

Characteristics of frequent users of the emergency department with chronic pain

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CLINICIAN'S CAPSULE

What is known about the topic?

Highly frequent users of the emergency department (ED) present with an increased prevalence of chronic disease, mental health, and substance misuse.

What did this study ask?

What is the proportion and demographic and medical characteristics of high frequent users with chronic pain visiting an ED.

What did this study find?

This chart review found 38% of high frequent users (≥12 visits) presented with chronic pain to the ED.

Why does this study matter to clinicians?

Treating high frequency ED users with chronic pain requires consideration of their comorbidities and psychosocial needs for best clinical outcomes.

Results: We analyzed 4,646 visits for 247 patients, mean age was 47.2 years (standard deviation = 17.8), and 50.2% were female. This chart review study found 38% of high-frequency users presented with chronic pain to the ED and that women were overrepresented in this group (64.5%). All high-frequency users presented with co-morbidities and/or mental health concerns. High-frequency users with chronic pain had more ED visits than those without and 52.7% were prescribed an opioid. Chronic abdominal pain was the primary concern for 54.8% of high-frequency users presenting with chronic pain.

Conclusions: Chronic pain, specifically chronic abdominal pain, is a significant driver of ED visits among patients who frequently use the ED. Interventions to support high-frequency users with chronic pain that take into account the complexity of patient's physical and mental health needs will likely achieve better clinical outcomes and reduce ED utilization.

RÉSUMÉ

Objectif: L'étude visait à déterminer la proportion de grands utilisateurs des services des urgences (SU), souffrant de douleur chronique.

Méthode: L'étude consistait en un examen des dossiers médicaux d'adultes comptant au moins 12 consultations au SU d'un hôpital universitaire de soins tertiaires, au Canada, de 2012 à 2013. Ont été recueillis divers types de renseignements : 1) l'âge et le sexe des patients; 2) le nombre de consultations au SU, le nombre d'hospitalisations ainsi que leur durée; le diagnostic et le siège principal de la douleur; 3) l'existence d'un usage abusif, passé ou présent, d'alcool ou d'autres drogues; l'état de santé mentale et les maladies concomitantes. Les dossiers ont été passés en revue par deux examinateurs indépendants, et les motifs de consultation au SU ont été

ABSTRACT

Objectives: To identify the proportion of high-frequency users of the emergency department (ED) who have chronic pain.

Methods: We reviewed medical records of adult patients with ≥ 12 visits to a tertiary-care, academic hospital ED in Canada in 2012-2013. We collected the following demographics: 1) patient age and sex; 2) visit details – number of ED visits, inpatient admissions, length of inpatient admissions, diagnosis, and primary location of pain; 3) current and past substance abuse, mental health and medical conditions. Charts were reviewed independently by two reviewers. ED visits were classified as either "chronic pain" or "not chronic pain" related.

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classés « en lien avec des douleurs chroniques » ou « non en lien avec des douleurs chroniques ».

Résultats: Ont été analysées les données sur 4646 consultations concernant 247 patients; l'âge moyen était de 47,2 ans (écart type : 17,8) et il y avait 50,2% de femmes. L'examen des dossiers a révélé que 38% des grands utilisateurs allaient au SU pour des douleurs chroniques et que les femmes étaient surreprésentées dans le groupe (64,5%). Tous les grands utilisateurs souffraient de maladies concomitantes ou de troubles de santé mentale. Les grands utilisateurs atteints de douleur chronique comptaient plus de consultations au SU que ceux qui en étaient exempts, et 52,7% des premiers se sont vu prescrire des opioïdes. Enfin, les douleurs chroniques

abdominales étaient le principal motif de consultation chez 54,8% des grands utilisateurs souffrant de douleur chronique.

Conclusions: Les douleurs chroniques, notamment abdominales, constituent un motif important de consultations au SU parmi les grands utilisateurs. Les interventions qui tiennent compte de la complexité des besoins en santé mentale et en santé physique des personnes souffrant de douleur chronique, dans le but de les soutenir sont susceptibles de donner de meilleurs résultats cliniques et de réduire le nombre de consultations au SU.

