Rate and Predictors of 1-year Readmission in Tertiary Psychiatric Hospitals

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ABSTRACT

Objective: To obtain the rate of 1-year readmission among psychiatric patients in tertiary centers in Oman and to study the association between readmission and sociodemographic and clinical factors.

Methods: This is a retrospective study using data from patients' medical records. All patients aged ≥18 years who were admitted to Al Masarra Hospital and the psychiatric ward at Sultan Qaboos University Hospital over a 6-month period were included in the study. Each patient was followed up for 1 year after discharge to determine whether they had been readmitted during that period. The analysis was conducted as a comparative study between patients with early readmission and those who had not been readmitted during the 1-year period. Fifteen factors were examined for association with readmission within the 1-year period.

Results: A total of 466 patients were admitted to the two hospitals during the study period, with 39% of these patients readmitted within 1 year. The univariate analysis revealed that 11 factors were significantly associated with 1-year readmission ($P < 0.05$). The multivariate logistic regression analysis identified four factors as independent significant predictors for 1-year rehospitalization: male gender, unemployment, nonadherence to medications and a history of previous hospitalization.

Conclusion: The rate of 1-year readmission was found to be high, in line with the findings of other studies. Specific sociodemographic factors and clinical factors were strongly associated with early readmission in psychiatric hospitals in Oman. Strategies for aftercare and community psychiatric services need to be implemented.

Key words: Mental health, Oman, psychiatry wards, readmission

INTRODUCTION

A shortage of beds in psychiatric hospitals presents challenges for health-care providers worldwide. Readmission of psychiatric patients within a short period following discharge aggravates the problem of limited bed capacity. Admissions are often a result of involuntary hospitalization and trigger the involvement of police, emergency room staff and various types of services.[1]

Readmission is commonly used as an outcome or quality indicator for inpatient psychiatric services in many countries, including the United Kingdom.

Predictors of psychiatric readmission have been widely discussed in literature. An increased likelihood of readmission was observed to be associated with many factors including age, educational level, diagnosis,

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treatment, mental state upon admission and discharge, prior history of psychiatric hospitalization, disease severity, general medical comorbidity, alcohol and substance use, personality disorder and lower level of patient function at discharge.[2-9] Social factors such as lower socioeconomic status, living alone and receiving a disability or unemployment benefit were reported as significant predictors for early readmission of psychiatric patients.[2-4] A short hospital stay for patients with schizophrenia was found to be associated with early rehospitalization.[5] In addition, aftercare-related factors such as inadequate community support and ambulatory care visits also predicted psychiatric readmission.[4,9,10]

Transitions between inpatient and outpatient psychiatric health-care settings are associated with increased risks of adverse events including early readmission and, therefore, are a focus of quality improvement initiatives.[11] Attempts to reduce the early readmission rate in the transition period were successful in producing 13.6–37% absolute reduction in readmission rates when the following interventions were applied independently: psychoeducation interventions targeting disease management and living skills and structured assessments of patients' discharge needs.[12]

It is important also to identify and address system-related issues that may play a role in rehospitalization, in particular, the attitudes, expectations and perceptions of clinical staff toward patients who return for further treatment.[13] Similarly, patients' expectations and attitudes toward the system also need to be considered. For example, patients that have a lower satisfaction with the care provided during the first week of involuntary admission have a higher chance of being involuntarily readmitted within 1 year.[4]

The phenomenon of readmission within a short period following discharge has been observed in tertiary psychiatric hospitals in Oman. Readmission in mental hospitals and factors associated with it have not previously been formally assessed in Oman. Therefore, exploring the extent of this problem locally will provide valuable information. The aim of this study was to determine the rate of readmission of patients to a psychiatric hospital within 1 year of discharge and to identify the associated predictors, which in turn would help to formulate a future care strategy designed at reducing cost and providing effective management of patients. The rate of psychiatric readmission in Oman is expected to be higher than the rate in developed countries because of the lack of community services.[14]

METHODS

This is a retrospective study using data from patients' medical records. The study included all patients aged ≥18 years admitted to Al Masarra Hospital (AMH), affiliated to the Ministry of Health, and the psychiatric ward at Sultan Qaboos University Hospital (SQUH) over a 6-month period between January and June 2011.

