



Research report

Readmission: A useful indicator of the quality of inpatient psychiatric care

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ABSTRACT

Background: The literature is unclear regarding the relationship between hospital outcome (i.e., symptom improvement during a hospital admission) and readmission, questioning the validity of readmission as an indicator of the quality of the previous hospitalization. Thus, the present aim was to examine if hospital outcome is a predictor of readmission and identify the factors that may mask any effects.

Methods: A naturalistic historical study compared the predictors of readmission over the 30 days, 6 months and 5 years following discharge for first-ever admitted inpatients with depression ($n = 478$) to all inpatients regardless of prior hospitalisations and current diagnoses ($n = 1177$).

Results: Hospital outcome, as indicated by changes from admission to discharge in scores on symptom measures, during both first-ever admissions and admissions which are not the first, predicted readmissions over all time periods for all patients, not only those with depression. However, this finding was only significant when hospital outcome was assessed by improvements on a patient-reported symptom measure, and not a clinician-rated measure.

Limitations: The sample included inpatients treated at a private psychiatric hospital and therefore it is unknown if these findings can be generalised to patients treated in a public system.

Conclusions: These findings support that readmission may be a useful indicator of the quality of the previous hospitalization.

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1. Introduction

Understanding the relationship between hospital outcome and subsequent readmission to psychiatric hospital is important for three important reasons. First, readmission is taken to be an indicator of the quality of the previous hospitalization (National Committee for Quality Assurance, 1993). Readmission rates have therefore been proposed in the context of increasing focus on monitoring the performance of mental health services to ensure efficient and effective service delivery. Second, with the ever-increasing cost of hospitalizing patients (e.g., in Australia the average cost per patient per day has increased by 68% from AUD \$410 in 1992 to AUD\$687 in 2007; Department of Health and Ageing, 2007), which is more than double the Consumer Price

Index over the same time period), it is important to minimise admissions where possible. Third, given the decreasing number of dedicated psychiatric beds available and growing population (728 beds available in 1992, decreasing to 643 in 2007; Department of Health and Ageing, 2007, despite the population increasing by over 20% during the same time period), it is important to identify patients who are at risk of being readmitted in an effort to guide treatment and plan the delivery of services. Although predictors of readmission have been widely researched (e.g., Durbin et al., 2007), the research examining the relationship between readmission and hospital outcome is limited and seemingly contradictory (Lauber et al., 2006; Lyons et al., 1997). This compromises the usefulness of readmission as an indicator of hospital performance because the available literature does not provide a clear picture. Hence, research is needed to clarify the research to date. Before describing the current research, these two studies will be examined in some detail.

Considering the study by Lyons et al. (1997), some have concluded that hospital outcome is not a predictor of readmission

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in the period following discharge. Hence, researchers have cautioned against using readmission as a quality indicator. The reason for the caution is that, Lyons et al. (1997) found that the success of hospital intervention, as assessed by improvement during the admission on an outcome measure of acute psychiatric services, does not influence the likelihood of readmission in the 30 days or 6 months following discharge for inpatients with a range of psychiatric disorders. Rather, patients who were at an increased risk of readmission were those with a greater impairment in self care, more severe symptoms, and more persistent illnesses. Thus, these data seem to suggest that patients with more severe symptoms were more likely to be readmitted, but the effect of treatment itself was not related to readmission.

Lyons et al. (1997) examined predictors of readmission over the shorter term (30 days and 6 months) which seems valid as it has been argued that an index hospitalization has less impact on readmission as the follow up period increases as other variables, such as environmental stressors, become involved (Durbin et al., 2007). However, individuals whose course of mental illness is chronic or relapsing are likely to be readmitted to psychiatric care beyond 6 months following an admission. Accordingly, it is also important to understand the role that hospital outcome plays in readmission over the longer term.

Interestingly, the factors predicative of readmission over the longer term appear to differ from those over the shorter term. Lauber et al. (2006) reported that the success of inpatient treatment during the first hospitalization impacted both short- and long term outcomes for patients diagnosed with unipolar depressive episode (single or recurrent). In their study, higher symptom improvement during the first hospitalization predicted less subsequent hospitalizations over the five years following discharge. However, sociodemographic and clinical variables did not significantly influence long term service use.

