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Original research article

FACTORS ASSOCIATED WITH PROLONGED HOSPITAL STAY OF PATIENTS TREATED IN THE EMERGENCY DEPARTMENT

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Abstract: *Prolonged length of stay (LOS) in the emergency department (ED) is a common issue that can strain hospital resources and affect patient outcomes. Identifying the factors contributing to prolonged hospital stays is essential for improving patient flow and care quality.* ***Objective:*** *To assess the factors associated with prolonged hospital stays in patients admitted to the emergency department.* ***Methods:*** *A cross-sectional study was conducted in the Emergency Department of Shifa International Hospital from July 2023 to June 2024. A total of 150 patients with a prolonged LOS of more than 6 hours were included in the study through convenience sampling. Data were collected using a modified questionnaire comprising three sections: sociodemographic characteristics, indices of timely care, and determinants of prolonged hospital stays. Medical records were reviewed to complete the first section, and in-depth interviews with on-call physicians and nurses were conducted to identify potential causes of prolonged stays. Statistical analysis included univariate and multivariate analyses, with odds ratios (OR) and 95% confidence intervals (CI) calculated to determine significant predictors of prolonged LOS.* ***Results:*** *Univariate analysis identified several important predictors of prolonged LOS, including female sex (OR: 1.50, 95% CI: 1.09-1.82), old age (OR: 1.11, 95% CI: 0.9-1.10), evening admission (OR: 3.9, 95% CI: 1.77-8.71), level I triage (OR: 1.84, 95% CI: 1.18-2.60), disposition order after 6 hours (OR: 0.15), and a high number of clinical and lab tests (OR: 1.19, 95% CI: 1.08-1.42). Multivariate analysis revealed that old age (p=0.020), disposition after 6 hours (p=0.005), and a high number of tests (p=0.033) were significantly associated with prolonged LOS.* ***Conclusion:*** *Factors such as female sex, old age, evening admission, level I triage, disposition order after 6 hours, and a high number of clinical and lab tests are significant predictors of prolonged LOS in the emergency department. These findings highlight the need for targeted interventions to reduce prolonged stays and improve ED efficiency.*

Keywords: Emergency, Hospital stay, Trauma, Triage.

Introduction

Overcrowding in the emergency department is a common threat to timely and efficient healthcare delivery globally. (1) This problem causes dysfunction of ER systems and delays emergent care. Overcrowded ED and delayed care greatly influence patient outcomes. Timely care can be guaranteed by streamlining and segmenting the patient admission process to discharge. Various systems, including triage systems, teamwork training, hiring certified emergency specialists, fast track units, and rules regarding the duration of hospital stay, have been set up to minimize the waiting times and ensure quality treatment in the ER. (2-4)

In Pakistan, emergency department visits are very often due to the aging population and severe health issues as a result of a lack of awareness. (5) Lack of adequate resources makes improving ERs and boosting their performance difficult. Programs like the Certification Program in Emergency Medicine and the Emergency Medicine Foundation Program aim to improve the quality of the ERs and teach physicians to work efficiently in the department to reduce waiting times and length of hospital stay, improving patient outcomes. (6) According to a recent study, the average hospital stay was 166 minutes before treatment due to lab results and physician assessment delays. However, after working on areas of improvement, a 30% reduction in LOS was reported. (7)

This study assessed factors associated with prolonged hospital stays of patients admitted to the emergency department.

Methodology

A cross-sectional study was conducted in the Emergency Department of Shifa International Hospital from July 2023 to June 2024. A total of 150 patients admitted to the emergency department for more than 6 hours (prolonged LOS) were included in the study by convenience sampling. Pediatric patients were excluded. All patients provided their informed consent to participate in the study, which was approved by the hospital's ethical board.

Length of hospital stay was calculated by subtracting the time of admission from the time of medical record review. Data was collected through a modified questionnaire used in Hosseininejad et al.(8). The questionnaire consisted of three parts. The first section included sociodemographic characteristics of patients, the second section assessed the indices of timely care, and the last section evaluated the determinants of prolonged hospital stay. The questionnaire was pretested for validity and reliability with a 76.0 Cronbach's α. Patients' medical records were reviewed to fill out the first section, and in-depth interviews with on-call physicians and nurses were conducted to determine probable factors causing prolonged hospital stays.

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All data was analyzed using SPSS version 24. Descriptive analysis was done to present data, and quantitative data was presented in percentages. The univariate variable reduction was done by keeping the p-value of 0.25 or less. Determinants of prolonged length of hospital stay were evaluated by multivariate binary logistic analysis calculating odds ratio and 95% CI for each. A p-value of <0.05 was taken as significant.

Results

A total of 150 patients had a prolonged stay in the ER with an average age of 55.6 ± 19.1 years. Most patients (42.7%) were women, and 80% had a level III triage. There were significant causes of ER visits: dyspnea (20%) and weakness (20%). On average, the nurses took 2.55 ± 1.80 minutes to visit the patient after admission, and the physician took 4.0 ± 3.1 minutes to see for assessment. 95% of patients were disposed of in less than 6 hours (Table I).

Univariate analysis revealed that significant predictors of prolonged LOS were female sex (OR: 1.50, 95% CI: 1.09-1.82), old age (OR: 1.11, 95% CI: 0.9-1.10), evening admission (OR: 3.9, 95% CI: 1.77-8.71), level I triage (OR: 1.84, 95% CI: 1.18-2.60), disposition order after 6 hours (OR: 0.15) and high number clinical and lab tests (OR: 1.19, 95% CI: 1.08-1.42). A 5-year increase in age increased the risk of prolonged LOS by five times. Multivariate analysis revealed prolonged LOS was significantly associated with old age (p= 0.020), disposition after 6 hours (p=0.005), and high number of tests (p= 0.033) (Table II).

