

## Original Articles

### Emergency Section and Overcrowding in a University Hospital of Karachi, Pakistan

R. Rehmani

Section of Emergency Medicine, The Aga Khan University Hospital, Karachi.

#### Abstract

**Objective:** To quantify the extent of Emergency Section overcrowding at a tertiary care hospital and to identify possible solutions.

**Methods:** This was a retrospective chart review of all the patients presented to the Aga Khan University Hospital's (AKUH) Emergency Section (ES). The ES information system has an automatic patient log and generates daily report for patients who stay longer than 6 hours. The charts of all patients who stayed longer than 6 hours were reviewed.

**Results:** Among 9630 patients, 1999 (20.8%) were held in the ES for more than 6 hours. Of those 134 (6.7%) were discharged from the ES, while 1535 (76.8) were admitted to the hospital. About two-third of all delays were due to unavailability of bed, followed by financial constraints, involvement of multiple specialty, and because the admitting residents wanted to investigate the patients more thoroughly.

**Conclusion:** Significant overcrowding exists in Emergency Section of the hospital. Four solutions were proposed: (1) early discharges of in-patients, (2) creation of a holding unit, (3) flexible ward assignment, (4) active inter-facility transfer. These efforts will lead to an optimal care in the Emergency Section in rising patient demand.(JPMA 54:233;2004).

## Introduction

Emergency department (ED) overcrowding is a serious and growing problem throughout the world.<sup>1,2</sup> Emergency department crowding has become a major barrier to receiving timely emergency care in the United States. Patients who present to EDs often face long waiting times to be treated and, for those who require admission, even longer wait for an inpatient hospital bed.<sup>3</sup> The United States is not alone in the overcrowding problem. In Canada, the issue of overcrowding in "accident and emergency rooms" is a serious national issue<sup>4</sup> and a recent study used an expert panel to identify factors that were deemed key determinants of ED crowding.<sup>5</sup> In Australia, ED overcrowding in Sydney has resulted in ambulance diversions from hospitals.<sup>6</sup> Other countries, including Great Britain and Taiwan, have also reported overcrowding.<sup>7</sup>

Reasons for Overcrowding in ED are numerous.<sup>8</sup> Recently, the ACEP Crowding Resources Task Force adopted the definition of ED crowding to be "a situation in which the defined need for emergency services outstrips available resources in the ED."<sup>9</sup> This situation occurs in hospital EDs when there are more patients than staffed ED treatment beds and wait times exceed a reasonable period. Overcrowding has led to a number of problems, including prolonged waiting times, increased suffering for those in pain, unpleasant therapeutic environments, and, in some cases, poor clinical outcomes.<sup>8</sup>

The EDs are structured to evaluate and manage patients for couple of hours.<sup>10</sup> Patients without serious illnesses are discharged and 30%-40% of patients found to have serious illnesses are admitted to the hospital. It can take approximately an hour to transfer the patient to a hospital bed. When the delay in transfer of admitted patients to a hospital bed is longer than 4 hours, this is classified as overcrowding. When this happens the ED becomes grid locked. In our ES, a major teaching hospital in Pakistan, the prolonged stay of large number of patients has been the major problem encountered in daily practice. The scenario is prevalent not only in our hospital, but also in other hospitals in the country. Because ED crowding is a reflection of larger supply and demand mismatches in the health care system, the problem cannot be solved by examination of the ED in isolation. The primary objective of this study was to analyze some of the specific causes of overcrowding and possible solutions. By analyzing the duration and causes of prolonged stay, we attempted to better delineate the problem and propose possible solutions. The data may be helpful in persuading hospital administrators to adopt necessary changes to improve the quality of ES patient care.

## Methods

### Study Design

This study was performed as a retrospective chart review of all the patients who stayed in the ES for 6 hours or more, between January to March 2001 to examine the causes of prolonged stay in our ES, leading to overcrowding. The study was approved by the hospital ethical committee with a waiver of the requirement for informed consent.