Therefore, as it stands, one might conclude that hospital outcome is predicative of readmission only over the long term. However, the seemingly conflicting conclusions reached by previous research may be explained by methodological differences. First, the different follow up periods may account for the difference, as the effects of predictors have been shown to change as the illness evolves (Kessing et al., 1997). Second, the samples are not comparable. Lyons et al. (1997) included consecutively admitted patients of whom not all would be first admission patients, whereas Lauber et al. (2006) restricted the sample to patients with no previous psychiatric admissions. The differences in patient groups may account for the findings that readmissions were predicted by the outcome of the first hospitalization but not the outcome of hospitalisations following the first (Lyons et al.) as it has been argued that patients recovering from their first episode are at a critical juncture for the development of their disorder (Segal et al., 2003) and the risk of readmission is higher following the first admission compared to later admissions (Daniels et al., 2001). Finally, the samples differ from including patients who only met the criteria for a unipolar depressive episode (single episode and recurrent) (Lauber et al., 2006), to including patients diagnosed with a range of psychiatric disorders (Lyons et al., 1997). Overall rates of readmission and clinical characteristics vary across diagnostic groups (Daniels et al., 2001). For example, patients with schizophrenia have significantly more hospital contact in the five years following their index admission (71.4%) compared to those with depression (47.7%; Daniels et al., 2001). It follows that grouping multiple

psychological disorders in a sample introduces variability, possibly making it difficult to find consistent overall patterns as individual patterns may be forming for each diagnostic category within the sample, because error variance is increased. This perhaps accounts for the failure of some research to conclude that hospital outcome is a predictor of readmission (Lyons et al., 1997).

As there does not appear to be a strong foundation upon which to use readmission as an indicator of the quality of the previous admission, it was necessary to elucidate if hospital outcome is a predictor of readmission and identify the factors that may mask any effects. To this end the present study aimed to replicate the methodologies of Lauber et al. (2006) and Lyons et al. (1997) within a single sample. In so doing it was possible to determine which aspects of the two studies replicated irrespective of methodological considerations (and hence could be considered more general claims) and those which replicated only when the methodologies were similar (which could be considered specific claims that were dependent on certain assumptions). Therefore, the present study examined the predictors of readmission for a broad sample that could be analysed in ways to mirror the Lyons et al. and Lauber et al. studies over the varying follow up periods; 30 days, 6 months and 5 years. The breadth of this study allowed an examination of the factors that explain why predictors of readmission appear to vary in the shorter and longer terms. Broadly, the predictors of interest were those investigated by Lyons et al. and Lauber et al., including hospital outcome which was assessed with both patient-rated and clinician-rated measures of symptoms. Although clinician-rated measures were the focus of past research (Lauber et al., 2006; Lyons et al., 1997), it is expected that using both clinician and patient reports will tell a more comprehensive story regarding hospital outcome. The need to use both types of measures is highlighted in findings such as clinicians ratings of the severity of depressed patients' sadness and pessimistic thoughts are lower than the rating of the patients themselves (Mundt et al., 2006).

In addition, by studying a cohort from Australia from 1998 to 2003 it would be possible to determine the degree to which previous findings were stable across time and country and health care system. Lyons et al.'s (1997) study was conducted in the mid 1990s in the US whereas Lauber et al.'s (2006) study was from Switzerland in the mid 1990s. Thus, by matching the methodological parameters of the present study with the original studies, the extent to which findings are replicated will go some way to allaying any concerns that the conclusions are limited to a location, time, or health system.

2. Method

2.1. Participants

The sample included consecutive inpatients who were admitted to a psychiatric hospital between 23 June 1998 and 31st October 2003 and had questionnaire data obtained at admission and discharge available. Questionnaire data are collected at the hospital as part of an ongoing program of evaluation and written informed consent is obtained upon admission to the hospital. Patients were excluded if they had a one day length of stay at the index admission or died within the

follow up period.¹ Two patient subgroups were selected in an effort to match the samples of Lyons et al. (1997) and Lauber et al. (2006).

First, consistent with the sample of Lyons et al. (1997), a total of 1177 patients were included who were consecutively admitted to the psychiatric hospital and had a primary diagnosis classified according to the ICD-10 main diagnostic criteria as either mood (affective) disorders (63.3%), neurotic, stress-related and somatoform disorders (23.5%), mental and behavioural disorders due to psychoactive substance use (6.6%) or schizophrenia, schizotypal and delusional disorders (3.1%). The remaining sample (3.5%) included patients with a primary diagnosis classified as a behavioural syndrome associated with physiological disturbances and physical factors, disorders of adult personality and behaviour, or organic including symptomatic mental disorders. Diagnoses were determined by the patient's treating psychiatrist according to ICD-10 criteria (National Centre for Classification in Health Publications, 2002).