The primary cause of prolonged LOS was the incorporation between departments, especially internal medicine (30.5%) and gastroenterology (19.1%). In the ER, delayed doctor visits (76%) and late admission (80%) caused postponed care. The causes of prolonged LOS are shown in Table III.

Table I: Patients' baseline features

Characteristics	N (%)
Gender	
Male	64 (42.7%)
Female	86 (57.3%)
Mode of transport to ER	
Ambulance	122 (81.3%)
Attendant	23 (15.4%)
Referred from another department	5 (3.3%)
Triage level	
I	3 (2%)
II	9 (6%)
III	120 (80%)
IV	18 (12%)
Time of ER admission	
Morning	84 (56%)
Evening	36 (24%)
Night	30 (20%)
Cause of ER visit	
Dyspnea	30 (20%)
Weakness and fatigue	30 (20%)
Abdominal pain	24 (16%)
Loss of consciousness	18 (12%)
Blood transfusion	15 (10%)
Poisoning	9 (6%)
GI bleed	9 (6%)
Convulsions	3 (2%)
Trauma	3 (2%)
Nausea	3 (2%)
Others	6 (4%)

Table II: Factors Associated with Prolonged Length of Hospital Stay

Determinants	Crude OR	aOR	P
Old age	1.10 (0.9-1.12)	1.15 (0.9-1.25)	0.020
Disposition time 6 hours or more	0.20 (0.05-1.0)	0.09 (0.005-0.28)	0.005
High number of clinical and laboratory assessments	1.33 (1.08-1.42)	1.6 (1.08-1.72)	0.033

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Table III: Causes of Prolonged LOS

Causes	N (%)
In the ER (n=25) *	
Delayed physician assessment	19 (76%)
Complicated cases	6 (24%)
Late admission	20 (80%)
Overcrowding	3 (12%)
Interdepartmental incorporation (n=105)	
Gastroenterology	20 (19.1%)
Respiratory	12 (11.5%)
Nephrology	8 (7.7%)
Surgery	8 (7.7%)
Orthopedic	3 (2.9%)
Internal medicine	32 (30.5%)
Oncology	8 (7.7%)
Endocrinology	12 (11.5%)
Neurosurgery	8 (7.7%)
Cardiovascular	5 (4.8%)
External factors (n=20)	
Interhospital consult	17 (85%)
External imaging	12 (60%)

*Can be attributed to more than one cause

Discussion

This study assessed the factors associated with prolonged hospital stays in the emergency department. The results revealed that female sex, old age, evening admission, level I triage, disposition order after 6 hours, and a high number of clinical and lab tests were significant risk factors of prolonged LOS. Similar results were reported by Dinh et al. and Ahmed et al. (9, 10)

Concerning demographics, prolonged LOS was more common in female patients (57.3%), which was also a determinant of LOS. However, this contrasts with Alnahari et al.,., who reported a high risk of longer hospital stays in men (OR: 1.19, 95% CI: 1.11 to 1.42). (11) Another Nigerian study also backed Alnahari. It concluded that males were more likely to be admitted to the ER (52.4%) as they were primarily victims of rash driving and road accidents than women. (12)

Old age was a significant factor influencing the length of hospital stay (OR: 1.15 95% CI: 0.9-1.25) (p=0.020). Similarly, patients aged 60 years or older were also reported at higher risk of prolonged LOS in Sir et al. due to a higher number of interventions required and consultations by more than one department. (13) Belayneh et al. and Burgess et al. also agreed with these results. (14, 15)

Evening admission was associated with longer stay (OR: 3.9, 95% CI: 1.77-8.71) than morning and night stay. Krutova et al. also reported the association between working shifts and length of hospital stay. (16) However, Ahmed et al. reported that patients admitted at night were likelier to have a more extended hospital stay as physicians keep patients overnight for further workups. (10)

Level I triage patients had a more extended hospital stay in our study than other emergency cases (OR: 1.84, 95% CI: 1.18-2.60). Parker et al. also reported the highest risk of hospital admission and longer length of stay on a triage scale for one patient (OR: 30.76, 95% CI: 28.22-31.52, p <0.001). (17) The time of patient disposition was also essential to determine patients' LOS. Patients disposed of after 6 hours were likelier to have a longer LOS (OR: 0.15). Patients with many clinical and laboratory assessments stayed longer in the emergency department (OR: 1.19, 95% CI: 1.08-1.42).

Our study has some limitations. We did not follow up on the patients with prolonged LOS to assess the patients' outcomes in such patients. We also could not determine the cause and risk factors of delayed disposition.

Conclusion

Female sex, old age, evening admission, level I triage, disposition order after 6 hours, and high number of clinical and lab tests were significant risk factors of prolonged LOS.

Declarations

Data Availability statement
All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate.
Approved by the department concerned. (IRB-SIHISB-382/22)

Consent for publication
Approved

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Not applicable

Conflict of interest

The authors declared an absence of conflict of interest.

Authors Contribution

MUHAMMAD HAMZA AKRAM (PG Y4)
Final Approval of version
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Revisiting Critically & Data Analysis
MUHAMMAD AWAIS KHALID (SMO)
Drafting, Concept & Design of Study

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