



Social determinants of health and emergency department utilization among adults receiving buprenorphine for opioid use disorder

Maja Radic^a, Anna Beth Parlier-Ahmad^b, Brandon Wills^c, Caitlin E. Martin^{d,*}

^a Virginia Commonwealth University School of Medicine, 1201 E Marshall St, Richmond, VA 23298, USA

^b Department of Psychology, Virginia Commonwealth University, 806 W. Franklin St., Richmond, VA 23284, USA

^c Department of Emergency Medicine, Virginia Commonwealth University, 1250 E. Marshall St., Richmond, VA 23298, USA

^d Department of Obstetrics and Gynecology and Institute for Drug and Alcohol Studies, Virginia Commonwealth University School of Medicine, 1250 E. Marshall St., Richmond, VA 23298, USA

ARTICLE INFO

Keywords:

Buprenorphine
Opioid use disorder
Healthcare utilization
Emergency department
Substance use disorder treatment
Social determinants of health

ABSTRACT

Background: Individuals with opioid use disorder (OUD) use the emergency department (ED) at high rates. Medication treatment for OUD (MOUD) is associated with reduced ED utilization. However, individuals receiving MOUD still utilize ED services at higher rates than the general population. The objective of this study is to compare the psychosocial and clinical characteristics of those who do and do not utilize ED services based on the Healthy People 2030 framework regarding social determinants of health (SDoH) among a sample of individuals receiving MOUD.

Methods: Participants receiving buprenorphine for OUD at an outpatient addiction clinic completed a cross-sectional survey between July and September 2019. A 6-month prospective medical record review was conducted. The primary outcome was ED visit (yes/no) during the 6-month study period. Demographic, psychosocial, and clinical characteristics were gathered from survey measures and chart abstraction. Chi square and T-tests tested differences by ED utilization.

Results: Participants (n=142) were 54.9% female and 68.8% Black, with an average age of 43.2 years (SD=12.5). Of the participants, 38.7% visited the ED in the study period, primarily for infectious or musculoskeletal causes. Participants with an ED visit were more likely to be Black (p=.011), have less social support (p=.030), more medical comorbidities (p=.008) including chronic pain (p=.045), and more visits with an addiction provider in the study period (p=.009).

Conclusions: Factors associated with ED utilization among individuals receiving buprenorphine for OUD include low social support and medical comorbidities, including chronic pain. More research is needed on modifiable SDoH that influence ED utilization.

1. Introduction

Individuals with substance use disorder (SUD) use the emergency department (ED) at disproportionate rates largely due to the deleterious effects of substance use, comorbid conditions, and stigma within preventative settings (Gryczynski et al., 2016; SAMHSA, 2016). Notably, most ED visits are due to SUD sequelae such as infection, trauma, injury, and mental health problems rather than the direct effects of substances (Lewer et al., 2020). Engaging in SUD treatment, such as medication for opioid use disorder (MOUD), can reduce ED use (Lewer et al., 2020; Mohlman et al., 2016; Wakeman et al., 2020), with longer treatment duration resulting in more profound effects (Lo-Ciganic et al., 2016; Schwarz et al., 2012; Williams et al., 2020). Clinical risk factors for persistently high ED use include HIV, multiple SUDs, psychiatric and

medical comorbidities (Friedmann et al., 2006; Presnall et al., 2019). For example, concurrent opioid use disorder (OUD) and chronic pain imposes more significant disease burden and clinical service use, including ED utilization, than either diagnosis alone (Dunn et al., 2015; MacLean et al., 2021).

Among the general population, the impact of social determinants of health (SDoH)—conditions in the environments in which people grow, live, and work (Healthy People 2030, 2021)—on ED use has been studied. Low social support and unemployment are associated with frequent ED use (Behr and Diaz, 2016). Homeless persons frequently using the ED have concomitant unmet social needs, including financial strain and food insecurity (Doran et al., 2016). Regarding individuals with SUD, social network factors and unstable housing influence ED utilization (Lewer et al., 2020; Sacamano et al., 2018), but few other social factors have been studied. Racial disparities in ED utilization are well doc-

* Corresponding author.

E-mail address: caitlin.martin@vcuhealth.org (C.E. Martin).

umented, with Black individuals being twice as likely to visit an ED as Whites or Hispanics (Rui et al., 2016). SDoH strongly contribute to these disparities.

Exploring the relationship between SDoH and ED utilization among individuals in treatment for OUD may illuminate the underlying mechanisms driving persistently high ED use and elucidate psychosocial factors that support positive outcomes. Identifying ways to positively amplify psychosocial factors to improve SUD outcomes is in line with SAMHSA priorities (SAMHSA, 2010). This study compares the psychosocial and clinical characteristics of those who do and do not utilize ED services among a sample of individuals receiving buprenorphine for OUD.

