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Opioid and cocaine use among primary care patients on buprenorphine - self-report and urine drug tests

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Abstract

Background: Urine drug tests (UDTs) are recommended to monitor patients treated for opioid use disorder in primary care. The aims are to (1) estimate the frequency of self-report and UDT results of opioid and cocaine use and (2) evaluate the association between treatment time with non-disclosure of opioid or cocaine use and having a positive UDT.

Methods: We conducted a retrospective review of patients enrolled in a primary care-based buprenorphine program between January 2011-April 2013. We describe three clinical visits types: no disclosure of opioid/cocaine use and positive UDT; disclosure of opioid or cocaine use and a negative or positive UDT; and no disclosure of opioid or cocaine use and a negative UDT. We fit generalized estimating equations logistic regression models to evaluate whether treatment time is associated with non-disclosure of opioids or cocaine use and a positive UDT.

Results: Among all UDT results (n=1,755) from 130 patients, 10% were positive for illicit opioids and 4% for cocaine. Among UDTs with illicit opioid or cocaine positive results, in 57%

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Contributors

SMB, DMC, AYW, JHS contributed to the original idea and design of the study, SMB, DMC, and MW contributed to the design and analysis. SMB wrote the first draft, and the other authors provided significant edits to the final version. All authors contributed to the interpretation of the results and approved the final manuscript.

Conflict of Interest

None declared.

Authors Disclosures

and 76% of these scenarios, the patient did not disclose. The odds of non-disclosure and having a positive UDT was higher in the first 180 days for opioids and 90 days for cocaine.

Conclusion: Among primary care patients treated with buprenorphine, a small but substantial percentage of UDTs were cocaine or opioid positive. As treatment time increased, non-disclosure was less common but persisted even after six months. Among primary care patients treated with buprenorphine, UDTs contribute information to optimize clinical care.

Keywords

urine drug testing; buprenorphine; cocaine; opioids

1. Introduction

In the United States, guidelines recommend that patients with opioid use disorder (OUD) treated with buprenorphine in office-based settings be monitored for treatment adherence and substance use with urine drug tests (UDTs; SAMHSA, 2018). Accordingly, as per a 2015 survey of American Society of Addiction Medicine members, 93% of the respondents prescribe buprenorphine and 79% use UDTs as a way to monitor patient adherence and further assess aberrant behaviors (Kirsh et al., 2015). Despite this recommendation and these practices, the current medical literature does not provide extensive evidence for the utility of UDTs for patients with OUD receiving buprenorphine in primary care.

Prior studies in addiction research and treatment settings have found varying results of the reliability of self-report compared to UDTs. An observational study of patients enrolled in a methadone treatment program found that UDTs generally detected higher rates of substance use compared to self-report and concluded that self-report was not sufficient (Chermack et al., 2000). Another more recent study of primary care patients enrolled in a randomized controlled trial comparing a brief motivational intervention to usual care found that 20% denied stimulant use and 27% denied opioid use despite having a positive UDT for that substance (McDonell et al., 2016). Hilario et al. (2015) found in a study of participants with prescription opioid disorder enrolled in a randomized controlled trial that 44.3% of those who used opioids during the study period denied use at some point in the study and yet overall 87.3% of self-reports and UDTs were consistent (Hilario et al., 2015). In an observational study of individuals entering substance use disorder treatment, authors found minimal under-reporting with conditional kappa values of 0.84 and 0.90 for opioids and cocaine, respectively. They acknowledge that patient knowledge that the UDT will be collected may influence self-report (Denis et al., 2012).

