The effect of new emergency program on patient length of stay in a teaching hospital emergency department of Tehran

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ABSTRACT

Background and **Aim:** Ideally, the period of patients admitting in the Emergency Department (ED) should not exceed 6 hours. Prolonged of the patients admitting time affects the ED overcrowding, quality of patient care and patient satisfaction. To evaluate the efficacy of new programs and suggest new strategies to reduce the overcrowding in a typical overcrowded ED of general teaching hospital in Tehran city. **Materials and Methods:** In this descriptive case study, charts of patients held over 24 hours, in Imam Hossein Hospital affiliated to the Shaheed Beheshti Medical University, were reviewed from April 21rd on August 23rd, 2008. **Results:** Of 15,477 patients, 151 (1%) have been held in the ED over 24 hours. Reasons for this long-stay included:lack of available bed in Intensive Care Unit (ICU) (125 patients), lack of available bed in related wards (18 patients), poor final decision — making by physician (eight patient) **Conclusion:** Long-term stay of patients in ED of teaching hospital is a major problem. The most frequent cause is a limitation of inpatient beds. The long stay time had not been affected by paraclinic procedures, multispecialities involvement or the lack of obvious diagnosis. The following solution is proposed: (1) creation of a holding unit, (2) active inter-facility transfer and (3) governing admittance of patients who need ICU care to related wards.

Key words: ED, Imam Hossein hospital, over-crowded, Tehran

INTRODUCTION

Many emergency departments (EDs) across the country are crowded. Nearly half of EDs report operating at or above capacity. Regarding teaching hospitals are more economical and have to accept all admitted patients. Overcrowding in the EDs of teaching hospitals is more considerable. This is more critical about growing cities like Tehran. Patients who are referred to the hospital must triaged quickly, primarily by staff (nurse or physician) and the patients who require further inve-stigation and examination have to be organised into the emergency room, rest be treated as outpatients or some of them should be discharged.[1] It seems since 6 hours are sufficient time to determine, discharge or organisation

of patients. Therefore, there is a public expectation that EDs is capable of providing appropriate, timely care, and that, they will have the capacity to protect and care for the public in the event of a disaster or public health emergency. In one study, in Iran mean admitting time was 255 minutes and for outpatients it was 120 minutes.[1] Although, the ideal hospitalisation duration is 6 hours, in countries like Iran 24 hours is acceptable also, but for some reasons, which is listed below, it is prolonged.

Usually some of the tragedy patients are chronic and non-urgent, also some patients need further treatments out of emergency but still they are in emergency. There is growing number of individuals with chronic and complex illnesses who often come to the ED for evaluation and treatment. Individuals with multiple illnesses increase the time and number of clinicians required to address medical concerns.[2] In addition, there is evidence showing that physicians and clinics refer patients to the ED for a variety of reasons,[3] including convenience for after-hours care, reluctance to take on complex cases, liability concerns and the need for diagnostic testing that cannot be performed in their offices. Because of the high patient volumes that many EDs

experience, the ED may be the clinical area that the public is most familiar with it. When crowding leads to long wait times and a decreased ability to protect patient privacy and provide patient-centred care, the community's trust and confidence in the organisation may be compromised.[4] The numbers of patients, physician idea, hospital facilities, kind and the process of disease, the major cause reported for this problem is lack of bed in the ED and other units of the hospital, need for equipment and facilities like Magnetic Resonance Imaging (MRI), condition of hospital in big cities etc.[4]

There are some patients who visited 3-20 times in ED, which are more hospitalised in comparison of the patients who attended just 1-2 times.[5] In another study, the ED factor surveyed as a main factor, the researchers found out that the patients increased after the extension of ED, hospitalisation duration increased from 4.6-5.6 hours.[6] This situation occurred at Albert Einstein Medical Centre in Philadelphia, PA also. After doubling the capacity of its ED, the hospital still diverted ambulances 100-150 hours each month due to bottlenecks in other parts of the hospital.[7] It shows several reasons involved in overcrowding EDs. Considering when capacity is exceeded, there are heightened opportunities for error and overall quality of care is below its potential.[8] Therefore, some new strategies were applied in EDs during recent years in Iranian hospitals to cope with the mentioned problems through a new program. Thus, as recommended by other investigators, our goal was to investigate the factors that lead to overcrowding of the ED in Imam Hossein hospital in Tehran, Iran.

MATERIALS AND METHODS

This study was a descriptive case study, which is conducted through observation, interview and patient's file in Imam Hossein hospital. Imam Hussein hospital is ateaching hospital which has 500 beds located in the east of Tehran, and visiting about 1,500 patients in a month. All patients were first referred to ED before organising to other units of the hospital. The study population concluded the patients who were in the ED of Imam Hossein hospital over 24 hours during April-August of 2009.

