

ORIGINAL ARTICLE

Reasons for emergency department visits of patients with opioid use disorder at an urban safety-net hospital: A retrospective records review

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ABSTRACT

Objectives: *The purpose of this study was to describe the emergency department (ED) visit chief complaints and discharge diagnoses of patients with an opioid use disorder (OUD) empaneled to a primary care clinic.*

Design: *ED visits were retrospectively reviewed through electronic health records. Patients with a history of using multiple substances and medical or psychiatric conditions were compared to those without these conditions.*

Setting: *This study was conducted at Harbor-UCLA ED, a safety-net level one trauma center.*

Patients and participants: *Eligible participants were empaneled to the Harbor-UCLA Family Health Center with a diagnosis of OUD between January 1, 2018, and December 31, 2020.*

Main outcome measures: *The primary outcome measures included number of ED visits, hospital admissions, chief complaints, and discharge diagnoses.*

Results: *The total number of patients was 59. The most common chief complaints were musculoskeletal (34 percent), gastrointestinal (18 percent), general (13 percent), and skin (8.6 percent). The most common discharge diagnoses were musculoskeletal (27 percent), gastrointestinal (20 percent), infectious (11 percent), substance use disorder related (11 percent), psychiatric (7 percent), and cardiovascular (7 percent). Co-occurring alcohol use was associated with a higher number of visits, 3.18 versus 1.15 ($p = 0.021$), and a higher percentage of patients with frequent visits, 46 percent versus 8 percent ($p = 0.008$). Patients with diabetes had more frequent visits, 40 percent versus 10 percent ($p = 0.036$), and were more likely to be admitted, 43 percent versus 15 percent ($p = 0.010$).*

Conclusions: *This study highlights the importance of screening and the management of alcohol use and diabetes among patients with OUD.*

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INTRODUCTION

Emergency department (ED) visits continue to be a substantial healthcare cost. According to the Agency for Healthcare Research and Quality, the cost of ED visits in 2017 totaled \$76.3 billion in the United States.¹ Patients with substance use disorders (SUDs) have increased rates of mental and

physical health conditions, which contributes to their increased use of ED services.^{2,3} Studies have shown that patients with opioid use disorder (OUD) are more likely to utilize the ED.^{4,5} Examining the utilization of ED services by patients with OUD may identify ways to reduce the morbidity and mortality of these patients, especially given the rise in overdose deaths.^{4,6}

One explanation for the higher frequency of ED visits is a lack of consistent primary care.⁷ Other reasons may be the lack of treatment for OUD and the high prevalence of co-occurring mental or physical health conditions in the population.⁷⁻¹¹

To fully understand the drivers of this increased number of visits, researchers should determine the characteristics of the patients utilizing ED services and their reasons for presenting to care. Previous studies have found polysubstance use, co-occurring mental or physical illness, and suicidal behaviors as characteristics that increased the risk of frequent ED visits and hospitalizations.^{7,12,13}

Only two studies have examined the reasons for ED visits among patients with SUDs. The first study found that the most common reasons were other, general, digestive, psychiatric, musculoskeletal, and respiratory but did not include substance use as a category and only categorized patients by alcohol or drug use disorder.¹⁴ The second study examined the common presenting complaints of patients with an alcohol use disorder (AUD) or SUD. The most common chief complaint was related to alcohol for patients with AUD; for patients with other SUDs, symptoms of psychosis and an adverse effect of alcohol or drug use were more commonly reported.¹⁵ Limitations of this study were that only presenting complaints and not discharge diagnoses were examined, and the study compared patients with AUD to those with SUD without further identifying the subset of patients with OUD.

No studies, to our knowledge, have evaluated both the chief complaints and discharge diagnoses of ED visits for patients with an OUD. Examining the specific chief complaints may better illustrate the reason for the visit from the patient's perspective. Reviewing the discharge diagnoses can help us better understand what underlying disease process led to the ED visit. Knowledge of this information may help primary care providers address patient needs in the outpatient setting and decrease unnecessary ED visits.

