Original Article

Factors Causing Delay in Discharge of Elderly Patients in an Acute Care Hospital

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Abstract

Introduction: Prolonged hospitalisation not only increases cost, it is also associated with other complications. Length of stay (LOS) is one of the indicators that reflect total cost of care during hospitalisation. So, it is of paramount importance to find out why elderly patients overstay in acute care hospitals and address these issues proactively. Since no local data is available, a study was planned to ascertain reasons why the discharging of elderly patients from hospital is delayed and whether these reasons are avoidable. Materials and Methods: Long-stay patients were defined as those whose LOS had notably exceeded the average LOS for the Diagnosis Related Group (DRG), based on principal admitting diagnosis. A separate analysis showed that the specialty-specific long-stay marker for geriatric medicine was 28 days, so casenote review was done for all patients with LOS of more than 28 days who were discharged from geriatric medicine service of an acute care hospital during a 1-year study period. Information was collected on demographic profile, functional and cognitive status, past medical and social history, admitting medical diagnoses, discharge limiting and delaying factors. Results: During the study period, 150 patients stayed over 28 days and 137 casenotes were available for review. The mean age of the patients was 84 years, 55.5% were female, 77.4% were Chinese, mean abbreviated mental test (AMT) score was 3 and mean modified Barthel's score was 11. The commonest primary diagnosis was sepsis followed by neurological problems, falls-related complication and cardiovascular diseases. The 2 most common discharge limiting factors (the final event which resulted in delay in discharge) were social issues (54, 39.4%) and sepsis (47, 34.3%). Of 47 patients with sepsis, 37 (78.7%) were nosocomial infection. Urinary tract infection and pneumonia were the 2 most common nosocomial infections. The 4 most common factors contributing to delayed discharge (various problems that surfaced throughout the hospital stay) were sepsis (94, 68.6%), deconditioning (65, 47.4%), social issues (52, 38.0%) and cardiovascular disorders (37, 27.0%). Conclusion: Elderly patients are more prone to hospitalisation-related complications like nosocomial infection and deconditioning leading to prolonged hospital stay. Early interventions can reduce these complications. Early identification of social issues and prompt discharge planning should be done to avoid delay in discharge.

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Key words: Deconditioning, Discharge planning, Nosocomial infections, Social

Introduction

With the introduction of block budget for acute care hospitals, cost containment is an important issue for all secondary and tertiary hospitals. Though health care cost was rising at a rate of 31.2% between the year 2002 and 2003,[1] it is important to keep the cost of health care affordable for all citizens of every income group, it should be done without any compromise of the quality of care. Length of stay (LOS) is one of the indicators that reflect total cost of care during hospitalisation.

Prolonged hospitalisation not only increases cost, it is also associated with other complications like nosocomial infections, immobility, pressure sores, deep vein thrombosis (DVT) and deconditioning, thus worsening the patients' quality of life (QOL). Overstaying the Diagnosis Related Group (DRG)[2] assigned hospital days increases the financial burden of both patients and hospitals leading to overall rise of health care cost in Singapore.

A recent finding of the Ministry of Health (MOH) showed that elderly citizens (age >65 years) make up 7.7%[3]

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of the total population and they are the heaviest users of the health care system in the public as well as the private sectors. The hospital admission rate for this age group per 1,000 population for 2003 was 262.8 for male patients and 229.8 for female patients.[4]

A survey published by the Ministry of Health indicated that elderly patients aged 65 and above had the highest proportion of long-stay inpatient days.[5] This group of patients made up 54.8% of all long-stay patients, defined as total inpatient days of more than 10 days. So, it is of paramount importance to find out why elderly patients overstay in acute hospitals and address these issues proactively. Since no local data is available, a study was planned to ascertain reasons why the discharging of elderly patients from hospital is delayed and whether these reasons are avoidable.

Materials and Methods

A retrospective casenote review was done for all long-stay patients under geriatric medicine service of a restructured hospital in Singapore from 1 April 2002 to 31 March 2003.

Long-stay patients were defined as those whose LOS had notably exceeded the average LOS for the DRG based on principal admitting diagnosis. However, the average LOS varied widely across the specialties. A separate analysis was therefore required to determine the proportion of long-stay patients in the respective specialties using specialty-specific long-stay markers. The following is one of the commonly used statistical markers:[5]

$(75^{th}\text{ percentile LOS})^2 + 1.5 \times \text{IQR}^3$

LOS refers to length of stay
IQR refers to inter-quartile LOS, i.e., 75^{th} percentile LOS less 25^{th} percentile LOS.

