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Brief Report

Frequent ED users: are most visits for mental health, alcohol, and drug-related complaints?☆,☆☆,★,★★

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ABSTRACT

Study objective: To determine whether frequent emergency department (ED) users are more likely to make at least one and a majority of visits for mental health, alcohol, or drug-related complaints compared to non-frequent users.

Methods: We performed a retrospective cohort study exploring frequent ED use and ED diagnosis at a single, academic hospital and included all ED patients between January 1 and December 31, 2010. We compared differences in ED visits with a primary *International Classification of Diseases, 9th Revision* visit diagnosis of mental health, alcohol or drug-related diagnoses between non-frequent users (<4 visits during previous 12-months) and frequent (repeat [4-7 visits], highly frequent [8-18 visits] and super frequent [≥19 visits]) users in univariate and multivariable analyses.

Results: Frequent users (2496/65201 [3.8%] patients) were more likely to make at least one visit associated with mental health, alcohol, or drug-related diagnoses. The proportion of patients with a *majority* of visits related to any of the three diagnoses increased from 5.8% among non-frequent users (3616/62705) to 9.4% among repeat users (181/1926), 13.1% among highly frequent users (62/473), and 25.8% (25/97 patients) in super frequent users. An increasing proportion of visits with alcohol-related diagnoses was observed among repeat, highly frequent, and super frequent users but was not found for mental health or drug-related complaints.

Conclusion: Frequent ED users were more likely to make a mental health, alcohol or drug-related visit, but a *majority* of visits were only noted for those with alcohol-related diagnoses. To address frequent ED use, interventions focusing on managing patients with frequent alcohol-related visits may be necessary.

1. Introduction

1.1. Background

Increasing emergency department (ED) crowding [1] has strained system capabilities, resulting in ED utilization being a focus of health policy deliberations not only in the United States but in countries with different health care systems [2]. Focusing on the subset of patients who frequently visit the ED is one method to understand ED utilization and design strategies to better manage ED resources.

1.2. Importance

Though frequent ED users only represent 1% to 8% of patients, they account for a substantial portion (17.6-28%) of ED visits [2,3]. They are often stereotyped as "people of modest means and poor health who go in and out of emergency department day after day, their fundamental health issues rarely resolved, at a tremendous and ever-growing cost to hospitals, municipalities and taxpayer." [4] Studies also show that frequent users are more likely to have *chronic* diagnoses of alcoholism and depression and are likely to make an ED visit for substance abuse and mental health related visits [2,5–7]. However, among those with multiple ED visits, it is not clear whether the majority of ED visits are related to mental health or substance abuse complaints. Our objective was to examine what percent of frequent users had ED visits associated with mental health, alcohol and drugs and whether the majority of ED visits were for these issues. We hypothesized that increasing frequency of ED visits would be associated with an increasing percentage of patients with (a) at least one visit and (b) a majority of visits for mental health, alcohol and drug-related issues compared to non-frequent users.

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1.3. Study objective

We sought to determine the likelihood that frequent (repeat, highly and super) ED users had made at least one and a majority of visits for mental health, alcohol or drug-related complaints compared to non-frequent users. We also examined whether frequent users were more likely to make a majority of visits in each diagnosis category, and whether stratifying frequent users into repeat, highly, or super frequent user classifications impacted the likelihood of making visits for mental health, alcohol or drug-related complaints.

2. Methods

2.1. Study design

We performed a retrospective cohort study to explore the association between frequent ED use and ED visit diagnosis at a single hospital. The study was approved by the hospital institutional review board.

2.2. Study setting and population

This study was conducted at a tertiary, urban, academic, level-one trauma center with an annual ED census of 90 000 visits. All patients who presented to the ED for at least one visit between January 1, 2010, and December 31, 2010, were included in the study.

2.3. Study protocol

An electronic medical record (EMR) system was utilized to obtain patient demographics, primary discharge visit code (*International Classification of Diseases, 9th Revision*, [ICD-9]) and ED disposition (admission to hospital, admission to ED observation unit, not admitted). For this study, we examined primary and secondary visit diagnosis rather than longitudinal/chronic diagnosis. For each ED visit, we counted the number of visits from the same patient in the previous 12 months [6]. For the patients who had multiple visits during the study period, the highest number of the previous 12-month visits was used to determine ED usage status. Non-frequent users, defined as patients whose highest number of visits during the previous 12-months was at least one but <4, served as the comparator group [3]. Frequent users were further categorized as repeat users (4-7 visits), highly frequent users (8-18 visits) and super frequent users (≥19 visits) based upon the largest number of ED visits in the previous 12-month period [6,8]. We also compared the top three ICD-9 diagnoses for non-frequent and frequent users.

