

Chronic Opioid Therapy in People Living With Human Immunodeficiency Virus: Patients' Perspectives on Risks, Monitoring, and Guidelines

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Background. Chronic opioid therapy (COT) is common in people living with human immunodeficiency virus (PLHIV), but is not well studied. We assessed opioid risk behaviors, perceptions of risk, opioid monitoring, and associated Current Opioid Misuse Measure (COMM) scores of PLHIV on COT.

Methods. COT was defined as ≥ 3 opioid prescriptions ≥ 21 days apart in the past 6 months. Demographics, substance use, COMM score, and perceptions of and satisfaction with COT monitoring were assessed among PLHIV on COT from 2 HIV clinics.

Results. Among participants (N = 165) on COT, 66% were male and 72% were black, with a median age of 55 (standard deviation, 8) years. Alcohol and drug use disorders were present in 17% and 19%, respectively. In 43%, the COMM score, a measure of potential opioid misuse, was high. Thirty percent had an opioid treatment agreement, 66% a urine drug test (UDT), and 12% a pill count. Ninety percent acknowledged opioids' addictive potential. Median (interquartile range) satisfaction levels (1–10 [10 = highest]) were 10 (7–10) for opioid treatment agreements, 9.5 (6–10) for pill counts, and 10 (8–10) for UDT. No association was found between higher COMM score and receipt of or satisfaction with COT monitoring.

Conclusions. Among PLHIV on COT, opioid misuse and awareness of the addictive potential of COT are common, yet COT monitoring practices were not guideline concordant. Patients who received monitoring practices reported high satisfaction. Patient attitudes suggest high acceptance of guideline concordant care for PLHIV on COT when it occurs.

Keywords. HIV; opioid; COT; monitoring; patient perspective.

In the past 2 decades, there has been a dramatic increase in the use of prescription opioids in the United States. Since 1999, the consumption of hydrocodone has more than doubled and oxycodone use has increased by nearly 500% [1]. During the same period, the number of drug overdose deaths has more than tripled, totaling 64 070 in 2016, with 63% of the overdose deaths related to opioids in 2015 [2, 3]. Half of opioid-related deaths involve a prescription opioid. Forty-five percent of people who use heroin are addicted to prescription opioids, and a history of prescription opioid use remains the strongest predictor of heroin use [4, 5].

Pain accounts for 20.7% of ambulatory healthcare visits, and chronic pain has been reported in 30%–90% of human immunodeficiency virus (HIV)–infected adults, compared to 30% of the general US population [6–9]. Furthermore, 31% of people living with HIV (PLHIV) in the Veterans Aging Cohort Study were prescribed opioids for pain in a 12-month period [10]. The importance of appropriate monitoring for patients on chronic opioid therapy (COT) has been highlighted with the publication of the first Centers for Disease Control and Prevention opioid prescribing guidelines [11, 12], as well as guidelines tailored specifically to PLHIV by the Infectious Diseases Society of America [13]. Despite guidelines that recommend incorporation of opioid treatment agreements, urine drug tests (UDTs), pill counts, use of prescription drug monitoring programs, and use of risk assessment tools into pain management care delivery, few clinicians currently follow these best practices [14–17]. To date, little is known about opioid monitoring practices among PLHIV on COT, nor the patients' perceptions of those monitoring practices, when applied. To address the current epidemic of

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prescription opioid drug use disorder, it is important to better understand current monitoring practices and barriers to implementing practice-improvement programs, from the vantage point of patients [18].

In this study, we describe patients' opioid risk behaviors, perceptions of opioid risk, and the receipt of and satisfaction with opioid monitoring (ie, opioid treatment agreements, UDTs, pill counts) using baseline data from an observational study of PLHIV on COT (ClinicalTrials.gov identifier NCT02525731). We explored differences in the study population, stratified by Current Opioid Misuse Measure (COMM) score (<9 or ≥9), a measure of misuse of opioid pain medications [19]. Finally, we explored the association between the COMM, and (1) the extent of appropriate monitoring and (2) patient satisfaction with monitoring.

