

Discharge delay in acute care: reasons and determinants of delay in general ward patients

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Abstract

To identify the reasons and determinants of discharge delay in acute care patients, information associated with delayed discharge was extracted from the medical record of 1958 patients in a tertiary referral hospital in New South Wales. A logistic regression model was used to examine the association between demographic factors and reasons for discharge delay. Delayed discharge was most commonly associated with the patient's medical conditions, delayed health care or medical consultation, delayed diagnostic services and delayed allied health services. Elderly patients, those living alone and patients from a non-English-speaking background were more likely to have these reasons for delayed discharge.

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THE INCREASING DEMAND for acute care hospital beds and a push for cost cutting requires efficient discharge planning.¹⁻⁴ Delayed discharge has become a major issue because it leads to unanticipated length of stay and bed block.^{2,5-7} Both the quality and cost-effectiveness of care may be compromised as a result.^{3,8} In the Austral-

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What is known about the topic?

Delayed discharge has become a major issue because it leads to unanticipated length of stay and bed block, reducing patient access.

What does this paper add?

The reasons for delayed discharge were complex and associated with patients' demographic characteristics and clinical management processes.

What are the implications for practitioners?

Patients from a non-English-speaking background and unmarried patients were likely to encounter more problems. Elderly patients and the patients with chronic health problems were more likely to experience difficulties in accessing alternative care. These groups need more attention in order to achieve timely discharge from acute care.

ian context, delayed discharge is a major reason for the unavailability of beds in major acute care hospitals.⁴

Recent studies suggest a range of reasons for discharge delays. Generically, the reasons for discharge delay include medical issues, hospital factors, patient and carer needs, and issues related to accessing alternative care or social care. The more detailed reasons include complication of the patient medical condition, delay in receiving diagnostic services or results of investigations, transfer delays, a lack of rehabilitation places, awaiting home care, community packages or community services and patient-related factors.^{1,2,7} However, the studies exploring the reasons for delayed discharges often had small sample sizes, or were studies examining selected patient populations or a particular ward in a hospital. Very few studies have comprehensively addressed the multifaceted problems of discharge delays in a heterogeneous acute patient population. The tools available for measuring inappropriate discharge delays have been demonstrated to have poor validity and reliability.⁹

Our study examined the data collected from a quality-improvement project aiming to improve the discharge process via a dedicated discharge facilitator. This study had two aims: 1) to describe the spectrum of reasons for discharge delays, as documented in the medical records of patients in general ward areas in a tertiary referral hospital; 2) to examine the factors associated with these reasons for delay.

Methods

The study was a prospective study, conducted over a 17-month period (14 April 2003 to 24 September 2004). It was part of a quality-improvement project which aimed to improve discharge during the weekend in the general wards. Hospital data showed that fewer discharges occurred during the weekend and a disproportionate number of discharges occurred during the early half of the week (Mondays to Wednesdays), potentially causing bed shortages, access block and resource wastage. Thus, it was conceived that through proactive case-finding and planning by a discharger facilitator, those patients who didn't have a long-term illness and were ready to be discharged could be identified and the necessary measures were taken to facilitate a more timely discharge, especially during weekends. An experienced clinical nurse consultant was employed as the discharge facilitator. The focus of the project was patients residing in general wards. The following were excluded: gynaecological and obstetric wards, mental health wards, brain injury unit, intensive care unit, paediatric wards and day only units. Long-term patients with complex medical conditions and terminally ill patients were also excluded.

The discharge facilitator reviewed all the medical records of patients on the targeted wards in order to identify the reasons for the delayed discharge and so as to take necessary steps to facilitate timely discharge. The review was semi-structured with a list of the common reasons and open-ended unexpected reasons. The discharge facilitator had to sometimes "read between lines" of the medical records in order to categorise and

identify the barriers leading to delayed discharge. She also regularly contacted the attending doctors, nurses and social workers in order to fully understand the needs of the patients. The role of the discharge facilitator included: facilitating prompt communication about discharge needs within the hospital, liaising with service providers in the community, actively facilitating the discharge of patients from Friday to Sunday, and data collection.

Ethics approval was obtained from the ethics committee of the Southwest Sydney Area Health Service. Patients were asked for written consent before collection of the data.