2.4. Measurements

To determine whether an ED visit was associated with mental health, alcohol or drug-related diagnoses, we utilized a previously established algorithm that groups these by ICD-9 code to classify type of visits to the ED based on the primary diagnosis [9]. Because we recognized that the primary diagnosis may not always accurately capture the true reason for an ED visit, we conducted a sensitivity analysis that also included all secondary diagnoses.

2.5. Data analysis

For each diagnosis of interest (mental health, alcohol and drug-related), we determined whether patients had at least one visit during the study period and whether the majority of their visits (≥50%) during the previous 12 months were associated with these diagnoses. The proportion of patients with at least one or a majority of visits associated with each type of diagnosis was presented with 95% confidence intervals. We compared the differences between non-frequent users and frequent users using t test, or χ^2 where appropriate. In the multivariable analyses, we compared each frequent user group to the non-frequent user group using logistic regression models controlling for age, gender, ethnicity/race, insurance status, and whether the patient had a listed primary care physician (PCP) or not. We selected these covariates a priori as they were most likely to affect outcomes. All statistical analyses were performed with SAS, version 9.3, (The SAS Institute, Cary, NC).

3. Results

Overall, 3.8% of patients (2496/65 201 ED patients) were considered frequent users and accounted for 14.6% (13 303/91 325) of visits in 2010. The majority of frequent users were repeat users (4-7 visits within the last 12 months; 1926/65 201 patients, 3.0%), accounting for 8.7% of visits (7915/91 325), compared to highly frequent users (8-18 visits; 473/65 201, 0.7% patients, and 3.9% of visits, 3 566/91 325) and super frequent users (≥19 visits; 97/65 201, 0.1% patients and 2.0% of visits 1800/91 325). Compared to non-frequent ED users, repeat, highly and super frequent users were more likely to be White, older men. Frequent users were more likely to have primary care physicians than non-frequent users ($P < .0001$), although differences were not all

Table 1
Patient characteristics

	All patients	Non-frequent user <4 visits	Frequent user ≥4 visits				*P* value comparing frequent, repeat, highly, super frequent and non frequent
			Overall frequent user (≥4 visits)	Repeat user (4-7 visits)	Highly frequent user (8-18 visits)	Super frequent user (≥19 visits)	
N (%)	65201 (100)	62705 (96.2)	2496 (3.8)	1926 (3.0)	473 (0.7)	97 (0.1)	
Age, Mean (SD)	42 (23)	42 (22)	49 (23)	49 (24)	50 (19)	49 (12)	<.0001, <.0001, <.0001, <.0001
Males (%)	33808 (51.9)	32372 (51.6)	1436 (57.5)	1038 (53.9)	325 (68.7)	73 (75.3)	<.0001, .05, <.0001, <.0001
Ethnicity (%)							<.000, <.0001, <.0001, .01
White	45,358 (69.6)	43,548 (69.4)	1810 (72.5)	1,366 (70.9)	368 (77.8)	76 (78.4)	
Hispanic / Latino	9,349 (14.3)	9,036 (14.4)	313 (12.5)	255 (13.2)	51 (10.8)	7 (7.2)	
Black	6,036 (9.3)	5,752 (9.2)	284 (11.4)	228 (11.8)	42 (8.9)	14 (14.4)	
Asian	2,696 (4.1)	2,638 (4.2)	58 (2.3)	49 (2.5)	9 (1.9)	0	
Other/NA	1762 (2.7)	1731 (2.8)	31 (1.2)	28 (1.5)	3 (0.6)	0	
Insurance Status (%)							<.0001, <.0001, <.0001, .0001
Commercial	36203 (55.5)	35445 (56.5)	758 (30.4)	636 (33.0)	106 (22.4)	16 (16.5)	
Medicare	12781 (19.6)	11796 (18.8)	985 (39.5)	763 (39.6)	189 (40.0)	33 (34.0)	
Welfare/FreeCare	10456 (16.0)	9744 (15.5)	712 (28.5)	497(25.8)	168 (35.5)	47 (48.5)	
Self Pay	3377 (5.2)	3348 (5.3)	29 (1.2)	21 (1.1)	8 (1.7)	0	
Other/NA	2216 (3.4)	2209 (3.5)	7 (0.3)	6 (0.3)	0	1 (1.0)	
PCP (yes)	56713 (87.0)	54395 (86.7)	2318 (92.9)	1803 (93.6)	425 (89.9)	90 (92.8)	<.0001, <.0001, .05, .08

