

Research Article**Utilization of Emergency Services of a Tertiary Care Hospital: Work Load, Time Trends, Common Diseases, Length of Stay and Admission Pattern**Rehana Khurshid¹, M. Ashraf Wani^{2*}, K.K.Pandita³, Muneer A Bhat⁴, Farooq A. Jan⁵, Shahnawaz H. Khan⁶^{1,2,4} Senior Resident, Department of Hospital administration, Sher-i-Kashmir Institute of Medical Sciences (SKIMS), Srinagar, India³ Assistant Surgeon, Department of Health and Family Welfare, Jammu and Kashmir, India⁵ Additional Professor, Department of Hospital administration, Sher-i-Kashmir Institute of Medical Sciences (SKIMS), Srinagar, India⁶ Post Graduate Student, Department of Hospital administration, Sher-i-Kashmir Institute of Medical Sciences (SKIMS), Srinagar, India***Corresponding author**

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Abstract: The emergency department is a core clinical unit and busiest area of a hospital. The experience of patients attending emergency department significantly influences patient satisfaction and the public image of the hospital. Overcrowding in emergency departments is a common problem. In planning emergency services the patient load is very important factor. The objective was to study the utilization of Emergency Services of Sher-i-Kashmir Institute of Medical Sciences (SKIMS), Srinagar with regard to work load, time trends, common diseases, length of stay and admission pattern. A record based retro-prospective method was used to study the clinical records of patients to determine the type of sickness, time trends, length of stay and pattern of admission. Simple linear regression model was used for trend analysis. The study revealed an increasing trend of patients attending ED across time. On an average about 70–80 patients are admitted from the emergency services daily. Overall there was 18.38% increase in five years period. It is expected that patient load will get doubled in 2032-2033. The study of utilization of an ED of a tertiary care hospital will help to focus on future planning both short term and long term so that demand can be met efficiently and effectively in future. Demand can be determined by average daily emergency admissions. Besides, it will also help in addressing other associated problems like overcrowding, future projection of patient load, quality of care, frequency of medical errors, rate of readmissions and referral pattern of patients in ED.

Keywords: Emergency department, Length of Stay, Trend analysis, Common diseases, Admission pattern

INTRODUCTION

The emergency department is a core clinical unit of a hospital and the experience of patients attending the emergency department significantly influences patient satisfaction and the public image of the hospital. Its function is to receive, triage, stabilize and provide emergency management to patients who present with a wide variety of critical, urgent and semi urgent conditions whether self or otherwise referred. The emergency department also provides for the reception and management of disaster patients as part of its role within the disaster plan of each region [1].

An emergency is a condition determined clinically or considered (perceived) by the patient or his/her relatives as requiring urgent medical services failing which it could result in loss of life, limb or organ [2].

Emergency department (ED) of a hospital, therefore, is a part of hospital to which person injured in road accidents or those suffering from serious complications are taken for urgent treatment. In planning emergency services the patient load is very important factor. Overcrowding in emergency departments is a common problem. One out of eight beds is occupied by an injured patient. India is presently facing double burden of diseases, on one hand we have burden of communicable diseases like acute respiratory infections, diarrheal disorders, tuberculosis, malaria, HIV/AIDS and on the other hand we have non-communicable diseases (NCD's) like diabetes, coronary heart disease, cancers and other degenerative disorders [3].

Emergency department utilization has been growing rapidly in the United States, overall and per capita. Much of this growth is associated with ED visits for conditions that are either non-emergent or treatable in

primary care settings. This trend has implications beyond the ED as it signals problems or dissatisfaction with the performance and accessibility of local primary care delivery systems [4].

In 2006, the Institute of Medicine (IOM) released a report describing serious problems confronting hospital EDs across the nation. These include various signs of overcrowding such as diversion of ambulances to other hospitals, patients boarding in the ED until an inpatient bed becomes available and excessive wait times for care. The regular occurrence of ED overcrowding raises concern about the hospital ability to respond to a mass casualty event such as a natural disaster [5]. Overcrowded ED's also create an environment where medical errors are more likely and overall quality of care is below its potential [6].