The primary purpose of this study was to describe the ED visit chief complaints and discharge diagnoses of patients with an OUD empaneled to a primary care clinic. Secondary goals were to identify any differences in ED visits and hospital admissions based on sociodemographics, comorbidities, whether the patient was on a medication for SUD (MSUD), and when they were last seen at their primary care clinic or its associated addiction medicine clinic. We hypothesized that (1) the reasons for ED visits will be due to a mental

health condition or SUD more often among the patients who were not on any MSUDs; (2) most of the ED visits will be made by patients who are not on MSUDs; (3) not being on a MSUD will be associated with more hospital admissions; (4) patients who were seen in the primary care or the addiction medicine clinic over a month prior will have more hospital admissions; and (5) the patients with co-occurring mental or physical health conditions, or polysubstance use will have a greater number of ED visits and admissions.

METHODS

Study design

This was a retrospective cohort study on patients with an OUD empaneled to a family medicine clinic. This study was conducted by completing a review of electronic medical records. A list of patients with an OUD empaneled to the clinic was created, and then each patient's medical record was reviewed within the 2018-2020 timeframe for data collection. Twenty percent of the ED visits were randomly selected for accuracy checks of the data. The individuals abstracting the data were not blinded to the purpose of this study.

Setting

This study evaluated the medical records of patients who visited the Harbor-UCLA ED, which was the designated hospital for each patient's primary care provider. Harbor-UCLA is a county safety-net level one trauma center located in the southern part of Los Angeles County. It serves over 700,000 residents of LA County and has a 300 square mile catchment area.¹⁶ Harbor-UCLA Family Health Center is the teaching clinic for the family medicine residency program, located in Harbor City, California. An estimated 44 percent of the population is Latinx, and 25 percent of the community live below the federal poverty level.¹⁷ The health center accepts patients from Harbor-UCLA's hospital catchment area. The center provides comprehensive care to patients with onsite addiction, sports, and minor procedures clinic, and has an onsite pharmacy.

Participants

Study participants were eligible if they were empaneled to the Harbor-UCLA Family Health

Center and had a diagnosis of OUD between January 1, 2018, and December 31, 2020. Patients did not need to have an ED visit before being empaneled. Empanelment refers to the assignment of an individual patient to a primary care provider. Institutional Review Board exempt status was obtained from the Lundquist Institute, which is associated with all Harbor-UCLA research (IRB# 18CR-32511-01).

Variables

Outcome variables included number of ED visits, hospital admissions, chief complaints, and discharge diagnoses. Frequent ED visits were determined to be more than three during the study timeframe, which was an average of once per year. We chose this number because it has been estimated that about 22 percent of the population visits the ED once per year.¹⁸ Chief complaints were categorized by review of systems, and discharge diagnoses were categorized by organ system with substance use-related diagnoses separated as its own category. Discharge diagnoses that were unclear were categorized based on the ED provider's most likely diagnosis. The primary independent variables for analyses included whether the patient was on a MSUD and whether the patient was seen in their primary care or the addiction medicine clinic within the past month. Possible MSUDs included buprenorphine, methadone, naltrexone, acamprosate, or any off-label use of a medication that was clearly stated in the medical record as being used for an SUD. A 1-month cutoff was used for the primary care and addiction medicine clinic because most of the providers in these clinics provide only a 1-month supply of MSUDs before requiring another appointment. Secondary independent variables included clinical characteristics and sociodemographics. Clinical characteristics included co-occurring mental or physical health conditions, polysubstance use, and whether the patient had a naloxone prescription in the last year. Sociodemographic variables included gender, race/ethnicity, age, and housing status, which was defined as a lack of stable housing within the past year. Polysubstance use was determined by the presence of an International Classification of Diseases, tenth edition, diagnostic code for any substance use (F10-F19), in addition to OUD, in the patient's history section of their medical record.

