FACTORS AFFECTING THE AVERAGE LENGTH OF STAY OF THE PATIENTS IN THE INPATIENT DEPARTMENT IN A TERTIARY CARE CENTRE IN NORTH INDIA

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ABSTRACT: Many hospitals emphasize on stabilizing the patient, minimizing the length of stay and postponing complete diagnosis and treatment for the outpatient setting and early discharge of incompletely treated patients resulting in frequent readmissions, thereby, decreasing the quality of patient care. On the contrary, prolonged hospitalization increases the healthcare costs due to nosocomial infections and iatrogenic complications. We conducted a prospective observational study on the factors affecting average length of stay of 100 patients in the Inpatient Department in a tertiary care centre in North India. The association of Average Length of Stay with nutritional status, educational status and insurance status of the patient was found to be statistically significant.

KEYWORDS: Length of stay, patient care, hospitalization, healthcare costs, diagnosis.

INTRODUCTION: Length of Stay is the time interval between date of admission and date of discharge and is used as an indicator to evaluate the hospital resource utilization rate, efficiency, and quality of healthcare services.1-2 The LOS is calculated from the time between patient’s admission and discharge and measures both bed utilization and inpatient units’ efficiency.3 Healthcare providers have been under much political and managerial pressure to keep LOS in a desirable minimum level to reduce costs without compromising patients’ outcomes.4 The LOS reduction level is restricted by factors such as quality and effectiveness considerations and it is important to know more about the factors that play a significant role in decreasing the patients’ LOS.5

The previous studies have shown that factors such as age,6 sex,7 marital status,8 place of residence,9 socio-economic status,10 the month, day and time of patient admission,11 patients’ physical and functional status,12 patients' status at discharge time,13 hospitalizing physician’s academic degree,14 types and severity of illnesses,15 malignancy, complications, hospital infections, and delay in laboratory exams and in surgical interventions,16 education status and increased severity of illness17 affect the average length of stay (ALOS) in the hospital. The present study was conducted on 100 patients in the IPD department of the Fortis Escorts Hospital, Amritsar to ascertain various factors associated with prolonged or reduced length of hospital stay.

RESULTS AND OBSERVATIONS: During the study period, a total of 100 patients were admitted in the Fortis Escorts Hospital, Amritsar.
DISCUSSION: The ALOS refers to the number of days (with an overnight stay) that patients spend in an acute-care inpatient institution. It is generally measured by dividing the total number of days stayed by all patients in the acute-care inpatient public institutions during a year by the number of admissions or discharges. It is often used as an indicator of efficiency of the hospital. However, policies exclusively focused on lowering LOS may not directly lead to a reduction in inappropriate hospital utilization.

Age: The analysis of the data revealed that the mean age of the patients admitted in IPD in the Fortis Escorts Hospital was 56.15 years (SD ± 17.70), the minimum age was 7 years and maximum age was 92 years. Wright SP et al. (2003) in his study reported a mean age of 73 years (S.D. 10.8). Agboado G et al. (2012) in a cross-sectional study of factors influencing the length of hospital stay among patients admitted with chronic obstructive airway disease reported a mean age of 70.1 years.

Sex: The analysis of the data revealed that out of 100 patients, 62 (62%) were males and 38 (38%) was females. The male:female ratio was 1.6:1. Wright SP et al. 2003 in their study of factors

<table>
<thead>
<tr>
<th>Demographic and clinical factors</th>
<th>Number of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>100</td>
</tr>
<tr>
<td>Male: Female</td>
<td>62: 38</td>
</tr>
<tr>
<td>Mean age (years)</td>
<td>56.15 ± 17.15</td>
</tr>
<tr>
<td>Rural: Urban</td>
<td>55:45</td>
</tr>
<tr>
<td>Single: Married: Widowed</td>
<td>12:78:10</td>
</tr>
<tr>
<td>Socio-economic status</td>
<td></td>
</tr>
<tr>
<td>Lower: middle: upper</td>
<td>0:97:3</td>
</tr>
<tr>
<td>Malnutrition</td>
<td>08 (8%)</td>
</tr>
<tr>
<td>Illiterate: Primary school: Secondary school: college</td>
<td>18:52:10:20</td>
</tr>
<tr>
<td>ECHS: non-ECHS</td>
<td>69:31</td>
</tr>
<tr>
<td>Health insurance</td>
<td>20 (20%)</td>
</tr>
<tr>
<td>Elective: Emergency</td>
<td>20:80</td>
</tr>
<tr>
<td>Duration of illness</td>
<td></td>
</tr>
<tr>
<td>Few days: weeks: years</td>
<td>32:49:19</td>
</tr>
<tr>
<td>Multi-system involvement</td>
<td>52 (52%)</td>
</tr>
<tr>
<td>Malignancy</td>
<td>03 (3%)</td>
</tr>
<tr>
<td>Surgical intervention</td>
<td>38 (38%)</td>
</tr>
<tr>
<td>Complications of illness</td>
<td>02 (2%)</td>
</tr>
<tr>
<td>Previous hospitalizations</td>
<td></td>
</tr>
<tr>
<td>Patient satisfaction with healthcare</td>
<td>87 (87%)</td>
</tr>
<tr>
<td>Recovery: Relative recovery</td>
<td>85:14</td>
</tr>
<tr>
<td>ALOS (years)</td>
<td>7.07 ± 5.21</td>
</tr>
</tbody>
</table>

