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Effectiveness of Emergency Medicine Wards in reducing length of stay and overcrowding in emergency departments

Shuk Man Lo RN BSN MPH FHKAN (Emergency) [a,*], Kenny Tze Ying Choi RN BSN FHKAN (Emergency), Registered Nurse [b], Eliza Mi Ling Wong RN BHS MHA PhD, Assistant Professor [c], Larry Lap Yip Lee MRCSEd FHKAM (Emergency Medicine), Associate Consultant [a], Richard Sai Dat Yeung FCEM FHKAM (Emergency Medicine), Consultant [a], Jimmy Tak Shing Chan FCEM FHKAM (Emergency Medicine), Chief of Service [a], Sek Ying Chair RN MBA PhD, Professor [c]

[a] Emergency Department, Alice Ho Miu Ling Nethersole Hospital, Tai Po, New Territories, Hong Kong Special Administrative Region
[b] Emergency Department, Tuen Mun Hospital, New Territories West, Hong Kong Special Administrative Region
[c] The Nethersole School of Nursing, Faculty of Medicine, The Chinese University of Hong Kong, Hong Kong Special Administrative Region

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ABSTRACT

Objective: This study aims to evaluate the effectiveness of an Emergency Medicine Ward (EMW) in reducing the length of stay (LOS) in the emergency department, length of hospitalization, emergency medical admission rate, and the hospital bed occupancy rate.
Methods: This study is a cross-sectional, observational study with a retrospective, quantitative record review conducted at the EMW of a regional acute hospital in Hong Kong from January 2009 to June 2009.
Results: During the study, a retrospective audit was conducted on 1834 patient records. The five main groups of patients admitted into EMW suffered from cardiac disease (26.5%), pneumonia (19.6%), dizziness (16.2%), Chronic Obstructive Pulmonary Disease (12.3%), and gastroenteritis (7.9%). The mean LOS in the EMW was 1.27 days (SD = 0.59). The average emergency medical admission rate within the six-month period was significantly reduced relative to that before the EMW became operational (January 2008 to June 2008). Clinically, the medical in-patient bed occupancy was significantly reduced by 6.2%. The average LOS during in-patient hospitalization after the EMW was established decreased to 4.13 days from the previous length of 5.16 days.
Conclusions: EMWs effectively reduce both the LOS during in-patient hospitalization and the avoidable medical admission rate.

Introduction

The healthcare system is increasingly pressured to accommodate the increasing demand for healthcare services. Aging population, increasing hospitalization, and shortage in hospital beds are regarded as public, economic, and healthcare concerns. Long wait times for hospital bed availability and overcrowding in emergency departments (EDs) are commonly observed. These occurrences may delay patient's treatment and compromise the quality of healthcare provided to patients (Derlet and Richards, 2000).

ED overcrowding is defined as "the situation where ED function is impeded primarily because the number of patients waiting to be seen, undergoing assessment and treatment, or waiting for departure exceeds either the physical or staffing capacity of the ED" (Australasian College for Emergency Medicine, p. 340). ED overcrowding is identified as multi-factorial and complex (Hoot and Aronsky, 2008) and commonly associated with extended wait times, lack of ED staff (Schneider et al., 2003), increased patient acuity (Jayaprakash et al., 2009), hospital bed occupancy (Cooke et al., 2004), as well as insufficient physical environment and access block (Forero et al., 2010). Access block is referred to as "the situations where patients in the ED requiring inpatient care are unable to gain access to appropriate hospital beds within a reasonable time frame" (p. 340) (Australasian College for Emergency Medicine, 2002). Access block and consequent ED overcrowding exert influence on the quality of emergency care (Richardson, 2001), patient morbidity and mortality (Sprivulis et al., 2006), as well as staff and patient satisfaction (Derlet and Richards, 2000).

* Corresponding author. Address: Alice Ho Miu Ling Nethersole Hospital, Accident and Emergency Department, 11 Chuen On Road, Tai Po, New Territories, Hong Kong Special Administrative Region. Tel.: +852 26892145; fax: +852 26671205.
E-mail address: losm1@ha.org.hk (S.M. Lo).

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In response to these problems, strategies for coping with the increasing demand for hospital beds have been implemented. Chest pain observation units (Martinez et al., 2001), rapid assessment zones (Bullard et al., 2012), and clinical decision units (Roberts et al., 2010) have evolved to meet the demands of ED in the US, Canada, and the UK. They provide alternatives to the management of specific disease groups of patients in overcoming access block and consequent ED overcrowding. In Hong Kong, Emergency Medicine Wards (EMWs) (similar to short-stay unit) have emerged because of their potential to reduce access block and streamline appropriate health service delivery.