Table 2
Visit characteristics

	All patients	Non- frequent user <4 visits	Frequent users >4 visits				*P* value comparing frequent, repeat, highly, super frequent and non frequent
	N = 65201 n (%)	N = 62705 n (%)	Overall frequent user (>4 visits) N = 2496 n (%)	Repeat user (4-7 visits) N = 1926 n (%)	Highly frequent user (8-18 visits) N = 473 n (%)	Super frequent user (≥19 visits) N = 97 n (%)	
Either mental health, alcohol, or drug visit							
At least one	4500 (6.9)	3,839 (6.1)	661 (26.5)	406 (21.1)	180 (38.1)	75 (77.3)	<.0001, <.0001, <.0001, <.0001
Majority	3,884 (6.0)	3,616 (5.8)	268 (10.7)	181 (9.4)	62 (13.1)	25 (25.8)	<.0001, <.0001, <.0001, <.0001
Mental health visit							
At least one	3,045 (4.7)	2649 (4.2)	396 (15.9)	270 (14.0)	93 (19.7)	33 (34.0)	<.0001, <.0001, <.0001, <.0001
Majority	2,599 (4.0)	2,479 (4.0)	120 (4.8)	103 (5.3)	14 (3.0)	3 (3.1)	.03, .002, .27, .66
Alcohol related visit							
At least one	1,393 (2.1)	1,061 (1.7)	332 (13.3)	163 (8.5)	109 (23.0)	60 (61.9)	<.0001, .0001, <.0001, <.0001
Majority	1,072 (1.6)	958 (1.5)	114 (4.6)	58 (3.0)	35 (7.4)	21 (21.6)	<.0001, <.0001, <.0001, <.0001
Drug-related							
At least one	279 (0.4)	207 (0.3)	72 (2.9)	35 (1.8)	30 (6.3)	7 (7.2)	<.0001, <.0001, <.0001, <.0001
Majority	185 (0.3)	175 (0.3)	10 (0.4)	8 (0.4)	2 (0.4)	0 (0)	.26, .27, .56, .60

statistically significant when comparing subdivisions of frequent users to non-frequent users (Table 1).

There was a consistent increasing trend in the proportion of patients with at least one visit associated with mental health, alcohol, or drug-related diagnosis from non-frequent users to super frequent users (Table 2). The proportion of patients with a majority of visits related to any of the three types of diagnoses increased from 5.8% among non-frequent users (3616/62705), to 9.4% among repeat users (181/1926), 13.1% among highly frequent users (62/473), and 25.8% (25/97 patients) in super frequent users. This trend was explained by an increasing proportion of visits for the primary diagnosis of alcohol-related complaints among repeat, highly frequent, and super frequent users and was not found with mental health or drug-related diagnoses.

These findings were consistent for frequent users with at least one visit for mental health, alcohol, or drug-related diagnosis (either or alone) when controlling for age, gender, ethnicity, insurance and PCP status (Table 3). All categories of frequent users had much higher odds of making a majority of visits for alcohol related reasons (OR 1.91, 95%CI [1.45-2.51], 3.92, 95%CI [2.73-5.64] and 12.4, 95% CI [7.41-20.76]). Only repeat users made a majority of visits for mental health reasons (OR 1.26, 95% CI [1.03-1.55]) and no frequent user groups made a majority of visits for drug-related complaints.

To determine whether our findings changed if we included all secondary diagnoses, we conducted a sensitivity analyses by performing the same multivariable logistic regression as in our primary analysis but included all secondary mental health, alcohol, or drug-related diagnoses. Results were similar (data not shown) except repeat and highly frequent users had an increased odds of having a mental health-related diagnosis for a majority of visits (repeat users 1.35 95% CI [1.20-1.52], highly frequent users 1.30 95% CI [1.04-1.64]). We also found that the top three ICD-9 diagnoses were the same for non-frequent and all categories of frequent users except for super frequent users (see Table 4). Among super frequent users the most frequent diagnosis was non-dependent abuse of drugs.

3.1. Limitations

This was a retrospective study at a single, academic, urban ED site and thus our results may not be generalizable. We did not analyze data based on chronic diagnosis, but focused on visit level discharge diagnoses. Our data are not likely to fully account for visits related to substance abuse/mental illness such as liver failure or trauma related to substance abuse. We did conduct a sensitivity analysis to try to include such visits if there was a secondary visit diagnosis related to

Table 3
Multivariate logistic regression of odds ratio of mental health, alcohol and drug-related visits, controlling for gender, ethnicity, insurance and PCP status