METHODS

Setting and Study Sample

The Atlanta-based clinic is an urban Ryan White HIV/AIDS Program–funded clinic, affiliated with the largest area safety-net hospital in Georgia. The clinic serves >6000 uninsured or underinsured patients who are predominantly African American and economically disadvantaged. The vast majority of these patients carry an AIDS diagnosis and those who do not have an AIDS diagnosis are either ≤24 years of age, pregnant, severely mentally ill, have a substance use disorder, or have complicating medical comorbidities [20]. The Boston-based clinic is also affiliated with Boston's largest safety-net hospital and serves a population where approximately 70% of patients come from underserved populations, including low-income families, minorities, and immigrants. It has been in operation since 1988 and serves 1400 patients. Neither clinic had an official policy to guide COT initiation or monitoring at the time the study was conducted. The Boston clinic had a co-located addiction specialist in the clinic who could provide consults or co-management of complex cases. Atlanta lacked an addiction specialist.

Inclusion criteria for the observational cohort were the following: age ≥18 years; HIV-infected; English-speaking; and receiving COT (defined as having ≥3 opioid prescriptions written at least 21 days apart during the prior 6 months). This working definition of COT has been used as a pragmatic means of identifying individuals who receive opioids daily for chronic pain [21]. A list of potential participants was generated from the medical record using an algorithm to identify patients meeting entry criteria. Clinicians on the research team then reviewed the medical records of those identified to confirm eligibility. Research assistants contacted potential participants within the HIV clinics or by telephone to describe the study and offer participation. Eligible and interested participants were invited for a final screening and baseline assessment. After informed

consent, participants completed a 60- to 90-minute research assistant–administered survey. Study participants were compensated with \$35 (cash or gift card equivalent) for participation in the survey.

Demographic, Clinical, and Behavioral Measures

The following domains were assessed in the survey: demographics; HIV transmission risk and date of diagnosis; antiretroviral therapy use; hepatitis C virus testing; education level [22]; housing instability and financial insecurities (adapted from Kim et al [23]); food insecurity [24]; depressive symptoms (Center for Epidemiologic Studies Depression Scale [CES-D]) [25]; medications with medical record reconciliation (HIV, opioids, nonopioid pain relievers, psychiatric medications); anxiety (State-Trait Anxiety Inventory) [26]; posttraumatic stress disorder (PTSD) scores (PTSD Checklist for the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*) [27]; substance use (Addiction Severity Index and Texas Christian University Drug Screen II) [28, 29]; opioid misuse (COMM) [19]; and perceptions of COT, satisfaction with COT monitoring, and receipt of naloxone [30, 31]. Research assistants entered data from the survey-based interviews directly into REDCap (Research Electronic Data Capture). Project managers completed quality assurance data reviews. The complete survey is included in the [Supplementary Appendix](#).

Current Opioid Misuse Measure

Guidelines recommend the use of the COMM as part of the assessment for patients on COT [17]. The COMM is a 17-question patient self-report assessment of aberrant behavior related to opioids in the past 30 days. Aberrant behaviors in this context are behaviors concerning for addiction or taking the medication other than how it was prescribed, including taking pain medication for symptoms other than pain, seeking early or outside prescriptions for pain medications, or using someone else's prescription opioids. A COMM score of ≥9 was determined to be a good measure of prior 30-day prescription opioid misuse when validated in patients receiving care in specialty pain management clinics. In a subsequent study, Meltzer et al [32] demonstrated that a COMM score of ≥13 had high sensitivity and specificity of predicting those patients with a prescription drug use disorder. We used the high COMM score as an indicator of potential opioid misuse.

