



PATTERN OF EMERGENCY DEPARTMENT ADMISSIONS AND THEIR CLINICAL OUTCOMES AT A TERTIARY CARE TEACHING HOSPITAL

Dr. Visani Tejas R^{1*}, Dr. Rajkumar Garg², Dr. Naziya Hamid³, Dr. Chanchal Shree Verma⁴, Dr. Shivam Kumar Saini⁵, Dr. Riddhi A Amreliya⁶, Dr. Vishvesh Lakhani⁷

^{1*}Post Graduate Resident-3, Department of Emergency Medicine, KD Medical College Hospital and Research Center, Mathura, Uttar Pradesh.

²Professor and Hod, Department of Emergency Medicine, KD Medical College Hospital and Research Center, Mathura, Uttar Pradesh.

³Assistant Professor, Department of Emergency Medicine, KD Medical College Hospital and Research Center, Mathura, Uttar Pradesh.

⁴Post Graduate Resident-3, Department of Emergency Medicine, KD Medical College Hospital and Research Center, Mathura, Uttar Pradesh.

⁵Post Graduate Resident-3, Department of Emergency Medicine, KD Medical College Hospital and Research Center, Mathura, Uttar Pradesh.

⁶Post Graduate Resident-3, Department of Rachana Sharir (Anatomy), J. S. Ayurveda Mahavidyalaya, Nadiad, Gujarat.

⁷Post Graduate Resident-1, Department of Emergency Medicine, KD Medical College Hospital and Research Center, Mathura, Uttar Pradesh.

Corresponding Author: Dr. Visani Tejas R

Post Graduate Resident-3, Department of Emergency Medicine, KD Medical College Hospital and Research Center, Mathura, Uttar Pradesh.

Email Id: tejasvisani@gmail.com

ABSTRACT

Background: Emergency departments (EDs) provide timely evaluation and management of patients with acute medical, surgical, and traumatic conditions. Understanding admission patterns and patient outcomes is essential for optimizing emergency care services, resource allocation, and quality improvement.

Aim: To evaluate the pattern of emergency department admissions and their clinical outcomes at a tertiary care teaching hospital.

Materials and Methods: This hospital-based cross-sectional observational study included 425 consecutive patients presenting to the emergency department over a 12-month period. Demographic characteristics, mode of arrival, presenting complaints, diagnostic categories, comorbidities, triage status, emergency interventions, duration of ED stay, and final clinical outcomes were recorded using a predesigned case-record form. Data were analyzed using descriptive statistics, while associations between categorical variables were assessed using the Chi-square or Fisher's exact test. A p-value <0.05 was considered statistically significant.

Results: The mean age of the participants was 43.8±19.6 years, and the majority were males (59.8%). Medical emergencies constituted the largest diagnostic category (40.5%), followed by trauma (19.8%) and surgical emergencies (14.8%). Fever (19.8%) and trauma (18.6%) were the most common presenting complaints. Nearly half of the patients (47.5%) were classified as green triage, whereas 13.2% required immediate resuscitation. Intravenous fluid administration (67.1%) and oxygen therapy (28.5%) were the most common emergency interventions. Overall, 39.5% of patients were discharged directly from the ED, 39.3% required ward admission, 9.6% required ICU admission, and the overall mortality was 1.7%. Clinical outcomes showed a significant association with triage category (p<0.001), with red and yellow triage patients experiencing higher rates of hospital admission, ICU transfer, and mortality than green triage patients.

Conclusion: Medical emergencies represented the predominant cause of ED admissions, while higher triage acuity was strongly associated with adverse clinical outcomes. Efficient triage, prompt emergency interventions, and appropriate resource utilization are crucial for improving patient outcomes and enhancing emergency care services in tertiary care teaching hospitals.

Keywords: Emergency Department, Admission Pattern, Clinical Outcomes, Triage; Emergency Medicine, Hospital Admission, Intensive Care Unit, Mortality.



