A Descriptive Study of Heavy Emergency Department Users at an Academic Emergency Department Reveals Heavy ED Users Have Better Access to Care Than Average Users

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Introduction: Emergency department (ED) overcrowding has been a significant problem for the last 10 years. Several studies have shown that a relatively small number of ED patients are responsible for a disproportionate amount of ED visits. This study aims to describe the frequent users of our emergency department.

Methods: This was an institutional review board–approved descriptive study performed by a retrospective review of electronic records. This pilot describes and compares patients who had 12 or more ED visits during the study year with those who visited less.

Results: The 234 patients who met criteria for high-frequency use (HFU) of the emergency department were responsible for a total of 4633 visits. Sex, race, and age distribution of HFU patients were similar to those of general ED patients. Eighty-four percent of HF users have insurance and 93% have primary care providers. A relatively small percentage of HFU visits, 4%, were mental health–related visits and 3% were alcohol- and drug-related visits. The HFU visits are socially connected: 93% have their own homes; 94% have relatives or friends; 73% have a religious affiliation. Pain or pain-related conditions are the most common diagnoses. These patients are also frequent users of ambulatory care services.

Conclusion: The similarities between our HFU and the general ED population are more numerous than their differences. The HFU patients of our emergency department are different in terms of age, employment status, and type of insurance.

Implications for Nurses: A detailed description of local HFU may help to inform planning and better meet ED patients' needs. As one of many results of this study, the ED chairman met with the Hematology-Oncology team and reviewed the protocol for ED management of sickle cell crisis. The meeting resulted in a revised protocol, including an immediate change in their pain medication from meperidine to either morphine or hydromorphone.

Nationwide emergency departments (EDs) are dangerously overcrowded. A small but significant component of patient volume in the ED is the group of patients who frequently use the ED. Several studies[1-3] have shown that a relatively small number of ED patients are responsible for a disproportionate amount of ED visits and costs. One study found that 4% of the ED patients accounted for 18% of the total number of ED visits; 100 patients (0.2%) had 12 to 74 visits.[4]

Most frequent users of EDs have acute and chronic medical problems as evidenced by multiple ED visits, hospital admissions, and visits to their primary care physicians.[4-7] They more often self-report fair to poor health status compared with non-ED users or those who use the ED only once or twice in a given year.[5] Frequent ED users also perceive their pain or other symptoms as a threat to life or personal autonomy.[8] Previous studies[9-11] suggest that heavy users of EDs are likely to have serious social problems including alcohol abuse and psychiatric dysfunction.

Our study identifies and describes a small number of high-frequency users (HFU) of ED services as the first step in organizing an approach to these special-needs patients.

Methods

STUDY DESIGN

This was a descriptive study using a retrospective review of hospital and departmental administrative databases. The study describes and compares patients with 12 or more ED visits during a given year with those patients with 4 to 11 visits and those with 1 to 3 visits. The study was approved by the hospital Institutional Review Board and was granted a waiver of informed consent. Patient privacy was protected. Patient identifiers were stored in a separate database from other patient information, and a password was required to access the database. Data were shared only with physicians and staff who had direct care responsiblities with patients. Patient identifiers are not included in material for publication.

STUDY SETTING AND POPULATION

The setting is an academic ED of a 600-bed, academic, urban, tertiary-care facility in Massachusetts, from October 1, 2002, through September 30, 2003. The general ED population at that time was 57% white, 27% Hispanic, and 13% African-American, almost equally divided by sex—males 49%, females 51%. By use of insurance as a proxy for income level, 31% either were self-pay or had Medicaid, 45% had private insurance, and 13% had Medicare. Age distribution was 24% less than age 18 years, 63% age 18 to 65 years, and 13% greater than age 65 years. The ED has an annual census of more than 100,000 patient visits, with an admission rate of approximately 20%. The facility is the only level 1 trauma and pediatric referral center for the region. Patient visits are defined as all visits where the patient registered to be seen in the ED and includes visits where patients left without being seen.

STUDY SAMPLE AND RATIONALE

The majority of published studies define "heavy use" of an ED as four or more visits per year.[1] If we used this definition, we would be looking at 3666 patients. We felt the group to be too large for future intervention. On the basis of the frequency of visits in our setting, we decided to refine the definitions as follows: HFUs as patients with 12 or more visits per year, moderate-frequency users (MFU) with 4 to 11 visits per year, and low-frequency users (LFU) with 1 to 3 visits per year. The grouping allows us to compare the HFUs with the two other groups in our setting and compare our results with the published studies on heavy ED use. It also allows us to focus on a smaller group of HFUs for future intervention.

MEASURES

The following variables were retrieved from the database for all patients: (1) frequency of visits and walk-out rates, (2) demographics (age, sex, and ethnicity), (3) ED diagnoses, (4) acuity of medical condition—facility billing level (rated 1 through 6 with 1 being lowest and 6 being highest; facility billing level rates the amount of resources [eg, staff time, materials, number of procedures] expended for patient care; we used this measure as a surrogate for

acuteness level), (5) health care access (insurance and primary care provider status), and (6) social variables (presence or absence of a home address, next of kin, religion, and employment status).