2. Materials and methods

2.1. Participants and study design

This is a secondary analysis of data from individuals recruited from an outpatient addiction clinic affiliated with an academic medical center to complete a cross-sectional survey between July 9-September 20, 2019 followed by prospective medical record abstraction (see Parlier-Ahmad et al. 2021a for more information). Two research assistants conducted the abstraction using a standardized electronic form, initially using double-extraction until reaching 100% consensus on all variables, and then completing the abstractions independently before the end of March 2020. Present study analyses included participants receiving MOUD with buprenorphine (Suboxone, Subutex, or Sublocade) at the time of the survey who provided at least one urine drug test (UDT) during the 6-month study period (n=142). Buprenorphine was solely prescribed for the treatment of OUD and not chronic pain. The medical center and affiliated addiction clinic serve as a safety net for the region within a Medicaid-expanded state and treat predominately low-income, racial and ethnic minorities.

2.2. Measures

2.2.1. ED utilization measures

The primary outcome was ED visit (yes/no) captured via medical record abstraction across seven consecutive 4-week periods (approximately 6 months) following the survey date. The number and reasons for ED visits and inpatient admissions were abstracted in two ways: 1) directly from the hospital record for visits within the health system, and 2) from patient-to-provider disclosure of visits at outside hospitals during addiction clinic visits. Given the increased possibility of inaccurate self-reporting with more frequent ED visits, we operationalize our primary outcome as a binary variable (Glass et al., 2011).

2.2.2. Demographic, psychosocial, and clinical variables

Demographic items included sex (male, female), race, ethnicity, age, education, employment, and homelessness. Additional psychosocial items included social support (mean score range 1-5 with higher scores indicating more support) (Sherbourne and Stewart, 1991) and two items in reference to past 12 month (yes/no): barriers to healthcare access (i.e., transportation, cost, unsafe neighborhood) and neighborhood safety. Clinical variables included insurance status, psychiatric, medical, and pain comorbidities. Chronic pain comorbidity included conditions such as endometriosis, neuropathy, and gout. Current treatment length was the number of days between the date of buprenorphine induction or initial clinic visit date through the survey date.

2.2.3. OUD treatment outcomes

Treatment outcomes were assessed using medical record review over seven 4-week periods following the survey date. OUD outcomes, described in detail previously (Parlier-Ahmad et al., 2021a), included: (1) treatment retention during the study period (yes/no) (O'Connor et al., 2020; Williams et al., 2018), (2) substance use recurrence (percentage

of 4-week treatment periods with at least one positive UDT for a non-prescribed substance), and (3) buprenorphine continuation (percentage of 4-week treatment periods with at least one positive UDT for buprenorphine).

When this study was conducted, patients at the study site generally were required to have at least one visit with a UDT every 4 weeks to receive continued buprenorphine prescriptions. Therefore, UDT results for participants who did not present to treatment during a 4-week period were assumed to be positive for a non-prescribed substance and negative for buprenorphine. Of all recorded substance use recurrence and buprenorphine continuation outcomes, 65% was confirmed by a UDT.

2.3. Analysis

Variables chosen for bivariate analysis are based on the Healthy People 2030 SDoH framework: employment status (economic stability), high school/GED completion (education), unsafe neighborhood (neighborhood/built environment), barriers to healthcare (health and health care), and social support (social and community context), along with variables identified in prior literature to impact ED use. Differences between groups with and without an ED admission were assessed by Pearson's χ^2 and T-tests for categorical and continuous variables, respectively. Significance was set at 0.05. Analyses were performed using SPSS version 26.

3. Results

Participants were 54.9% female, mostly middle-aged, Black, publicly insured, not employed and with a high school diploma. Many participants reported at least one barrier to healthcare in the past year. Nearly 3 in 4 participants had a psychiatric or medical comorbidity. Approximately half of participants had been in treatment for at least one year (Table 1).

Many participants (69%) remained in treatment throughout the study period (Table 2). On average, substance use recurrence occurred in 58% (SD=34%) and buprenorphine continuation in 61% (SD=26%) of treatment periods.

During the 6-month study period, 38.7% of participants visited the ED. Of those, the average number of ED visits was 1.67 (SD=1.3), with 67.2% visiting the ED only once. The most common reasons for ED visits were infectious (38.2%) or musculoskeletal causes (23.6%). Only 9.1% who used the ED did so for direct substance-related causes. Overall, 16.1% of ED visits resulted in inpatient admissions, which were primarily for exacerbations of chronic medical conditions and infectious complications. Participants with an ED visit were more likely to be Black, have medical comorbidities, including chronic pain, and have less social support than participants without an ED visit (Table 1). Participants who used the ED had 8.6 visits with an addiction provider compared to 7.0 visits for those who did not use the ED ($p=.009$; Table 2). OUD treatment outcomes did not differ by ED use.

