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Emergency department visits in patients with low acuity conditions: Factors associated with resource utilization☆

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ABSTRACT

Objectives: To identify health beliefs of emergency department (ED) patients with low acuity conditions and how these affect ambulance (AMB) utilization.

Methods: We performed a prospective, observational study on a convenience sample of patients 18 years or older, who presented to the ED of an urban, academic hospital with an Emergency Severity Index (ESI) triage level of 4 or 5. Demographics, treatment, and disposition data were obtained along with self-administered surveys. Characteristics of patients with low acuity conditions who presented to the ED by AMB were compared to the patients who came to the ED by private transportation (PT). Data were analyzed with the chi-square test, *t*-test, and Mann-Whitney test.

Results: A total of 197 patients (97 AMB and 100 PT) were enrolled. Compared to PT, AMB patients were more likely to: be insured (82% vs. 56%; $p = 0.000$), have a primary care provider (62% vs. 44%; $p = 0.048$), and lack a regular means of transportation (53% vs. 33%; $p = 0.005$). Three surveys were used the SF-8, Short Test of Functional Health Literacy in Adults [STOFHLA], and Health Belief Model [HBM]. Answers to HBM showed patients perceive that their illness required care within one hour of arrival (38% vs. 21%; $p = 0.04$), have used an ambulance in the past year (76% vs. 33%; $p = 0.001$) and to utilize an ambulance in the future for similar concerns (53% vs. 15%; $p = 0.000$). AMB patients were more likely to call an ambulance for any health concern ($p = 0.035$) and felt that there were enough ambulances for all patients in the city ($p = 0.01$). There were no differences in age, employment, level of income and education, nor hospital admission rate between groups.

Conclusions: Ambulance use in low-acuity ED patients is associated with misperceptions regarding severity of illness and resource allocation as well as limited access to private transportation. Understanding patient perceptions of illness and other barriers to receiving care is imperative for the development of interventions aimed at enabling change in health behaviors such as the elective use of limited resources.

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1. Introduction

Out of the 1.1 billion ambulatory visits in the United States in 2006, 19.2 million were to the Emergency Department (ED) [1]. Low-acuity ambulatory visits to the ED represent > 15% of the total ED visits annually [1]. What role low acuity or non-urgent visits play in ED overcrowding and rising healthcare costs is under scrutiny. Many estimates of the volume and percentage of non-urgent ED visits exist with great variability - figures suggesting significant financial burden have been both

supported [2] and disputed [3,4] in the medical literature. In addition to cost considerations, physical crowding in EDs can also influence care and cause ambulance diversion [5]. Non-urgent visits to EDs may be more hazardous when overcrowding is present and can contribute to delays for patients with truly urgent or emergent conditions.

For many, Emergency Medical Services (EMS) functions as an important portal of access to hospital-based emergency medicine care. However, EMS is not always used by those with severe illness or injury and, on some occasions, may serve as a means of transportation for individuals with low acuity conditions [6–10]. Reasons why patients present to the ED with low acuity conditions have been previously studied and several reoccurring themes have been noted; among these are convenience of 24-h care, desire to avoid wait times, dissatisfaction with

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their primary care doctor, and general lack of access to a “medical home” [11–14]. Despite identifying these reasons, little attention has been directed to why patients with low-acuity conditions utilize EMS for transport to the ED. Factors such as inadequate health literacy and illness perceptions may contribute; but to date, this has largely been unexplored.

This study was designed to address the gap in knowledge surrounding such decision-making and identify factors that may contribute to the use of ambulance services for transportation of patients to the ED with low acuity problems. We hypothesize that ambulance usage is strongly influenced by issues such as lack of personal transportation, incongruous perceptions of illness severity, and lower health literacy. Our overarching goal was to gain an understanding of social and behavioral characteristics that influence patients' behaviors, other than severity of illness.

2. Methods

2.1. Study setting and selection of participants

The study was conducted at a single, large academic urban hospital in downtown Detroit with approximately 100,000 ED visits annually, nearly 20,000 of which present via ambulance. This ED functions as the primary safety net for an under resourced community of approximately 650,000 people. Our sample included patients with low acuity visits, with equal distribution between ambulance (AMB) and private transportation (PT) as the mode of arrival. Low acuity was defined by the triage nurse's assignment of emergency severity index (ESI) level 4 or 5, which corresponds to the need for zero or one resource based on the patient's chief complaint. Examples of typical ESI 4 or 5 visits to our facility include upper respiratory infections, bronchitis, non-traumatic neck and back pain, non-traumatic headache, nausea, vomiting, diarrhea, and ear or dental pain.