### Study Setting

The study was conducted at a 550-bed-acute care urban institution, The Aga Khan University hospital with an annual census of about 38,000 patient visits at ES and an emergency medicine residency-training program. The ES is staffed by full-time emergency physicians, residents from emergency medicine training program, and rotating senior residents from the Departments of Medicine, Surgery, and Pediatrics. Emergency physicians admit the patients in internal medicine and pediatrics, while the residents admit the patients in all other specialties.

More than 70% of the 410,000 patients who visit AKUH every year are from low and middle-income households. Often they cannot bear the full cost of their medical treatment. To support the treatment of such needy patients, there is a Patient Welfare Program. Patients who find that they are unable to pay the full cost of the Hospital's inpatient services, may request the Financial Counselors for welfare assistance. However, in a life-threatening situation, the patient is admitted first and the request for welfare assistance may be made after the admission. The Patients' 'Behbud Society for AKUH', is another Society for additional monetary help through Zakat funds.<sup>11</sup>

For this study, prolonged length of stay was defined as the stay being longer than 6 hours in the ES. All patients presented to the ES were selected on the basis of the following inclusion criteria: (1) stay in the ES for 6 hours or more. We used the Emergency Patients Information System (EPIS) for the study. EPIS records the date and time of registration for each ES visit. Patients register as soon as they enter the department; therefore, the registration time identifies when they arrived. The EPIS also generates daily report for patients who stay longer than 6 hours in the ES and included patients' length of stay in ES, destination and the specialty under which they are admitted. All charts of patients who stayed longer than 6 hours were reviewed. The reasons for the prolonged stay were abstracted from the ES charts.

A data form was created for data extraction. A single reviewer performed chart review and data collection in a non-blinded manner using the physician and nurse reports

from the ES record. Demographic data were recorded and included age and sex. Explicit criteria for clinical data were defined before chart review and included the following:

1. Patients' admitting diagnosis
2. Patient's disposition: admission to hospital, discharged home, transferred to other facility, left against medical advice, expired in ES, and dead on arrival.
3. Patients' reasons for delay: lack of beds for patients admitted to the hospital, financial constraints, multiple consultations due to increased complexity and acuity of patients presenting to the ES, priority list in admission office, problems with language and cultural barriers, delays in service provided by radiology, laboratory, and ancillary services, and shortage of staff.

The data was entered in SPSS for Windows version 7.5 and Microsoft Excel Version 97 and analyzed.

## Results

From January to March 2001, 9630 patients visited the ES. Among them, 1999 (20.8%) patients were held in the ES for more than 6 hours. Of the 1999 patients, 134 (6.7%) were discharged from the ES, while 1535 (76.8%) were admitted to the hospital. In addition, 240 (12%) were transferred to other hospitals; 65 (3.25%) left the section against medical advice and 25 (1.25) expired in the section (Figure).

Figure. Disposition of ES patients during the study.

Of the 134 patients who stayed in the ES for more than 6 hours before discharge, 80% waited for their blood tests, 15% for service consultations, and 5% for the ultrasound examination.

Sixty-four percent of patients were not admitted within 6 hours because there was no free bed and 18% because of financial constraints. In 8% patients, more than one department or subspecialty was involved and no one would take primary responsibility. In 6% the admitting residents wanted to investigate the patients more thoroughly. Sixty two (4%) had social problems: 20 could have been treated in outpatient clinics; 30 needed home or nursing home care, but neither was available; and the another 12 had personal problems that could not easily be addressed.

Of the 1535 admitted patients who stayed in the ES for longer than 6 hours: 1182 (77%) had medical conditions, 307 (20%) had traumatic or surgical conditions, 31 (2%) had pediatric problems and 15 had miscellaneous problems. (Figure).

## Discussion

Emergency Department overcrowding is closely related to a decrease in both subjective patient satisfactions<sup>12,13</sup> and objective quality care.<sup>14-16</sup>

In our study, 134 patients stayed in the ES for more than 6 hours before the discharge. Of them 80% waited for their blood tests, 15% for service consultations, and 5% for the ultrasound. This system issue is now rectified with organizational reform, and all the patients are now discharged home in 2 hours.