4. Discussion

This study compares psychosocial and clinical characteristics of individuals who do and do not utilize ED services among a sample of adults with OUD receiving buprenorphine. Participants with an ED visit were more likely to be Black, have less social support, more medical comorbidities including chronic pain, and more visits with an addiction provider. Findings suggest a need to study how SDoH influence ED utilization in larger samples of people in OUD treatment.

Our sample had a high prevalence of several adverse SDoH, including unsafe neighborhood, homelessness, unemployment, and barriers to healthcare. These factors often limit accessibility and make primary care visits less feasible than ED visits (Davis et al., 2020). SDoH, being a driver of racial health disparities, likely contributed to the association between Black race and ED use in our sample. However, con-

Table 1

Demographic, psychosocial, and clinical characteristics among individuals receiving buprenorphine for OUD who had ED visits and those who did not within the 6-month follow-up period.

Demographic, Psychosocial, and Clinical Characteristics	Total N (%) N=142	ED visit in follow-up period N (%) N=55	No ED visit in follow-up period N (%) N=87	P-value
Sex				
Male	64 (45.1)	30 (54.5)	34 (39.1)	.071
Female	78 (54.9)	25 (45.5)	53 (60.9)	
Age (years; Mean ± SD)	43.2 ± 12.5	45.8 ± 11.6	41.6 ± 12.8	.051
Race/ethnicity				
Non-Latinx, White	35 (24.8)	7 (12.7)	28 (32.6)	.011
Non-Latinx, Black	97 (68.8)	42 (76.4)	55 (64.0)	
Other	9 (6.4)	6 (10.9)	3 (3.5)	
Insurance/ethnicity				
Public	82 (57.7)	36 (65.5)	46 (52.9)	.250
Private	15 (10.6)	6 (10.9)	9 (10.3)	
None	45 (31.7)	13 (23.6)	32 (36.8)	
Homelessness	50 (35.7)	23 (41.8)	27 (31.8)	.225
Psychiatric comorbidity diagnosis	101 (71.1)	37 (67.3)	64 (73.6)	.420
Chronic medical conditions				
Medical comorbidity	103 (72.5)	45 (81.8)	58 (66.7)	.049
Chronic pain comorbidity	43 (30.3)	22 (40.0)	21 (24.1)	.045
Infectious disease comorbidity	50 (35.2)	20 (36.4)	30 (34.5)	.819
Length of current treatment episode at time of survey ≥1 year ^a	80 (56.3)	31 (56.4)	49 (56.3)	.996
Social Factors in the Five Domains of the Conceptual Model				
Education Domain				
< high school degree	30 (21.1)	16 (29.1)	14 (16.1)	.084
High school degree/equivalent	72 (50.7)	22 (40.0)	50 (57.5)	
> high school degree	40 (28.2)	17 (30.9)	23 (26.4)	
Economic Stability Domain				
Employed	37 (26.1)	15 (27.3)	22 (25.3)	.108
Unemployed	73 (51.4)	23 (41.8)	50 (57.5)	
Disability	32 (22.5)	17 (30.9)	15 (17.2)	
Neighborhood/Built Environment Domain				
Unsafe neighborhood	57 (40.7)	27 (50.0)	30 (34.9)	.076
Social and Community Context Domain				
Social support score (range 0-5; Mean ± SD)	3.5 ± 1.1	3.2 ± 1.1	3.6 ± 1.0	.030
Health and Healthcare Domain				
Barriers to healthcare				
Transportation	50 (36.2)	16 (30.2)	34 (40.0)	.244
Cost	39 (28.1)	17 (32.1)	34 (40.0)	.408
Unsafe	26 (19.0)	9 (17.3)	17 (20.0)	.697
Any barrier (≥1 barrier)	75 (54.0)	26 (49.1)	49 (57.0)	.363

^a At time of baseline survey completion. Notes. OUD, opioid use disorder; ED, emergency department; SD, standard deviation; Boldface indicates significance at p ≤ .05

Table 2

OUD treatment outcomes among individuals receiving buprenorphine for OUD who had ED visits and those who did not within the 6-month follow-up period.