With the ongoing opioid-related overdose epidemic continuing in the U.S., expansion of office-based addiction treatment (OBAT) with buprenorphine has become a key strategy (Samet and Kertesz, 2018). Hence, examining the role of UDTs in this clinical care setting has gained more urgency, and yet no published studies describe the concordance of self-report and UDT in OBAT. Furthermore, it is not known if concordance varies as patients are in treatment longer, a clinical perspective that merits empiric validation. As described in the prior paragraph, past research in different settings (e.g., methadone clinics, randomized controlled trials, general substance use treatment) do not sufficiently reflect on the potential

value of UDT to guide clinical practice in a primary care OBAT program. Clinical consensus suggests that identifying the presence of illicit opioid and cocaine use during treatment with buprenorphine can have implications for treatment outcomes. Although studies have demonstrated that some people with OUD who also use cocaine can be successfully treated with buprenorphine, baseline and ongoing illicit opioid and cocaine use is associated with worse treatment outcomes (e.g., poor retention in treatment; Alford et al., 2011; Stein et al., 2005; Sullivan et al., 2011). The objectives of this study were: 1) to estimate the frequency and discordance of self-report disclosure and UDT results of illicit opioid and cocaine use in a primary care OBAT program and 2) to evaluate the association between time in treatment with non-disclosure of illicit opioid and cocaine use among those with positive UDTs in a primary care OBAT program.

2. Materials and methods

2.1 Subjects and setting

We conducted a retrospective electronic medical record review of patients with a first prescription for buprenorphine in the (OBAT) at Boston Medical Center which is an urban safety net academic medical center between January 2011-December 2013. Details of the program have been described previously.

2.2 Key variables

2.2.1 Urine drug testing and self-report of substance use.—Before starting treatment, the nurse care manager (NCM) reviewed with the patient the components of treatment, including monitoring with UDT. The NCM also clarified that continued illicit drug use will necessitate more intensive treatment (e.g., closer monitoring, mandated counseling) rather than discontinuation of opioid agonist treatment. Patients in OBAT were routinely tested for buprenorphine, opiates (e.g., morphine, codeine), oxycodone, methadone, amphetamines, barbiturates, cocaine, and benzodiazepines. An opioid positive UDT was defined as one positive for oxycodone, methadone, or opiates. A cocaine positive UDT was defined as one positive for cocaine's primary metabolite, benzoylecgonine. Per protocol, a UDT is conducted weekly for 46 weeks, then biweekly for 4–6 weeks and then monthly as the patient becomes stable on buprenorphine. UDTs were sent to the laboratory at our institution and immunoassayed. When there was a UDT result that was not expected, the clinic protocol was to call the patient back to clinic to give a repeat sample within 1–2 days. When the patient disagreed with the results, confirmation tests (e.g., gas chromatography/mass spectrometry) were requested by providers. For this study's analysis, UDT results were retrieved from the hospital's Clinical Data Warehouse, which consolidates data from the electronic medical record system for quality improvement and research purposes. The typical clinical encounter involved a NCM or medical assistant collecting an unobserved sample for an UDT from the patient prior to the patient visit with the nurse. Every time a UDT was ordered, the NCM documented the patient's self-reported drug use. In order to categorize patients as disclosing drug use or denying drug use, we abstracted the text from each note associated with a positive UDT for illicit opioids or cocaine. MW and SMB then electronically searched the notes to categorize them as "discloses use" or "denies

use." The first author (SMB) reviewed and categorized the notes that could not be electronically categorized.

2.2.2 Other variables.—Other variables including age, gender, employment status, race/ethnicity, hepatitis C diagnosis, psychiatric diagnosis (Depression, Anxiety, Post-Traumatic Stress Disorder, Bipolar Disorder), and prescription data for all opioids including buprenorphine were retrieved through the Clinical Data Warehouse.

2.2.3 Time in treatment.—A treatment episode was defined as a "period" that began with the first buprenorphine prescription and ended if there was a gap in prescriptions for greater than one month. For individuals with more than one initiation of buprenorphine in the dates examined, we only included the first treatment episode in our analysis, in order to create an inception cohort of individuals with one longitudinal treatment episode. Within a treatment episode, we were able to examine multiple nurse visits and UDT results. For those patients with positive UDTs, we would expect to have more UDTs as they are called back to clinic for more frequent monitoring.

2.3 Inclusion and exclusion criteria

We included patients with an OUD enrolled in the OBAT program at BMC between January 1, 2011-April 20, 2013 and had at least one prescription for buprenorphine and a NCM visit on the same day. All of these patients were 18 years and older. We excluded patients who had been seen by OBAT staff but did not receive a prescription for buprenorphine. We obtained approval through the Boston University Medical Center Institutional Review Board to conduct this study.