Sampling

The sample was assembled via two separate paths: patients with a delayed discharge date were identified by the discharge facilitator through a review of the medical records of all patients on the targeted wards; or health professionals working in the wards identified and referred patients directly to the discharge facilitator. The discharge facilitator attended the morning rounds and regularly contacted the members of the multidisciplinary team (doctors, nurses, physiotherapists, social workers, etc). Cases referred by team members were included in the study sample.

Data collection

The discharge facilitator extracted the reasons for delays in discharge, as documented by staff in the medical records. She extracted the first documented estimated date of discharge (EDD), the subsequent changes to the EDD and then the actual date of discharge (ADD). A Microsoft Access database supporting the data collection was purposely built to fit with the Variance Monitoring Tool, recommended by the New South Wales Department of Health in the responsive discharge planning policy.¹⁰ NSW Health policy recommends the evaluation of the variance between EDD and ADD. This policy requires that all non-complex admissions should have an assigned EDD within 24 hours of admission. Variance is conceived to be an indicator of the efficiency of the hospital discharge process, and a

I Documented reasons for discharge delay by patient demographics, no. (%)

Reasons	Age		Sex		Marital status		Preferred language		Total n=1954
	<65 (n=1007)	≥65 (n=947)	Male (n=1121)	Female (n=833)	Married (n=1114)	Single/ wid/divor (n=772)	English (n=1421)	Non- English (n=532)	
Medical problem									
Medical condition	237 (23.53)	251 (26.50)	296 (26.40)	192 (23.05)	281 (25.22)	188 (24.35)	338 (23.79)	150 (28.19) [†]	488 (24.97)
Others	49 (4.87)	34 (3.59)	41 (3.66)	42 (5.04)	44 (3.95)	37 (4.79)	71 (5.00)	12 (2.26) [†]	83 (4.25)
Any of above	286 (28.40)	285 (30.10)	337 (30.06)	234 (28.09)	325 (29.17)	225 (29.15)	409 (28.78)	162 (30.45)	571 (29.22)
Hospital problem									
Consultation delay	68 (6.75)	86 (9.08)	96 (8.56)	58 (6.69)	71 (6.37)	75 (9.72) [†]	107 (7.53)	47 (8.83)	154 (7.89)
Diagnostic services delay	63 (6.26)	57 (6.02)	68 (6.07)	52 (6.24)	70 (6.28)	46 (5.96)	86 (6.05)	34 (6.39)	120 (6.14)
Delayed transfer to acute care hospital	16 (1.59)	21 (2.22)	18 (1.61)	19 (2.28)	16 (1.44)	21 (2.72)*	33 (2.32)	4 (0.75) [†]	37 (1.89)
Any of above	139 (13.80)	165 (17.42)*	176 (15.70)	128 (15.37)	156 (14.00)	136 (17.62)*	223 (15.69)	81 (15.23)	304 (15.56)
Post-hospital problem									
Awaiting equipment	6 (0.60)	15 (1.58)	15 (1.34)	6 (0.72)	13 (1.17)	8 (1.04)	17 (1.20)	4 (0.75)	21 (1.07)
Lack of carer support	12 (1.19)	46 (4.86) [†]	38 (3.39)	20 (2.40)	25 (2.24)	32 (4.15)	46 (3.24)	12 (2.26)	58 (2.97)
Awaiting community nursing	4 (0.40)	11 (1.16)	7 (0.62)	8 (0.96)	9 (0.81)	6 (0.78)	9 (0.63)	6 (1.13)	15 (0.77)
Awaiting allied health	35 (3.48)	45 (4.75)	46 (4.10)	34 (4.08)	49 (4.40)	30 (3.89)	56 (3.94)	23 (4.32)	79 (4.04)
Any of above	52 (5.16)	108 (11.40) [†]	97 (8.65)	63 (7.56)	84 (7.54)	4 (9.59)	120 (8.44)	39 (7.33)	159 (8.14)
Alternative care problem									
Awaiting rehabilitation placement	17 (1.69)	31 (3.27)*	31 (2.77)	17 (2.04)	24 (2.15)	21 (2.72)	37 (2.60)	11 (2.07)	48 (2.46)
Awaiting respite care	4 (0.40)	37 (3.91) [†]	24 (2.14)	17 (2.04)	15 (1.35)	23 (2.98)*	25 (1.76)	16 (3.01)	41 (2.10)
Any of above	21 (2.09)	63 (6.65) [†]	51 (4.55)	33 (3.96)	38 (3.41)	40 (5.18)	58 (4.08)	26 (4.89)	84 (4.30)