Table showing Socio-demographic and clinical characteristics of the patients:
influencing the length of hospital stay of patients with heart failure found that 60% were males, 40% were females and a male: female ratio of 1.5:1.[20]

**Residence:** Out of 100 patients, 55 (55%) were from rural areas and 45 (45%) were from urban areas. The association of the place of residence with LOS was not statistically significant (p=0.36). Agboado G et al. (2012) too in their study did not find a significant association between LOS and the place of residence.[21]

**Marital Status:** 12(12%) of the patients were single (unmarried), 78(78%) were married and 10(10%) were widowed. The association of the marital status with LOS was not statistically significant (p=0.39).

**ECHS Patients:** Out of 100 patients, 69(69%) were ECHS patients and 31(31%) were non-ECHS (self-paying) patients. In their study, Chistie KM et al (1973), had also reported a shorter LOS in "non-paying" (ECHS) patients than "paying patients".[22]

**Socio-economic Status:** Out of 100 patients, 97(97%) were from the middle class of the society and 3(3%) were from the higher socio-economic class of the society, none belonged to the lower socio-economic class of the society, the majority of the patients admitted in the IPD of the Fortis Escorts Hospital, Amritsar during the study period belonged to the middle socio-economic class of the society and the number of patients from the lower and higher socio-economic strata was not sufficient enough to make some statistically significant opinion. Chistie KM et al (1973) in their study did not report a statistically significant association between LOS and the socio-economic status of the patients.[22]

**Nutritional Status:** Out of 100 patients in the study, 92(92%) had adequate nutrition but 8(8%) were malnourished. Out of 92 adequately nourished patients, 44(47.82%) had LOS between 1-5 days, 35(38.04%) had LOS between 6-10 days, 13(14.13%) had LOS longer than 11 days. Out of 8 malnourished patients, 4(50%) had LOS between 1-5 days, 2(25%) had LOS between 6-10 days and 2(25%) had LOS longer than 11 days. It can be clearly inferred that malnourished patients had longer LOS than adequately nourished patients and the difference was statistically significant (p<0.05). In their study, Robinson G et al (1987) had also reported longer LOS in malnourished patients than adequately nourished patients.[23]

**Education Status:** In the present study, 18(18%) patients were illiterate, 52(52%) patients had primary school education, 10(10%) patients had secondary school education and 20(20%) patients had graduated in the college. Esatoglu AE et al (2002) in their study had made similar observations, thereby, reporting that illiterates had longer LOS than literate patients and the difference was meaningfully significant.[24]

**Insurance Status:** Out of 20 insured patients, 6(30%) patients had LOS between 1-5 days, 13(65%) patients had LOS between 6-10 days, 1(5%) had LOS between 21-25 days. Out of 80 uninsured patients, 42(52.50%) patients had LOS between 1-5 days, 24(30%) patients had LOS between 6-10
days whereas 12(15%) patients had LOS between 11-20 days whereas 2 (2.5%) patients had LOS longer than 21 days. So, the patients without insurance had a shorter LOS than those who were insured. It, hereby, implies from the data analysis that there exists a statistically significant positive association between the insurance status and the LOS (p < 0.05). Manious AG et al (2011) in their study made similar observations and reported a significantly shorter LOS in patients without insurance than those with insurance.[25]

Reimbursement: 32(80%) of the 40 patients with claim for reimbursement had LOS between 1-10 days whereas 51(85%) patients out of 60 patients without claim for reimbursement had LOS between 1-10 days. So, the length of stay was shorter in patients with claim for reimbursement. Jones RP et al (2013) too in their study had found truncating effect of medicare reimbursement on ALOS in US hospitals.[26]

The duration of illness, associated co-morbidities, referring authority, history of surgical intervention or previous hospitalization, complications of the illness and the patient satisfaction were not significantly associated with LOS in the present study.

CONCLUSION: ALOS is an indicator of the efficiency of a hospital but principal focus should be on lowering the inappropriate hospital utilization because lowering the LOS may not directly lower the inappropriate utilization of the medical facilities. The LOS is prolonged in elderly patients, females, malnourished, illiterates and insured patients. The elderly and malnourished patients are more likely to develop complications of the illness, the illiterate patients have prolonged LOS in view of the lack of insight into the graveness of the illness and are more likely to fail to adhere to their dosage schedule. The females are more likely to develop certain medical conditions with social dimensions like anemia, malnutrition, etc., thereby increasing the LOS. The LOS was more in insured patients because they were more likely to receive treatment and complete the treatment regardless of the cost of the treatment. Further studies with larger sample size are required to establish the association of LOS with the duration of illness, associated co-morbidities, referring authority, history of surgical intervention or previous hospitalization, complications of the illness and the patients’ satisfaction.

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