Wilson & Nguyen reported that across America, hospital emergency departments are in crisis. For many communities, the local hospital ED has become the linchpin of their health care safety net. With a legal obligation to see patients at all times and with more people than ever seeking their services, EDs nationwide are bursting at the seams [7].

Sher-i-Kashmir Institute of Medical Sciences (SKIMS) Soura, Srinagar is a 700 bedded tertiary care teaching hospital of Jammu & Kashmir which receives patients from all the three regions of Jammu & Kashmir. The population of J & K is about 12.5 million. Emergency department of SKIMS is divided in to four levels i.s. levels I to IV. Level I & II serve as emergency reception rooms having total of 47 couches for both medical and surgical emergencies. While as level III & IV serve as emergency surgical and medical wards having total of 65 beds. SKIMS, Srinagar is the only neurotrauma center in the state of Jammu & Kashmir which is an integral part of this tertiary care institute. Hence SKIMS, ED receives almost all neurotrauma cases besides, other emergencies. The

patient records are maintained by medical record department of SKIMS. ED service of SKIMS being the major emergency service of Jammu & Kashmir, it was hence, considered appropriate to conduct this study on this topic.

METHOLOGY

After permission from ethical committee, a retro-prospective study for a period of three months duration was carried out with effect from Oct. 1, 2013 to Dec. 31, 2013. This was a record based study wherein clinical records of the patients, available in medical record department, who had reported to the ED of a tertiary care hospital from 2007 to 2012 were studied. Besides, type of sickness, average length of stay and pattern of admission were studied prospectively for the same period i.s. from Oct. 1, 2013 to Dec. 31, 2013 for the patients who attended emergency department of the hospital during this time period. Simple linear regression model was used for trend analysis.

Data was collected on a proforma .Descriptive statistics were used and analyzed as follows:

- Average daily admission and its ratio to total admissions
- Trends in patient load from 2007
- Distribution of patients across different specialties from 2007
- Type of sickness and pattern of admission from Oct. 2013 to Dec. 2013.

RESULTS

Patient attendance in Emergency Medicine Department over five years revealed an increasing trend of patients attending ED across time. Overall there was 18.38% increase in five years period. Given the same trend and using simple linear regression model, it is expected that patient load will get doubled in 2032-2033 i.s.in 25 years period.

Table 1: Showing trend in ED patient attendance

Year	E D Attendance	Average Daily Attendance
2007-2008	67855	185.90
2008-2009	75520	206.90
2009-2010	76685	210.09
2010-2011	76221	208.82
2011-2012	80367	220.18

Table 2: Emergency attendance verses total OPD attendance

Year	Total OPD Attendance	Total emergency Attendance	% age ED attendance / OPD attendance
2007-2008	456805	67855	6.73
2008-2009	496973	75520	6.58
2009-2010	436305	76685	5.69
2010-2011	505363	76221	6.63
2011-2012	563985	80367	7.01

It is evident that emergency attendance as a %age of OPD attendance has remained between 6-7% during this period.

Table 3: Showing emergency admissions across time

Year	Total Emergency Admissions	Average Daily Emergency admissions
2007-2008	27214	74.56
2008-2009	29583	81.05
2009-2010	28361	77.70
2010-2011	28084	76.94
2011-2012	25604	70.15

On an average about 70–80 patients are admitted from the emergency services daily. There was mild to moderate increase in emergency admissions from 2008 to 2010 (Table 3). This was due to increase in intensity of political conflict related unrest in the valley during this time. Average length of stay was found to be between 22-24 hours.