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INTRODUCTION

The emergency department (ED) serves as the primary point of contact for patients requiring immediate medical evaluation and treatment. It plays a critical role in the early recognition, stabilization, and disposition of patients presenting with a broad spectrum of medical, surgical, trauma, and obstetric emergencies. Increasing population growth, urbanization, aging demographics, and the rising burden of non-communicable diseases have substantially increased ED utilization worldwide, resulting in overcrowding and greater demand for emergency care services. These challenges can adversely affect the quality of care, patient safety, and clinical outcomes if not addressed through evidence-based resource planning [1, 2].

Understanding the pattern of ED admissions is fundamental for optimizing healthcare delivery. Analysis of demographic characteristics, presenting complaints, disease profiles, seasonal variations, and modes of arrival provides valuable insights into the healthcare needs of the population served by a hospital. Such information assists administrators and policymakers in workforce planning, infrastructure development, emergency preparedness, and allocation of diagnostic and therapeutic resources. Furthermore, knowledge of admission patterns facilitates the development of targeted interventions to improve patient flow and reduce unnecessary delays in care [3-5].

Clinical outcomes of patients presenting to the ED, including hospital admission, intensive care unit (ICU) transfer, discharge, referral, and mortality, are widely recognized indicators of emergency care performance. These outcomes are influenced by multiple factors such as patient age, underlying comorbidities, disease severity, timeliness of intervention, and availability of specialized services. Evaluating these outcomes in conjunction with admission patterns enables identification of high-risk patient groups and provides opportunities to improve triage systems, clinical decision-making, and quality improvement initiatives [6-8].

In low- and middle-income countries, including India, emergency departments frequently experience resource limitations while managing a rapidly increasing patient load. Trauma, cardiovascular emergencies, infectious diseases, respiratory illnesses, poisoning, and neurological disorders remain common reasons for ED attendance, although their relative frequencies vary

across regions and healthcare settings. Local epidemiological data are therefore essential because patterns of emergency presentations and outcomes differ according to demographic characteristics, disease burden, referral practices, and institutional capabilities [9, 10].

Despite the expanding role of emergency medicine, comprehensive data describing admission patterns and associated clinical outcomes from tertiary care teaching hospitals in India remain limited. Generating institution-specific evidence can help identify prevailing disease trends, evaluate patient disposition, and support strategies aimed at improving emergency care delivery and resource utilization.

Therefore, the present study was undertaken to evaluate the pattern of emergency department admissions and their clinical outcomes at a tertiary care teaching hospital, with the objective of providing evidence that may contribute to improved emergency department planning, patient management, and healthcare policy.

MATERIALS AND METHODS

Study Design and Setting

This hospital-based cross-sectional observational study was conducted in the Emergency medicine Department of a tertiary care teaching hospital. The study was included 425 consecutive patients presenting to the emergency medicine department during the predefined study period of 12 months.

Inclusion Criteria

Patients of all age groups presenting to the emergency department during the study period and undergoing evaluation, treatment, observation, hospital admission, referral, or emergency intervention was included. Patients or their legally authorized representatives must provide informed consent wherever required.

Exclusion Criteria

Patients brought dead to the emergency department, those leaving before clinical assessment, patients with incomplete essential clinical records, and individuals who decline consent was excluded. Repeat visits by the same patient for the same clinical episode was counted only once.

Data Collection

Data was collected using a predesigned and pilot-tested case-record form. Information recorded were include age, sex, residence, mode and time of arrival, presenting complaint, provisional diagnosis, comorbidities, vital signs at presentation, Glasgow Coma Scale score, triage category, time from arrival to triage and physician assessment, investigations performed, emergency interventions, duration of emergency department stay, and final patient disposition.

Patients were classified according to the major diagnostic category, such as medical, surgical,

traumatic, neurological, cardiovascular, respiratory, gastrointestinal, toxicological, obstetric, pediatric, or other emergencies. Clinical outcomes were documented as discharge from the emergency department, admission to a general ward, admission to an intensive care unit, emergency surgery, referral to another centre, leaving against medical advice, or death.