*P<0.05. †P<0.01. Wid = widowed; Divor = divorced.

means of identifying the sources of delays in discharge. Hence the information extracted from the medical records was classified into one of the four main categories defined by NSW Health policy. The categories are listed in Box 1. They

depict the flow of care from the patient's medical problem and factors inside the walls of the hospital, to factors outside the walls of the hospital. Carer status and alternative care factors are also included.

2 Patient demographics by documented reasons for discharge delays

	Documented reason(s) for delayed discharge		
	None, no. (%) (n=1065)	One or more, no. (%) (n=889)	Total, no. (%) (n=1954)
Age (years)			
18–34	140 (13.16)	72 (8.11) [†]	212 (10.85)
35–54	247 (23.19)	186 (20.92)	433 (22.16)
55–74	436 (40.94)	372 (41.84)	808 (41.35)
75+	242 (22.72)	259 (29.13)	501 (25.64)
Mean ±SD	59.16±18.07	62.82±17.03 [†]	60.83±17.70
Sex			
Male	600 (56.34)	521 (58.61)	1121 (57.37)
Female	465 (43.66)	368 (41.39)	833 (42.63)
Marital status			
Married	625 (58.69)	489 (55.01)	1114 (57.07)
Single/widowed/divorced	401 (37.65)	371 (41.73)	772 (39.55)
Not record	39 (3.66)	29 (3.26)	68 (3.48)
Preferred language			
English	769 (72.21)	652 (73.42)	1421 (72.72)
Non-English-speaking	296 (27.79)	236 (26.55)	533 (27.23)

*P<0.05. †P<0.01 for both chi-square test and Wilcoxon rank sum test for age.

Definition of ‘delayed discharge’

“Delayed discharge” includes discharges where the ADD was greater than the first EDD. The reasons that the last or other EDD was not used were that some patients’ records had multiple changes to the EDDs and therefore the interpretation of the variance was potentially unclear. For patients without long-term illnesses or multiple comorbidities, the first EDD should reflect the normal expectation of their length of stay.

The project data were linked with administrative data extracted from the Health Information Exchange to obtain demographic and clinical information on the study participants.^{11–13} The clinical variables included diagnostic and procedural codes (International Classification of Diseases, 10th revision). These variables were used to derive both current Charlson Index (index admission only) and cumulative Charlson Index (all previous admissions for the past 12 months) scores.¹⁴ They were calculated using the SPSS syntax developed by the research team, School of

Public Health, University of Western Australia. The method is based on the Dartmouth–Manitoba algorithm for administrative data.¹⁵ It provides a validated index of a patient’s comorbidity.

Statistical analysis

We examined the data using both descriptive statistics and inferential statistical tests. For the categorical variables, the frequency and the proportion of each category were described. Chi-square or Fisher’s Exact test were used to explore the association between the categorical variables where appropriate. For continuous variables, the mean and standard deviations were presented. The Wilcoxon rank sum test was used to examine the mean differences between dichotomous variables (eg, sex). Using logistic regression, we explored the association between the four outcome variables and the explanatory variables (age group, sex, preferred language, source of admission, day of the week, current Charlson Index score, the type of staff who could refer a patient to the discharge