OUD Treatment Outcomes	Total N (%) N=142	ED visit in follow-up period N (%) N=55	No ED visit in follow-up period N (%) N=87	P-value
OUD treatment retention: remained in treatment for 7 treatment periods [N(%)]	98 (69.0)	43 (78.2)	55 (63.2)	.060
Number of visits with substance use provider in 28-week follow-up period (Mean ± SD)	7.6 ± 3.5	8.6 ± 3.4	7.0 ± 3.5	.009
Substance use recurrence: Percent of treatment periods with urine testing positive for non-prescribed substance out of 7 (Mean ± SD)	58.0 ± 34.2	58.4 ± 33.7	57.8 ± 34.8	.914
Buprenorphine continuation: % (SD) treatment periods with urine testing positive for buprenorphine out of 7 (Mean ± SD)	61.3 ± 25.5	66.2 ± 23.2	58.1 ± 26.5	.065

Notes. OUD, opioid use disorder; ED, emergency department; SD, standard deviation; Boldface indicates significance at p ≤ .05

trasting prior studies, many adverse SDoH were not associated with ED use (Behr and Diaz, 2016; Blonigen et al., 2017). This discrepancy may be partially due to more frequent interfacing with medical providers among adults receiving MOUD compared to other populations. Additionally, the inconsistency may be due to participants having high levels of recovery capital (Parlier-Ahmad et al., 2021b), the sum of an individual’s resources that can be drawn upon to initiate and maintain

recovery from addiction (Granfield, 1999). High recovery capital predicts sustained abstinence, improved quality of life, and lower stress (Laudet and White, 2008). Higher recovery capital may also help individuals manage their social vulnerabilities, meaning social drivers are less likely to result in ED visits.

Similar to prior research, participants who utilized the ED endorsed less social support suggesting that social network factors may influence

ED use among people receiving MOUD, even after substantial treatment duration (Davis et al., 2020; Sacamano et al., 2018). Social support interventions may demonstrate positive downstream effects if incorporated within addiction treatment settings. For example, peer navigators reduce primary-care related ED utilization among medically underserved populations and may be effective in patients with SUD (Enard and Ganelin, 2013).

People with multiple comorbidities often require acute care and tend to use the ED frequently (Krieg et al., 2016). Among our sample, both medical and chronic pain comorbidities were associated with ED use, highlighting how existing health status greatly influences the need for emergency services. The biopsychosocial model of chronic pain acknowledges that psychosocial factors interact with clinical variables to perpetuate and even worsen the clinical presentation of pain (Gatchel and Okifuji, 2006). Importantly, buprenorphine/naloxone can provide pain relief for patients with OUD, making it a potentially effective treatment for concurrent chronic pain and OUD (Chen et al., 2014) that may be underutilized. Primary care providers, as opposed to addiction providers, may be more likely to address comorbid pain as they may be more comfortable managing pain and not as singularly focused on OUD. Providers should be educated on the safety and utility of concurrent pain management and OUD treatment with buprenorphine/naloxone and multi-modal therapies to improve patient outcomes.

Incongruent with previous research, we found that participants with an ED visit had more visits with an addiction provider. This finding may reflect bias due to data source limitations, creating an artificial association. Participants with ED visits outside of our health system are less likely to be retained within our medical records, whereas participants attending their addiction treatment visits (and potentially reporting ED use) are retained. Alternatively, both provider and patient factors, such as clinic guidelines requiring increased visit frequency for less stable patients, may have contributed to this finding (Meyer et al., 2014). Patients with more outpatient visits, who are likely less stable, may be more complex, have higher comorbidity burden, and higher medical needs, resulting in increased ED utilization. Unstable OUD may result in deterioration of other medical conditions and overall poorer health status. Implementing integrated care practices and providing primary care linkage to SUD recovery-oriented health systems may help reduce ED use among people receiving MOUD (Friedmann et al., 2006).

4.1. Limitations

The study recruited a convenience sample from a single SUD clinic, limiting generalizability. Some patients receive their OUD treatment in other settings, like primary care, where other health concerns may be addressed more. Chart abstraction was limited to a single health system and relied on patient disclosure at attended appointments and provider documentation of outside hospital utilization; this contributed to information bias via likely missing a substantial number of visits (Gryczynski et al., 2020), particularly for participants with more frequent ED use (Finnell et al., 2011).

5. Conclusions

Low social support and chronic medical comorbidities may contribute to frequent ED use among adults receiving buprenorphine for OUD. More research on modifiable SDoH that influence ED utilization is needed to guide intervention strategies within the OUD treatment setting.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper

CRedit authorship contribution statement

Maja Radic: Conceptualization, Writing – review & editing. **Anna Beth Parlier-Ahmad:** Conceptualization, Methodology, Project administration, Formal analysis, Data curation. **Brandon Wills:** Conceptualization. **Caitlin E. Martin:** Conceptualization, Methodology, Supervision.

Role of funding source

Dr. Martin is supported by NIDA K23DA053507. Anna Beth Parlier-Ahmad is supported by NIDA T32DA007027 (PI: Dr. William Dewey). This study was supported by the Jeanann Gray Dunlap Foundation as well as partially by CTSA award No. UL1TR002649 from the National Center for Advancing Translational Sciences. Its contents are solely the responsibility of the authors and do not necessarily represent official views of the National Center for Advancing Translational Sciences or the National Institute on Drug Abuse. Funders were not directly involved in the preparation of this research manuscript.

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