The researcher completed the record sheets including the following information: Time was measured in minutes from the time of registration to the time of departure from the ED for all patients whether they were discharged, transferred to another facility, or admitted to an inpatient ward. We recorded (1) age, (2) gender, (3) diagnosis time (4) ED physicians on duty, (5) ED discharges, defined as patients leaving the ED whether admitted, transferred to another facility, or discharged, (6) intensive care unit (ICU) admissions, i.e. patients seen in the ED who are subsequently admitted to the ICU, (7) other services (internal, neurology, surgery, infection etc), (9) reasons for prolong admit (lack of bed in relevant ward, suspected diagnosis by physician, delay in par clinic examinations,

multiservices need and finally, expiry, discharge or leaving hospital patients by self consent.

Internal and external measures taken are assessed by emergency medicine residents from all the patients. Ethically, there was no any invasive testing and treatment intervention on patients.

Data analysis
Descriptive statistics used included frequency distributions, means and medians.

RESULTS

During the investigation time, 15,477 patients were admitted among which 36% were female and rest male [Figure 1]. About 1% (151/15,477) of admitted patients stayed in the ED for more than 24 hours. The total hospitalisation time was 62,393 hours that is 17% (11,054/62,393), which belongs to patients who stayed in the ED for more than 24 hours [Figure 2]. The average number
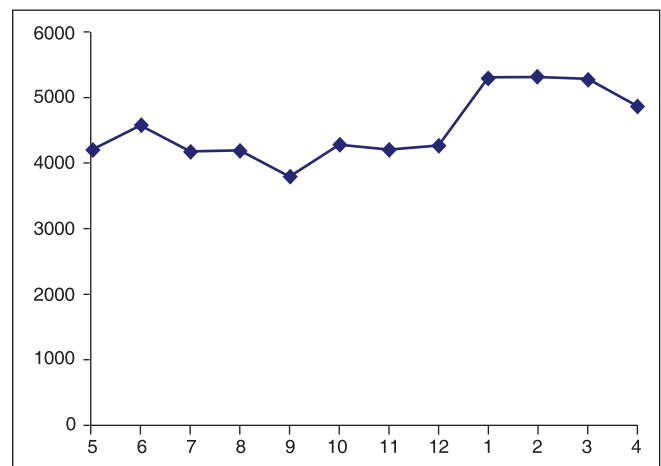

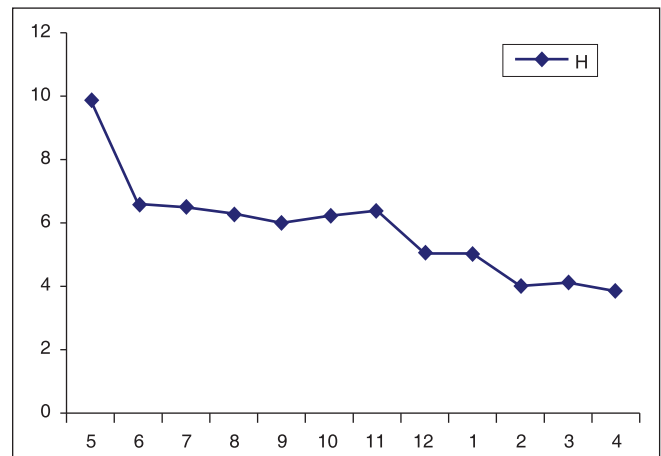**Figure 1:** Total referred patients to ED

Figure 2: Total admitting time

of admission to hospital in a month was 5,159 people and average of staying for more than 24 hours in a month was 50, which who hospitalise about 73.2 hours in the ED. The average of staying over 24 hours was five people each day among which 73% were over 60 years old.

The most common diagnosis in patients over 24 hours have been Cardiac allograft vasculopathy (CAV) ischaemia, sepsis, immunocompromised hosts.

(ICH) and pneumonia and the most involved services were internal, neurology, infectious disease.

Reasons of long-stay patients include:lack of bed in ICU (71%), give up (12%), lack of bed (12%), lack of determination by a physician (5%), respectively.

Forty-seven percent of all patients who remained in ED for over 24 hours were transferred to the relevant wards of hospitals, 39% expired, 4% were transferred to other centres, 5% have left the hospital and 5% of patients were discharged from the ED.

The services in which patients were mostly admitted included internal, neurology and infection. Out of the patients in end stage or waiting to get admitted in ICU, 46% expired, 34% admitted and only 7% could be hospitalised in the ICU ward.

DISCUSSION

The results showed 1% of patients remained in ED over than 24 hours and the main given reasons was lack of bed in the ED, in other sections, suspected by a physician which is confirmed with previous studies done in Iran. According to a study conducted by Hatam Abadi *et al.*, 222 (7%) out of 3,630 referred patients remained in ED over 24 hours during 1 month for which the main reason was lack of beds in the relevant wards for admitting (*n* = 68), prolonged in outcomes of tests and imaging (*n* = 33), the need for multiservices (*n* = 21), the suffusion of treatment in the ED room (*n* = 52) and leaving hospital with personal consent (*n* = 17). Out of 222 patients, who were admitted in ED room for over 24 hours, 122 transferred other relevant units of hospital.[1] In our study, admitting over 24 hours was just 1%, while it was 7% in Hatam Abadi *et al.*, study which was conducted in same hospital in 2005, it shows remaining the patients in ED of this hospital significantly decreased during 4 years although referred patients increased from 3,630-5,159 in a month [Figure 3].