### Bed Availability

The most frequent reason for ES over crowding in our study, was the inability to move admitted patients from the ES to an inpatient bed, as in other studies.<sup>17,18</sup> The first step in solving this problem, therefore, is to maximize the hospital's ability to accept additional ES patients into wards.<sup>4,19</sup> Expanding inpatient hospital bed capabilities, especially telemetry, and intensive care unit is a long-term solution. The beds may be available if the in-patients are discharged early in the day. We are working on it with the hospital administration, and at present, are able to send 80% of all discharged patients by 1600 hours.

Part of the problem is that most wards are rather rigidly designated to a single specialty, these patients are not welcome to any ward despite the fact they actually need more care than most of the other stable patients in the wards. We suggest that instead of serving limited roles, beds should be equipped and staffed to provide a broader range of care (e.g. medical, surgical, subspecialty) and must be interchangeable.<sup>4</sup> Bed assignments should be flexible. Appointment of an admission coordinator familiar with the admission and inpatient procedures of every ward may be helpful.<sup>4</sup> Recently, the hospital administration has assigned this task to a registered nurse, and we hope the issue will be addressed effectively.

The admission office assigns priority for inpatient beds, which frustrated both patients and ED staff. Emergency physicians are often caught in the middle.<sup>4,20</sup> We are currently working on a policy for setting bed availability priorities for patients awaiting hospital admission, whether from the ED or outpatient clinics. The priority depends on the nature of the patients' problems, but not who they are or where they are.<sup>4</sup>

### Observation Unit/Holding Area

Under ideal conditions, all patients should be admitted to acute wards in 6-hours. This was not possible,

however, without available beds. If the holding of admitted patients in the ES has become a common practice, it would be better to develop an observation unit for a subset of patients who would otherwise wait in the ES for a prolonged period while being treated for their conditions.<sup>4,21</sup> We can thus elevate the quality of care and comfort of the patients. The critical care beds would be then available for a new needy patient, and their waiting time may also be reduced. Many EDs in United States have developed observation units to further clarify which patient really needs hospital admission. With these observation units, many patients avoid hospital admission even after unsuccessful initial treatment in the ED that would otherwise lead to hospitalization. American College of Emergency Physician has published a textbook summarizing the scientific background for observation services<sup>22</sup>, reports on managing observation units<sup>23</sup> and chest pain units in EDs<sup>24</sup> as well as a textbook on implementing and managing observation units.<sup>25</sup>

### Financial Assistance

In our study, 18% of patients were not admitted within 6 hours because they had financial constraints. Although there is an established financial assistance program, significant families were not able to timely contribute towards their treatment. During 2000-2001, there was also influx of Afghani patients; a third-party was paying for their admission to the hospital. The admission processes of Afghani patients were very cumbersome and took a considerable amount of physician's time. This problem is resolved now as most of the Afghani patients have gone back to their homes.

### Interhospital Transfer

In our study, only 77.83% of patients that stayed more than 6 hours were admitted. Therefore measures should be taken for those that could not be accommodated, even after prolonged waiting. An important step will be to establish a mutually agreed-on system to facilitate interhospital transfer of patients.<sup>4,12</sup> It would be better for patients with relatively minor diseases who cannot be admitted at AKUH to be treated at a local hospital and referred back if needed. However, such strategy has some drawbacks: financial loss to the hospital when many patients are transferred out; many patients are reluctant to be transferred to an unfamiliar hospital; and some patients who cannot be admitted to wards in our hospital may also be rejected by other hospitals.<sup>7</sup> To provide long-term solution to this problem, emergency physicians and administrators from different hospitals should join to develop a realistic and effective protocol to facilitate interfacility transfer and prevent patient dumping.<sup>4</sup>

In our study, 81 patients left the hospital against the medical advice and could not be admitted. Two common reasons were preference for nearby hospital and compliance with the family physician's advice. We believe that talking to the families early can take care of the problem considerably. The home care nursing system and home health care system are very primitive and still under development and so, some patients not needing in-hospital care may be admitted.

ED overcrowding is a multidisciplinary problem that can only be solved by joint efforts of various departments and the administration of the hospital.

## Acknowledgements

I am grateful to all the physicians for timely completion of the charts for data collection. I am also indebted to The Aga Khan University for the financial assistance of the project.

