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Variation in hospital admission rates between a tertiary care and two freestanding emergency departments☆

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ABSTRACT

Background: Recently, freestanding emergency departments (FSEDs) have grown significantly in number. Critics have expressed concern that FSEDs may increase healthcare costs.
Objective: We determined whether admission rates for identical diagnoses varied among the same group of physicians according to clinical setting.
Methods: This was a retrospective comparison of adult admission rates (n = 3230) for chest pain, chronic obstructive pulmonary disease (COPD), asthma, and congestive heart failure (CHF) between a hospital-based ED (HBED) and two FSEDs throughout 2015. Frequency distribution and proportions were reported for categorical variables stratified by facility type. For categories with cell frequency less or equal to 5, Fisher's Exact test was used to calculate a *P* value. Chi square tests were used to assess difference in proportions of potential predictor variables between the HBED and FSEDs. For continuous variables, the mean was reported and Student's *t*-test assessed the difference in means between HBED and FSED patients. Multivariate logistic regression analyses were performed to estimate the unadjusted and adjusted prevalence odds ratio with 95% confidence interval (CI) for patient disposition outcomes associated with type of ED facility visited.
Results: Of 3230 patients, 53% used the HBED and 47% used the FSED. Patients visiting the HBED and FSED varied significantly in gender, acuity levels, diagnosis, and number of visits. Age was not significantly different between facilities. Multivariable adjusted estimated prevalence odds ratio for patients admitted were 1.2 [95%CI: 1.0–1.4] in the HBED facility compared to patients using FSEDs.
Conclusion: In our healthcare system, FSEDs showed a trend towards a 20% lower admission rate for chest pain, COPD, asthma and CHF.

1. Introduction

Freestanding emergency departments (FSEDs) have grown rapidly over the past decade. Depending on the state, FSEDs can be operated independently or as part of a hospital system. Hospital-Based FSEDs are run by hospitals and must be licensed by the state and adherent to Medicare Conditions of Participation. They are financially and clinically integrated with the affiliated hospital and located within a 35-mile radius. They are compliant with all of the requirements of their parent hospital's ED, including 24/7 care and EMTALA obligations. Independent Freestanding Emergency Centers/Departments (IFECs) are facilities owned and operated by non-hospital for-profit entities. IFECs are similar to hospital-based FSEDs in terms of services they offer. They are not considered provider-based emergency departments (EDs) and are not recognized by the Center for Medicare and Medicaid Services (CMS) as emergency departments; because of this, these facilities are not bound by federal ED regulations and do not have to comply with EMTALA, although many do.

FSEDs have increased by 62% between 2009 and 2015 [1,2,3]. Now that there are over 360 FSEDs in operation across the United States (U.S.), some have questioned the effect of these facilities on patient care [4]. Approximately a quarter of all acute care outpatient visits occur in U.S. emergency departments and that number continues to grow [5].

Perhaps the most significant financial decision that an emergency physician (EP) makes is the choice to admit a patient [6]. Called "the

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most expensive decision in US healthcare" [7], hospital admissions coming through the emergency department (ED) have continued to rise and represented 81.8% of all unscheduled hospital admissions in 2013 [8]. According to a recent analysis, admissions from the ED account for 8.3% of national health expenditures [9]. Another study revealed inpatient care accounts for 31% of national healthcare spending [6]. Sabbatini found that among 961 hospital-based EDs, admission rate was 15.4% and the average charge was $34,826 per admission [10]. Another study evaluated 8303 ED encounters and found a median charge of $1233 and a mean charge of $2168 for outpatient conditions in the ER [11]. Variations in clinical practice and the medical legal environment has led to large discrepancies in the decision to admit, with some facilities having more than a 6-fold difference for comparable cases [12].

There has even been variation between EPs at the same facilities, with some EPs admitting as little as 38% of patients and others admitting as much as 79%, even though the physicians have seen comparable patients [13]. Admission agreement between EPs could be as low as 52% in some cases, leading some to conclude that the decision to admit is dependent on EP personality and practice style [13].

Clearly, there are factors outside of a patient's presenting condition that affect the EP's decision to admit. Convenience, cost of transport, availability of outpatient follow-up, need to "turn" a bed for patients in the waiting room, pressure from metric driven reimbursement, time to reevaluate and perform serial exams or labs, social support, and the patient's primary care support may also influence an EP's choice. While studies have explored the differences in admission rates and acuity levels at various facilities [12,14,15], none have compared admission rates between a HBED and FSEDs for the same diagnosis.

Critics of FSEDs have remarked that they see little differences in the capabilities and quality of care between the two. However, they are concerned with the competition that is brought from FSEDs for the "paying, urgent-care patients" so that HBEDs can continue to afford to provide care for all patients. They feel the playing field is already uneven and marketing of non-hospital-based FSEDs makes that challenge more difficult [16]. Others criticize FSEDs and the care they provide because state policies vary widely with no standard requirement for location, staffing patterns, or clinical capabilities. Some feel consistent state regulations are needed [17].