2.4 Analysis

Descriptive statistics (i.e., frequencies and proportions for categorical variables; means, medians, standard deviations, and interquartile ranges for continuous variables) were calculated for all baseline variables including age, gender, employment status, education level, and race/ethnicity.

To address the first aim, we created five categories of time in treatment: 1–30 days, 31–90 days, 91–180 days, 181–365 days, and greater than 365 days. These particular time periods were of interest based on clinical experience caring for patients with OUD and our treatment protocol described above. We then categorized patient UDT and disclosure results within each time period as follows:

1. Opioid use not disclosed to nurse/positive UDT
2. Opioid use disclosed to nurse/positive or negative UDT
3. No opioid use disclosed to nurse/negative UDT

We excluded UDTs that were positive for opioids if the patient had a prescription for an opioid in the prior 30 days. For aim 1, we summarized results for each patient within each time period by assigning a status based on the following hierarchy. If a patient had at least one visit with non-disclosure of use and positive UDT, we assigned category (1) to that time

period. Otherwise, if they had at least one visit with disclosure of use (regardless of UDT result) we assigned category (2). Finally, if the patient only had visits with non-disclosure of use and negative UDT results we assigned category (3) to that time period. Each patient could only contribute one observation to each time period. We repeated the process for cocaine. We did not include participants in category 3 in the concordance calculations.

For the second aim, to account for clustering due to multiple periods of UDT results per patient, generalized estimating equations (GEE) logistic regression models were fit to evaluate whether duration in treatment is associated with the outcome of patient non-disclosure of cocaine or opioids and a positive UDT. Our hypothesis was that shorter time in treatment would be associated with greater odds of non-disclosure and positive UDT. We considered time in treatment as the independent variable and the dependent variable was patient report negative/UDT positive result for opioids or cocaine. The GEE models used a first-order autoregressive working correlation structure and empirical standard errors are reported for all models. In the adjusted model, we controlled for age at start of treatment, gender, race/ethnicity, hepatitis C diagnosis, and any history of a psychiatric diagnosis.

3. Results

3.1 Sample description

During the study period, we identified 130 patients with a first prescription who had a corresponding UDT and nurse note. These patients had a total of 1755 visits (mean=13.5 visits/per patient) during the study period. Eighteen percent (308/1755) of visits were within the first 30 days of treatment; 27% (483/1755) were within days 31–90; 19% (334/1755) within days 91–180; 19% (339/1755) within days 181–365; and 17% (291/1755) after day 365 of treatment. Baseline characteristics are shown in Table 1.

3.2 Illicit opioid and cocaine use based on UDTs and self-report

After excluding 192 UDTs among nine patients who had a past 30-day prescription for an opioid based on the prescription data from the electronic medical record, results were positive for opioids in 10% (157/1563) of UDTs; 62% (98/157) of the UDTs positive for opioids occurred after the first 30 days of treatment. Patient disclosure and UDTs were discordant at 57% (89/157) of such visits. Fifty percent (n=65) of all patients had a UDT that was positive for opioids at least once during the study period. Thirty-five patients had more than one positive opioid test.

UDTs were positive for cocaine 4% (78/1755) of the time; 65% (51/78) of the UDTs positive for cocaine occurred after the first 30 days of treatment. Patient disclosure and UDTs were discordant at 76% (59/78) of the visits when there was a cocaine positive UDT. Twenty five percent (n=32) of all patients had a UDT that was positive for cocaine at least once during the study period. Sixteen patients had more than 1 positive cocaine test.

3.3 Illicit opioid and cocaine use by time in treatment

The proportion of individuals who did not disclose opioid use, but had a UDT positive for opioids appeared to decrease as the time in treatment increased (Table 2). The proportion of

individuals who did not disclose cocaine use, but had a UDT positive for cocaine was stable for the first 6 months, appeared to decrease at one year, and then increased after one year (Table 2).