Second, consistent with Lauber et al. (2006) the sample was restricted to a total of 478 first-ever admitted patients with a primary diagnosis of depression (single or recurrent). See Tables 1 and 2 for demographic details about the two groups.

2.2. Measures and procedure

The measures included demographic information attained at admission and the patient-rated and clinician-rated questionnaires completed at admission and discharge. The measures were used to obtain predictor variables that were consistent with both Lauber et al. (2006) and Lyons et al. (1997).

Demographic information included age at admission, sex, marital status and presence of a dual psychiatric diagnosis. Socioeconomic status was derived from the Index published by the Australian Bureau of Statistics (2006), which is based on census variables including household income and employment. This index assigns a value to each postal area in Australia relative to the rest of the country, with lower values representing greater disadvantage. The patients' postal codes of home addresses reported at admission were used.

The Health of the Nation Outcome Scale (HoNOS; Wing et al., 1998) is a clinician-rated measure consisting of 12 items covering behavioural problems, social problems, cognitive problems and impairment over the two weeks prior to admission and the 72 h prior to discharge. Total scores on the HoNOS range from 0 to 48, with higher scores representing greater problems in the areas assessed. The HoNOS has good construct validity (Wing et al., 1998) and is sensitive to treatment change (Page et al., 2001). The internal consistency of the HoNOS is moderately high as it assesses a diverse range of symptom clusters (Page et al.).

The Depression Anxiety and Stress Scale 42 (DASS; Lovibond and Lovibond, 1995b) was employed to assess the patient's level of depression, anxiety and stress over the past few days. Patients indicate the severity of each symptom on a 4 point scale. Although the subscale scores can be considered separately, a composite measure of symptom distress was

¹ The samples were slightly larger for the 30 day and 6 month follow-up compared to the 5 year follow-up (as more patients died within this longer period of time).

Table 1
Sample characteristics.

	Various diagnoses and prior admissions (N=1177)		Depressed, first admission (N=478)	
	%	Mean (SD)	%	Mean (SD)
Gender, male	35.2		32.8	
Dual diagnosis	67.7		67.6	
Marital status				
Single	31.0		27.4	
Widow	3.6		4.6	
Divorced	5.5		4.2	
Separated	7.9		7.2	
Married/defacto	52		56.6	
Age (years)		41 (14.93)		42 (15.21)
Socioeconomic status ^a		1041.87 (83.72)		1032.80 (80.45)
Severity of symptoms				
HoNOS		12.68 (4.65)		12.57 (4.50)
Admission score				
DASS 42		76.36 (27.37)		82.25 (23.39)
Admission score				
HoNOS improvement		8.14 (4.63)		8.09 (4.40)
DASS 42 improvement		38.60 (30.99)		42.55 (28.88)
Length of inpatient stay (days)		14 (9.46)		14 (10.51)

^a There is more information about Socioeconomic status in the Method section. Socioeconomic status could not be derived for all patients thus there is missing data for this variable (N = 1144 and N = 465 for the samples Various diagnoses and prior admissions and Depressed, First admission respectively).

obtained by summing the scores of all three subscales, resulting in a total score ranging from 0 to 126. Higher total scores indicate more severe psychopathology. The DASS 42 has high internal consistency (Crawford and Henry, 2003) and construct validity (Lovibond and Lovibond, 1995a).

Table 2

Inpatient service utilization over the 30 days, 6 months and 5 years following discharge for patients with varying primary diagnoses and varying number of previous inpatient admissions compared to first-ever admitted patients with depression.

	Over 30 days	Over 6 months	Over 5 years
<i>Total length of further inpatient treatment (days)^a</i>			
Various diagnoses and prior admissions			
25th percentile	5	7	5
50th percentile	9	14	15
75th percentile	16	23	38
Depressed, first admissions			
25th percentile	5	7	6
50th percentile	10	13	15.5
75th percentile	17	23	40.76
<i>Number of further inpatient admissions</i>			
Various diagnoses and prior admissions			
No readmissions	90%	77.7%	52.6%
1 readmission	9.5%	15.3%	22.2%
2 readmissions	0.5%	5.4%	10.4%
>3 readmissions	–	1.6%	14.8%
Depressed, first admission			
No readmissions	88.1%	74.5%	49%
1 readmission	11.3%	17.6%	21.4%
2 readmissions	0.6%	5.6%	12.7%
>3 readmissions	–	2.3%	16.9%

^a Total length of further inpatient stay has been calculated only for those patients who were readmitted.