These two hospitals are the only hospitals that provide inpatient psychiatric services in Oman and they cover a population of 4 million people. AMH is the tertiary psychiatric hospital that provides inpatient and outpatient care. The psychiatric service outside the capital city is based on outpatient care alone, which represents the secondary psychiatric health-care service. The total bed capacity in the general adult psychiatry unit of AMH is 88 for male patients and 40 for female patients. Additional beds are available in the forensic ward, child psychiatry ward and addiction unit. The system of admission to AMH is based on referrals of patients by psychiatrists from other hospitals outside Muscat or as a walk-in at the the accident and emergency department of AMH. SQUH is a multispecialty hospital. The Psychiatry Department in SQUH provides a tertiary psychiatric care (outpatient and inpatient). The total bed capacity of the psychiatric ward is 15 each for male and female patients. Unlike AMH, the SQUH psychiatric ward is an open ward that cannot accommodate patients who present an immediate risk to self or others and those who are at risk of absconding. Admission to the psychiatry ward is made after the assessment of patients by the psychiatric on-call team. These patients are usually referred from other departments in the hospital including the emergency department. The transfer of patients between these two hospitals is accepted for certain cases. For example, in general, patients transferred from the SQUH psychiatric ward to AMH are those with comorbid substance misuse or those who are deemed to impose immediate risk to self or others, whereas pregnant women and patients with medical comorbidities admitted to AMH would eventually be transferred to the SQUH psychiatric ward to receive multiprofessional care. Admission during this period was considered the "index admission," regardless of the history of previous admission.

Patients aged <18 years, those admitted electively for maintenance electroconvulsive therapy (ECT), detoxification from alcohol/drugs or for forensic assessment were excluded from the study. The records of eligible participants were reviewed to retrieve a patient's

demographic data (place of residence, gender, age, marital status and employment status), clinical diagnosis based on the International Classification of Diseases 10th revision, previous admission to psychiatric hospitals and presence of mental and physical comorbid conditions. Detailed information of the index admission including a patient's presentation, length of hospital stay, pattern of discharge, place of outpatient follow-up, adherence to medications after discharge and level of social support were also obtained. The dependent variable was "readmission," which is defined as a second admission within 1 year of the index admission.

Nonadherence to medications was defined in our study as missing the medication doses for 2 consecutive weeks or irregular intake of medications (missing the doses three or more days a week) for at least 1 month. Irregular follow-up in the psychiatry clinic after discharge was defined as missing more than 20% of the appointments within the 1-year period following discharge. Any documentation in the medical notes about poor family support or impaired social network was considered as poor social support. Examples of poor social support include any kind of abuse toward the patient, refusal of the family to take the patient home after discharge and unsupervised patients who were deemed to be at risk. Poor social support was not included in the assessment of prediction to readmission because there are no clear definitions or categorizations of levels of social or family support in literature on which our assessment could be based.

The SPSS software (version 22; IBM Corp., Armonk, New York) was used for data entry and analysis. Missing data were treated by multiple imputation methods using the fully conditional specification (MCMC) method. A total of 25 imputations were performed by a logistic regression model and included all outcome variables, predictors and covariates. Data were described using mean ($\bar{x}$) and standard deviation (*s*) as well as number and percentages. The case–control analysis was used to identify the predictors of readmission. Patients who were readmitted within 1 year of the index admission represented the cases and those who were not readmitted within 1 year of the index admission represented the controls. The univariate and multivariate logistic regression analyses were used to model readmission to a psychiatric hospital as a function of patients' demographic characteristics and clinical profile. The significance of the obtained results was judged at the 5% level.

Ethical approval for this study (Ethical Committee N° MREC#901-A) was provided by the Ethical Review Committee at the College of Medicine and Health Science, Sultan Qaboos University, Muscat, on February 12, 2010, and by the Ethical Review Committee at the Ministry of Health.