Keywords: Pain, emergency medicine, education, research

INTRODUCTION

Individuals who repeatedly present to the emergency department (ED) require substantial medical resources^{1,2} and are increasingly the focus of programming³⁻⁵ to reduce ED overcrowding and wait times.⁶ Pain has been reported as the reason for presentation to the ED for 38%–78% of all ED visits, with chronic pain accounting for 10%–16% of visits.⁷⁻⁹ The highest standard of care for chronic pain involves a longitudinal and interdisciplinary approach along with self-management efforts, similar to other chronic diseases such as chronic obstructive pulmonary disease (COPD)¹⁰ and diabetes mellitus.¹¹ Given the episodic nature of ED care, it is not an appropriate setting for chronic pain management.

There are large variations in the definitions of high frequency ED users, ranging from 2 visits¹² to as many as 20 visits¹³ per year, with four or five visits being the most common criteria. Among high frequency users, older age, low socioeconomic status, chronic comorbidities, and high disease burden correlate with increased ED visits.¹⁴ Multiple ED visits are associated with greater utilization of other forms of health care, suggestive of unmet health care needs.¹⁵ Previous attempts to better understand pain-related ED presentations have yielded conflicting results because of variations in the population, methodology, and pain problem of interest.¹⁶⁻¹⁹ This literature may also not reflect current circumstances, in which increased opioid-related morbidity and mortality are motivating changes in the way pain is managed.²⁰ In a recent review, Pines stressed the importance of understanding high frequency users with specific conditions better to guide the development of targeted interventions.^{14,21}

This study is part of a program of research investigating the frequent use of the ED by patients who present for chronic pain with the goal of developing cost-effective interventions and improving patient care.^{22,23} The objectives of this study were to: 1) determine the proportion of highly frequent ED users who were presenting for chronic pain; and 2) describe the demographic and medical characteristics of patients with chronic pain.

METHODS

Study design and time period

This was a cross-sectional study consisting of a health record review of high frequency users from April 1, 2012, to March 31, 2013. This study was approved by the institutional research ethics board.

Setting

The study was conducted at an urban tertiary care academic medical centre in Canada. There were 148,778 ED visits during the 2012–2013 fiscal year, including 22,995 Canadian Triage and Acuity Scale²⁴ (CTAS) category 4 (less urgent condition) and 3,462 Category 5 (non-urgent condition) visits.

Population

To be included, patients had to 1) be ≥ 18 years of age; and 2) have had ≥ 12 ED visits during the study period.^{4,25} Because of resource limitations, we focused on highly frequent users with 12 or more visits in

A	Pain was the primary reason for presentation to the ED along with one of the following criteria;
B	One of the following criteria was met:
	(1) A pain diagnosis* was listed in the “Past Medical History” section of the ED record of the visit or nursing triage document and the symptoms precipitating the visit were congruent with this diagnosis.
	(2) There was documentation that the patient was taking opioids and/or co-analgesics for chronic pain; i.e. pregabalin, duloxetine, and/or NSAIDs, and evidence that the pain was present at previous hospital encounters (either in the ED or with a specialist) three months (or more) prior to the ED visit in question.
	(3) There was documentation from the ED Physician or the ED triage nurse stating that the length of time the patient has suffered with pain related to the presenting complaint was at least 3 months.
	(4) There was evidence of chronic pain in the electronic medical record, determined by reviewing previous encounters/notes from the ED and specialists, that pain had existed for at least 3 months.**
	(5) The electronic medical record had chronic pain noted as the presenting complaint, presenting diagnosis and/or final diagnosis.

Figure 1. Criteria to classify an ED visit as being chronic pain related (both A and B must be satisfied).

*Fibromyalgia, complex regional pain syndrome, chronic low back pain, etc.

**Multiple notes citing ongoing pain problems motivating an ED visit.

preparation for piloting a small collaborative care program. Patients who had 50% or more of their ED visits attributed to chronic pain were classified as high frequency users because of chronic pain; all others were classified as non-chronic-pain high-frequency users. Chronic pain is defined as recurrent or persistent pain lasting for more than three to six months or beyond the normal duration of healing.²⁶ Pain could be *constant* (e.g., low back pain and fibromyalgia) or *recurrent* (e.g., migraine and nephrolithiasis).