3 Odds ratio (95% CI) for predictors of four categories of reasons for delayed discharge (n = 1954)

Variables	Type of problem			
	Medical	Hospital	Post-hospital	Alternative care
Age (years)				
18–34	1.00	1.00	1.00	1.00
35–49	1.46 (0.94–2.27)	1.36 (0.78–2.36)	0.64 (0.26–1.56)	3.11 (0.63–15.33)
50–64	1.48 (0.97–2.25)	1.15 (0.68–1.97)	0.95 (0.43–2.09)	2.10 (0.43–10.24)
65–75	1.34 (0.88–2.05)	1.19 (0.70–2.03)	1.89 (0.90–3.98)	4.77 (1.05–21.75)*
76+	1.27 (0.83–1.95)	1.52 (0.90–2.57)	2.23 (1.07–4.63)*	8.67 (1.95–35.52)†
Female v male	0.88 (0.71–1.09)	0.89 (0.68–1.16)	0.79 (0.54–1.14)	0.70 (0.42–1.17)
Marital status				
Married	1.00	1.00	1.00	1.00
Single/widowed/divorced	1.07 (0.86–1.35)	1.23 (0.93–1.62)	1.23 (0.85–1.79)	1.34 (0.80–2.25)
No record	1.16 (0.65–2.06)	1.53 (0.77–3.03)	0.21 (0.03–1.56)	2.57 (0.87–7.60)
ATSI v neither	0.60 (0.19–1.91)	2.00 (0.68–5.92)	0.69 (0.08–5.96)	3.87 (0.74–20.34)
Non-English v English speaking	1.11 (0.88–1.41)	0.95 (0.70–1.28)	0.75 (0.49–1.13)	1.01 (0.59–1.73)
The current Charlson Index score	1.05 (0.99–1.10)	1.00 (0.94–1.06)	1.02 (0.94–1.10)	1.11 (1.01–1.22)*
Source of admission				
Preoperative clinics	1.00	1.00	1.00	1.00
Emergency Department	0.71 (0.48–1.05)	1.88 (1.06–3.35)*	1.59 (0.75–3.37)	2.82 (0.62–12.97)
Other hospital/ nursing home	0.54 (0.19–1.51)	1.40 (0.36–5.44)	7.98 (2.34–27.22)†	5.13 (0.41–64.74)
Planned admission	0.68 (0.45–1.02)	1.61 (0.89–2.94)	1.58 (0.72–3.45)	3.00 (0.64–14.10)
Ward	0.64 (0.40–1.04)	1.94 (0.99–3.76)	1.19 (0.48–2.93)	2.96 (0.57–15.37)
Day of discharge				
Sunday	1.00	1.00	1.00	1.00
Monday	1.69 (1.10–2.59)*	1.36 (0.79–2.33)	4.42 (1.63–11.99)†	3.39 (0.73–15.71)
Tuesday	1.81 (1.14–2.87)*	1.50 (0.85–2.67)	4.66 (1.67–12.97)†	1.48 (0.29–7.44)
Wednesday	2.21 (1.33–3.68)†	1.99 (1.07–3.69)*	3.80 (1.27–11.35)*	3.78 (0.73–19.03)
Thursday	1.16 (0.72–1.86)	0.81 (0.44–1.52)	2.11 (0.71–6.22)	7.14 (1.54–33.12)*
Friday	1.02 (0.67–1.56)	1.13 (0.66–1.93)	1.92 (0.68–5.41)	2.47 (0.53–11.50)
Saturday	0.76 (0.49–1.19)	0.74 (0.42–1.32)	2.48 (0.89–6.91)	1.12 (0.21–5.96)
Referred by:				
Nurse	1.00	1.00	1.00	1.00
Doctor	0.54 (0.19–1.54)	0.45 (0.10–2.00)	1.69 (0.45–6.31)	3.67 (0.66–20.37)
Doctor and nurse	0.93 (0.65–1.34)	2.61 (1.78–3.83)†	2.75 (1.72–4.38)†	7.52 (3.88–14.58)†
Allied Health	0.29 (0.22–0.39)†	0.28 (0.19–0.43)†	0.28 (0.15–0.52)†	0.23 (0.10–0.52)†
Time trend				
08 Aug 2003–07 Dec 2003	1.00	1.00	1.00	1.00
08 Dec 2003–07 May 2004	2.14 (1.58–2.90)†	1.29 (0.88–1.90)	1.10 (0.63–1.90)	0.27 (0.12–0.60)†
08 May 2004–30 Dec 2004	1.25 (0.91–1.72)	1.28 (0.86–1.88)	1.94 (1.15–3.26)*	0.46 (0.22–0.95)*
Type of ward				
Cardiac/thoracic unit	1.00	1.00	1.00	1.00
Medical unit	0.70 (0.52–0.96)*	1.43 (0.96–2.12)	1.42 (0.82–2.45)	1.61 (0.76–3.44)
Surgical unit	0.80 (0.59–1.07)	1.05 (0.71–1.55)	1.44 (0.84–2.46)	2.00 (0.94–4.28)
Coronary care unit	0.52 (0.28–0.96)*	1.01 (0.49–2.08)	0.93 (0.35–2.50)	
Others	0.60 (0.10–3.46)	1.40 (0.16–12.34)		