We chose to explore the potential difference between the admission decisions occurring in FSEDs and HBEDs due to multiple reports that the admission rates differ between these types of facilities [18,19]. Some thought leaders believe that FSEDs are a novel healthcare model that could curb healthcare costs through the process of reducing hospital admissions [20]. The difficulty of addressing this issue is confounded by the fact that HBEDs and FSEDs may see different patient populations in terms of both breadths of conditions as well as acuity of patients. Thus, our study objective was to determine whether patient admission rates for the same diagnosis, with similar acuity, varied for the same group of physicians according to the clinical setting.

We evaluated whether admission rates of patients vary between FSEDs and a HBED after controlling for type of health conditions, acuity level, gender and age. If variation exists, it would warrant further study on whether health care costs are ultimately impacted by the growth of FSEDs.

2. Materials and methods

This was a retrospective comparison of admission rates between an urban tertiary care hospital-based ED (HBED) and two FSEDs within the same health system. Data were collected from the HBED and its two FSEDs during 2015. All physicians were Board Certified by American Board of Emergency Medicine or American Osteopathic Board of Emergency Medicine. All physicians were scheduled to work at the HBED and the FSEDs at relatively equal shift percentages. The distance between the HBED and FSEDs were 16 miles and 4.5 miles respectively. The EDs had the same overall hospital administration and utilized the same treatment protocols. Each ED had its own medical director. FSED 1 and 2 had full lab service available, which included blood banking with O-Negative packed red blood cells and fresh frozen plasma. Both FSEDs had radiology services that included dedicated CT and x-ray availability. Ultrasound was available but required calling in an ultrasound technician at all hours at FSED 1 for a formal ultrasound. FSED 2 had an ultrasound technician available from 8 am to 5 pm on weekdays and on call for other hours. FSED 1 had no MRI capabilities; however FSED 2 had an onsite MRI available from 8 am to 5 pm.

The HBED is a tertiary care facility with annual volume of 64,296 in 2015. FSED 1 is a hospital owned ED with annual volume of 17,948 in 2015. FSED 2 is also hospital owned with annual volume of 26,819 patients in 2015. FSED 1 and FSED 2 take ambulances and all patients including Medicare and Medicaid patients.

Data were gathered using the electronic medical record Medhost version 4.4 for metrics at all facilities. The analysis for our study was restricted to adults aged 18 years or above ($n = 3230$). Data included patient age, gender, triage acuity level, diagnosis, and disposition. Patients under 18 and those that expired were excluded from the study. Patients that eloped or left against medical advice (LAMA) were categorized as "discharged" and patients transferred to outside hospital systems were considered "admitted". We looked at the 20 most common diagnosis-acuity groups and found sample sizes were only adequate for chronic obstructive pulmonary disease (COPD), chest pain, asthma and congestive heart failure (CHF). All acuity levels were collected and categorized via the triage emergency severity index. The ESI was calculated by the potential use of resources. Level 1 required "Resuscitation" for stabilization and was determined to be critical. Level 2 was "Emergent" and was high risk. Level 3 was "Urgent" and determined to likely require more than one resource to treat at triage. Level 4 was "Semi-Urgent" and predicted to need only one resource for treatment. Level 5 was "Non-Urgent" and predicted at triage to require no other resources for treatment other than a physician evaluation. All 2015 data was filtered to determine admission percentage for each facility based on disposition diagnosis.

Our primary factor of interest (predictor) was facility type (HBED versus FSEDs). Potential confounding variables used for the study were, age, sex, acuity level, and type of diagnosis. Outcome of interest was patient disposition (admitted versus discharged). Age was categorized into three groups: a) 18 to 35 years; b) 36 to 54 years; c) 55 and above. For the multivariable analysis, the sample was restricted to acuity levels 2, 3 and 4 because of small sample size in acuity level 1 and 5. Total sample size used for the multivariate analysis was 1371.

3. Statistical analyses

Frequency distribution and proportions were reported for categorical variables stratified by facility type that patients visited (HBED versus FSEDs) and patient disposition (admitted versus discharged). Chi square tests were used to assess the difference in proportions of potential predictor variable between the HBED and FSEDs. For categories with cell frequency less or equal to 5, Fisher's Exact test was used to calculate *P* value. For continuous variables, the mean [standard deviation (SD)] was reported and Student's *t*-test was used to access the difference in means between HBED patients and FSED patients. Significance of the test was determined using $\alpha = 0.05$ as a cutoff. Multivariate logistic regression analyses were performed to estimate the unadjusted and adjusted prevalence odds ratio (OR) with 95% confidence interval (CI) for patient disposition outcomes associated with type of ED facility visited by patients. All analyses were conducted using SAS® 9.3 (SAS Institute Inc., Cary, NC, USA). The Baylor College of Medicine Institutional Review Board approved this study as exempt.

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