For geriatric medicine service, the average LOS for geriatric medicine was 10.9 days. The LOS at the 25^{th}, 50^{th}, 75^{th}, 90^{th} and 95^{th} percentile were 5, 8, 14, 22 and 29 days, respectively. The specialty specific marker for geriatric medicine long-stay patients, by using the marker above, was 28 days.

Two doctors from the Department of Geriatric Medicine reviewed the casenotes of all patients with LOS of more than 28 days who were discharged from geriatric medicine service during the 1-year study period. Demographic profile, functional and cognitive status, past medical and social history, admitting medical diagnoses, discharge limiting factors and factors contributing to delay in discharge were captured.

Primary diagnosis was defined as the main clinical diagnosis for admission. The secondary diagnosis was defined as any comorbid illness other than the primary diagnosis. Discharge limiting factors were the final events that resulted in the delay in discharge. Factors contributing to delay in discharge were the various problems, including the primary diagnosis that surfaced throughout the hospital stay.

Abbreviated mental test (AMT)[6] was used to assess cognition and modified Barthel's index[7] was used to assess functional status of the patients. The study was approved by the hospital's ethics committee. The data collected were analysed using Windows SPSS 10.0 programme (SPSS Inc., Chicago, IL,USA).

Results

During the 1-year period, 150 patients stayed over 28 days and 137 casenotes were available for review. Ninety-one (66.4%) patients were admitted to Geriatric Medicine, 27 (19.7%) to General Medicine, 8 (5.8%) to General Surgery, 9 (6.6%) to Orthopaedic Surgery and 2 (1.5%) patients were admitted to other departments. Study patients admitted to other services were later transferred to Geriatric Medicine service for various reasons.

The mean age of the patients was 84 years (SD, 6.58). There were 61 (44.5%) male and 76 (55.5%) female patients. There were 106 (77.4%) Chinese, 23 (16.8%) Malays, 3 (2.2%) Indians and 5 (3.6%) patients were of other ethnic origins.

The living arrangement of the long stay patients is as shown in Table 1.

The mean AMT score of the study population was 3 (range, 1 to 10). Eighteen (13.1%) patients had no cognitive assessment done due to severe hearing impairment or patients were uncommunicative for various reasons. The

Table 1. Living and Caregiver Arrangement of Patients at the Time of Admission

Living arrangement	Frequency No. (%)
With children	88 (62.4)
In nursing home	19 (13.9)
With spouse	10 (7.3)
With spouse and children	10 (7.3)
Alone	5 (3.6)
Other living arrangements, e.g. living with friend or siblings	5 (3.6)
Primary caregiver	**Frequency No. (%)**
Domestic helper	50 (40.9)
Children	38 (27.7)
Self-caring	10 (7.3)
Spouse	9 (6.6)
Other caregiver, e.g. friend or sibling	24 (17.5)

Table 2. The Primary Diagnosis of Long-stay Patients

Primary diagnosis	Frequency No.	(%)
Sepsis	59	(43.1)
• Pneumonia	30	(50.8)
• Urinary tract infection	15	(25.4)
• Infected pressure sores	4	(6.8)
• Others	10	(16.9)
Neurological	22	(16.1)
• Strokes	12	(54.5)
• Depression	4	(18.2)
• Head injury	2	(9.1)
• Dementia	2	(9.1)
• Seizures	2	(9.1)
Falls-related complications	19	(13.9)
• Falls with fractures	6	(31.6)
• Falls without fractures	13	(68.4)
Cardiovascular diseases	15	(10.9)
• Ischaemic heart disease (ACS, NSTEMI, MI)	9	(60)
• Congestive cardiac failure	3	(20)
• Arrythmia	2	(13.3)
• Deep vein thrombosis	1	(6.7)
Gastrointestinal disorders	8	(5.8)
Musculoskeletal disorders	4	(2.9)
Diabetes and electrolyte abnormalities	3	(2.2)
Others	7	(5.1)

ACS: acute coronary syndrome; AMI: acute myocardial infarction; NSTEMI: non-ST elevation myocardial infarction

Table 3. Disease Burden on Patients at the Time of Admission

Score of modified Charlson's Comorbidity Index	Frequency No.	(%)
1	10	(7.3)
2	19	(13.9)
3	29	(21.2)
4	20	(14.6)
5	24	(17.5)
6	17	(12.4)
7	11	(8)
8	2	(1.5)
9	4	(2.9)
16	1	(0.7)

mean modified Barthel score of the study population was 11 (range, 0 to 20). There were 6 (4.4%) patients with no documented Barthel score.

The commonest primary diagnosis was sepsis followed by neurological problems, falls related complication and cardiovascular diseases (Table 2). On admission, 15 (10.9%), 25 (18.3%), 35 (25.5%), 33 (24.1%), 18 (13.2%) and 11 (8%) patients had 8, 7, 6, 5, 4 and 3 or less comorbidities, respectively. The chronic disease burden on patients at the time of admission was determined by using modified Charlson comorbidity index (Table 3).