## References

1. Andrulis DP, Kellermann A, Hintz EA, et al. Emergency departments and crowding in United States teaching hospitals. *Ann Emerg Med* 1991; 20: 980-6.
2. Derlet RW, Richards JR, Kravitz RL. Frequent overcrowding in US emergency departments. *Acad Emerg Med* 2001; 8:151-5.
3. Asplin BR, Magid DL, Rhodes KV, et al. A conceptual model of emergency department crowding. *Ann Emerg Med* 2003;42:173-80.
4. Kondro W. Relief at a price for emergency wards in Ontario. *Lancet* 1998;352:1451.
5. Schull MJ, Slaughter PM, Redelmeier DA. Urban emergency department overcrowding: defining the problem and eliminating misconceptions. *Can J Emerg Med* 2002;4:76-83.
6. Doherty L. Crowded hospitals diverting patients. *The Sydney Morning Herald* November 3, 1998.
7. Shih FS, Huei-Ming M, Chen SC, et al. ED overcrowding in Taiwan: facts and strategies. *Am J Emerg Med* 1999;17:198-202.
8. Derlet RW, Richards JR. Overcrowding in the nation's emergency department: complex causes and disturbing effects. *Ann Emerg Med* 2000;35:63-7.
9. ACEP Crowding Resources Task Force. Responding to Emergency Department Crowding: guidebook for chapters. Dallas TX: American College of Emergency Physicians; 2002. Available at: <http://www.acep.org/library/pdf/edCrowdingReport.pdf>. Accessed July 19, 2003.
10. Saunders CE, Makens PK, LeBlanc LJ. Modeling emergency department operations using advanced computer stimulation systems. *Ann Emerg Med* 1989;18:134-40.
11. The Aga Khan University, Available at [www.aku.edu/akuh/patientcare/intro/patwelindex.shtml](http://www.aku.edu/akuh/patientcare/intro/patwelindex.shtml). Accessed July 19, 2003.
12. Nerney MP, Chin MH, Jin L, et al. Factors associated with older patients' satisfaction with care in an inner-city emergency department. *Ann Emerg Med* 2001;38:140-5.
13. Hansagi H, Carisson B, Brismar B. The urgency of care need and patient satisfaction of a hospital emergency department. *Health Care Manag Rev* 1992; 17: 71- 5.
14. Miro O, Antonio MT, Jimenez S, et al. Decreased health care quality associated with emergency department overcrowding. *Eur J Emerg Med* 2000;7:79-80.
15. Miro O, Sanchez M, Milla J. Hospital mortality and staff workload. *Lancet* 2000; 356: 1356- 7.
16. Bindman AB, Grumbach K, Keane D, et al. Consequences of queuing for care at a public hospital emergency department. *JAMA* 1991; 266: 1091- 6.

17. Espinosa G, Miro O, Sanchez M, et al. Effects of external and internal factors on emergency department overcrowding. *Ann Emerg Med*. 2002; 39: 693-5.
  18. Forster AJ, Stiell I, Wells G, et al. The effect of hospital occupancy on emergency department length of stay and patient disposition. *Acad Emerg Med*. 2003; 10: 127-33.
  19. American College of Emergency Physicians: Measures to deal with emergency department overcrowding. *Ann Emerg Med* 1990; 19: 944-5.
  20. Olson CM. Hospital admission through the emergency department: the obstructed pathway. *JAMA* 1991;266:2274.
  21. American College of Emergency Physicians. Emergency department observation units. *Ann Emerg Med* 1988;17:95-6.
  22. Graff L (ed). *Observation Medicine*. Boston: Butterworth Heineman, 1993.
  23. Brillman J, Graff LG, Dunbar L, et al. American College of Emergency Physician Section of Observation Services: management of observation units. *Ann Emerg Med* 1995;25:823-30.
  24. Graff L, Joseph A, Andelmann R, et al. American College of Emergency Physician: Chest pain units in emergency departments. *Am J Cardiol* 1995;76:1036-39.
  25. Graff LG (ed). *Observation units: Implementation and management strategies*. Dallas, TX: American College of Emergency Physicians, 1998.
-