Procedures

We obtained the list of patients with ≥ 12 ED visits during the 2012-2013 fiscal year from the hospital administrative database. All available demographic information, ED utilization, and medical history including specialist consultation notes were reviewed independently by two

paired reviewers with expertise in chronic pain (two anesthesiology residents, one chiropractor, and one staff anesthesiologist with expertise in pain medicine) who attended training and pilot tested their review skills with 10 charts. Each ED visit was classified as either “chronic pain” or “not chronic pain related” using the definition above, along with additional information in Figure 1. Disagreements were resolved through consensus meetings. The following data were collected in duplicate by two reviewers using a standardized abstraction form (Excel Version 2013): age, gender, total number of ED visits, total number of and total length of stay for in-patient admissions, use of opioid medication, current and past substance abuse, mental health, and other medical conditions, as well as most responsible diagnosis for the majority of ED visits. For patients visiting repeatedly for chronic pain, we collected this additional data: location of pain and type of pain.

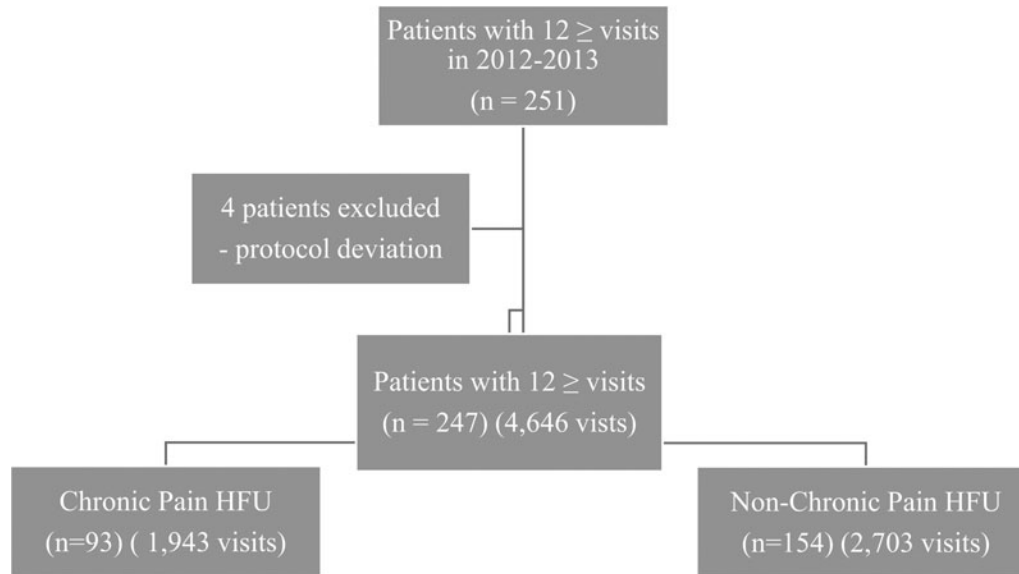


Figure 2. Study flow diagram.

Statistical analysis

Data were transferred into SPSS 23.0 for analyses.²⁷ Descriptive and univariate analyses were performed. Continuous variables are presented as means and standard deviations (SDs), and categorical variables are presented as percentages and counts. Demographic variables (age, gender) and ED visit variables (number of visits to the ED, having a general practitioner, number of in-patient admissions during the study period, and length of stay for each admission) were compared between the non-chronic-pain high-frequency users and chronic-pain high-frequency users using *t*-tests and chi-square tests. Given the exploratory nature of this work, no corrections were applied to adjust for inflation in familywise error because of multiple statistical tests.

Sample size

Our sample size was restricted based on our definition of high frequency users. A sensitivity analysis was performed using GPower 3.1.9.2 (2019) to evaluate the magnitude of effect size that could be detected between chronic-pain high-frequency users and non-chronic-pain high-frequency users. Using two-tailed hypothesis testing with α of 0.05 and power set to 80%, a sample of 247 patients was sufficiently sensitive to detect an effect size that met or exceeded *d* of 0.36, representing a

small to medium effect size by Cohen's standards. For proportional differences, the sample was sufficient to detect an effect that exceeded $\chi^2(1)$ critical of 3.84.