The DASS and HoNOS provided measures of symptom improvement during the inpatient admission and symptom severity at admission and discharge. Additionally on the HoNOS several items were of interest as predictors in the current study, including those assessing problems at admission with non-accidental self injury (item 2), activities of daily living (item 10), relationships (item 9), overactive, aggressive, disruptive or agitated behaviour (item 1), drinking or drug-taking (item 3), physical illness or disability (item 5), living conditions (item 11) and occupation and activities (item 12).

The two measures indicative of inpatient service utilization over the three time periods were the total further length of stay (days) admitted to the psychiatric hospital and the total further number of readmissions. To that end, the 30 day, 6 month and 5 year follow up was individually calculated for each patient from their index/first admission. Only data regarding admissions which fell within each time period were included in each corresponding analysis.

2.3. Statistics

Multiple regression analyses were used to explore the predictors of readmission over the short- and long-term. The predictors of readmission were based on those examined by Lyons et al. (1997) and Lauber et al. (2006) and were obtained from the aforementioned measures. In an effort to replicate previous research, the predictors were collated in a model such that those variables previously found to be significantly predicative of readmission were entered first, followed by those found to be non significant. This same model was then used to compare the predictors of readmission over 30 days, 6 months and 5 years following discharge for the two samples of interest, that is 1) patients with multiple diagnoses and admissions (consistent with Lyons et al.) and 2) first-ever admitted patients with depression (consistent with Lauber et al.). Demographic details regarding the samples are presented in Tables 1 and 2.

3. Results

As the total further length of stay (over the time period of interest) and length of inpatient stay were skewed, these variables were log-transformed.

3.1. All patients

When the sample included patients similar to those included in the Lyons et al. (1997) study, that is all patients admitted to psychiatric care (i.e., not restricted to diagnoses or history of hospitalizations), self-reported improvement in symptoms (i.e., hospital outcome) during the admission, severity of symptoms at discharge and age were significant predictors of both subsequent length of inpatient stay and number of subsequent inpatient admissions over 30 days. Smaller improvements in symptoms during the admission, more severe symptoms at admission and being younger at admission were associated with a greater number of readmissions and more subsequent days admitted as an inpatient in the 30 days following discharge (see Table 3). These findings are inconsistent with Lyons et al. who found only impairments

in self care significantly associated with 30 day readmission for a similar patient sample.

Similar to Lyons et al. (1997), more severe symptoms at admission were also significantly associated with a greater number of readmissions and total length of inpatient stay occurring in the 6 months following discharge. However unlike Lyons et al. who did not find a significant association between improvement in symptoms and readmission or length of stay of the index admission and readmission, these data also suggest that smaller improvements in symptoms during the admission and having a longer inpatient admission is related to more readmissions and total further length of inpatient stay over the 6 months following discharge (see Table 3).

Additionally, for this sample predictors of readmissions over 5 years following discharge were examined. Interestingly, severity of symptoms was no longer a significant predictor of readmission when the follow up period was extended to 5 years. Similar to the 6 month data, longer hospital stay was significantly associated with more total further admissions and greater subsequent length of stay. Additionally, smaller improvements in self-reported symptoms, being a female and younger age at admission was predicative of a greater number of subsequent readmissions. Problems with relationships predicted total length of stay over the 5 years following the admission. Interestingly, the fewer problems with relationships at admission the greater the total length of stay over the 5 year follow up (see Table 3).

3.2. First-ever admitted patients with depression

When the sample was restricted to the criteria used by Lauber et al. (2006), that is first ever admitted patients with depression (single or recurrent), the findings were similar to when the sample included all diagnoses, such that less improvement in self-reported symptoms and greater self-reported symptoms at the admission appeared to be related to more subsequent readmissions and total length of stay in the 30 days following discharge. However, it was also found that greater problems with self injury as assessed by the staff at admission and clinician-reported improvement in symptoms was associated with more subsequent readmissions and total length of stay in the 30 days following discharge. Additionally, the younger the patient is at admission, the greater number of readmissions in the following 30 days.