Study Variables

The primary variables are the pattern of emergency department admissions and final clinical outcomes. Secondary variables are demographic characteristics, presenting complaints, diagnostic categories, triage status, comorbidities, mode of arrival, duration of emergency department stay, requirement for emergency interventions, hospital admission, intensive care unit transfer, and mortality.

Outcome Measures

The primary outcome was the distribution of patients according to major emergency diagnostic categories. Secondary outcomes were the proportions of patients discharged, admitted to a ward, transferred to an intensive care unit, referred, operated upon, leaving against medical advice, or

dying during emergency department care or hospitalization.

Statistical Analysis

Data were analysed using an appropriate statistical software package. Continuous variables were expressed as mean with standard deviation while categorical variables were presented as frequencies and percentages. The chi-square test or Fisher's exact test was used to assess associations between categorical variables. The independent-samples *t*-test or Mann-Whitney *U* test was applied for comparison of continuous variables between two groups, as appropriate. Multivariable logistic regression analysis may be performed to identify independent predictors of hospital admission, intensive care unit transfer, prolonged emergency department stay, or mortality. A *p*-value of less than 0.05 was considered statistically significant.

RESULTS

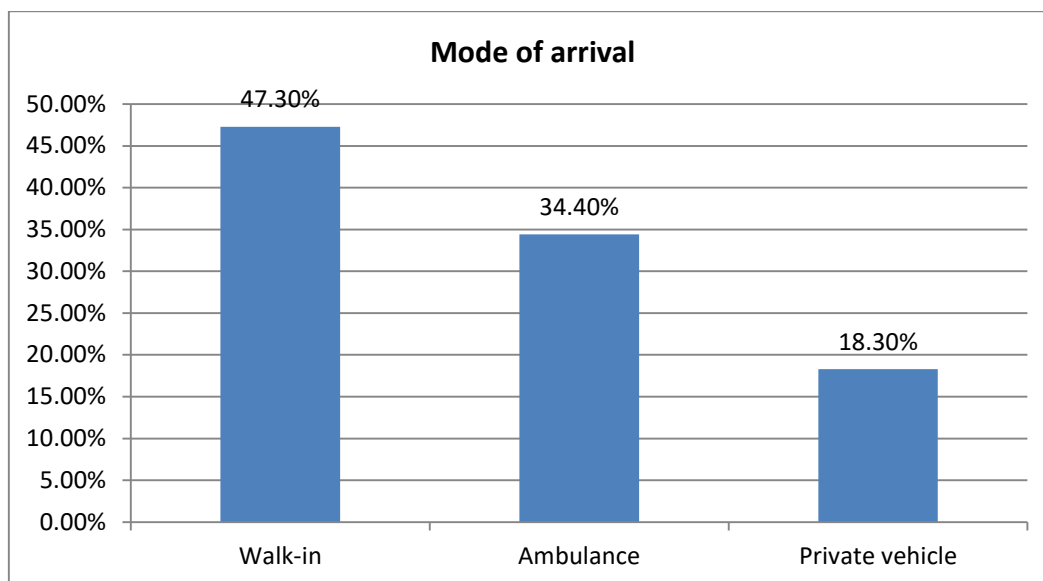
Among 425 patients, the mean age was 43.8±19.6 years. The largest proportion belonged to the 18–40-year age group (36.7%). Males constituted 59.8% of participants, while 55.8% were from urban areas.

Table 1: Baseline demographic characteristics of study participants (N = 425)

Variable		Frequency (n)	Percentage (%)
Age (years)	<18	42	9.9
	18–40	156	36.7
	41–60	139	32.7
	>60	88	20.7
	Mean age (years)	43.8 ± 19.6	
Gender	Male	254	59.8
	Female	171	40.2
Residence	Urban	237	55.8
	Rural	188	44.2

Nearly half of the patients (47.3%) arrived as walk-ins, whereas 34.4% were transported by ambulance.