RESULTS

Demographic characteristics

There were 251 patients who had ≥ 12 visits to the ED during the 2012–2013 fiscal year. Four patients who were 17 years of age were excluded from the final dataset, which consisted of 247 patients (50.2% female, mean age 47.2, SD = 17.8 years old) accounting for 4,646 ED visits (Figure 2). Patients in this group were among the top 1% of users, accounting for 3.1% of all ED visits and 17.8% of all CTAS category 4 (less urgent conditions) or 5 (non-urgent conditions) visits. The majority (75.7%) had a family physician. The top three reasons for ED presentation for the entire high frequency user group were chronic pain (37.7%), alcohol abuse (8.5%), and cellulitis (6.0%). The top ten most common diagnoses are listed in Table 1. Mental health issues and substance abuse were commonly documented in the medical history: 52.6% of high frequency users reported mental health issues, with depression being the most common; and 42.1% reported a history of substance misuse, with alcohol misuse being the most common.

Table 1. Top ten most responsible diagnoses for repeated presentation

Most common diagnoses	Frequency <i>n</i> = 156*
Chronic pain	69
Alcohol abuse	21
Cellulitis	15
Schizophrenia	12
Multiple complaints	8
Suicidal	8
Substance abuse [†]	7
Chest pain	6
COPD	5
UTI	5
Total	156

Note: COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.
 **n* = 156 pertains to 156 participants represented in the top 10 most common diagnoses. The remaining 91 participants did not present with these diagnoses.
[†]Substance abuse includes opioid, cocaine, tetrahydrocannabinol, benzodiazepines, stimulants, polysubstance abuse, lithium, intravenous (IV) drugs, anticholinergics, graval, ecstasy, and muscle relaxants.

Comparison between chronic-pain high-frequency users and non-chronic-pain high-frequency users

Table 2 lists the demographic and medical characteristics, as well as health care utilization data for both chronic-pain and non-chronic-pain high-frequency users. There were 93 patients with ≥ 12 visits (1,943 total ED visits) for high frequency users with chronic pain and 154 patients for high frequency users without chronic pain (2,703 total ED visits). No age difference was detected between groups, but women were overrepresented among high frequency users with chronic pain (64.5% v. 41.6%, respectively). Both groups had a similar proportion of patients rostered to a family physician (high frequency users with chronic pain = 80.6%, and high frequency users without chronic pain = 73.3%). The high frequency users with chronic pain had significantly more ED visits (mean = 20.89, SD = 12.1) than the non-chronic-pain group (mean = 17.6, SD = 7.5), with a small to medium effect size (*d*) of 0.32. There was a non-significant trend toward a greater number of in-patient admissions for high frequency users with chronic pain, but no difference in in-patient length of stay. There were no differences between the two groups in the proportion of patients with a documented comorbid medical condition, but more patients in the chronic-pain high-frequency user group had documented hypertension (32.3% v. 20.8% for

non-chronic-pain high frequency users). More patients in the chronic-pain high-frequency group were currently prescribed an opioid than in the non-chronic-pain high-frequency user group (52.7% v. 19.5% for non-chronic-pain high-frequency users).

There was no difference in the proportion of patients with a documented mental health history between the two groups. There was a non-significant trend suggesting that substance misuse problems were more frequent in the non-chronic-pain group. Both groups reported similar opioid misuse history; however, a history of alcohol, cocaine, and tetrahydrocannabinol misuse was more often reported for non-chronic-pain high-frequency users than the chronic-pain high-frequency users (see Table 2).

Chronic pain-related complaints among high frequent users with chronic pain

Abdominal pain was the most common presenting concern among high frequency users with chronic pain (54.8%). Chest pain (10.8%) or pain in multiple areas (11.8%) was also common (see Table 2).