Background

EMWs were developed in 2008. To date, 68% of EDs in Hong Kong offer EMW service. EMWs aim to reduce avoidable hospital medical admissions and consequent ED overcrowding, as well as reduce costs. Despite variations in EMWs, these EMWs share a similar mission and are commonly governed by the Hospital Authority (HA). The EMWs provide tailor-made services for the region population under study. First, the care was protocol-driven to a specific group of patients with reference to individual departmental policies. The protocols used [i.e. chest pain, hypertension (HT), and Chronic Obstructive Pulmonary Disease (COPD) protocols] were derived from international guidelines and evidence and then modified to suit the local setting and culture. We sought the approval of a panel of medical consultants, nurse managers, and nurse specialists in emergency medicine. The patient care service also encouraged inter-departmental and inter-disciplinary collaboration by an inpatient consultation and referral system, such as community nurse service and a geriatric team. Second, ward rounds were conducted by emergency specialists who perform four to six rounds per day. With this approach, all patients were treated promptly (Hospital Authority, 2008). In this acute hospital in the region, the EMW manages almost all medical patients, except those requiring airborne precautions, suffering from renal failure and on continuous ambulatory peritoneal dialysis, and critically ill. Patients are expected to be in a stable condition and discharged within 48 h. If the medical condition requires longer hospitalization and specialty care, the patient is transferred to an appropriate medical unit. The process ultimately aims to improve the quality of medical care through extended observation and multi-disciplinary care and simultaneously reduce inappropriate hospital admission and healthcare costs. EMWs provide alternative in-patient beds for subacute patients (Hospital Authority, 2008).

Systematic reviews have been conducted on the effectiveness of all similar types of short-stay, observation, and subacute medical units. Numerous studies have shown that these units can effectively reduce mortality, length of stay (LOS), and access block, as well as improve staff and patient satisfaction (Cooke et al., 2003; Daly et al., 2003; Scott et al., 2009). However, studies have rarely been conducted in Asian countries. In Hong Kong, the future development of EMWs remains uncertain because of the emergence of different EMW models. The effectiveness of existing systems in each hospital must first be ascertained prior to the conclusive identification of the model that works effectively. Cost-effective resource allocation for EMW can be determined subsequently. The overall purpose of the present study is to assess the role, effectiveness, and future direction of EMWs in addressing the global problem of hospital bed availability (access block) and the increasing demand for quality service, considering that EMWs have been operational for four years. This study aims to evaluate the effectiveness of EMWs in terms of LOS in ED and hospitalization, medical in-patient admission rate, and bed occupancy.

Methods

Study design and setting

This study is a cross-sectional, observational study involving a quantitative, retrospective review of the ED records of all EMW patients during the study period. This study was conducted with the approval of the joint Chinese University of Hong Kong–New Territories East Cluster clinical research ethical committee. The EMW is located in a regional government acute care hospital with 583 beds, which serves approximately 300,000 people in the local district. According to the internal statistics of ED, the average daily ED attendance in 2008 was nearly 327, and the medical admission rate constituted 55.31% of all emergency admissions. Moreover, the overall in-patient bed occupancy rate reached 98.8%. The 26-bed unit EMW was established in December 2008.

Data collection

The data collection periods were divided into two parts. The first part included the EMW data collected from January to June 2009; the ED records of all adult patients were retrieved during this period. Adult patients who were provided care for their medical illnesses at the ED and then admitted to the EMW for continuity of care were included. Meanwhile, part two included the data of a group of patients with similar diseases prior to the establishment of the EMW (i.e., from January to June 2008). All data were retrieved retrospectively through the Clinical Management System, a Hong Kong-wide computerized patient management system of the HA. Established in 1990, HA is a statutory body responsible for managing public hospitals in Hong Kong. Fig. 1 illustrates the conceptual framework for analyzing the effectiveness of EMW.

Outcome measurement

Outcome measurements included the ED first attendance, triage category, LOS of in-patient hospitalization, LOS in ED, medical in-patient admission number, and bed occupancy. These outcomes with and without EMW were compared.

Data analysis

Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 20.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics were presented to summarize the demographic and clinical data. The data consisted of age, gender, provisional diagnosis, triage category, past health, final disposal from the EMW, and LOS in the EMW and the ED. *T*-tests were used to measure the differences in LOS during in-patient hospitalization, medical in-patient admission, and bed occupancy before and after the establishment of the EMW. The level of significance was set at 5% in all comparisons.

Results

From January to June 2009, the average ED first attendance was calculated as 319 patients per day, with a total of 1834 EMW admissions. Among the eligible EMW patients ($N = 1834$), 56% consisted of male patients. Most patients were elderly, with a mean age of 69.36 (SD = 18.29). Nearly 85% of the patients suffer from significant comorbidities, such as hypertension, diabetes mellitus, heart disease, and COPD. The five main disease categories were cardiac disease (26.5%; $N = 486$), pneumonia (19.6%; $N = 359$), dizziness (16.2%; $N = 297$), COPD (12.3%; $N = 226$), and gastroenteritis (7.9%; $N = 145$) (Table 1). Most of these patients were triaged in