Similarly, more subsequent readmissions and total length of stay over the 6 months following discharge for patients with depression was predicted by less improvement in symptoms according to both self-report and clinician-report. Younger age and greater length of first inpatient stay was also associated with greater number of readmissions over 6 months.

Consistent with Lauber et al. (2006), greater number of readmissions and longer total length of stay over the 5 years following discharge was associated with less self-reported symptom improvement during the first admission. This relationship was also supported by the clinician-rated measure. However, inconsistent with Lauber et al., a longer first inpatient stay was significantly associated with a greater number of readmissions and longer total length of stay over the 5 years following discharge. Additionally, higher socioeconomic status was a significant predictor of longer further inpatient stay over the five years and being female was associated with a greater

Table 3

Results of multiple regression analyses. Association between variables of interest and inpatient service utilization over the 30 days, 6 months and 5 years following discharge from the index hospitalization for patients with varying primary diagnoses and varying number of previous inpatient admissions (Various diagnoses) compared to first-ever admitted patients with depression (Depressed)^a.

Follow up period Sample	30 days				6 months				5 years			
	Various diagnoses		Depressed		Various diagnoses		Depressed		Various diagnoses		Depressed	
	Total inpatient LOS	Total further admissions										
<i>Standardized beta weights for dependent variables</i>												
<i>Improvement in symptoms</i>												
DASS change score	-.10**	-.02**	-.14**	-.14**	-.11**	-.13**	-.15**	-.17**	-.01	-.07*	-.10*	-.13**
HoNOS change score	-.07	-.07	-.16*	-.16*	-.09	-.09	-.18*	-.21**	-.05	-.02	-.15*	-.09
<i>Severity of symptoms</i>												
DASS total at admin	.09*	.09*	.01	-.01	.09*	.07*	.05	.03	.04	.03	.00	.02
Problems with self injury	.06	.06	.13*	.12*	.05	.05	.08	.06	.04	.06	.03	.06
Problems with relationships	-.04	-.03	-.04	-.02	-.06	-.04	-.09	-.06	-.08*	-.05	-.11	-.08
Gender	-.02	-.02	.03	.03	-.03	-.04	.03	.02	-.04	-.10**	-.04	-.11*
Age	-.09**	-.09**	-.10	-.11*	-.03	-.06	-.08	-.12*	-.02	-.07*	-.02	-.10
Socioeconomic status	.01	.01	-.01	-.01	.02	.01	.08	.04	.01	.00	.13**	.07
Length of stay of index admission	.05	.05	.03	.04	.09**	.11**	.08	.14**	.19**	.23**	.16**	.21**
<i>Model coefficients</i>												
R ² for Step 1	.03	.03	.07	.06	.03	.03	.06	.06	.01	.01	.03	.04
ΔR ² for Step 2	.01 (NS)	.01 (NS)	.02 (NS)	.02 (NS)	.01 (NS)	.02*	.02 (NS)	.03 (NS)	.04**	.07**	.05*	.08**

Statistically significant regression coefficients indicated by bold type. ** $p < .01$ level, * $p < .05$; DASS change score = Change in total DASS score from admission to discharge; HoNOS change score = Change in total HoNOS score from admission to discharge; Total inpatient LOS = Total Inpatient Length of Stay following the index admission; Total Further Admissions = Total admissions following the index admission; Length of stay of index admission = Length of stay of index admission log-transformed.

^a Variables which were not found to be significant predictors of readmission for any follow up period or sample were not included in the table. These variables were HoNOS total score at admission, Problems with activities of daily living, Dual diagnosis, Problems with overactive/aggressive behaviour, Problems with drinking/drugs, Physical problems, Problems with living condition and Problems with occupation.

