Inappropriate Use of Hospital Beds in a Tertiary Care Service Hospital

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Abstract

Background: The cost of medical care is continuing to rise and cost containment measures need to focus on inappropriate hospitalization. Armed Forces Medical Services ensure universal access to its consumers but continuous increase in patient load is stretching the capability of service hospitals. The present study was undertaken to determine the rate of inappropriate hospitalization in a large tertiary care service hospital.

Methods: Appropriateness Evaluation Protocol (AEP) was used to assess the appropriateness of hospital days, the study being carried out in the acute medical and acute surgical wards of the hospital on randomly selected days over a period of three months. **Results:** Inappropriate patient days were found to be 29.48% during the study period, with 34% of acute surgical patient days and 24.4% of acute medical patient days found to be inappropriate. No statistically significant difference was observed in the rate of inappropriate hospital stay between serving personnel and ex-servicemen. 31.25% non local patients as compared to 25.81% of local patients were found to have inappropriate hospital stays, though the difference was not found to be statistically significant. 60.71% of inappropriate stays were found in the initial period of admission (1-5 days), the phenomenon being observed both in the acute surgical and acute medical wards.

Conclusion: The study shows that the rate of inappropriate patient days is quite high among the study population and regular utilization reviews need to be carried out to conserve health care resources available with the service hospitals.

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Key Words: Appropriateness Evaluation Protocol (AEP); Inappropriate patient days (IPD)

Introduction

As the cost of medical care continues to increase, attention focuses on its most expensive component-hospitalization. Proportion of total health expenditure spent on inpatient care ranged from 40-50% in developed countries to 45% in Malaysia [1]. To reduce hospital costs, various economic incentives have been employed and widely implemented. Although economic incentives can decrease hospital use and cost, their consequences for patients' access to health care and the quality of care are controversial [2]. To maintain quality and access, it is important to focus cost containment measures on medically inappropriate services.

Appropriate utilization of hospital based services, reduction of adverse occurrences and efficient use of health care resources can have a significant impact on health care finance [3]. Utilization review of hospital services has become imperative when data reveals that one in three admissions are unnecessary and one third of all hospital days are inappropriate [4].

Armed Forces Medical Services ensure that all health

care consumers dependent on the service hospitals have universal access to health care, with coverage for all inpatient and outpatient service, investigations and management. Patient management occurs without intervention from any authority. However, continuous increase in patient load along with restrictions on material and human resources are stretching the capability of service hospitals to its limit.

Several studies have suggested that a significant proportion of patient days in modern hospitals are inappropriate [5,6]. Cost of providing hospital services will decline if the medically inappropriate patient days are reduced or abolished altogether.

The present study has been undertaken to determine the rate of inappropriate hospitalization in a large tertiary care service hospital associated with a teaching medical college.

Material and Methods

The study was conducted at a large tertiary care and teaching service hospital.

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The instrument utilized to assess the appropriateness of hospital days was the Appropriateness Evaluation Protocol (AEP), developed by Boston University researchers to identify unnecessary hospital stays [7]. The protocol consists of twenty-seven criteria related to medical services, nursing or life support services and patient condition factors as shown in Table 1. The validity and reliability of the protocol have been assessed and found to be applicable to acute care hospitals [8]. A patient day was judged appropriate if any of

Table 1
Evaluation protocol criteria

A. Medical services

- M1. Procedure in operating room on that day
- M2. Scheduled for procedure in operating room the next day, requiring preoperative consultation or evaluation
- M3. Cardiac catheterization that day
- M4. Angiography that day
- M5. Biopsy of an internal organ that day
- M6. Thoracocentesis or paracentesis on that day
- M7. Invasive central nervous system diagnostic procedure that day
- M8. Any test requiring strict dietary control, for the duration of the diet
- M9. New or experimental treatment requiring frequent adjustments of under direct medical supervision
- M10. Close medical monitoring by a doctor at least three times daily
- M11. Postoperative day for any procedure

B. Nursing and life support services

- N1. Respiratory care: Intermittent or continuous respiratory use or inhalation therapy (with chest physical therapy, intermittent positive pressure breathing) at least three times daily
- N2. Parenteral therapy: Intermittent or continuous intravenous fluid with any supplementation (electrolytes, protein, or medications)
- N3. Continuous monitoring of vital signs, at least every 30 minutes, for at least four hours
- N4. Intramuscular subcutaneous injections, or both, at least twice daily
- N5. Intake and output measurement
- N6. Care of major surgical wound and drainage (chest tubes, T tubes, Hemovac, Penrose drains)
- N7. Close medical monitoring by a nurse at least three times daily