Lack of bed in relevant units and ED was reported as a major problem in both studies. It seems inability to discharge patients from inpatient bed timely is a common problem in most of the hospitals, which creates dissatisfaction for ED patients who are waiting for
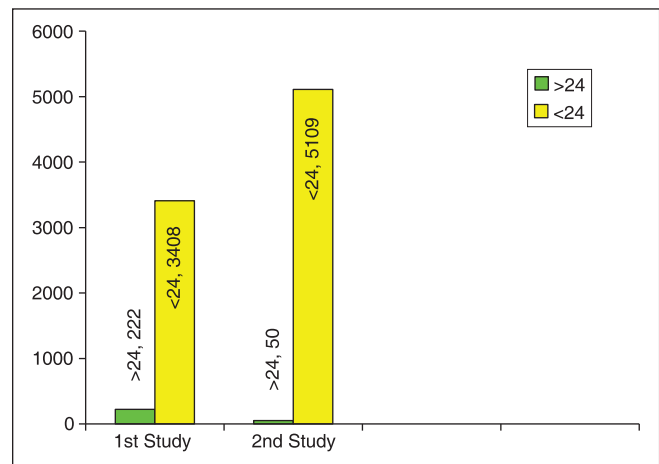

Figure 3: Comparison of study 1 (2005) with study 2 (2009)

admission. Some studies, in harmony with our study, reported the lack of available inpatient beds, especially ICU and telemetry beds.[9,10] In a study done in New Jersey for 47 days in 2005, more than 95% of all staffed beds were occupied. This number increased from 29 days in 2004 and 11 days in 2003.[11,12]

Over the past few years, several studies have presented clear evidence that ED crowding contributes to poor quality care.[13-17] One of the suggested strategies in numerous research studies to triage and discharged patients timely was creating multidisciplinary teams to plan quality improvement interventions.[18,19] The benefits of a multidisciplinary team are that members will bring different perspectives and knowledge about their problems, underlying causes and potential solutions. Identifying the right individuals to participate in implementing the patient flow improvement strategies also will be central to the success of your effort. Once formed, the team should meet on a regular basis (e.g., weekly) throughout the planning and implementation stages.[20]

Applying these suggestions seems to be more critical in teaching hospitals, ED cause throughput can be slowed down by the need to train residents in emergency medicine. It has been shown in other contexts that residents often generate inefficiencies by ordering more tests and processing patients more slowly than experienced physicians.[21]

As remained patients in this study decreased from 7% in 2005 to 1% in 2009 and also considering the main reported problem is lack of beds. It means the new program affected the ED during the years in the shadow of new program following changes applied in this hospital.

Authority of transfer of the patients remained over 6 hours in ED to relevant units of hospital by emergency medicine faculty members, in this program internal

medicine specialist was on call in ED per shift to determine and treat the internal problems, expanding the emergency and increasing the number of beds to almost three times, increase the number of emergency medicine residents from 2-6 people per shift, in new program, second and third-year emergency medicine residents were also included while already just first residents had duty to be in ED. Totally referred patients increased (42%) although admitting over 24 hours decreased to 77%. In our study, the reasons like under multiservices or delay cause of para clinic examination did not exist because of authority of member faculty of emergency specialist to referring patients to other wards after 6 hours.

Increasing bed is one solution to lack of bed in ED to reduce the overcrowding. In a review study done by Nathan R. Hoot, Dominik Aronsky[22] two articles considered hospital bed access: After increasing the number of critical care beds from 47-67, ambulance diversion at one hospital decreased by 66%. A natural experiment resulting from a period of industrial action, leading to improved hospital bed access for an ED, resulted in insignificant decreases in occupancy levels and waiting times.[23]

Recently studies have corroborated with successful interventions that reduced crowding by altering the operation of hospital and community services other than the ED.[24-26]

CONCLUSION

As suggested by other authors, the major themes among the solutions of crowding in other studies included additional personnel, observation units, hospital bed access, nonurgent referrals, ambulance diversion, destination control, crowding measures and queuing theory.[22] Our results showed the most frequent cause is a limitation of inpatient beds. The long stay time had not been affected by paraclinic procedures, multispecialities involvement or the lack of obvious diagnosis. The Following solution is proposed: (1) creation of a holding unit, (2) active inter- facility transfer, (3) governing admittance of patients who need ICU care to relate wards. Considering the positive effect of new program to decrease patients stay in ED authors suggesting to Iranian hospitals to use the new EDs measurement to control the quality of ED cares.

There were some limitation in our study, for example, this study just included one educational hospital from east of Tehran, which is not a typical sample for other parts of Iran, therefore, it is suggested to future researchers to investigate different parts of Iran. Becausewidely reporting the results of multi-unit and department initiatives helps to create a culture of transparency and openness. Units

given the opportunity to compare their performance relative to other units will develop a healthy competition to improve.

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