Table 4Summary of variables found to be significant predictors of readmission.^a

<p><i>Patient-reported improvement in symptoms during the admission</i> was a predictor of readmission for:</p> <ul style="list-style-type: none"> • various diagnoses sample across all follow up periods • depressed sample across all follow up periods. <p><i>Clinician-reported improvement in symptoms during the admission</i> was a predictor of readmission for:</p> <ul style="list-style-type: none"> • depressed sample, across all follow up periods. <p><i>Patient-reported severity of symptoms at admission</i> was a predictor of readmission for:</p> <ul style="list-style-type: none"> • various diagnoses sample, over the 30 day and 6 month follow up periods. <p><i>Problems with relationships</i> was a predictor of readmission for:</p> <ul style="list-style-type: none"> • various diagnoses sample, over the 5 year follow up period. <p><i>Gender</i> was a predictor of readmission for:</p> <ul style="list-style-type: none"> • various diagnoses sample over the 5 year follow up period • depressed sample over the 5 year follow up period. <p><i>Age</i> was a predictor of readmission for:</p> <ul style="list-style-type: none"> • various diagnoses sample over the 30 days and 5 year follow up period. • depressed sample over the 30 days and 6 month follow up period. <p><i>Socioeconomic status</i> was a predictor of readmission for:</p> <ul style="list-style-type: none"> • depressed sample over the 5 year follow up period. <p><i>Length of stay</i> was a predictor of readmission for:</p> <ul style="list-style-type: none"> • various diagnoses sample over the 6 months and 5 year follow up period. • depressed sample over the 6 months and 5 year follow up period.
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^a Variables which were not found to be significant predictors of readmission for any follow up period or sample were not included in this table. These variables were HoNOS total score at admission, Problems with activities of daily living, Dual diagnosis, Problems with overactive/aggressive behaviour, Problems with drinking/drugs, Physical problems, Problems with living condition and Problems with occupation.

number of subsequent readmissions (see Table 3). See Table 4 for a summary of the predictors found to be significant in this study.

4. Discussion

The primary aim of this study was to examine the usefulness of readmission as an indicator of the quality of the index hospitalization. To that end, the predictors of readmission over the 30 days, 6 months and 5 years following admission for all inpatients at a psychiatric hospital and first-ever admitted patients with depression were compared, with particular interest in the relationship between improvement in symptoms during the admission and subsequent readmissions over each time period. The fundamental findings were that greater symptom improvement (whether it occurred during both the first-ever admission and admissions which were not the first) predicted less subsequent readmissions for patients with a range of diagnoses, not only depression. This finding was reliable regardless of the time period studied. Secondly, other variables found to be predictive of readmission were symptom severity at admission, length of inpatient stay, gender, age, problems with relationships and problems with self-harm. However, the importance of these variables differed depending on which follow up period or sample were examined, therefore when comparing predictors of readmission across studies, it is important to consider the follow up period examined.

Lyons et al. (1997) recommend that readmission should not be used as an indicator of the quality of the previous hospital admission based on the finding that the success of the hospital intervention does not influence readmissions in the 30 days and 6 months following discharge. The present data

support this conclusion but only when the success of the hospital intervention was measured by a change in the staff rated measures during the admission. Specifically, change in the HoNOS total score from admission to discharge did not significantly influence readmissions in the 30 days or 6 months following discharge when the sample was similar to that of Lyons et al. This is expected as the HoNOS and Acuity of Psychiatric Illness Scale, examined by Lyons et al., are both clinician-rated measures which cover functioning over a range of areas (such as aggressive outbursts, living situation and self care).

Interestingly, contrasting results were found when patient self reports were studied. Specifically, the success of the hospital intervention based on changes in the DASS score during an admission was found to be significantly associated with subsequent readmissions across all time periods and samples. Contrary to prior recommendations (e.g., Lyons et al., 1997) the present results suggest that patients' ratings of the success of a hospital intervention does significantly influence later inpatient service utilization over the short and long term for all patients, not only those with depression. It is possible this finding was only significant for the DASS scores and not the HoNOS scores as the DASS is a self-report measure which taps symptoms common to this patient group rather than overall functioning. This raises the possibility that clinicians should base assessments of patients' risk of being readmitted to hospital on self-reported symptom measures in addition to clinician-reported global functioning measures and future research could examine if these findings can be replicated with other measures. Other explanations are possible for the differences between the patient and clinician measures. For example, Clements et al. (2006) suggest that patient-reported measures may be more predictive of readmission as hospital readmission may be driven largely by how the patient feels whereas clinician ratings may be more closely associated with outcomes such as length of stay, which may be more driven by clinical judgement. Future research may address this issue.

Additionally, Kessing et al. (1997) found that as the illness progresses it seems to follow its own course regardless of prior predictors. However, the present data suggest that improvement in symptoms may remain a risk factor for readmission over the short and long term (as the illness progresses) (Kessing et al., 1997). The other factors predictive of readmission will now be discussed in turn, making apparent that risk factors for readmission differ according to the follow up period examined.