RESULTS

During the study period, a total of 605 patients were admitted to AMH and the psychiatric ward in SQUH. Of these, 139 patients were excluded because they did not fulfil the study criteria. Of the 466 patients eligible for inclusion, 39% (*n* = 181) were readmitted within 1 year of the index admission; 13% were readmitted within 1 month; 30% within 6 months and 57% were admitted between 6 months and 1 year. The rate of readmission in SQUH (24%) was much lower than that of AMH (45.5%).

As shown in Tables 1 and 2, the mean age of the patients included in the study was 35.6 ± 12.65 years. Females represented 45.7% of the sample, while 54.3% were male. Approximately half of the participants (49.6%) had never been married and 82% of them were unemployed [Table 1]. The most frequently encountered diagnosis was schizophrenia (37.1%) followed by bipolar affective disorder (19.3%) and depression (11.6%). The majority of patients (80.7%) were followed up in the outpatient clinic at the tertiary psychiatric hospital for 1 year following discharge. Only 19.3% of the patients were referred to a local psychiatrist for follow-up. Although the majority of the patients did not have comorbidity, the most commonly encountered comorbidity was general medical diseases. A small number of the patients had neurological and psychiatric comorbidities.

Table 3 illustrates the univariate analysis of the factors associated with early readmission. Age, marital status, receiving ECT and irregularity of follow-up after discharge from index admission did not show a significant association with readmission within 1 year of discharge. Male gender and unemployment were significantly linked to readmission within the 1-year period. Psychotic disorders were found to be associated with a higher percentage of readmission compared with nonpsychotic disorders. Aggression at the time of admission was significantly associated with rehospitalization within the period, whereas suicidal risk at the time of admission represented a protective factor for readmission (associated with a lower percentage of readmission compared with those who had no suicidal risk at the time of admission). Patients who received long-acting injections showed a significantly higher rate of 1-year readmission compared

Table 1: Sociodemographic characteristics of the patients (*n* = 466)

Patients' characteristic	n (%)
Sex	
Male	253 (54.3)
Female	213 (45.7)
Marital status	
Never married	231 (49.6)
Married	149 (32)
Divorced/widow	65 (13.9)
No available data	21 (4.5)
Employment status	
Unemployed	383 (82.2)
Employed	73 (15.7)
No available data	10 (2.1)
Age in years ($\bar{x} \pm s$)	35.6 ± 12.65

Table 2: Clinical profile of patients (*n* = 466)

Clinical profile	n (%)
Diagnosis (ICD10)	
Schizophrenia	174 (37.3)
Bipolar affective disorder	90 (19.3)
Depression	54 (11.6)
Schizoaffective disorder	37 (7.9)
Personality disorders	22 (4.7)
Acute and transient psychotic disorder	22 (4.7)
Organic mental disorders	15 (3.2)
Mental retardation	14 (3.0)
Others*	44 (9.4)
Aggression on admission	
Yes	186 (39.9)
No	280 (60.1)
Suicide risk on admission	
Yes	61 (13.1)
No	405 (86.9)
Treatment received at index admission	
Oral medications only	324 (69.5)
Oral medications and long acting injections	116 (24.9)
Oral medications and ECT	15 (3.2)
Oral medications, injections and ECT	11 (2.4)
Type of discharge from index admission	
Premature discharge**	84 (18.0)
Based on psychiatrist recommendation	382 (82.0)
Place of follow-up after discharge	
Tertiary psychiatric hospital	376 (80.7)
Psychiatry clinic in a general hospital	90 (19.3)
Pattern of follow-up	
Irregular	169 (36.3)
Regular	236 (50.6)
No available data	61 (13.1)

Contd...

Table 2: Contd...

Clinical profile	n (%)
Presence of comorbidity	
Absence	310 (66.5)
Present	156 (33.5)
Medical	105 (67.3)
Neurological	12 (7.7)
Psychiatric	27 (17.3)
Combination of more than one category	12 (7.7)
History of previous hospital admission	
Never admitted	185 (39.7)
Previously admitted	277 (59.4)
Length of hospital stay at index admission (days)	
<7	107 (23)
8–14	93 (20)
15–30	165 (35.4)
31–60	67 (14.4)
>60	34 (7.3)
Adherence to medications after discharge	
Adherent	223 (47.9)
Nonadherent	167 (37.8)
No available data	67 (14.4)
Evidence of poor social support	
Yes	423 (90.8)
No	43 (9.2)