C. Patients condition within 24 hours before the day of review

- PC1. Inability to avoid or move bowels in the past 24 hours, not attributable to a neurologic disorder
- PC2. Transfusion due to blood loss
- PC3. Ventricular fibrillation or electrocardiographic evidence of acute ischaemia
- PC4. Fever of at least 101°F rectally (at least 100°F orally), if patient was admitted for a reason other than fever
- PC5. Coma: unresponsiveness for at least one hour
- PC6. Acute confusional state not due to alcohol withdrawal
- PC7. Acute hematologic disorders, neutropenia, anaemia or thrombocytosis,
- PC8. Progressive acute neurologic difficulties within 14 days before the day of review
- PC9. Occurrence of a documented, new acute myocardial infarction or cerebrovascular accident (stroke)

the criteria of the AEP was met on the day of review and inappropriateness was determined as failure to meet any of the twenty-seven criterias of the protocol.

The study was carried out in the acute male medical and surgical adult wards of the hospital on randomly selected days over a period of three months from January to March 2002. To exclude inappropriate patient days due to administrative reasons peculiar to service clientele, the study was restricted to acute wards only and any patient reporting for medical boards have been excluded. To maintain focus on acute care services, patients in sub acute wards have also been excluded from the study population. The patients in intensive care units on the days of review have been excluded as their patient days have been assumed to be appropriate.

The principal author reviewed all patient charts, meeting the criteria laid down in the study design on the days of review. The information abstracted included the service status, residential status, attending service on the day reviewed and the criteria met on the AEP. The length of stay of each patient prior to the day of review was also noted to find out any relation between length of stay and inappropriateness of hospital stay. No over-riding of the protocol has been utilized to avoid observer bias.

The data collected was subjected to statistical analysis wherever considered necessary with statistical significance set at $p < 0.05$.

Appropriateness Evaluation Protocol was used to assess the appropriateness of hospital days, the study being carried out in the acute medical and acute surgical ward of the hospital.

Results

There were 95 patient days during the study period, out of which 50 were acute surgical patient days and 45 were acute medical patient days. 34% of acute surgical patient days and 24.4% of acute medical patient days were found to be inappropriate, with the rate of inappropriate patient days standing at 29.48% as shown in Table 2. Though the rate of inappropriate hospital days of acute surgery ward was found to be more than that of acute medical ward, the difference was not found to be statistically significant ($p > 0.05$).

In the acute surgical ward, 28.58% of serving personnel and an almost equal proportion (30.77%) of ex-servicemen had inappropriate stays, the difference being statistically not

Table 2
Inappropriate patient days for acute surgical and medical ward

Ward	Appropriate	Inappropriate	Total
Acute surgery	33	17	50
(Row%)	(66)	(34)	(100)
Acute medicine	34	11	45
(Row%)	(75.6)	(24.4)	(100)
Total	67	28	95
(%)	(70.52)	(29.48)	(100)

χ^2 - 1.04; df = 1; $P = 0.30$ (>0.05) (Not significant),
ODDS Ratio = 0.63 (95% CI - 0.23 to 1.68)

significant as shown in Table 3.

The results presented in Table 4 indicated that 31.25% of patients of non-residential status as compared to 25.81% of patients of residential status had inappropriate hospital stays. Though the difference was not found to be statistically significant, a higher probability of inappropriate hospital stay was observed in patients of non-residential status.

While observing the relationship between the rate of inappropriate use and length of stay, 60.71% of inappropriate patient days were found for stays of 1-5 days prior to the day of review while 14.19% were found for stays for 15 days and above, as shown in Table 5. A steady decline in inappropriate patient days was noticed with increased length of stay, the maximum number of inappropriate stays found in the initial period after admission (1-5 days). This phenomenon was observed both in the acute surgical and acute medical wards.

Table 3
Inappropriate patient days by patient's service status

Service status	Appropriate stay	Inappropriate stay	Total
Servicemen (Row%)	40 (71.42)	16 (28.58)	56 (100)
Non-servicemen (Row %)	27 (69.23)	12 (30.77)	39 (100)
Total (%)	67 (70.52)	28 (29.48)	95 (100)

χ^2 - 0.05; df = 1; P = 0.82 (>0.05) (Not significant),
ODDS Ratio = 1.11 (95% CI - 0.41 to 2.97)

Table 4
Inappropriate patient days by residential status

Residential status	Appropriate stay	Inappropriate stay	Total
Local (Row %)	23 (74.19)	8 (25.81)	31 (100)
Non-local (Row %)	44 (68.75)	20 (31.25)	64 (100)
Total (%)	67 (70.52)	28 (29.48)	95 (100)

χ^2 - 0.30; df = 1; P = 0.59 (> 0.05) (Not significant);
ODS Ratio = 1.31 (95% CI - 0.45 to 3.83)