Statistical methods

All analyses were computed by the study authors using Statistical Package for the Social Sciences software version 28.0.1.1. Descriptive statistics were done for all variables. Missing values were removed from the analyses. Chi-squared test or Fisher's exact test was used for analyses between categorical variables. One-way analysis of variance or two independent sample *t*-tests were used for analyses between a categorical independent variable and an interval dependent variable. Statistical significance was defined as a *p*-value of less than 0.05.

RESULTS

Patient characteristics

The total number of patients in the clinic with a diagnosis of OUD during 2018-2020 was 59. A total of 30 patients had at least one ED visit, while 29 patients had no visits. Characteristics are shown in Table 1.

Sociodemographics of the patients presenting to the ED

The total number of ED visits was 93, made by 30 patients. Thirty percent of the 93 visits lead to a hospital admission. Eighteen patients left before being seen, two patients left against medical advice, one patient eloped, and one patient was transferred to another hospital. Sociodemographics are shown in Table 1. There was no statistically significant association between age or housing insecurity and the number of ED visits.

Notably, 12 percent of African American (AA) patients were on an MSUD in the last month compared to 41 percent of all other races ($p = 0.026$), and 6 percent of AA patients had a naloxone prescription in the last year compared to 30 percent of all other races ($p = 0.06$). Sixty-two percent of Latinx patients were on an MSUD in the last month compared to 9 percent of all other races ($p < 0.001$), and 49 percent of Latinx patients had a prescription for naloxone in the last year compared to 9 percent of all other races ($p < 0.001$).

Reasons for ED visits

The chief complaints and discharge diagnoses are presented in Tables 2 and 3, respectively.

Table 1. Sociodemographics of empaneled OUD patients with or without an ED visit

Variable	Patients with one or more ED visits (percent)	Patients with no ED visits (percent)
Age*	50.48/54 (mean/median)	n/a [†]
18-39	20/93 (21.5)	n/a [†]
40-59	40/93 (43.0)	n/a [†]
60+	33/93 (35.5)	n/a [†]
Gender		
Male	18/30 (60.0)	14/29 (48.3)
Female	12/30 (40.0)	15/29 (51.7)
Race/Ethnicity		
White	7/30 (23.3)	6/29 (20.7)
Latinx	12/30 (40.0)	6/29 (20.7)
African American	4/30 (13.3)	4/29 (13.8)
Asian	2/30 (6.7)	1/29 (3.4)
Indigenous	0/30 (0.0)	2/29 (6.9)
Alaskan Native	0/30 (0.0)	1/29 (3.4)
Other	3/30 (10.0)	9/29 (31.0)
Middle eastern	2/30 (6.7)	0/29 (0.0)
Housing insecurity [‡]	19/93 (20.4)	n/a [†]

OUD: opioid use disorder; ED: emergency department.
 *Age data included all 93 ED visits, including multiple visits made by the same patient.
[†]Data not collected.
[‡]Housing insecurity defined as no stable housing in the year prior to the ED visit. This variable includes all 93 visits, including multiple visits made by the same patient.

Twenty-three percent of the patients who were taking an MSUD had a substance use-related reason for the ED visit versus 4 percent for those not taking an MSUD ($p = 0.01$).

Clinical characteristics

The differences in clinical characteristics are shown in Table 4. Twenty-eight percent of patients with polysubstance use had frequent ED visits