DISCUSSION

This is the first study to investigate the proportion and characteristics of high frequency users visiting the ED for chronic pain in Canada. We found that 37.7% of high frequency users visited the study site for chronic pain. High frequency users with chronic pain visited the ED more often than those without, and their visits accounted for 17.6% of all CTAS category 4 and 5 ED visits during the 2012–2013 year. Comparatively, in a separate review of 1,000 charts selected at random, 10% of all ED visits were attributable to chronic pain at this institution over the same time period.⁹ There was also a non-significant trend for individuals with chronic pain to be admitted to in-patient care more often. This may reflect a higher level of distress being communicated in the setting of chronic pain and demonstrates the pressure that unmanaged chronic pain exerts on acute care resources.

More than one-half (55%) of all chronic pain visits in our sample were driven by abdominal pain; this confirms the findings of Kim et al. who indicated that abdominal pain was the most common reason for consultation among patients with seven or more ED visits per year

Table 2. Demographic, ED utilization, and medical history characteristics

	Chronic-pain high-frequency user group N = 93	Non-chronic-pain high-frequency user group N = 154	p-value
Age (M, SD)	47.7 (17.4)	47.0 (18.1)	0.76
Sex female (n,%)	60 (64.5)	64 (41.6)	*0.0001
Family Physician Present (n,%)	75 (80.6)	113 (73.3)	
# of ED Visits per patient (M, SD)	20.9 (12.1)	17.5 (7.5)	*0.02
# of in-patient admissions (M, SD)	2.5 (3.8)	1.9 (2.5)	0.17
Length of stay of in-patient admissions (days) (M, SD)	13.6 (23.5)	16.1 (29.1)	0.48
On opioid medications (n,%)	49 (52.7)	30 (19.5)	*0.0001
History of problematic substance use	33 (35.5)	71 (46.1)	0.10
Opioid	24 (25.8)	28 (18.2)	0.15
Alcohol	14 (15.0)	52 (33.8)	*0.0001
Cocaine	5 (5.4)	23 (14.9)	*0.02
THC	4 (4.3)	23 (14.9)	*0.01
BZD	3 (3.2)	8 (5.2)	0.47
Other	7 (7.5)	17 (11.0)	0.37
History of mental health conditions	46 (49.5)	84 (54.5)	0.44
Neurodevelopmental disorder	6 (6.4)	15 (9.7)	0.37
Schizophrenic psychotic disorder	11 (11.8)	24 (15.6)	0.41
Bipolar disorder	6 (6.4)	17 (11.0)	0.23
Depressive disorder	27 (29.0)	38 (24.7)	0.45
Anxiety disorder	18 (19.3)	23 (14.9)	0.37
Other mental health disorders	11 (11.8)	34 (22.0)	0.42
History of medical conditions	81 (87.1)	127 (82.5)	0.33
Diabetes	15 (16.1)	33 (21.4)	0.31
Respiratory	19 (20.4)	40 (26.0)	0.90
Arthritis	11 (11.8)	13 (8.4)	0.38
Kidney failure	10 (10.7)	9 (5.8)	0.61
Hypertension	30 (32.3)	32 (20.8)	0.16
Obesity	10 (10.7)	14 (9.1)	0.14
Heart Disease	14 (15.0)	26 (16.9)	0.04
Cancer	10 (10.7)	22 (14.3)	0.67
Gastro tract disease	23 (24.7)	28 (18.2)	0.70
Other medical condition	31 (33.3)	101 (65.5)	*0.001
Primary location of pain (n,%)	51 (54.8)		
Abdominal	11 (11.8)		
3 or more regions	10 (10.7)		
Chest	7 (7.5)		
Low back, spine, sacrum, coccyx	7 (7.5)		
Lower limbs	5 (5.3)		
Head and/or face	2 (2.1)		
Anal, perineal, and genital	1 (1.1)		
Shoulder and upper limbs	51 (54.8)		