	Frequent user, Yes vs. No >4 vs. <4 visits	Repeat user vs. Non-frequent user 4-7 vs. <4 visits	Highly frequent user vs. Non-frequent user 8-18 visits vs. <4 visits	Super frequent user vs. Non-frequent user ≥19 vs. <4 visits
Either mental health, alcohol or drug, at least one	5.03 (4.56-5.56)	3.84 (3.41-4.32)	7.93 (6.52-9.63)	42.68 (26.21-69.52)
Either mental health, alcohol or drug, majority	1.78 (1.55-2.03)	1.58 (1.35-1.86)	2.05 (1.56-2.70)	4.38 (2.76-6.97)
Mental health visit, at least one	3.86 (3.43-4.34)	5.17 (5.16-5.18)	9.17 (9.12-9.21)	0
Mental health visit, majority	1.11 (0.92-1.35)	1.26 (1.03-1.55)	0.65 (0.38-1.10)	0.65 (0.21-2.06)
Alcohol related visit, at least one	8.00 (6.95-9.21)	5.10 (4.26-6.11)	13.58 (10.7-17.25)	76.93 (49.27-120.11)
Alcohol related, majority	2.75 (2.24-3.38)	1.91 (1.45-2.51)	3.92 (2.73-5.64)	12.40 (7.41-20.76)
Drug-related visit, at least one	7.08 (5.30-9.44)	4.77 (3.28-6.93)	13.57 (8.95-20.57)	13.61 (6.08-30.47)
Drug-related visit, majority	1.12 (0.59-2.14)	1.25 (0.61-2.57)	0.97 (0.24-3.96)	0

Table 4
Top three International Classification of Disease (ICD-9) diagnoses

	Non- frequent user <4 visits	Frequent users >4 visits				*P* value comparing frequent, repeat, highly, super frequent and non frequent
	N = 62705 n (%)	Overall frequent user (> 4 visits) N = 2496 n (%)	Repeat user (4-7 visits) N = 1926 n (%)	Highly frequent user (8-18 visits) N = 473 n (%)	Super frequent user (≥19 visits) N = 97 n (%)	
Symptoms involving respiratory system and other chest symptoms (786)	5283 (8.4)	191 (7.7)	142 (7.4)	41 (8.7)	8 (8.2)	.17, .10, .85, .95
General symptoms (780)	3792 (6.0)	137 (5.5)	110 (5.7)	23 (4.9)		.25, .54, .28, .43
Other symptoms involving abdomen and pelvis (789)	2622 (4.2)	102 (4.1)	67 (3.5)	25 (5.3)	10 (10.3)	.82, .13, .23, .003
Nondependent abuse of drugs (305)					14 (14.4)	<.0001, .0004, <.0001, <.0001

mental illness/alcohol or drugs as described above. Also, the data from ICD-9 discharge diagnosis codes may not accurately capture the reason for a visit. Furthermore, we did not examine whether our frequent ED users also made visits to other EDs for similar complaints. Finally, we included only one calendar year in our analysis; frequent users may drift into and out of the frequent user pool.

4. Discussion

Our study found that frequent users as compared to non-frequent users were much more likely to have at least one visit associated with either mental health, alcohol or drug-related diagnoses. Frequent users also had the majority of visits for either mental health, alcohol, or drug-related diagnoses, but this appeared to be driven by alcohol-related visits. This, combined with our finding that the top three category of visits were similar between non-frequent and most categories of frequent users, suggest that despite stereotypes, frequent users commonly present to the ED for medical and surgical problems and most often present for similar reasons as non-frequent users.

Prior studies show that frequent users were more likely to make mental health, alcohol, or drug-related related visits. Fuda found that frequent users had a higher frequency of visits for substance abuse (4.3% vs. 1.0%) and mental disorders (7.0% vs. 2.7%) [2]. Mandelberg, Kuhn and Kohn also found that frequent users were more likely to make alcohol-related visits (withdrawal [relative risk 4.4], dependence [RR 3.4] and intoxication [RR 2.4]), but not for non-alcohol use [7].

We found that while frequent users had the majority of visits associated with alcohol-related diagnoses, this was not the case for patients with mental health or drug-related complaints. This suggests that frequent users with mental health and drug-related diagnoses make ED visits for a multitude of complaints. Our study did find that frequent users, whether defined as repeat, highly frequent, or super users, had high higher odds of making a majority of visits for alcohol-related complaints and confirms the heavy burden of alcohol among frequent ED users. McDonald found that 7.9% of ED visits between 1992 and 2000 were related to alcohol, representing 7.6 million visits per year [10]. ED physicians and caregivers have multiple opportunities to intervene with patients presenting to the ED with alcohol-related visits, and represents an opportunity for identifying such individuals for interventions.

In conclusion, our study showed that frequent ED users are more likely to present with at least one mental health, alcohol or drug-related visit, but that made a majority of visits were only seen for alcohol-related complaints. This may indicate that to address frequent ED use, successful interventions that particularly focus on managing patients with frequent alcohol-related visits are necessary.

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