Table 5
Rate of inappropriate patients days by length of stay

Length of stay	Acute surgical ward	Acute medical ward	Total
1-5 days (Row %)	10 (58.82)	7 (63.63)	17 (60.71)
6-14 days (Row %)	4 (23.52)	3 (27.27)	7 (25)
15 + days (Row %)	3 (17.64)	1 (10.10)	4 (14.19)
Total (%)	17 (100)	11 (100)	28 (100)

(Note : Statistical analysis could not be undertaken since the cell frequencies in a member of cells were very small)

Discussion

The study was primarily conducted to determine the rate of inappropriate patient days among acute care patients in a tertiary care service hospital. The rate of inappropriate patient days is quite significant at 29.48%, which is more than the rate found in other studies [5,9]. Though statistically not significant, the rate of inappropriate patient days is more in the acute surgery ward than in the acute medical ward, which is similar to the findings of the study carried out by Celik et al and Martinez et al [5,6].

It is surprising to find such high rate of inappropriate hospital days in a tertiary care hospital, particularly as this hospital is having high levels of average bed occupancy rate of more than 85%. Moreover, this hospital boasts of hospital staff that includes highly trained physicians and hospital administrators, which make such high rate of inappropriateness more noticeable. On the other hand, some inappropriate hospital days may be explained by prolonged admission of interesting cases for teaching activities as well as peculiar service requirement of admission of outstation patients referred to this hospital for management.

The rate of inappropriate hospital stay was found to be of almost equal proportions among servicemen and patients of non-service status. Though a therapeutic interference, particularly operative interference may delay early discharge of a patient, the high rate of inappropriate stay among patients of service status probably shows excessive concern for the physical condition of a trained soldier at the cost of his availability to the environment. The appreciably high rate of inappropriate stay among patients of non-service status probably reflects the home environment in our country, particularly in rural areas where necessary care during the period of recovery or timely medical aid in an emergency cannot be ensured. This factor might have influenced the hospital specialists to retain the patients for evaluation and monitoring, even though the days turnout to be inappropriate by the AEP criteria. However, some procedural formalities leading to inappropriate hospital stay in both the groups of patients need to be considered too.

The rate of inappropriate hospital days was found to be more in outstation patients, who are being referred from outstation units. This hospital receives patients from peripheral hospitals, which may not have adequate investigate facilities and thus, these patients need substantial workup before any definitive management, even if the days are considered inappropriate. Moreover, concern for returning the cured patient to his unit may influence the physician to retain him for few additional days for complete recuperation.

The most striking finding is the high rate of inappropriate use associated with short length of stay of 1-5 days and the correspondingly low rate associated with long stays. Our finding is similar to studies carried out by Celik et al [5] and Kemper et al [10] but the study carried out by Gloor et al [9] in a pediatric population found the highest number of inappropriate days for hospital stays of 3-14 days. Though this finding may be partly explained by presence of outstation service patients, the high rate of inappropriate hospital days in the initial days of admission probably points to inadequate use of outpatient services. Better utilization of ambulatory services for pre-admission workup can definitely reduce this high rate found for hospital stays of 1-5 days.

Though the criteria used in the AEP are fairly liberal, some social and administrative factors need to be included for a more objective study. This may include location of the unit of the patient, availability of proper communication facility and presence of responsible adults at home to take on the responsibility of home care. However, any over-riding option was not exercised to avoid observer bias. Future studies may build in these social factors into the AEP to make it more applicable to service hospital environment, since some inappropriate use of our acute care facility may reflect a lack of alternatives for these patients.

Though we did not set out to address the reason for inappropriate hospitalization, we found a significant number of inappropriate hospital stays for laboratory investigations, imaging facilities and even non-availability of the respective consultants. Another factor found for inappropriateness was delay as the time of discharge approaches. Better utilization of ambulatory care facilities, laying down of clinical algorithms and discharge protocols and necessary feedback of results of utilization reviews combined with education and peer review of the practice patterns of different physicians may be able to substantially reduce the rate of inappropriate hospital stays. Indeed the scarce and expensive technical facilities of the acute care wards can be more successfully and meaningfully utilized, when their utilization of resources can be fully focused for the care of those who really need them, undiluted by the presence of 24-34% of patients who are inappropriately there.

Our study conclusively shows that the rate of inappropriate patient days is quite high among our study population in a tertiary care service hospital. However, we intend to follow up with further study into various factors, which are directly or indirectly impacting upon the rate of inappropriateness of hospitalization in service hospitals. Moreover, with the need to make the protocol more responsive to our service hospital environment, we intend to introduce the over riding concept on specific service factors with a larger scale of study population in future.

Our study implies the need for regular utilization reviews as a part of internal audit in service hospitals to conserve scarce health care resources of our hospitals.

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