Graph 1: Mode of arrival to the emergency department



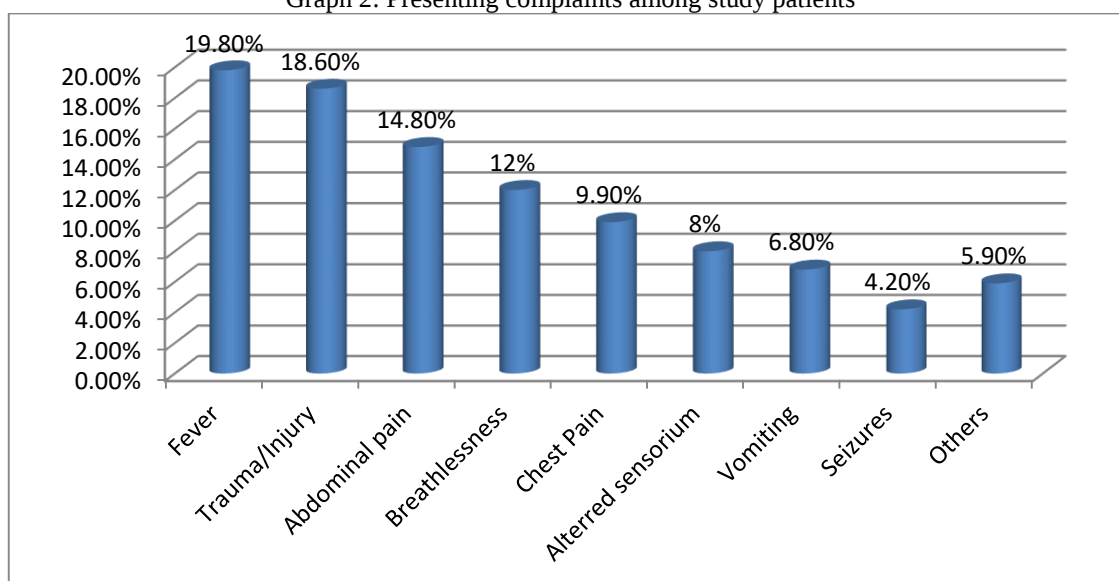
Medical emergencies were the most common diagnosis (40.5%), followed by trauma (19.8%) and surgical emergencies (14.8%).

Table 2: Major diagnostic categories of emergency admissions

Diagnosis	Frequency (n)	Percentage (%)
Medical emergencies	172	40.5
Trauma	84	19.8
Surgical emergencies	63	14.8
Cardiovascular	34	8.0
Neurological	28	6.6
Respiratory	22	5.2
Poisoning	12	2.8
Obstetric/Gynecological	10	2.3

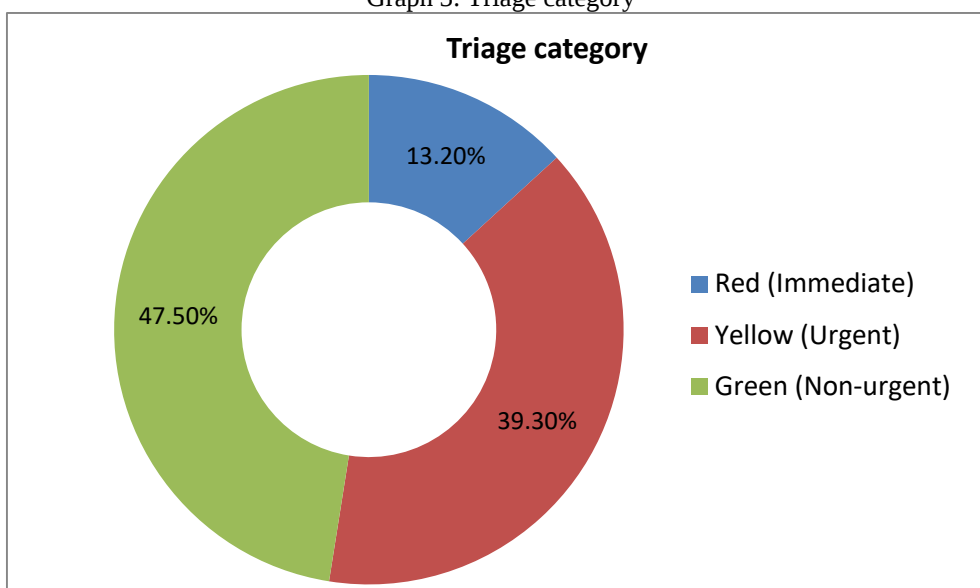
Fever (19.8%) and trauma (18.6%) were the leading presenting complaints, followed by abdominal pain (14.8%).