Statistical Analysis

Descriptive statistics were evaluated for subject characteristics overall and stratified by COMM score (<9 vs ≥9). Differences by COMM score were compared using χ^2 test, Fisher exact test, 2-sample *t* test, and Wilcoxon rank-sum test, as appropriate. Post hoc logistic regression analyses explored the relationship between the main independent variable, COMM scores, and the outcomes extent of monitoring and patient satisfaction

with monitoring. Six outcomes were explored in regression analyses: 3 COT monitoring practices (ie, opioid treatment agreements, UDTs, pill counts) and, among those who received each monitoring practice, satisfaction with those practices. The satisfaction outcome variables were dichotomized at 10 (ie, 10 = satisfied, <10 = not satisfied), due to the distributions of scores. The following covariates were controlled for due to potential confounding based on the literature and clinical knowledge: age, gender, race, substance use disorder within the previous 12 months, and ever having an opioid overdose. Due to a limited number of events, only gender and substance use disorder were controlled for in analyses of pill count, satisfaction with pill count, and satisfaction with opioid treatment agreements. Post hoc exploratory evaluations of the association between CES-D on reported monitoring practices as well as an evaluation of the Brief Pain Inventory score and medication misuse were also conducted. Given the exploratory, hypothesis-generating nature of these analyses, no adjustment was made for multiple comparisons.

This study was reviewed and approved by the institutional review boards at the Boston University Medical Campus and

Emory University School of Medicine, and the Grady (Health System) Research Oversight Committee.

RESULTS

Out of 280 individuals identified as eligible by medical record review, 48 could not be reached for screening, 61 declined screening, and 171 completed screening, 100% of whom were eligible to be enrolled. One individual was unable to provide informed consent due to illness severity, 2 individuals did not have complete data, and 4 individuals did not complete the baseline survey, leaving 165 who comprised the study sample. Study participant demographics are stratified by COMM score (<9 or ≥9) and shown in Table 1. The median age was 55 years (interquartile range [IQR], 49–59 years) with 66.1% men, 72.1% African American/black, and 9.1% Hispanic. Substance use data, not presented in table form, are described here. Eighty-one (48.8%) participants reported using a substance, other than alcohol, in the previous 12 months. Among patients with drug use in the previous 12 months, 64.2% (52/81) reported marijuana as the substance they most frequently used and 21%

Table 1. Demographic and Social Characteristics of People Living with Human Immunodeficiency Virus on Chronic Opioid Therapy for Chronic Pain

Characteristic	Overall (n = 165)	COMM Score ≥9 (n = 71)	COMM Score <9 (n = 94)	P Value
Age, y, median (IQR)	55 (49–59)	53 (49–57)	56 (50–60)	.15
Age group, y				
25–34	4 (2.4)	1 (1.4)	3 (3.2)	
35–44	13 (7.9)	9 (12.7)	4 (4.3)	
45–54	69 (41.8)	33 (46.5)	36 (38.3)	
55–64	72 (43.6)	26 (36.6)	46 (48.9)	
≥65	7 (4.2)	2 (2.8)	5 (5.3)	
Male	109 (66.1)	41 (57.7)	68 (72.3)	.05
African American	119 (72.1)	54 (76.1)	65 (69.1)	.33
Hispanic	15 (9.1)	7 (9.9)	8 (8.5)	.57
Sexuality				.34
Straight/heterosexual	112 (67.9)	51 (71.8)	61 (64.9)	
Gay/lesbian/queer/homosexual	37 (22.4)	12 (16.9)	25 (26.6)	
Bisexual	15 (9.1)	7 (9.9)	8 (8.5)	
Other	1 (0.6)	1 (1.4)	0 (0.0)	
Housing				.06
Own/rent	140 (84.8)	56 (78.9)	84 (89.4)	
Education				.27
Graduated high school	110 (66.7)	44 (62.0)	66 (70.2)	
Health insurance	152 (92.1)	66 (93.0)	86 (91.5)	.73
Ran out of money for basic necessities (prior 12 mo)				.73
Never	62 (37.6)	25 (35.2)	37 (39.4)	
Occasionally	55 (33.3)	26 (36.6)	29 (30.9)	
Monthly/weekly/daily	48 (29.1)	20 (28.2)	28 (29.8)	
Food insecurity (prior 30 d)	21 (12.7)	11 (15.5)	10 (10.6)	.35
Jail or prison (prior 12 mo)	14 (8.5)	6 (8.5)	8 (8.5)	.99

Data are presented as No. (%) unless otherwise indicated.

Abbreviations: COMM, Current Opioid Misuse Measure; IQR, interquartile range.