Table 4. Discharge Limiting Factors

Discharge limiting factor	Frequency No.	(%)
Social	54	(39.4)
Clinical		
Cardiovascular disorders	7	(5.1)
Neurological disorders	6	(4.3)
Musculoskeletal disorders	4	(2.9)
Sepsis	47	(34.3)
• Pneumonia	21	(44.7)
• Urinary tract infection	19	(40.4)
• Infected pressure sores	3	(6.4)
• Other sources of infection	4	(8.5)
Awaiting surgery or endoscopies	9	(6.6)
Deconditioning of patients	3	(2.2)
Others	7	(5.1)

Table 5. Factors Contributing to Delay in Discharge

Factor	Frequency No.	(%)
Clinical		
Sepsis	94	(68.6)
• Urinary tract infection	42	(44.7)
• Pneumonia	40	(42.6)
• Hepatobiliary sepsis	5	(5.3)
• Infected pressure sores	2	(2.1)
• Other sources of infection	5	(5.3)
Cardiovascular disorders	37	(27)
• Uncontrolled blood pressure	20	(56.8)
• Ischaemic heart disease	16	(43.2)
Endocrine disorders	29	(20.2)
Musculoskeletal disorders	27	(19.6)
New strokes	26	(19.0)
Gastrointestinal disorders	17	(12.6)
Bed sores	7	(5.1)
Depression	31	(22.6)
Deconditioning	65	(47.4)
Social	52	(38)
• No caregiver or awaiting arrival of caregiver	31	(59.6)
• Awaiting nursing home	21	(40.4)
Hospital process related		
Weaning off urinary catheter	34	(24.8)
Awaiting investigation	31	(22.6)
Awaiting endoscopy	28	(20.4)
Awaiting surgery	25	(18.2)

Discharge limiting factors are shown in Table 4. The two commonest discharge limiting factors were social issues (54, 39.4%) and sepsis (47, 34.3%). Of these 47 patients with sepsis, 37 (78.7%) were nosocomial infection. Urinary tract infection (UTI) was the commonest nosocomial infections [19 (51.4%) patients] followed by pneumonia [17 (45.9%) patients] and venipuncture site infection [1 patient (2.7%)]. Factors contributing to delay in discharge are shown in Table 5.

On admission, 54 patients had known history of depression. Six patients had newly diagnosed depression while 54 patients had known history, of which 25 patients had exacerbation of depression during their hospital stay.

All the study patients had their discharge plan documented in the casenote. One hundred and twenty-nine patients (94.1%) had their discharge planned during their stay in the geriatric unit whilst the other 8 (5.9%) had their discharge planning initiated in other departments.

Fifty (36.5%), 25 (18.2%), 10 (10.9%) and 2 (1.5%) were discharged to their own homes, community hospitals, nursing homes and to the community with other living arrangements, respectively. Twenty-nine (21.2%) long-stay patients died during the study period. Seventeen patients died from pneumonia, 4 from UTI, 3 from ischaemic heart disease, 2 from stroke, 1 each from renal failure, stomach cancer and lung cancer.

Discussion

LOS is now widely used as an indicator of hospital performance because it is an objective outcome measure of resource utilisation though the relationship between LOS and quality of care remains unclear. There is a growing demand for inpatient beds and it is imperative to ensure that bed use is cost-efficient, effective and efficacious.[5,8]

In the literature, age 80 years and above, female sex, history of delirium and/or dementia, reduced functional ability and the likelihood of alternative living arrangement after discharge are identified factors predicting longer hospital stay.[9-11] Our study population had similar characteristics. They had a mean age 84 years, mainly female, most of them had functional and cognitive impairment and were dependent on carers at the time of admission.

In our study, social issues were the main discharge limiting factors for 54 patients. Social issues were also present as discharge delaying factors for another 52 patients. So, social issues influenced discharge of 106 (77.3%) patients. In the study, social issues consisted of a lack of identified caregiver, awaiting the arrival of foreign domestic helper, caregiver training and awaiting placement in nursing home. At present, Singapore society is experiencing smaller family size with more female family members are joining the workforce. The female working family members may be caring for the children as well as shouldering the responsibility of care for the frail elderly. Alternative to this is to employ foreign domestic worker who generally has poor educational background with no formal caregiver training. Burden on the caregiver has been known to be associated with the age of the caregiver, level of responsibility on and presence of depression in the caregiver, presence of behavioural problems and functional and cognitive decline of the recipients. Caregiver burden has been known to influence the time to medical presentation, patients' condition at presentation and patient institutionalisation.[12,13] Throughout the process of providing care for their loved ones, caregivers frequently experience social, emotional and financial losses, which becomes more significant as the disease progresses.[14,15] Caregiver respite is not readily available for most. It is very likely that the premorbid level of care was barely sustainable for most of the long-stay patients. With further functional deterioration from prolonged hospitalisation, it was not surprising that alternative care-giving arrangement or institutionalisation was required at discharge. Early anticipation and identification of care-giver fatigue as part of the discharge planning may help reduce the LOS for some of the patients. A more readily available respite care system, caregiver support network, family counselling[16] and day-care centres may reduce the risk of caregiver fatigue, reduce prolonged hospitalisation and reduce need for custodial care.[17-19]