* Significant at 5%; † Significant at 1%. ATSI = Aboriginal and Torres Strait Islander.

facilitator, the time trend [the first, second and third five-month interval indicator variables] and the type of ward). Those with preferred language other than English were categorised as being from a non-English-speaking background (NESB). A P value of 0.05 was considered indicative of statistical significance. Statistical analysis was performed using Stata 9.1 (Stata Corporation, College Station, Tex, USA) and SPSS 13.0 for Windows (SPSS Inc, Chicago, Ill, USA).

Results

About 45% (889/1954) of the study sample had a documented reason(s) for discharge delay (Box 2). Overall, slightly more than one-third of the participants were over fifty-five years of age; over one-quarter were from an NESB; and those who had one or more documented reasons for discharge delays were older than those for whom no reason was documented in the medical record (mean age 63 years versus 59 years [$P < 0.01$]).

The four most common specified reasons for delayed discharge were: the patient's medical conditions (24.97%), delayed consultations (7.89%), delayed diagnostic services (6.14%) and delayed allied health (4.04%).

- *Category 1: Medical problems.* The proportion of patients whose discharge was delayed because of their medical condition was higher for NESB patients than English-speaking patients (28.19% v 23.79%; $P < 0.01$) (Box 1);
- *Category 2: Hospital problems.* There was a larger proportion of elderly patients (65 years or older) with at least one documented reason in this category (17.42% v 13.80%; $P < 0.05$). For patients who were single, widowed or divorced, the proportion who experienced a delay in consultation was higher than those who were married ($P < 0.01$). A lower proportion of patients from an NESB experienced a delay in transfer to another acute hospital ($P < 0.01$); whereas the proportion was higher ($P < 0.05$) for people who were single. The proportion of patients who were single was also significantly higher for any of the documented reasons for hospital-related delays ($P < 0.05$).

- *Category 3: Post-hospital problems.* The proportion of patients 65 years or older who lacked carer support was significantly higher compared with those younger than 65 years ($P < 0.01$).

- *Category 4: Alternative care problems.* The proportion of patients experiencing alternative care problems was significantly higher for patients aged 65 years or older. Patients who were single, widowed or divorced also had more problems in awaiting respite care ($P < 0.05$).

The logistic regression models are outlined in Box 3. In comparison with those admitted via the perioperative clinics, patients admitted via the emergency department (ED) or from another ward within the hospital were more likely to have a hospital problem. Patients 75 years or older experienced significantly more post-hospital problems and more alternative care problems. Patients with a higher current Charlson Index score were more likely to experience an alternative care problem. Patients admitted from another hospital or a nursing home were almost six times more likely to encounter a post-hospital problem than those admitted from perioperative clinics; and patients admitted via planned admissions were more likely to have alternative problems but less likely to have medical problems. The proportion of patients who had medical problems delaying their discharge increased significantly during the second 5-month period in comparison with the first 5-month period (OR = 2.14; 95% CI, 1.58–2.90). The proportions of patients who had alternative care problems decreased significantly during the second 5-month (OR = 0.27; 95% CI, 0.12–0.60) and the third five-month (OR = 0.46; 95% CI, 0.22–0.95) periods. The likelihood of having a medical problem as the reason for the delay was significantly different among different wards.

Discharges that occurred on Mondays, Tuesdays and Wednesdays were more likely to be associated with a medical problem or a post hospital problem compared with discharges on Sundays. If the patients were referred to a discharge facilitator by both a doctor and a nurse, they were far more likely to encounter all the reasons for delay, except for medical problems.

Discussion

This study identified a wide range of documented reasons for delayed discharges among close to 2000 patients from general wards in a tertiary referral hospital in New South Wales. We ascertained the magnitude of each of the four broad categories of discharge delays identified in the responsive discharge policy, NSW Department of Health — the policy guiding discharge planning in the study hospital.¹⁰ In particular, we were able to describe in detail the factors that caused delays in discharge within each of the four categories defined by NSW Health policy. However, contrary to policy requirements, less than half of this highly heterogeneous patient sample had a formal documented reason for the delayed discharge. Hence, the proportion of the reasons presented in this study may be deemed to be a conservative estimate of the true problems.