We also retrieved the number of clinic visits made by HFU patients to our health system's 3 clinics during the same 1-year study period and the volume of blood tests (complete blood cell counts and electrolytes) and radiologic procedures (chest x-ray examination; computed tomographic scan of the abdomen, pelvis, and head) done per patient.

DATA ANALYSIS

Microsoft Excel 2002 SP-1 (Microsoft, Redmond, Wash) and Stata SE 8 (Stata Corporation, College Station, Tex) were used to describe and analyze the data. Chi-square tests were used to compare the groups on race, sex, age category, insurance status, ED level of service, primary care provider status, homelessness, unemployment, and next-of-kin status. A *P* value of less than .05 was considered statistically significant. An a priori sample size was not calculated.

Results and Discussion

See Table 1 for a summary of the characteristics of the LFUs, MFUs, and HFUs of the ED (frequency of visits: 1 visit/y, 73% of total patients; 2 visits/y, 16% of total patients; 3 visits/y, 5% of total patients; and 4 or more visits/y, 6% of total patients).

The 6% accounted for 22,795 visits (22% of total patient visits). Of the 3666 patients making up the 6%, 234 are HFUs, responsible for 4633 visits.

DEMOGRAPHICS

The ethnicity and sex distribution of the ED heavy users were similar to that of the general ED population. A greater percentage (92%) of HFU patients were 18 to 65 years old versus 63% in the general population.

ACUTENESS OF MEDICAL CONDITION

There were 374 diagnoses for the 4633 visits. The top 10 diagnoses using Agency for Healthcare Research and Qualigy diagnostic categories[12] are shown in Table 2 for HFU and non-HFU patients. Diagnostic categories more common in frequent ED users are abdominal pain, chest pain, and asthma.[6]

TABLE 1
Characteristics of LFUs, MFUs, and HFUs of the ED

	LFU (1-3 visits)	MHU (4-11 visits)	HFU (≥12 visits)
No. of patients	62,886	3,432	234
No. of visits	80,858	18,028	4,633
Ethnicity			
White	57.7%	44.3%	46.6%
Hispanic	26.2%	38.6%	37.6%
African-American	12.4%	15.7%	15.4%
Sex			
Male	49.7%	44.7%	44.9%
Female	50.3%	55.3%	55.1%
Average age (y)			
<18	24.4%	15.2%	3.0%
18-65	62.4%	70.1%	91.5%
>65	13.2%	14.7%	5.6%
With insurance			
Medicare	12.6%	20.5%	20.5%
Medicaid	12.3%	27.0%	43.6%
Commercial	46.2%	30.5%	20.1%
Self-pay	18.2%	17.2%	15.0%
Other	10.7%	4.8%	0.9%
With primary care provider	76.1%	89.5%	93.2%
Admission rate	18.3%	21.9%	13.0%
Walkout rate	6.9%	6.8%	8.5%
Facility level			
Fewer resources used (levels 1-3)	57.3%	53.4%	51.3%
More resources used (levels 4-6)	36.3%	40.0%	48.7%
With home (address)	97.5%	83.4%	93.2%
With next of kin	84.9%	95.3%	94.4%
With religion	53.1%	69.0%	73.1%
With employment	59.0%	36.4%	15.8%

We found pain of all kinds the most common reason for the HF users' ED visit. Pain-related conditions accounted for 27% of the HFU visits. These included headaches and migraines (500 visits), abdominal pain (223 visits), various myalgias/neuralgias (461 visits), and joint pains (67 visits). Sickle cell disease, which is also a painful condition, accounted for an additional 5% of total visits (219 visits) made by only 7 patients. If we added

TABLE 2
Top 10 Agency for Healthcare Research and Quality diagnostic categories

HFU patients	Non-HFU patients
Headache, including migraine	Sprains and strains
Spondylosis, intervertebral disc disorders, other back problems	Superficial injury, contusion
Nonspecific chest pain	Nonspecific chest pain
Abdominal pain	Abdominal pain
Sickle cell anemia	Open wounds of extremities
Sprains and strains	Other upper respiratory infections
Asthma	Spondylosis, intervertebral disc disorders, other back problems
Superficial injury, contusion	Open wounds of head, neck, and trunk
Other mental conditions	Fracture of upper limb
Other connective tissue disease	Headache, including migraine

other conditions also associated with pain, such as injuries of all kinds (abrasions, sprains, contusions, etc) (8% of total visits) and cardiac problems (chest pain, acute infarction) (6% of total visits), we are looking at 46% of total visits associated with pain. This puts pain management at the forefront of nursing care in the ED.

ACCESS TO CARE

Two variables were used to measure "access to care" —having some form of insurance and having a primary care provider. This study showed that 84% of the HFU patients versus 72% of the general ED patients had insurance coverage and that HFU patients had a primary care provider 93.2% of the time versus 76.1% for the LFUs. Solely on the basis of these two measures, we can say that "access" is better for the HFUs than for the general population.