2.2. Study design

A convenience sample of 200 patients at a single hospital center with low acuity conditions were included, 197 of whom completed study specific data collection. Inclusion criteria were patients 18 and over with ESI level 4 or 5, able to provide consent and had no clinical evidence of intoxication. ESI scores assigned by nurses have been found to have excellent inter-rater reliability and predict hospital admission [15]. Patients that were cognitively impaired (dementia, mental retardation), had a high acuity condition (ESI 1, 2, or 3) or needed immediate resuscitation (e.g., unconscious, cardiac arrest, or respiratory failure) were automatically excluded. Additionally, intoxicated patients and those who declined to participate were also excluded. Screening occurred 24 h a day from September 2009 to April 2010, but the majority were recruited between the hours of 7 am and 11 pm. Data was collected both prospectively and augmented by review of the electronic medical records by trained research assistants. This study was approved by the institutional review board (IRB) and written informed consent was obtained from all subjects. Participation was voluntary with no financial compensation.

2.3. Survey content and administration

After nursing and physician evaluation, patients were prospectively enrolled by study staff. After written informed consent was obtained, a survey tool that included elements from three standardized social science instruments was administered: the Short-Form 8 (SF-8) [16], and the Short Test of Functional Health Literacy in Adults (STOFHLA) [17, 18] and the Health Belief Model (HBM) [19]. While the surveys were self-administered, study staff was available to help those who needed questions read to them (in these instances, the STOFHLA was not completed). Health care utilization was assessed using survey questions as

well as retrospective chart review. Our survey included multiple pages and several patients ($n = 20$) did not have time to complete the entire survey.

2.4. Assessment instruments

2.4.1. Short form – 8 (SF-8)

The SF-8 is a validated, self-reported quality of life questionnaire containing eight items from eight domains divided into two categories: physical component summary (PCS) and mental component summary (MCS), which both have calculated summary scores [16]. For PCS these domains include physical functioning, role limitations physical, bodily pain, general health perceptions. For MCS these domains include vitality, social functioning, role limitations emotional, and mental health. Scores for the SF-8 were calculated according to the algorithm devised by Quality Metrics. All eight domains are scored on a scale of 0–100, with 100 representing the best possible health state. The summary score has a mean of 50 and a standard deviation (SD) of 10. Low scores indicate poor perceived health status.

2.4.2. Short test of functional literacy in adults - (STOFHLA)

The STOFHLA is a validated health literacy tool [20]. The test requires subjects to read one passage that summarizes instructions for preparation for an X-ray and a Medicaid rights passage. There are 36 items divided into two parts (A and B) and time to administer is approximately seven minutes. If patients indicate they cannot read at all, they are assigned a 0. Part A has a gunning fog index for readability of 4.3 and Part B has a gunning fog index of 10.4. A gunning fog index of 12 requires the reading level of a U.S. high school senior (18 years of age). The STOFHLA has three classifications based on score range: inadequate - unable to read and interpret health texts [1–13,21–23]; marginal - has difficulty reading and interpreting health texts [14–19]; and adequate - can read and interpret most health texts [24–36].

2.4.3. Health belief model (HBM)

The (HBM) is a framework used to embrace understanding of health-related behaviors. It is a value expectancy theory that helps to evaluate an individual's behavior pattern on a given health condition using perceived benefits balanced with perceived costs or barriers [19]. The six main components of the HBM are perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy [19]. For purposes of this study, we developed a 12 - question HBM which was pilot tested (by the primary author) in the low acuity area of our hospital using a convenience sample. Cognitive interviews were included in the pilot phase to assess the readability of the HBM questions and resulting information was used to modify and improve readability of the survey. The reading level of the survey was determined to be a Flesch-Kincaid Grade Level 6.1. The health belief questions used a four-point Likert scale: not at all to almost certain, with higher scores indicating higher efficacy. Five questions assessing perception of severity of illness compared to common emergency department diagnoses were also obtained.

2.5. Data analysis

2.5.1. Descriptive

Descriptive statistics were used to examine the characteristics of the sample for demographic characteristics and survey data. Statistical analysis was performed using chi-square for nominal data and *t*-test for interval data. The HBM questions had multiple possible responses; as a result, data were collapsed and compared as categorical values using the Mann Whiney test. Health belief questions were analyzed using Mann Whitney test. Data for the SF-8 and STOFHLA were also compared to population norms. Results were considered statistically significant with a *p*-value of <0.05 and all analyses were performed using SPSS v21.0 (Armonk, NY).

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