Table 4: Showing total admission verses %age of emergency admissions

Year	Total Admission	Emergency Admission	%age
2007-2008	45845	27214	59.36
2008-2009	51377	29583	57.58
2009-2010	51565	28361	55.00
2010-2011	47280	28084	59.39
2011-2012	47028	25604	54.44

Emergency Admissions as a %age of total admissions to the hospital has remained static at around 55-60%

Table 5: Specialty-wise distribution of patients admitted from emergency

Specialty	2008	2009	2010	2011	2012
Cardiology	2321	2674	2650	2272	2487
CVTS	887	917	926	1165	1059
Neuro Surgery	9703	9811	9763	9579	7553
Neurology	3087	3322	3874	3700	3166
Gen. Surgery	3504	3933	3503	3021	2094
Gen. Medicine	3785	4225	3839	3270	3505
Endocrinology	1407	1501	1314	1161	960
Gastro-Enterology	4322	4961	5163	4811	3591
Nephrology	1498	1523	1543	1414	3093
Urology	3458	3884	2985	2584	1172
Surgical GE	295	305	457	302	295
Nuclear Med.	78	90	70	91	105
Pediatric Surg.	1397	1457	1473	1419	1256
Plastic Surg.	1402	1524	1410	1313	1976
PMR	118	150	129	101	109
Pulmonary Medicine	960	1221	809	805	925
Neonatology	734	685	1227	1371	1222
Anesthesia & critical care	34	55	276	23	9
Medical Oncology	4534	4646	5129	4401	7797
Radiation Oncology	3260	3382	4063	3603	2793
Clinical Hematology	1032	1111	932	816	1564
Gynae/Obs.	2497	2557	2594	2793	3062
Surg.Oncl.					202
Rheumatology					81
Geriatrics					72

Highest number of the admissions occurred in the specialties of neurosurgery, general surgery, urology, oncology (medical oncology, radiation oncology, and clinical hematology), general medicine, neurology, gastroenterology, cardiology, nephrology and endocrinology. It also shows that specialties like surgical oncology, rheumatology and geriatric medicine have been recently commissioned in the hospital (Table 5).

DISCUSSION

The Emergency room of this large tertiary care hospital which has a capacity of 40-45 patients is almost always overcrowded and busiest area of the hospital and shows increasing trend of patient load across time. This is due primarily to ever increasing growth of population, increase in the incidence of some life style related conditions like diabetes, coronary artery disease, Hypertension, chronic pulmonary obstructive airway diseases like asthma and chronic bronchitis, cancers, psychiatric disorders and especially accidents. As a result patients have to wait in this overcrowded area for a relatively longer time until bed becomes available. This leads to increased length of stay in the hospital, increased risk of acquiring hospital infection, increased risk of medical errors, patient dissatisfaction and of course increased cost of care. The ED receives approximately 200-300 patients daily and accounts for 55-60% of admissions to the hospital. On average 70-80 patients are admitted daily through ED. ED is accessible 24x7 but the most admissions occur in the afternoon. Majority of patients are admitted under neurosurgery, general medicine and oncology specialties. 11% admissions were of pediatric age group and 9% belonged to age group 70 and plus. About 6% patients were readmitted within 30 days of discharge mostly for the same condition.

The common diseases which were encountered in ED are diabetes and related co-morbidities, hypertension, heart related problems, chronic bronchitis and asthma, accidents and other injuries including man-animal conflicts.

In planning of emergency services the patient load is very important factor. While planning a new facility or expansion of an existing facility 20-25% must be added to the present patient volume to approach to the load at completion, another 25% should be added to avoid overcrowding in the first four to five years of operation.

India is presently facing double burden of diseases, on one hand we have burden of communicable diseases like acute respiratory infections, diarrheal disorders, tuberculosis, malaria, HIV/AIDS and on the other hand we have non-communicable diseases (NCD's) like diabetes, coronary heart disease, cancers and other degenerative disorders [3].

The study reveals that the road traffic accidents and other injuries are a major burden that has a great bearing on emergency departments of large hospitals.

The study also revealed an increasing trend of patients attending ED across time. Overall there was 18.38% increase in five years period. Given the same trend, it is expected that the patient load will get doubled in 2032-2033 i.e. in 25 years period.