Graph 2: Presenting complaints among study patients



Nearly half of the patients (47.5%) were classified as green triage, while 13.2% required immediate resuscitation.

Graph 3: Triage category



Hypertension (20.7%) and diabetes (17.2%) were the commonest comorbid conditions, while 43.1% had no known comorbidity.

Table 3: Comorbidities

Comorbidity	Frequency (n)	Percentage (%)
Hypertension	88	20.7
Diabetes mellitus	73	17.2
Chronic kidney disease	24	5.6
Chronic respiratory disease	31	7.3
Coronary artery disease	26	6.1
No comorbidity	183	43.1

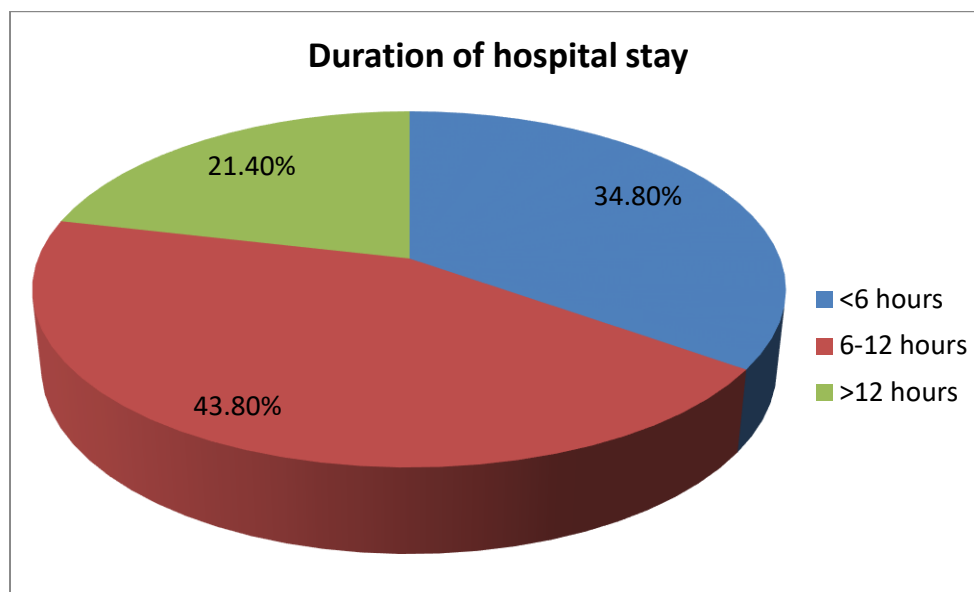
Intravenous fluid administration (67.1%) was the commonest intervention, followed by oxygen therapy (28.5%).

Table 4: Emergency interventions performed

Intervention	Frequency (n)	Percentage (%)
Intravenous fluids	285	67.1
Oxygen therapy	121	28.5
Nebulization	48	11.3
Blood transfusion	27	6.4
Mechanical ventilation	23	5.4
CPR	12	2.8

Most patients (43.8%) stayed in the emergency department for 6–12 hours, whereas 21.4% remained for more than 12 hours.

Graph 4: Duration of emergency department stay



Approximately 39.5% of patients were discharged directly from the emergency department, while 39.3% required hospital admission. ICU admission occurred in 9.6%, and overall mortality was 1.7%.