(17/81) reported crack/cocaine as the substance they most frequently used. One-quarter (44/165 [26.7%]) of participants met criteria for a substance use disorder during the previous year. Drug use disorders were present in 19.3% and alcohol use disorders in 16.9%. Overall, baseline characteristics appeared similar by COMM score.

Table 2 shows opioid misuse, risk of misuse, and patient beliefs about pain medications. Only 8 (4.8%) reported illicit opioid use in the prior 12 months, while 26.1% reported any history of illicit opioid use. Many patients met criteria for being high risk for opioid misuse, based on the COMM score, with close to half (43.0%) scoring ≥ 9 and almost one-quarter (22.9%) ≥ 13 . Participants reported a perceived danger of pain medications with 89.8% responding affirmatively to a question about the addiction potential of opioids. With response choices of 0–5 (0 = do not agree at all, 5 = agree very much) the median scores were as follows, when asked about agreement with the statements: “Pain medicine is very addictive” was 5 (IQR, 3–5) and “There is a danger of becoming addicted to pain medicine” was 5 (IQR, 4–5). There appeared to be stronger agreement to “Pain medicine is very addictive” in the COMM ≥ 9 group.

Patient report of COT monitoring and satisfaction with the monitoring are shown in Table 3. Self-report of having received COT monitoring was low overall. Referring to their current clinic, 30.3% reported ever signing an opioid treatment agreement, two-thirds reported ever having a UDT, and 12% reported ever having a pill count. Less than 5% received all 3 types of monitoring; those in the COMM ≥ 9 group had a higher proportion receiving all 3 types; however, the results were not statistically significant. Twenty-four percent did not receive any type of monitoring and only 10.3% had ever been prescribed naloxone. On a scale from 1 to 10 (1 = not satisfied at all, 10 = extremely satisfied) among those with monitoring, median satisfaction (25th, 75th percentile) with opioid treatment agreements was 10 (7, 10), with UDTs was 10 (8, 10), and with pill counts was 10 (6, 10). COMM scores (using cutoffs at ≥ 9

or ≥ 13) were not significantly associated with opioid treatment agreements, UDTs, or pill counts. COMM scores were also not significantly associated with satisfaction with any of the monitoring modalities. Odds ratios for adjusted and unadjusted analyses are reported in Table 4 for COMM ≥ 9 . Models for COMM ≥ 13 did not appreciably differ from the ≥ 9 model (data not shown). In a post hoc, exploratory analysis (Supplementary Table 1), no significant association was observed between CES-D and any of the opioid monitoring/satisfaction outcomes. A possible association was found between higher brief pain inventory score (both severity and interference scales) (Supplementary Table 2) and higher odds of responding affirmatively to medication misuse questions on the COMM tool.

DISCUSSION

Among PLHIV on COT, 3 findings were most notable: patients clearly understood the significant risk of addiction to their pain medications; patients had high risk of opioid misuse; and yet, patients reported receiving minimal monitoring regarding COT. Patient knowledge of risk of addiction is consistent with a qualitative study of patients on COT in San Francisco [33]. The combination of high risk of misuse and minimal monitoring yields potential for bad outcomes, for both patients’ and the public’s health. Despite the limited monitoring that occurred, patients who did receive it were accepting of the monitoring and reported very high levels of satisfaction with it.

Consistent with other reports, the UDT was the one monitoring practice that a majority (two-thirds) had received at least once in the past [34]. We hypothesize that UDTs are used most because it is an easy task to accomplish for the provider, completed by simply writing an order for the test. However, we do not have information on the extent to which the UDT results were followed up, which is what likely makes UDTs an effective monitoring practice. Few patients in the current cohort reported signing an opioid treatment agreement or having a pill

Table 2. Patient Report of Opioid Use, Misuse, and Perception of Risk in a Cohort of People Living with Human Immunodeficiency Virus on Chronic Opioid Therapy for Chronic Pain