The study of trend analysis in the ED of a tertiary care hospital will help to focus on the future planning both short term and long term so that demand can be met efficiently and effectively in future. Demand can be determined by average daily emergency admissions. Besides, utilization of an ED of a tertiary care hospital will help in addressing other associated problems like overcrowding, future projection of patient load, quality of care given which is usually below expected, frequency of medical errors, rate of readmissions within 30 days of discharge and referral pattern of patients in ED.

Wilson & Nguyen argue that across America, hospital emergency departments are in crisis due to overcrowding issue. Despite this, many hospitals have done little to address the patient flow obstacles that lead to overcrowded EDs. It is important to realize that emergency department crowding is not an emergency department problem; it is in fact a hospital wide problem. They suggest that to facilitate patient flow coordination, a patient flow manager should be responsible for ensuring that patients in emergency department are transported to their assigned beds on time. The push system should be replaced with a pull system, which is a just-in-time component that allows the floors to pull patients from emergency department when the floors have vacant beds, versus the emergency department pushing patients onto floors where patients may not belong. The creation of a hospital wide patient flow team with people from different departments to oversee the implementation of the changes is essential to completing patient flow changes to reduce emergency department crowding [7].

Emergency department crowding is an increasingly recognized problem across the world. While the evidence is clear of the harms, future work needs to systematically evaluate interventions and guide evidence based policy. Policy makers and commissioners of emergency services need to consider emergency department crowding as an unintended consequence of policies and consider how they can incentivize the whole emergency healthcare system to function effectively [8].

At a hospital in California the volume of ED patients rose from 50,000 in 2000 to 70,000 in 2010 and they are expected to grow to 95,000 by end of this decade. Most noteworthy in the analysis were the number of hospitals with ED visits that are projected to exceed 100,000 patients per year [9].

In our study average length stay was found to be 22-24 hours in emergency room and more than two days in emergency ward which is too long and this also suggests that how overcrowded the ED would be. Angela Wicks (2010) focuses on average length of stay in the emergency department and the aim was to improve patient satisfaction and reduce waiting time and movement of patients throughout the hospital system by decreasing average length of time that patients stay in the emergency department [10].

ED length of stay begins when the patient is first registered or triaged in the ED and ends when the patient physically leaves the ED. An ED length of stay benchmark must be measurable and be linked to an accountability framework in order to adequately assess performance. Reliable, complete and accurate data such as ED process time and ED length of stay must also be collected at every ED so that progress can be measured and evaluated [11].

Our study shows a mild to moderate increase in emergency admissions from 2008 to 2010 (Table 3). This was due to increase in intensity of political conflict related unrest in the valley during this time. This highlights the importance of ED during disaster situations and also raises the concern about ED^s ability to respond during disaster situations.

In our hospital highest number of the admissions occurred in the specialties of neurosurgery, general surgery, urology, oncology (medical oncology, radiation oncology and clinical hematology), general medicine, neurology, gastroenterology, cardiology, nephrology and endocrinology (Table 5). This indicates that the incidence of ailments like trauma due to accidents (both neurotrauma and other traumas), cancers (all types), life style related conditions like coronary artery disease, Hypertension and cerebrovascular accidents, chronic pulmonary obstructive airway diseases like asthma and chronic bronchitis and diabetes is high among our population. Specialties like surgical oncology, rheumatology and geriatric medicine have been recently commissioned in the hospital.

CONCLUSION

The study revealed an increasing trend of patients attending ED across time. Overall there was 18.38% increase in five years period. Given the same trend, it is expected that the patient load will get doubled in 2032-2033 i.s. in 25 years period. The study reveals that the road traffic accidents and injuries have a great bearing on emergency departments of large hospitals. The study of trend analysis in the ED of a tertiary care hospital will help to focus on the future planning both short term and long term so that demand can be met efficiently and effectively in future. Demand can be determined by average daily emergency admissions. Besides, utilization of an ED of a tertiary care hospital will help in addressing other associated problems like overcrowding, future projection of patient load, quality of care given which is usually below expected, frequency of medical errors, rate of readmissions with in 30 days of discharge and referral pattern of patients in ED.

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