Table 2. Emergency department visit chief complaints

	All (percent)	Patients on an MSUD* (percent)	Patients not on an MSUD* (percent)
Cardiovascular	4/93 (4.3)	1/33 (3.0)	3/60 (5.0)
Ear, nose, throat	2/93 (2.2)	1/33 (3.0)	1/60 (1.7)
General [†]	12/93 (12.9)	4/33 (12.1)	8/60 (13.3)
Gastrointestinal	17/93 (18.3)	8/33 (24.2)	9/60 (15.0)
Genitourinary	5/93 (5.4)	0/33 (0.0)	5/60 (8.3)
Gynecological	1/93 (1.1)	1/33 (3.0)	0/60 (0.0)
Hematologic	1/93 (1.1)	0/33 (0.0)	1/60 (1.7)
Musculoskeletal	32/93 (34.4)	12/33 (36.4)	20/60 (33.3)
Neurologic	5/93 (5.4)	1/33 (3.0)	4/60 (6.7)
Psychiatric	2/93 (2.2)	1/33 (3.0)	1/60 (1.7)
Respiratory	4/93 (4.3)	0/33 (0.0)	4/60 (6.7)
Skin	8/93 (8.6)	4/33 (12.1)	4/60 (6.7)

*Medications for substance use disorder (MSUD) included buprenorphine, methadone, naltrexone, and acamprosate.
[†]General included medication refills, appointment requests, or other nonacute medical needs.

compared to 3 percent for patients with only OUD ($p = 0.01$). Co-occurring alcohol use was associated with a higher number of ED visits, 3.18 versus 1.15 ($p = 0.021$), and a higher percentage of patients with frequent ED visits, 46 percent versus 8 percent ($p = 0.008$). Patients with diabetes had a higher number of ED visits, 4.20 versus 0.98 ($p = 0.076$), more patients with frequent ED visits, 40 percent versus 10 percent ($p = 0.036$), and more patients admitted, 43 percent versus 15 percent ($p = 0.010$). The patients who were not on any MSUD were admitted in 38 percent of their ED visits versus 16 percent for those on an MSUD ($p = 0.08$).

DISCUSSION

Previous studies have examined different characteristics of patients with SUDs who present to the ED.^{7,12-15} Two previous studies examined the reasons for ED visits among patients with SUDs.^{14,15} Zhang et al.¹⁴ examined 27,609 ED visits using the

Table 3. Emergency department visit discharge diagnoses

	All (percent)	Patients on an MSUD* (percent)	Patients not on an MSUD* (percent)
Cardiovascular	5/74 (6.8)	0/26 (0.0)	5/48 (10.4)
Ear, nose, throat	2/74 (2.7)	1/26 (3.8)	1/48 (2.1)
Gastrointestinal	15/74 (20.3)	5/26 (19.2)	10/48 (20.8)
Genitourinary	4/74 (5.4)	0/26 (0.0)	4/48 (8.3)
Gynecological	1/74 (1.4)	1/26 (3.8)	0/48 (0.0)
Hematologic	1/74 (1.4)	0/26 (0.0)	1/48 (2.1)
Idiopathic	1/74 (1.4)	0/26 (0.0)	1/48 (2.1)
Infectious	8/74 (10.8)	3/26 (11.5)	5/48 (10.4)
Musculoskeletal	20/74 (27.0)	9/26 (34.6)	11/48 (22.9)
Neurologic	1/74 (1.4)	0/26 (0.0)	1/48 (2.1)
No diagnosis	1/74 (1.4)	0/26 (0.0)	1/48 (2.1)
Ophthalmologic	1/74 (1.4)	0/26 (0.0)	1/48 (2.1)
Psychiatric	5/74 (6.8)	1/26 (3.8)	4/48 (8.3)
Skin	1/74 (1.4)	0/26 (0.0)	1/48 (2.1)
Substance use related [†]	8/74 (10.8)	6/26 (23.1)	2/48 (4.2)

*Medications for substance use disorder (MSUD) included buprenorphine, methadone, naltrexone, and acamprosate.

[†]Substance use-related category included discharge diagnoses related to alcohol or drug use, including misuse of opioids.