3.4 Association between time in treatment and non-disclosure of opioid or cocaine use among those with positive UDT

The odds of non-disclosure of opioid use and having a positive UDT were significantly higher during days 1–30, 31–90, and 91–180 compared to after one year of treatment [AOR 7.53,(95% CI 1.96, 29.00); AOR 4.93, (95% CI 1.28, 18.90); and AOR 3.53 (95% CI 1.09, 11.47)] (Table 3). The odds of non-disclosure of cocaine use and having a positive UDT was higher in days 1–30 and 31–90 compared after one year of treatment [AOR 5.39 (95% CI 1.89, 15.33) and AOR 3.12 (95% CI1.15, 8.45)] (Table 3).

4. Discussion

In our study of 130 primary care patients with opioid use disorder initiating treatment with buprenorphine, among 1755 UDTs, both cocaine and opioid positive UDTs were uncommon (4% and 10%, respectively). However, 76% of the UDTs positive for cocaine and 57% of the UDTs positive for opioids were not disclosed by patients at the time of urine collection. The odds of non-disclosure were higher for both cocaine and opioids within the first 90 and 180 days of treatment, respectively, compared to after one year of treatment.

This study adds to the body of literature suggesting that UDTs are a useful adjunct to patient self-report to identify substance use in patients treated with buprenorphine in an office-based setting. Prior studies have focused on individuals treated with methadone or who are in clinical trials (Chermack et al., 2000; Hilario et al., 2015; Wilcox et al., 2013). Various explanations, not explicitly explored in this study, may account for why patient self-report may be inadequate alone for assessing for the use of illicit opioids and cocaine. For example, patients may have concerns about being discharged from treatment if they disclose use or they may feel shame about relapse and do not want to disappoint their care team. As increasing provision of substance use disorder treatment occurs in primary care settings, understanding the role of UDTs in that setting is essential so as to provide efficient and effective clinical care and determine cost- effectiveness.

In addition to finding that UDTs are a useful adjunct, we also found that, as patients are in treatment for a longer period of time, the odds of non-disclosure with a positive UDT for opioids or cocaine appears to decrease. The current guidelines recommend less frequent testing as patients become stable in their recovery (SAMHSA, 2018). Those guidelines have been based on expert consensus and importantly this study provides evidence to support that practice. Although this study does not explicitly examine patient intent, it is possible that patients may be more willing to disclose use as they are in treatment longer. This could be explained by anticipated stigma at the beginning of treatment becoming less of an issue over time as a trusting relationship develops with providers (Merrill et al., 2002; Velez et al., 2017).

A main limitation of this study is potential misclassification of denial or disclosure of use. We attempted to assess the magnitude of such error by manually reviewing a random sample of NCM notes. It is possible that a proportion of the patients with a positive UDT for opioids had a prescription outside of our electronic medical record. This hypothesis could be tested by use of a prescription drug monitoring program (PDMP). However, although a PDMP has existed in Massachusetts since 2010, during the study period, prescribers were not required to check the state PDMP. Additionally, in Massachusetts, it is not permitted to retrospectively check the PDMP for research purposes. Of note, the UDT panel used during the study period did not include fentanyl analogs. In the period of this study, the opioid overdose deaths were still primarily related to heroin use, as it was before the significant increase in fentanyl-related overdose deaths in 2014 (Massachusetts Department of Public Health, 2018). In addition, the number of patients included in the study was modest (n=130) and in evaluating the association between time in treatment with non-disclosure of opioid or cocaine among those with positive UDTs, the number of patients with discordant results who were in treatment for over 1 year was small, which led to wide confidence intervals. As this is a study of a clinical program with different NCMs assessing substance use, there could be variation in how NCMs perform. It is also important to point out that retention at 12 months was about 50%, although this is consistent with other observational studies of buprenorphine treatment (Fiellin et al., 2008; Manhapra et al., 2018). These data reflect patients in ongoing treatment. Finally, we recognize that it is possible that those patients who left treatment may have been more likely to have had a positive UDT. This would be a selection bias if one was considering the outcomes of UDTs of all patients in OBAT, rather than the more adherent patient population that remains in treatment over time. Nonetheless, a major strength of this study is that it examines an inception cohort of patients starting office-based treatment with buprenorphine and reflects actual clinical practice in a highly functional primary care practice.