Characteristic	Overall	COMM Score ≥ 9	COMM Score < 9	P Value
	(n = 165)	(n = 71)	(n = 94)	
History of illicit opioid use	43 (26.1)	17 (23.9)	26 (27.7)	.59
Use of illicit opioid in past 12 mo	8 (4.8)	4 (5.6)	4 (4.3)	.73
Ever overdosed on opioids	12 (7.3)	5 (7.0)	7 (7.4)	.92
Patient beliefs about pain medication ^a				
Pain medicine is very addictive, median (25 th , 75 th percentile)	5 (3, 5)	5 (4, 5)	5 (3, 5)	.04
There is a danger of becoming addicted to opioid pain medicine, median (25 th , 75 th percentile)	5 (4, 5)	5 (4, 5)	5 (4, 5)	.87
Answered ≥ 3 on either of the above 2 questions	153 (92.7)	68 (95.8)	85 (90.4)	.19

Data are presented as No. (%) unless otherwise indicated.

Abbreviation: COMM, Current Opioid Misuse Measure.

^aScale from 0 to 5 (0 = do not agree at all, 5 = agree very much).

Table 3. Chronic Opioid Therapy (COT) Monitoring and Patient Satisfaction With COT Monitoring in a Cohort of People Living with Human Immunodeficiency Virus on COT for Chronic Pain

Characteristic	Overall	COMM Score ≥9	COMM Score <9	P Value
	(n = 165)	(n = 71)	(n = 94)	
COT monitoring				
Ever signed opioid treatment agreement at current clinic	50 (30.3)	28 (39.4)	22 (23.4)	.05
Ever had pain medication stopped due to not following rules of agreement	11 (18.6)	7 (23.3)	4 (13.8)	.34
Ever had urine drug test at current clinic	110 (66.7)	49 (69.0)	61 (64.9)	.38
Ever had pill count at current clinic	20 (12.1)	11 (15.5)	9 (9.6)	.25
Received all 3: treatment agreement, urine drug test, and pill count	8 (4.8)	6 (8.5)	2 (2.1)	.08
Patient satisfaction with COT monitoring^a				
Opioid treatment agreement, median (25th, 75th percentile)	10 (7, 10)	10 (7, 10)	10 (7, 10)	.25
Urine drug test, median (25th, 75th percentile)	10 (8, 10)	10 (8, 10)	10 (8, 10)	.93
Pill count, median (25th, 75th percentile)	10 (6, 10)	9 (7, 10)	10 (5, 10)	.81
Ever received naloxone	17 (10.3)	7 (9.9)	10 (10.6)	.87

Data are presented as No. (%) unless otherwise indicated.

Abbreviations: COMM, Current Opioid Misuse Measure; COT, chronic opioid therapy.

^aSatisfaction (scale of 1–10: 1 = not satisfied at all, 10 = extremely satisfied) was assessed only among the subgroup who had ever received each respective type of monitoring (ie, for the overall group, opioid treatment agreement, n = 51; urine drug test, n = 110; pill count, n = 20).

count. However, the current study does report higher levels than earlier studies [34–36]. This follows the logic that systems-level changes may be necessary to effect the uptake of more time and human resource-intensive procedures, such as reviewing and signing an opioid treatment agreement, performing pill counts, and following up the UDT results [37–39]. Guideline concordant care would require patients to receive opioid treatment agreements, UDTs, and pill counts, the 3 of which were received by a negligible percentage of patients [14].

A large proportion of patients had high COMM scores, a predictor of opioid misuse. Though no associations between COMM scores and COT monitoring practices were statistically significant, potentially due to lack of power, the effect sizes we observed between higher COMM score and treatment agreement and having received all 3 practices were notable. These findings should be further explored with a larger sample. We

found that other aspects of safe prescribing, such as prescribing naloxone alongside opioids, was only reported by 10% of the patients and did not appear to correlate with COMM-based risk. This represents an opportunity to increase naloxone distribution as a way to improve safe prescribing, as was done by the Department of Veterans Affairs in 2014 [40].