Our study showed that the patients' medical condition, consultation delays, diagnostic service delays and awaiting allied health were the most common reasons for discharge delay. Almost one-third of patient discharges were delayed by their medical problems. The awaiting rehabilitation placement and awaiting for respite care categories were not as common but were significantly higher within the population aged 65 years or older. These findings concur with the findings of previous studies.^{5,16,19} Specific policies may need to be developed to solve these problems, including developing intermediate care provision and designing specific databases in order to facilitate information flow within the hospital and between the residential care facilities and acute care hospitals.^{5,20,21}

Although the overall proportion of patients experiencing delayed transfer to an acute care hospital was low, patients from an NESB were significantly less likely to have this experience but more likely to have a medical problem as the reason for delayed discharge. There is scarce information regarding the non-English-speaking groups in previous studies.¹ We may speculate that these patients may have more communication problems with health professionals regarding their symptoms, complications or other ailments

that may lead to delayed identification or treatment. However, it is also possible that more patients from an NESB were referred for discharge planning based on their medical problems.

A significantly higher proportion of patients who were single, widowed or divorced had problems of delayed consultation, lack of social support, were awaiting respite care, and experienced a delayed transfer to an acute care hospital. These results suggested that this group of patients needs specific attention and assistance in order to foster social support and improve communication.^{19,22} The only patient demographic factor which was a significant predictor for the four broad categories of the reasons was the patients' age. The fact that the current Charlson Index was a significant predictor of the alternative care problem was expected, as the need for alternative care related to having a chronic problem. Further research is needed to test the feasibility of using the current Charlson Index as a tool for predicting the length of stay in hospital and the need for alternative care services.

We also found that patients admitted through different sources had different reasons for delayed discharge. In comparison to the patients admitted from the perioperative clinics, patients admitted through ED had more hospital problems but fewer medical problems. This may be explained by the possibility that patients admitted through the ED had more serious and complex medical problems and required more diagnostic tests and consultations. Patients admitted through other hospitals or nursing homes may need more attention in preparing them for rehabilitation placement. Patients admitted through any other means (eg, most of the patients were recommended by general practitioners and admitted directly from the community) were more likely to have greater needs for community services and were less likely to have a medical problem as the reason for the delayed discharge. We also found that across the three designated time periods, the proportion of documented medical problems and alternative care problems were different. Different wards also showed variance in docu-

mented medical problems. Some of these variations may be due to the ward policies, procedures and staffing or the patients' casemix. However, there were insufficient data to further explore this issue.

Our study has several strengths. It provided comprehensive descriptions of the common reasons for delays in discharge while other studies have focused more narrowly on particular patient populations, wards or specific discharge issues.^{16,18,22} The study used a standardised data collection tool with a predetermined list of reasons for delayed discharge. It also linked study data with administrative data. The sample size of the study was relatively large compared with similar studies.^{19,23} The discharge facilitator was trained in performing medical record reviews and was very experienced in bed management and discharge processes. Furthermore, the discharge facilitator had a detailed understanding of both policy expectations and the local hospital culture with regard to discharge planning and processes. The study targeted acute care patients with simple to moderate discharge needs. Thus, the data collected were likely to be both valid and accurate.

One limitation of the study was that the discharge facilitator worked as both the service provider and the data collector, which could potentially introduce bias. As our data were collected through medical record reviews, the proportion of patients with delayed discharge is likely to be a conservative estimate. The study was conducted in only one hospital. Thus, generalisability of these findings to other acute care settings is uncertain.

In summary, the reasons for delayed discharge were complex and associated both with patients' demographic characteristics and clinical management processes. The elderly, the non-English-speaking patients and unmarried patients were in greater need of discharge facilitation and social support. The current Charlson Index was a significant predictor of discharge delays related to alternative care problems and may be a useful predictive tool. Further studies are needed in understanding the reasons and possible policy interventions for delayed discharge.

Competing interests

The authors declare that they have no competing interests.

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