Further studies should elucidate optimal UDT protocols, including cost-effectiveness as an outcome, given the overall infrequency of positive UDT and the trend to disclose drug use as time in treatment advances. In addition, next steps to develop interventions for those with positive UDTs such as intensification of treatment and keeping patients engaged in care are needed. Determining the optimal use of information gained from both UDTs and substance use self-report can help improve the care of patients with opioid use disorders in primary care.

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Highlights

- Truthful disclosure of opioid and cocaine use increases with time in treatment for opioid use disorder (OUD).
- Urine drug tests provide useful information to clinicians treating OUD.
- Further work should explore optimal protocols for urine drug testing in office-based addiction treatment (OBAT) in primary care.

Table 1.

Baseline Characteristics of Patients with an Opioid Use Disorder Initiating Care in an Office Based Addiction Treatment Program receiving Buprenorphine, N=130 between January 2011 and April 2013

Variable	% (N)
Age (years, median, range)	41 (22–61)
Female gender	33.1% (43)
Unemployed	63.9% (83)
Race/ethnicity White Hispanic Black/African American Other/unknown	 51.5% (67) 22.3% (29) 20.8% (27) 5.4% (7)
Hepatitis C (positive antibody)	34.6% (45)
History of psychiatric diagnosis *	75.4% (98)
Any UDT positive for cocaine during the study period	30.0% (39)
Any UDT positive for a non-prescribed opioid during the study period	50.8% (66)
Follow-up time (days, median (range))	297 (4–1166)
Discontinued care during follow-up period	50.8%(66)

* Depression, Anxiety, Post-Traumatic Stress Disorder, Bipolar Disorder

Table 2.

Proportion of Patients in OBAT with UDT results positive or negative for opioids or cocaine and disclosure to nurse by time in treatment* % (n)

	Initial UDT	1–30 days	31–90 days	91–180 days	181–365 days	>365 days
Opioid use not disclosed to nurse and positive UDT	13.2% (16/121)	19.8% (24/121)	20% (20/100)	12.7% (8/63)	15.6% (7/45)	8.7% (2/23)
Opioid use disclosed to nurse and either negative or positive UDT	15.7% (19/121)	16.5% (20/121)	10% (10/100)	17.5% (11/63)	8.9% (4/45)	4.3% (1/23)
No opioid use disclosed to nurse and negative UDT	71.1% (86/121)	63.6% (77/121)	70% (70/100)	69.6% (44/63)	75.6% (34/45)	87% (20/23)
Cocaine use not disclosed to nurse and positive UDT	10.0% (13/130)	13.1% (17/130)	11.9% (13/109)	12.7% (9/71)	8.0% (4/50)	14.8% (4/27)
Cocaine use disclosed to either negative or positive UDT	3.1% (4/130)	3.8% (5/130)	1.8% (2/109)	0%	4.0% (2/50)	0%
No cocaine use disclosed to nurse and negative UDT	86.9% (113/130)	83.1% (108/130)	86.2% (94/109)	87.3% (62/71)	88% (44/50)	85.2% (23/27)

* 9 patients had a prescription for an opioid in the prior 30 days and were excluded from the opioid calculations

Table 3.

Association between Time in treatment and Non-disclosure of opioid or cocaine use

Time in Treatment	Did not self-report opioid Use and positive UDT OR (95% CI)	Did not self-report cocaine use and positive UDT OR (95% CI)
Days 1–30	7.53 (1.96, 29.00)	5.39 (1.89, 15.33)
Days 31–90	4.93 (1.28, 18.90)	3.12 (1.15, 8.45)
Days 91–180	3.53 (1.09, 11.47)	2.30 (0.86, 6.20)
Days 181–365	3.10 (0.69, 13.90)	0.88 (0.30, 2.53)
>365 days	1.00 (reference)	1.00 (reference)

** Adjusted for age at start of treatment, gender, race/ethnicity, HCV exposure, any psychiatric diagnosis