*Others – Anxiety disorders, obsessive–compulsive disorder, somatization disorder, conversion disorders, persistent delusional disorders and mental and behavioral disorders due to psychoactive substance use; **Premature discharge includes discharged against medical advice and absconded

with other patients. A longer hospital stay for the index admission was significantly associated with a higher rate of 1-year readmission. After a patient's initial admission, he/she is less likely to be readmitted within the first year of discharge. This observation indicates that a history of previous hospitalization is significantly associated with 1-year readmission. Other clinical factors that showed a significant association with 1-year rehospitalization include premature discharge and nonadherence to prescribed medications.

Multivariate logistic regression analysis identified four factors as independent significant predictors for 1-year readmission, as shown in Table 4. Compared with female patients, male patients had a 82% higher risk of readmission within 1 year of discharge. The risk of readmission within 1 year of discharge for unemployed patients was twice as high for psychiatric patients who were employed. Similarly, patients that were nonadherent to medications were twice as likely to have a readmission within 1 year as compared with patients who were adherent

Table 3: Univariate logistic regression analysis results (based on the multiply imputed data)				
Variable	*P*	OR	95% CI for OR	
			Lower	Upper
Age (years)				
≤35	0.148	0.758	0.521	1.104
>35†				
Gender				
Male	0.003*	1.787	1.221	2.615
Female†				
Marital status				
Not married**	0.939	0.986	0.677	1.434
Married†				
Employment				
Unemployed	0.007*	2.18	1.233	3.855
Employed†				
Diagnosis				
Psychotic disorders***	0.028*	1.522	1.046	2.215
Nonpsychotic disorders†				
Aggression on admission				
Yes	0.001*	2.447	1.666	3.593
No†				
Suicide risk on admission				
Yes	0.016*	2.13	1.151	3.942
No†				
Received long-acting injections				
Yes	0.001*	2.305	1.521	3.492
No†				
Received ECT at index admission				
Yes	0.433	1.374	0.621	3.043
No†				
Length of hospital stay (days)				
≥15	0.001*	2.19	1.483	3.236
<15†				
Type of discharge				
On psychiatrist recommendation	0.002*	2.331	1.356	4.007
Premature†				
Pattern of follow-up after discharge				
Irregular	0.158	0.752	0.506	1.117
Regular†				
Adherence to medications				
Not adherent	0.001*	2.05	1.381	3.043
Adherent†				
History of a previous admission				
Previously admitted	0.001*	3.603	2.366	5.487
Never admitted†				
Presence of comorbidity				
Yes	0.022*	1.581	1.068	2.339
No†				

†Reference category, *P* value is statistically significant, **Not married includes single, widowed or divorced individuals, ***Psychotic disorders include schizophrenia, schizoaffective disorder, delusional disorder, acute and transient psychotic disorder and organic psychotic disorder. CI – Confidence interval; OR – Odds ratio; ECT – Electroconvulsive therapy

to medications. A history of previous hospitalization showed the strongest association (odds ratio: 2.5) with 1-year readmission to a psychiatric ward.

DISCUSSION

This study found the rate of 1-year readmission to psychiatric units in Oman to be 39%, which is slightly lower than that reported by a similar study in Australia (46%).[15] A prospective study from Malaysia (2007–2008) revealed that 32% of the patients who were discharged from a psychiatry ward were readmitted within 6 months of discharge, which is comparable with the rate found in the current study.[1] In Taiwan, a study that examined early readmission among patients who are admitted for the first time at index admission found that the rate of readmission within 1 month after discharge was 22.3%, which is similar to the percentage found in our study (21.6%).[16]

In the Arab world, there are limited data available with respect to predictors of psychiatric readmissions. According to a multicentre study conducted in Egypt and Saudi Arabia, it was found that male patients who were unemployed, unmarried, educated to primary school level, diagnosed with mood disorders or schizophrenia, living in rural areas and who were discharged without completing their treatment were more likely to have an early readmission.[17] The findings are similar to the results obtained from univariate analysis in our study but most of the factors mentioned above have been eliminated after applying the multivariate analysis.