Regarding severity of symptoms at admission as a predictor of readmission, it appears that greater severity of symptoms at admission was significantly associated with more readmissions over the 30 days and 6 months following discharge. This finding was only significant when patients with a range of diagnoses were grouped together and when severity was based on the DASS score and not the HoNOS score. Again, this may be a reflection of the differences between patient-reported and clinician-reported measures and follows research implying that patient-reported symptoms at hospital admission are a better predictor of one year hospital readmission than clinician-report (Clements et al., 2006). Clements et al. suggest that one reason possibly accounting for differences between patient and clinician-reported measures at admission is that patients may be better able to assess their functioning compared to the clinician who may be unfamiliar to the patient and their distress.

The length of the inpatient admission was not a predictor of rapid readmission (i.e., readmissions within 30 days following discharge), which is consistent with Lyons et al. (1997). However, there was a positive association between length of stay (of either first admissions or admissions which are not the first) and later readmissions for both samples in the 6 months and 5 years following discharge, such that a longer length of stay is associated with more subsequent readmissions. It has been speculated that prematurely discharged patients are at higher risk of readmission (e.g., Hodgson et al., 2001). However, this positive association between length of stay and subsequent readmissions does not support this notion and is consistent with Hodgson et al. (2001) and Mojtabai et al. (1997). Based on their similar results, Hodgson et al. concluded that patients are not being deprived of care via premature discharge therefore high readmission rates should not be used as a measure for poor service outcome. Although our findings regarding the relationship between length of stay and readmissions are consistent; our conclusions differ as they are based on the premise that a relationship between symptom improvement (success of intervention) and readmission supports that readmission should be used as an outcome indicator (Lyons et al., 1997), rather than a relationship between length of stay and readmission (Hodgson et al., 2001). This discrepancy in conclusions highlights that there are many variables which contribute to the success of an inpatient treatment, including improvement in symptoms, length of inpatient stay and discharge planning.

In evaluating the present findings some limitations need to be considered. First, only a small amount of variance in readmission was explained by the models investigated. Although this is consistent with past research (e.g., Lauber et al., 2006), this implies that other factors need to be taken into account as risk factors for readmission. Although the role of hospital factors in influencing readmission over the short term (30–90 days) have been largely studied (e.g., Durbin et al., 2007), the role of hospital factors in influencing readmission over the long term is restricted. The present results suggest that hospital factors may be important in influencing readmission over the long term and therefore this may be an area for future research. Also, factors which lie beyond the hospital admission need to be considered (e.g., support received post-hospitalization).

Second, the number of inpatient admissions was used as one indicator of inpatient service utilization. This measure is limited as it does not necessarily equate to the number of episodes a patient experiences over time. It is possible that patients may experience an episode of psychiatric illness, but not be admitted to psychiatric care. Additionally, it is possible that patients in this sample were admitted to psychiatric hospitals other than the one studied. These limitations may result in this data underestimating inpatient utilization. Nevertheless, these limitations are common to research in this area, with previous work also examining admissions rather than episodes (e.g., Kessing et al., 1997; Lauber et al. 2006) and 12 out of the 13 studies cited in a recent review of predictors of early readmission having examined readmissions to the same facility (see Durbin et al. 2007). Therefore, these data are comparable to such research. Finally, this sample included inpatients from one private psychiatric hospital in Australia and therefore, it is unclear to what extent the present findings generalise to patients treated at other psychiatric hospitals, both private and public. Additionally, the present sample differs from Lauber et al.'s and Lyons et al.'s samples which were derived at

different times and from different countries. Furthermore, the health care systems differ between the present study and the samples it is being compared to. In Australia, private health insurance is purchased by individuals with government support through taxation and covers approximately 45.1% of Australian individuals (Private Health Insurance Administration Council, 2008). However, the similarities between the present findings and past research regarding the associations between hospital outcome and later readmission suggests that this finding may remain consistent across location, time and health system, strengthening the conclusion that hospital outcome is predictive of further admissions.

Overall, this study adds to existing literature by providing evidence that readmission may be associated with the success of the previous hospitalization for patients with a range of diagnoses, not only depression, thus raises the suggestion that readmission may be a useful indicator of the quality of the previous hospitalization. Additionally, as the predictors of readmission varied over the short and long term while the samples remained consistent, it is evident that the follow up period is important to consider when interpreting research in this area.

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Conflict of interest

There are no conflicts of interest.

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