Patients reported higher levels of satisfaction with opioid monitoring practices than we expected. At a time when patient satisfaction has become such an important metric in many healthcare settings, these results are encouraging as they suggest patients are receptive to opioid monitoring practices. This result is particularly susceptible to the selection bias of a cohort study, as it is possible that patients dissatisfied with opioid prescribing practices may have left the current clinics. However, the result suggests that interventions to improve guideline-concordant prescribing and monitoring may be well received by

Table 4. Association Between Current Opioid Misuse Measure Score With Receipt of Monitoring and With Satisfaction Toward the Monitoring in a Cohort of Human Immunodeficiency Virus–Infected Patients on Chronic Opioid Therapy for Chronic Pain

Independent Variable	Outcome	No. ^a	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
COMM score ≥9	Pain treatment agreement ^b	156	2.02 (1.02–3.99)	1.82 (.89–3.74)
	Urine drug test ^b	162	1.10 (.56–2.13)	1.01 (.50–2.04)
	Pill count ^c	165	1.73 (.68–4.44)	1.59 (.60–4.26)
Satisfaction with COT monitoring ^d	Satisfaction with pain treatment agreement ^e	50	0.38 (.11–1.24)	0.36 (.10–1.25)
	Satisfaction with urine drug screen ^d	110	0.55 (.25–1.20)	0.54 (.22–1.29)
	Satisfaction with pill count ^e	20	0.67 (.11–3.92)	0.52 (.05–5.05)

Abbreviations: CI, confidence interval; COMM, Current Opioid Misuse Measure; OR, odds ratio.

^aSample size varies because individuals who responded “I don’t know” were excluded. Sample size for satisfaction only includes those who responded affirmatively to receiving the respective monitoring practice.

^bAdjusted for: age, gender, race, past year substance use disorder, ever had opioid overdose.

^cAdjusted for: gender, substance use disorder in the past 12 months.

^dAdjusted for: age, gender, race, substance use disorder in the past 12 months, ever had opioid overdose.

^eAdjusted for: gender, substance use disorder in the past 12 months.

patients. Despite not finding a statistically significant association between COMM scores and satisfaction with monitoring, the effect sizes observed in this exploratory study were notable from a clinical perspective and should be further investigated in a larger-scale study. If confirmed, this may represent a subgroup of patients who need particular attention to engage in the monitoring process.

The study has several limitations. Recall bias and social desirability bias associated with the survey-based interview may have affected results, as patient self-report was not corroborated in the medical record. The baseline assessments were conducted at a time when opioids and the opioid epidemic were prominent in the media, which could have affected patient perception. The patient reports about receiving COT monitoring practices (ie, opioid treatment agreement, UDTs, pill counts) were reported as ever having received that practice at the current clinic. This may overestimate the true amount of monitoring taking place as optimal monitoring requires things such as UDT and pill counts to occur with some regularity. Additionally, given lack of quantifiable data around UDT and pill counts, we are unable to discern if patients are satisfied with the practice itself or if there is a role that frequency, or lack thereof, plays to drive satisfaction. Post hoc analyses exploring the relationship between COMM scores and extent of monitoring or patient satisfaction with monitoring were likely underpowered due to relatively small samples, particularly for outcomes related to pill count. Despite these limitations, the current study had strengths including the following: systematically administered interviews, quality assurance mechanisms including verification of medications with those in the medical record, a thorough review of the study assessment by an additional staff member, and logic checks by the data management team; in addition, the multisite design assessed >1 distinct patient population, providing some heterogeneity in the baseline data.

CONCLUSIONS

Among PLHIV on COT, opioid misuse and awareness of the addictive potential of COT are common. COT monitoring practices among PLHIV are not the norm, with two-thirds ever receiving a UDT, one-third signing an opioid treatment agreement, and only 12% having a pill count. Surprisingly, patients who received these COT monitoring practices reported high satisfaction. Effective implementation of guidelines for care of PLHIV on COT merits attention from HIV clinical teams. Optimal approaches to accomplish this goal are needed, but it is reassuring that patient attitudes suggest high acceptance of such practices.

Supplementary Data

Supplementary materials are available at *Clinical Infectious Diseases* online. Consisting of data provided by the authors to benefit the reader, the posted materials are not copyedited and are the sole responsibility of the authors, so questions or comments should be addressed to the corresponding author.

Notes

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