In our study, the difference in the rate of early readmission between AMH and SQUH is related to the characteristics of the patients who are accepted for admission in each center. Aggressive patients and those who are deemed to be at a higher risk of suicide are not accepted for admission in SQUH because the setting is not suitable for such patients. Patients with medical comorbidities are mostly admitted to SQUH because of a lack of specialized medical services at AMH. This difference should not affect the validity of the results because these factors were addressed in this study.

In the univariate analysis, 11 factors were found to be significantly associated with early readmission, whereas in the multivariate analysis, only 4 of the 11 factors were found to independently predict early readmission. The other variables did not maintain their predictive capacity due to the confounders.

Poor adherence to medications was reported as an independent predictor for readmission in the present study. Similarly, a study has previously shown treatment abandonment to be the main reason for rehospitalization among patients who were discharged from a psychiatry hospital in Brazil (2006–2007).[18] Another study has shown that poor compliance was the only significant predictor of early readmission.[1] On the other hand, medication noncompliance is not predictive for rehospitalizations, according to a study that examined predictors of psychiatric readmissions to the psychiatric unit of a tertiary health facility in a Nigerian city (2000–2005).[19]

Male gender is a significant predictor for psychiatric readmission, according to the current study. This finding is in accord with the fact that the male gender is considered as a poor prognostic factor for most serious

Table 4: Independent predictors for early readmission in the multivariate logistic regression model (based on the multiple imputed data)				
Variable	*P*	OR	95% CI for OR	
			Lower	Upper
Gender				
Male	0.018	1.829	1.108	3.017
Female†				
Employment				
Unemployed	0.030	2.112	1.073	4.157
Employed†				
Adherence to medications				
Not adherent	0.001	2.346	1.481	3.717
Adherent†				
History of a previous admission				
Previously admitted	0.001	2.452	1.519	3.959
Never admitted†				

†Reference category. CI – Confidence interval; OR – Odds ratio

mental illnesses. However, although a prospective study that was conducted in Taiwan over 5 years (2000–2005) with 44,237 first-time hospitalized psychiatric patients identified male gender as a predictor for early readmission,[16] several other studies have not found this association to be significant.[1,19,20]

The current study found that as compared to being admitted for the first time, having a history of previous hospitalization is significantly associated with readmission. These findings are in accord with the findings of three other studies. The risk to others at the time of presentation was found to be a significant factor in a study conducted in Australia.[15] The above study concluded that a high risk of suicide at the time of presentation is a predictor for readmission. Interestingly, in contrast, our study found that having a high risk of suicide upon admission is associated with a lower occurrence of readmission. This was an unexpected finding because high risk of suicide is known to be a significant factor in deciding the prognosis of the patient and predicting their risk of readmission. Other factors frequently reported as predictors of readmission are increased length of hospital stay and diagnosis of schizophrenia;[2,16,20-22] however, neither of these factors were found to be significant in the current study.

CONCLUSION

The rate of readmission in psychiatric hospitals in Oman was found to be high and similar to those reported in outher countries. Specific sociodemographic and clinical factors are strongly associated with 1-year readmission, including male gender, unemployment, nonadherence to medications and a history of a previous hospitalization. Strategies for aftercare and community psychiatric services need to be implemented in Oman to minimize the risk of readmission.

Limitations and Recommendations

In terms of limitations, as this is a retrospective study, the variables were confined with the data available in the patients' medical records. Other factors that might be associated with early readmission in psychiatric patients, such as emotions expressed by family members, were not recorded in the medical records, and thus not included in this study.

The authors recommend that policy makers in the Ministry of Health should explore specific forms of aftercare community services like primary care psychiatric services, community mental health teams, assertive community treatment, early interventions services, crisis teams, home treatment teams, supported accommodation and day centers to ensure that patients remain in the community; i.e., they do not need to be readmitted in a psychiatric hospital.[14,23-25] Hospital administrators should improve care strategies and discharge planning. Health-care providers need to strategize to overcome reversible risk factors such as poor adherence to medications and closely monitor patients with fixed risk factors that are difficult to reverse.

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Conflicts of interest

The authors have no conflicts of interest.

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