Note. BZD = benzodiazepine; COPD = chronic obstructive pulmonary disease; ED = emergency department; EtOH = ethyl alcohol; THC = tetrahydrocannabinol. Other abuse includes stimulants, polysubstance abuse, lithium, intravenous (IV) drugs, anticholinergics, graval, ecstasy, and muscle relaxants. Other medical includes, but not limited to, sleep apnea, pulmonary embolus, polycystic ovarian syndrome, pneumonia, Alzheimer's dementia, and cerebral palsy
*Significance at the 0.05 level

in a Canadian hospital.⁴ Pain in the abdomen can arise from several organ systems including genitourinary, gastrointestinal, and gynecological tracts, but in many

cases, no organic causes for the pain could be identified.²⁸ Patients without a diagnosis can be driven to visit the ED in the hope of being able to access advanced

diagnostic tests.²⁹ Even in the presence of a clear diagnosis, problems such as endometriosis and Crohn's disease³⁰ can be difficult to manage because of their chronicity and episodic nature. Many patients visit the ED after having exhausted self-management strategies.²² This highlights the importance of assisting patients in developing effective strategies to avoid and manage acute flare-ups.

Unsurprisingly, high frequency users with chronic pain were more likely to be using prescription opioids than users without chronic pain. This is in line with current guidelines recommending that opioids be trialled in the context of persistent pain that is refractory to other forms of pharmacotherapy and non-pharmacological therapies.²⁰ However, the benefits of opioids for the treatment of chronic pain are generally small,²⁰ and side effects can include hyperalgesia³¹ and the development of an opioid use disorder.³² Significantly fewer individuals with chronic pain had a documented current or past history of a substance misuse problem in comparison with non-chronic-pain users. This aligned with studies indicating that less than 5% of patients prescribed opioids²⁰ develop a substance use problem, but it could also be indicative of the difficulty teasing out the problematic use of opioids in the context of chronic pain.

More than one-half of the high frequency users in this sample presented with a current or past history of mental health problems in line with previous research investigating factors associated with ED use.^{4,33,34} Chronic pain is generally best managed using a biopsychosocial approach that combines patient education and physical and psychological therapies, along with pharmacotherapy and attention to social determinants of health.³⁵ In a pilot study, Rash et al. (2018) enrolled high frequency users with chronic pain into an interdisciplinary chronic pain program that developed and implemented personalized care plans. Results indicated an improvement in clinically important outcomes and ED visits. ED physicians reported that these plans were particularly helpful when meeting with patients during subsequent ED visits.³⁶

A lack of access to primary care is often cited as a reason for ED visits; however, the majority of high frequency users with chronic pain had access to a family practitioner. This supports research demonstrating that patients who frequently use the ED also rely on primary care.³⁷ An important consideration, however, is the difference between a patient being rostered to a family physician and a patient's perception that they can access

help from their primary care providers.³⁸ In Canada, barriers such as significant primary care wait times³⁹ and limited availability of same-day appointments can result in increased presentation to urgent care for non-urgent health concerns.

The primary limitation of this study was that data collection focused on one Canadian hospital that could impact the generalizability of results. There are also inherent limitations to using a chart review design as this relies on extracting data that were collected for alternative purposes than for a research study. It is not possible to ascertain if the documentation of the chart review data was complete or accurate. The extraction of data also relies on chart reviewers; in this study, each of the reviewers was affiliated with an academic pain clinic operating within the hospital in which the study was conducted. It is possible that this could have biased the review toward identifying more visits because of chronic pain as the extractors were aware of the study objective. This is unlikely, however, as the data extraction process involved consensus meetings to obtain agreement from other reviewers.

Our work highlights differences between high frequency users with and without chronic pain to guide the development of targeted interventions. We also found that the two groups were similar in many ways (e.g., admissions, mental health concerns, and medical comorbidity). Future research that investigates other factors may help to differentiate high frequency users with chronic pain (e.g., social support and disability) better and guide intervention development.

CONCLUSIONS

Unmanaged chronic pain contributes to a significant proportion of acute health care resource utilization. Patients with chronic pain using the ED frequently present with multiple medical and psychosocial challenges including chronic use of opioid therapy. The treatment of chronic pain in the ED, as well as easy-to-access alternatives to support patients and their health care providers, need to be part of a cohesive approach to reduce ED use and improve the quality of life of people living with chronic pain who frequently use the ED. This could be an important aspect of an eventual Canadian Pain Strategy.⁴⁰

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