180-day period (between 31 and 210 days) after the index

Table 1
Sample characteristics of the entire cohort.

Characteristics	No follow-up visit (N = 7246)		Follow-up visit (N = 41,333)		Standardized difference, %
	n	%	n	%	
Age, years					
0–19	202	2.8	1145	2.8	0.0
20–34	1609	22.2	9877	23.9	−4.0
35–49	2727	37.6	17,293	41.8	−8.6
50–64	2708	37.4	13,018	31.5	12.4
Sex, female	3625	50.0	24,088	58.3	−16.7
Number of psychiatric visits within 180 days before index admission					
0	2377	32.8	4810	11.6	52.8
1–3	1693	23.4	5686	13.8	24.9
4–6	1311	18.1	8907	21.5	−8.5
7–12	1377	19.0	15,074	36.5	−39.9
13 or greater	488	6.7	6856	16.6	−31.2
History of psychiatric admission within 180 days before index admission	1160	16.0	4957	12.0	11.5
History of intensive care unit admission within 180 days before index admission	182	2.5	979	2.4	0.6
Charlson index within 180 days before admission					
0	4933	68.1	28,663	69.3	−2.6
1	1501	20.7	8448	20.4	0.7
2	468	6.5	2605	6.3	0.8
3 or greater	344	4.7	1617	3.9	3.9
Diagnosis of substance use disorders within 180 days before admission	336	4.6	1838	4.4	1.0
Type of hospital at admission					
General hospital	823	11.4	5345	12.9	−4.6
Non-general hospital	6423	88.6	35,988	87.1	4.6
Type of unit at admission					
Acute care unit	3941	54.4	25,580	61.9	−15.2
Non-acute care unit	3305	45.6	15,753	38.1	15.2
Type of admission					
Involuntary	3136	43.3	18,579	45.0	−3.4
Voluntary	4110	56.7	22,754	55.0	3.4
Principal diagnosis (ICD-10 codes)					
Schizophrenia (F2)	6050	83.5	32,097	77.7	14.7
Bipolar affective disorder (F30–F31)	1196	16.5	9236	22.3	−14.7
Use of ECT during index admission	172	2.4	1030	2.5	−0.6
Length of hospital stay					
1st (1–21 days)	1614	22.3	7993	19.3	7.4
2nd (22–40 days)	1300	17.9	8418	20.4	−6.4
3rd (41–64 days)	1227	16.9	8581	20.8	−10.0
4th (65–89 days)	1287	17.8	8002	19.4	−4.1
5th (90–180 days)	1818	25.1	8339	20.2	11.7

Abbreviations: ECT, electroconvulsive therapy; ICD, international classification of diseases.

discharge. The secondary outcome was psychiatric readmission during the 90-day period (between 31 and 120 days) after the index discharge. Planned readmissions for electroconvulsive therapy were excluded from the definition of psychiatric readmission.

2.6. Other variables

As potential covariates, we extracted information on patient demographic characteristics (sex and age), characteristics during the 180 days prior to the index admission (Charlson index (Sundararajan et al., 2007), diagnosis of substance use disorders [ICD-10 codes: F10–F19], number of psychiatric visits, history of psychiatric admission, and