National Hospital Ambulatory Medical Care survey between 2016 and 2017. Of these visits, 3,282 included a patient with an SUD. The most common reasons for the visits were other (21.2 percent), general (19.5 percent), digestive (14.3 percent), psychiatric (13.1 percent), musculoskeletal (11.3 percent), and respiratory (7.1 percent). However, they did not include substance use as a category and only categorized patients by alcohol or drug use disorder, not OUD.¹⁴

Suen et al.¹⁵ examined 9.3 million ED visits made by patients with an SUD utilizing the National Hospital Ambulatory Medical Care survey conducted between 2014 and 2018. The most common chief complaint was related to alcohol for patients with AUD (27.4 percent); for patients with other

Table 4. Select clinical characteristics of the patients who presented to ED

Variable	Percentage of ED visits
Polysubstance use* (all)	61/93 (65.6)
Alcohol	35/93 (37.6)
Methamphetamine	32/92 (34.8)
Cannabis	14/93 (15.1)
Mental health condition (all)	53/93 (57.0)
Depression	31/93 (33.3)
Anxiety	22/93 (23.7)
Bipolar	13/93 (14.0)
Physical health condition (all)	77/93 (82.8)
Hypertension	42/93 (45.2)
Diabetes	42/93 (45.2)
Hepatitis C	21/93 (22.6)
Naloxone prescription in the last year	24/93 (25.8)
MSUD [†] prescription in the last month	33/93 (35.5)
Primary care clinic visit over a month ago	54/83 (65.1)
Addiction medicine clinic visit over a month ago	86/93 (92.5)

ED: emergency department.

*Polysubstance use was determined by the presence of an International Classification of Diseases, tenth edition, diagnostic code for substance use (F10-F19), in addition to OUD, in the patient's history section of their medical record.

[†]Medications for substance use disorder (MSUD) included buprenorphine, methadone, naltrexone, and acamprosate.

SUDs, symptoms of psychosis (9.2 percent) and an adverse effect of alcohol (8.9 percent) or drug use (7.5 percent) were more commonly reported compared to those without an SUD.¹⁵ Limitations of this study were that only presenting complaints and not discharge diagnoses were examined, and this study compared patients with AUD to those with SUD without further identifying the subset of patients with OUD.

None of the previous studies included patients who were empaneled to a primary care clinic. A previous study found improved outcomes for patients who had continuous primary care.⁷ Therefore, the

population in our study was expected to have better outcomes compared to the previous studies that did not include patients empaneled to a primary care clinic. However, the outcomes for our secondary variables were largely the same as the previous studies, indicating empanelment alone does not affect those outcomes. One limitation to this theory is that empanelment does not accurately reflect how engaged a patient is in care, including how frequently they visit their primary care clinic.

The reasons for ED visits differed from those described in previous studies.^{14,15} Musculoskeletal, gastrointestinal, general, and skin were the most common chief complaints in our study compared to other, general, digestive, psychiatric, musculoskeletal, and respiratory in the previous study.¹⁴ The most common discharge diagnoses were like the chief complaints with musculoskeletal and gastrointestinal as the top two categories. However, we also found substance use and infections as common discharge diagnosis categories. The substance use category comprised mostly of withdrawal from substances or acute intoxication. The infectious category was mostly related to skin infections associated with injecting drugs. This finding highlights the importance of examining the skin of the patients who inject drugs and the need for widespread distribution of safer consumption supplies including syringes.

Our first hypothesis was incorrect. Patients who were taking an MSUD were more likely to have an SUD as their discharge diagnosis. One explanation is that many patients on MSUDs, specifically buprenorphine-naloxone, would miss a follow-up appointment, run out of their medication, and then present to the ED for a refill or in withdrawal.

Our second hypothesis was correct. Most of the patients, 64.5 percent, who presented to the ED were not on any MSUD. This is consistent with previous studies.^{8,9} Furthermore, 74.2 percent of patients did not have a prescription for naloxone in the past year, which is concerning because it has been recommended as the standard of care.¹⁹ Despite the patients being empaneled to a primary care clinic, the majority still did not have a prescription for naloxone. This presents an opportunity for growth within the healthcare system, and future studies should investigate ways to ensure patients with OUD have naloxone. Proposals include an alert in the electronic health record that appears when OUD is added as a diagnosis for the visit or

that naloxone is given at bedside before a patient leaves the appointment. Additionally, a special alert or electronic message to the primary care provider notifying them of the patient's substance use would be useful to ensure that the provider does not miss the substance use when they are reading the ED visit note. This could be an area of future research to assess if it helps with SUD continuity of care.