Table 5: Final patient disposition

Outcome	Frequency (n)	Percentage (%)
Discharged	168	39.5
Admitted to ward	167	39.3
ICU admission	41	9.6
Emergency surgery	18	4.2
Referred	16	3.8
Left against medical advice	8	1.9
Death	7	1.7

Clinical outcome was significantly associated with triage category (χ^2 test, $p < 0.001$). Patients classified as red or yellow triage had substantially higher rates of ward admission, ICU transfer, and mortality than those in the green category.

Table 6: Association between triage category and clinical outcome

Triage	Discharged	Ward admission	ICU	Death	Total	p-value
Green	132	66	3	1	202	
Yellow	34	84	44	5	167	
Red	2	17	21	1	56	
Total	168	167	68	7	425	<0.001

DISCUSSION

This study demonstrated that adults aged 18–40 years constituted the largest proportion of emergency department (ED) admissions, with a predominance of male patients. Similar demographic trends have been reported in recent multicenter studies, where young and middle-aged adults represented the majority of ED visits because of greater occupational exposure, trauma, and acute medical illnesses. Male predominance has also been consistently attributed to increased exposure to road traffic accidents, workplace injuries, and cardiovascular risk factors.

Medical emergencies accounted for the largest diagnostic category, followed by trauma and surgical emergencies. This pattern reflects the epidemiological transition in low- and middle-income countries, where non-communicable diseases coexist with a high burden of trauma. Comparable findings have been reported by Müller et al [11] and Horan et al [12], who observed that acute medical illnesses remain the principal reason for ED utilization, while trauma continues to be a major contributor to emergency admissions. Fever and trauma were the leading presenting complaints in the present study. Similar symptom profiles have been described in tertiary hospitals in

developing countries, reflecting the continued burden of infectious diseases together with increasing accidental injuries. These findings highlight the importance of maintaining adequate emergency resources for both infectious and trauma-related conditions [13, 14].

Nearly half of the patients were categorized as green triage, whereas only a small proportion required immediate resuscitation. This distribution suggests that although many patients present with less urgent conditions, a significant minority require rapid life-saving interventions. The strong association between triage category and clinical outcome observed in this study is consistent with previous reports demonstrating that standardized triage systems accurately predict hospital admission, intensive care requirement, and mortality [12, 15].

Hypertension and diabetes mellitus were the most common comorbidities among ED patients, emphasizing the growing impact of chronic non-communicable diseases on emergency care. Similar observations have been reported internationally, where cardiovascular and metabolic disorders substantially increase the risk of hospitalization and adverse outcomes among emergency patients [13, 16].

Intravenous fluid administration and oxygen therapy were the most frequently performed emergency interventions, reflecting their fundamental role in the initial stabilization of critically ill patients. Early implementation of these supportive measures remains a cornerstone of emergency management and has been associated with improved physiological stabilization before definitive treatment.

Approximately two-fifths of patients required hospital admission, whereas fewer than 10% required ICU care and overall mortality remained low. These findings indicate that most emergency presentations were successfully managed without critical care admission, while patients triaged as high priority had significantly poorer outcomes. Similar relationships between triage severity and disposition have been demonstrated in recent studies evaluating emergency department performance indicators [17, 18].

Overall, the findings indicate that systematic triage, prompt emergency interventions, and early identification of high-risk patients are essential for improving patient outcomes and optimizing resource utilization in tertiary care emergency departments.

CONCLUSION

This study demonstrated that medical emergencies constituted the largest proportion of emergency department admissions, followed by trauma and surgical emergencies, with young adults and males representing the majority of patients. Most patients

were categorized as non-urgent; however, higher triage categories were strongly associated with hospital admission, intensive care unit admission, and mortality. Intravenous fluid therapy and oxygen supplementation were the most frequently required emergency interventions, reflecting the need for prompt initial stabilization. These findings emphasize the importance of efficient triage, timely emergency management, and appropriate resource allocation to optimize patient outcomes. Continuous monitoring of admission patterns and clinical outcomes can support evidence-based planning, improve emergency department performance, and enhance the quality of emergency care in tertiary care teaching hospitals.

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