However, a closer look at the figures show that the general ED population had greater private insurance coverage at 45% versus 20% for the HFUs; the HFU group had greater Medicaid coverage, 44% versus 13% for the general ED patients. This replicates the finding of a study[5] looking at insurance coverage and access to care among ED users that showed that publicly insured adults were 2.08 times more likely to be frequent users. Is there a hidden access problem for patients with public insurance? How many private physicians do not accept Medicaid? Forty-four percent of our HFU patients are clinic patients, and our clinics are open only at certain hours. In addition, when our clinic patients say they have a physician, they actually mean they are assigned a resident who cares for them, until that resident rotates to another service for training. These confounders make "access to care" less clear cut than what the numbers suggest.

SOCIAL SUPPORT

Home. Of the 234 HFU patients, only one consistently did not have any address for the 18 times that he came to the ED; 47 other patients reported no address during 1 to 8 visits to the ED (average of 2 visits/patient).

Social Connectedness. Three factors were considered: Is there a next of kin or friend identified? Is the patient a member of a church group, or at least lists a religion? Is the patient employed? Of 234 HFU patients, 3 said "none" when asked to list "next of kin" or a friend as a contact; 10 patients listed relatives or friends who are from out of state.

Malone[10] cited a study where 87% of heavy users of an ED had a history of alcohol abuse, whereas 80% had moderate psychiatric dysfunction; they were also found more likely to be unemployed, homeless, and socially isolated. We did not review the charts of all 234 patients; they may in fact have alcohol, drug, or psychiatric problems that did not require an ED visit and hence was not apparent in this review. What we found was a relatively small number of ED visits for these problems: 4% mental health–related visits and 3% alcohol- and drug-related visits out of 4633 visits made by the HFUs for the entire year. The majority of our HFUs are socially connected: most have homes, friends or relatives, and a church or religion. However, they fared worse than the general population in terms of employment: 88% of HFU patients versus 12% in the general population were unemployed or too old or too young for employment.

Previous studies report that frequent ED users use all aspects of the health care system more frequently: more ambulatory care visits and more admissions than non-ED

users or patients who visit the ED twice or less in a given year.[4,6,7] This study also showed high ambulatory care visits: 74% of HFU patients have used the clinics affiliated with the hospital. And of those HFUs who use the hospital clinics, 15% visit at least once a month.

Preliminary Interventions

Findings of this study were presented to the leadership of the ED—the chairman, the vice-chairman, the director, the manager, and the head of case management. During the meeting, it was decided to involve the heads of the hospital clinics because 58% of our HFUs are managed by these clinics and practices owned by the health system. The chairman shared the study findings with the Chairman of Medicine, who oversees the outpatient clinic. Primary care providers of all HFUs were notified of the frequency and dates of their patient visits to the ED. Case managers and hospitalists were also made aware of the list of HFUs.

One of the smallest groups of HFUs was the 7 patients with sickle cell disease who visited 219 times. The ED chairman met with the hematology-oncology team and reviewed the protocol for ED management of sickle cell disease. The meeting resulted in a revised protocol, and one of the concrete suggestions that can be implemented immediately was to change the medication that is usually given to patients with sickle cell disease from meperidine to either morphine or hydromorphone hydrochloride for pain management.

The ED team also met with systems health insurance and informed them of all patients seen in the ED >4 times in fiscal year 2003. They will assign case managers to those patients to better meet their health needs.

We are also in the process of developing a multidisciplinary team that will spearhead creation of individualized care plans for a subset of patients. This intervention has shown some promise in other settings.[13]

This descriptive study has served as a catalyst for looking at the problem of heavy users of the ED more closely. However, it will be at least 2 more years before we can fully implement the interventions we have set in motion.

Limitations

This study has several important limitations. Our study only looked at frequent users of a single ED in a single region. We did not determine the subgroup of HFUs of ED services within the entire community. EDs in other regions may have a different subset of HFUs of their services.

We used administrative databases for our study, and we cannot attest to the overall accuracy of data entry; medical records were not reviewed to verify information.

Implications for Emergency Nursing

A significant finding of this study is that pain, either as a chief complaint or a significant symptom accompanying the chief complaint, is the reason for almost half of the HFU visits. Pain management in the ED has been the focus of several studies.[14-16] To date, a majority of ED nurses now have the skills to assess pain, although we still need to increase our understanding of the different pharmacologic and nonpharmacologic interventions for pain. The HFUs who continually come back with complaints of pain present a more difficult challenge. This subset of patients causes a tremendous amount of frustration among the ED staff and in some cases precipitates violence in the ED.[14] The episodic nature of ED interaction with these patients may work against the effective management of their care; episodic care meant lack of continuity, lack of consistency, and lack of integration with other aspects of these patients' care management. It is a challenge tailored for emergency nurses.

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