

A New Model in Reducing Emergency Department Crowding: The Electronic Blockage System

Acil Servis Kalabalığını Azaltmada Yeni Bir Model: Elektronik Blokaj Sistemi

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SUMMARY

Objectives

Emergency department (ED) crowding is a growing problem across the world. Hospitals need to identify the situation using emergency department crowding scoring systems and to produce appropriate solutions.

Methods

A new program (Electronic Blockage System, EBS) was written supplementary to the Hospital Information System. It was planned that the number of empty beds in the hospital should primarily be used for patients awaiting admission to a hospital bed at the ED. In the presence of patients awaiting admission at the ED, non-urgent admissions to other departments were blocked. ED overcrowded was measured in the period before initiation of EBS, the early post-EBS period and the late post-EBS period, of one-week's duration each, using NEDOCS scoring.

Results

NEDOCS values were significantly lower in the early post-EBS period compared to the other periods ($p<0.0001$). Although outpatient numbers applying to the ED and existing patient numbers at time of measurement remained unchanged in all three periods, the number of patients awaiting admission in the early post-EBS period was significantly lower than in the pre-EBS and late post-EBS periods ($p=0.0001$, $p=0.001$).

Conclusions

EBS is a form of triage system aimed at preventing crowding and ensuring the priority admission of emergency patients over that of polyclinic patients. In hospitals with an insufficient number of total beds it can be used to reduce ED crowding and accelerate admissions to hospital from the ED.

Key words: Emergency department; National Emergency Department Overcrowding Study; NEDOCS; overcrowding.

ÖZET

Amaç

Acil servis kalabalığı tüm dünyada giderek yaygınlaşan bir sorundur. Hastanelerin acil servis kalabalık ölçütlerini kullanarak durum tespiti yapması ve uygun çözüm önerileri üretmeleri gereklidir.

Gereç ve Yöntem

Çalışmamızda Hastane Bilgi Yönetim Sistemine ek bir program (Elektronik Blokaj Sistemi, EBS) yazıldı. Buna göre hastanede bulunan boş yatakların öncelikli olarak acil serviste yatış bekleyen hastalar için kullanılması planlandı. Acil serviste yatış bekleyen hasta varken, ilgili servislere yapılacak acil olmayan poliklinik yatışları bloke edildi. EBS başlamadan önceki dönem, EBS sonrası erken dönem ve EBS sonrası geç dönemde birer hafta boyunca NEDOCS skorlaması ile acil servis kalabalıklığı ölçüldü.

Bulgular

Elektronik blokaj sistemi sonrası erken dönemde diğer dönemlere göre NEDOCS değeri anlamlı olarak daha düşük bulundu ($p<0.0001$). Her üç dönemde de acil servise başvuran günlük hasta sayısı ve ölçüm anında mevcut olan hasta sayısı değişmediği halde, acil servis içinde yatış bekleyen hasta sayısı EBS sonrası erken dönemde, EBS öncesi ve EBS sonrası geç döneme göre anlamlı olarak daha azdı ($p=0.0001$, $p=0.001$).

Sonuç

Elektronik blokaj sistemi, acil hastaların poliklinik hastalarına göre öncelikli olarak hastaneye yatışını sağlayan, kalabalığı önlemeye yönelik bir çeşit yatış triaji sistemidir. Hastanedeki toplam yatak sayısının yeterli olmadığı hastanelerde, acil servis kalabalığını azaltmak için acil servisten hastaneye olan yatışları hızlandırmak amacıyla kullanılabilir.

Anahtar sözcükler: Acil servis; National Emergency Department Overcrowding Study; NEDOCS; kalabalık.

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Introduction

Overcrowding occurs when no inpatient beds are available in hospital as a result of too many patients with non-urgent medical conditions seeking emergency care.^[1] Emergency department (ED) overcrowding is an increasing problem worldwide. Overcrowding is correlated with several negative outcomes, such as increased in-hospital death rates, prolonged treatment times, a rise in preventable medical errors, patients leaving without receiving medical advice from a physician or without being examined in the ED, and repeated applications to hospital.^[2,3]

Among the reasons for ED overcrowding are an insufficient number of hospital beds, a rise in ED applications, excessive critical patient numbers, an insufficient numbers of nurse, delayed consultations, delayed radiological examinations, and a shortage of ED physical space.^[4]

There are no globally accepted standard criteria for measuring ED overcrowding. However, five main scoring systems have been employed in studies regarding ED overcrowding.^[5-9]

1. Emergency Department Crowding Score, EDCS
2. Real Time Emergency Analysis of Demand Indicators Score, READI
3. Emergency Department Work Index, EDWIN
4. National Emergency Department Overcrowding Study, NEDOCS
5. Work Score

Hoot et al. compared overcrowding scoring systems and reported that EDWIN, NEDOCS and Work Score provided powerful prediction of emergency service overcrowding, with negative predictive values of approximately 94%.^[10]

A new strategy has been introduced with an aim to reduce

the overcrowding in the our ED and accelerate turnover called the Electronic Blockage System (EBS). The main principle of the EBS is to prioritize, patients awaiting admission to the ED. For example, patients that are waiting clinical admission within the ED are registered and all other admissions outside the ED are blocked in the electronic system.

In order to evaluate the success of the EBS based on the principle of priority being given to patients in the ED in admission and reduce ED overcrowding, our study evaluated ED overcrowding in the pre-EBS and early and late post-EBS periods.

Materials and Methods

Study environment

The Dokuz Eylül University Hospital (DEUH) is one of two universities and four ministry of health training and research hospitals providing tertiary casualty department service in the Izmir with a metropolitan population of approximately 4 million. With its 925-bed capacity, it is the third-largest hospital in the province of Izmir. The DEUH ED served 85,813 patients in 2011. Despite a rise in numbers of patients applying to our hospital ED in recent years, the admission rates from the ED to hospital have declined in relative terms since there has been no change in department/intensive care admission rates (Table 1). The mean age of patients applying was determined to be 46. Eight percent of the patients were able to be admitted, while 4% transferred to another institution or left the ED of their own volition. The majority (87%) were able to be seen at the ED and discharged. The ED harbors 42 beds, consisting of: 1 resuscitation room, 11 monitored observation, 10 observation units, 5 for the trauma, 5 in other areas (ear-nose-and-throat, eye, gynecology, psychiatry) and 10 additional beds. Sixteen beds are monitored and 6 have mechanical ventilators. There are two work shifts in the ED from 08:00 to 18:00 and 18:00 to 08:00. Each shift includes one emer-

Table 1. Five-year emergency department admission numbers

Year	Patient numbers	Rise in patient numbers (%)	Percentage of admissions from the emergency department to hospital (%)
2011	85.813	8	8.0
2010	79.438	18	8.0
2009	67.476	22	8.1
2008	55.438	22	8.4
2007	45.326	16	9.6
2006	35.808	26	11.8

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