The elderly are more susceptible to develop complications associated with hospital stay, such as nosocomial infection, loss of function, immobility, falls and confusion. Ninety-five per cent of the long-stay patients acquired other medical problems not related to their primary diagnosis, of which hospital-acquired sepsis was the commonest. It is known that nosocomial infections increase LOS, mortality and cost of care.[20,21] In our study, sepsis was the second commonest cause for delayed hospital discharges among our long-stay patients and the majority of these were hospital-acquired sepsis. Pneumonia and UTI were the 2 most common form of nosocomial infections seen in the study patients. The high incidence of hospital-acquired urosepsis may be related to the common occurrence of urinary retention which required urinary catheterisation. This was also reflected in the delayed discharge of a large number of patients (n = 34) because of trials to wean off urinary catheters. The causes of urinary retention in the elderly are multifactorial; among the commoner ones are reduced mobility, the use of restraints and constipation. The other factors to be considered for the frequent nosocomial infections may be the use of multiple antibiotics,[22] the frequency of invasive procedures, diabetes mellitus, chronic obstructive pulmonary disease, urinary catheters and mechanical ventilation.[23,24] Early ambulation, judicious use of antibiotics, management of constipation, proper catheter care, adequate hydration and nutrition should reduce nosocomial infections in the elderly.[25-27]

Loss of function and independence is a common consequence of hospitalisation. The elderly are particularly susceptible to develop loss of ability to maintain activities of daily living during their hospital stay which impacts on

the discharge planning, and the level of care required after discharge. Fortunately, most of the patients were able to regain some of the functional ability with rehabilitation.[28,29] A large number of patients 65 (47.4%) deconditioned during their stay in the hospitals. Prior to discharge, these patients required a period of rehabilitation as an attempt to return them to their pre-morbid status. Recognition of the need for early commencement of physiotherapy would reduce the risk of deconditioning and hence reduce hospital stay.

Presence of depression during the hospital stay was an important factor among the elderly long-stay patients. In our study, there were 31 (22.6%) patients who developed depression during their prolonged hospitalisation needing treatment and rehabilitation. Six were new cases while 25 patients had known history but had exacerbation of depression during their hospital stay. The incidence of depression is known to increase with age and the depressed elderly seem to have a significantly higher rate of concurrent physical illnesses.[30] The elderly inpatients with depression were also more likely to be readmitted, have longer LOS and have higher inpatient service utilisation during their follow-up regardless of their functional and health status. It is therefore important to recognise and treat depression early.[31]

Waiting for surgeries, endoscopies and investigations were discharge limiting factors for 25 (18.2%), 28 (20.4%) and 31 (22.6%) patients. Most of the elderly patients were limited in their physical abilities and were heavily dependent, therefore re-admission for procedures were avoided if possible. In order to avoid delay in investigations or surgical procedures, early liaison and good communication with the respective specialties cannot be overemphasised.

Frail elderly patients often have complex care needs and a comprehensive care package is often needed after hospital discharge to help them remain in the community successfully. An effective discharge arrangement is the key component in continuation of care in the community. Supported discharge from hospital to home has been shown to maximise the likelihood of keeping the elderly at home and reducing admission to long-term care.[32] In order to carry out effective discharge planning, the transition between the inpatient cares to the community must be as smooth as possible.[33] Discharge planning should be done proactively and initiated as early as possible. Discharge planning should also take into account timely referral to the multidisciplinary team and early communication with the community services.

Conclusion

Elderly patients are more likely to stay longer as inpatients compared to younger ones even after their acute medical problems have resolved. They are more prone to hospitalisation-related complications like nosocomial infection, worsening function and cognition and depressed mood all of which may lead to further caregiver burden upon discharge. Changing needs of the patient from the above causes with changing social and caregiver arrangement may lead to increase in LOS at acute care hospitals. Proactive management of hospital-related complications, early discharge planning with particular attention on the changing care needs of the patient and caregiver burden and better utilisation of community resources like community hospitals and home health care services would further decrease LOS of elderly patients in acute care hospitals.

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