The third hypothesis was found to be true that patients who were on an MSUD were less likely to be admitted, which is consistent with previous studies.^{8,9} However, it failed to reach statistical significance ($p = 0.08$). There was no statistically significant difference regarding the fourth hypothesis that patients with a primary care or addiction medicine clinic appointment over a month ago would have more ED visits.

Previous studies have shown that co-occurring physical or mental health conditions and polysubstance use leads to an increase in ED visits.^{7,12,13} No studies, to our knowledge, analyzed which specific co-occurring physical health conditions were associated with this increase in visits. We found that co-occurring diabetes was associated with frequent ED visits and hospital admissions. The prevention of diabetes and efforts to support adequate glucose control may represent an area of focus for primary care providers managing patients with OUD.

Patients with polysubstance use had more frequent ED visits. Specifically, alcohol was associated with a higher number of ED visits and more frequent ED visits. This may be due to the many complications of alcohol, which affect multiple organ systems and the dangers of combining opioids and alcohol.

Racial/ethnic minorities with SUDs, especially AAs, have worse treatment outcomes and comorbidities.²⁰⁻²⁴ Our findings for AAs were consistent with these health disparities. AA patients were significantly less likely to be on an MSUD (12 percent versus 41 percent, $p = 0.026$) and significantly less likely to have a prescription for naloxone in the last year (6 percent versus 30 percent, $p = 0.06$). A likely explanation for these findings is mistrust of the medical field and perceived stigma and discrimination by minority patients,^{25,26} both of which likely leads to AA patients being less likely to accept MSUDs. More culturally sensitive research needs to be conducted to determine how to improve access to care for AA patients. Researchers should consider participatory action research with this population to help foster trust.

Our study found that Latinx patients were more likely to have a prescription for an MSUD and naloxone. This appears inconsistent with some previous studies showing Latinx patients to be less likely to complete treatment, and that treatment is less effective in reducing substance use.^{22,24} However, a methodological flaw of one of the studies was that it included AA and Latinx patients as one group. A separate study had findings contradictory to the previous two; it found that Latinx patients had a better outcome in SUD treatment than White and AA patients.²³ Further research should be done to clarify these inconsistent findings and should include analyses that separate AA and Latinx patients into different groups.

Limitations

A major limitation for our study was that it included ED visits only from Harbor-UCLA. However, we believe that the number of visits from other hospitals is low, given Harbor-UCLA is the safety-net hospital for the region, and many patients were transferred to Harbor-UCLA if an admission was required due to insurance. Another limitation was that our sample size was small, which may affect the ability of the analyses to detect statistical significance. Finally, limitations of a medical records review include improper documentation, missing information, and potential bias from the individuals abstracting the data. We worked toward diminishing these limitations by performing accuracy checks and having a template for data collection prior to starting the medical records review.

An additional limitation was that we were unable to assess if a patient was denied admission to the hospital due to an SUD because it was not reflected anywhere in the electronic medical record. Therefore, we are unable to assess if there was any bias in relation to hospital admission.

We did not include after-visit summaries or counseling upon discharge in our study. While after-visit summaries and counseling are important for patient education, we found they were used inconsistently by providers. Similarly, we did not include referrals to SUD clinics, Alcohol Anonymous, or Narcotics Anonymous in our study because documentation of any referrals was rare and inconsistent. We did not use medical records from transferring hospitals in our study because they were also rarely and inconsistently placed into our electronic medical records.

Our study aims to provide a better understanding of reasons for ED visits among patients with OUD and hopefully will help improve patient-centered care. Future studies should include a larger sample size, assess level of engagement with outpatient primary care or addiction services, and include ED visits from outside the patient's healthcare network.

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