HIV risk behavior in opioid dependent adults seeking detoxification treatment: An exploratory comparison of heroin and oxycodone users

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Abstract

Heroin users are at high risk for HIV infection, but little is known about HIV risk in oxycodone users. This study examined HIV risk behaviors in heroin (n=27) and oxycodone (n=23) users seeking inpatient detoxification at a private psychiatric hospital. Drug use histories were similar, except oxycodone users used marijuana more frequently. Injection drug risk occurred exclusively among heroin users. The rates of sexual activity (66%), unprotected intercourse (69%), sex while intoxicated (74%), and sex with strangers (24%) were similar, but more oxycodone users had multiple partners (39% vs. 6%, *p*<.05). HIV prevention efforts should target both heroin and oxycodone users.

Keywords

HIV risk behavior; opioid dependence; heroin; oxycodone

INTRODUCTION

Since the discovery of HIV/AIDS in the early 1980s, opioid dependence has been closely tied to the epidemic in the United States. Injection drug users are at high risk for contracting HIV through the reuse and sharing of syringes and injection paraphernalia. In 2006, 24% of persons living with HIV had been infected through injection drug use (1). Approximately two-thirds of heroin users inject the drug and are thus at high risk for HIV infection (2).

Non-medical use of prescription opioids is rapidly becoming a major public health problem in the United States (3). One of the more commonly abused opioid analgesics is oxycodone. In 2007, an estimated 1.4 million Americans abused oxycodone (4). Oxycodone is typically inhaled or taken orally, so users are not at risk for contracting HIV via injection behaviors. However, non-injection drug use also contributes to the spread of HIV through its association with sexual risk behavior. Previous research has found that heroin users engage in high rates of sexual risk behavior, including multiple partners, unprotected intercourse, and sex trading (5–8). To date, studies have not examined sexual risk behavior in oxycodone abusers.

As patterns of drug use shift in the United States, it is important to identify the types of behaviors that continue to place opioid abusers at risk for HIV infection. The purpose of this study was to compare the rates of HIV risk behaviors in heroin versus oxycodone abusers. Given the high rate of HIV infection in heroin users (9–12), we hypothesized that heroin users would engage in higher rates of injection drug and sexual risk behaviors compared to oxycodone users.

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METHOD

Participants and Procedures

This study used baseline data collected as part of a clinical trial of adjunctive electroacupuncture for opioid detoxification. Participants were adults 18–59 years of age who sought inpatient opioid detoxification at the Alcohol and Drug Abuse Treatment Program at McLean Hospital between August 2007 and July 2008. Patients admitted for opioid detoxification to this 17-bed unit meet daily with a psychiatrist and a case worker and generally receive a 4-day buprenorphine-naloxone taper and ancillary medications (e.g., antidepressants, sleep aids) as needed. They also receive individual and group substance abuse counseling, emphasizing relapse prevention and introducing 12-step/mutual-help programs. Inclusion criteria for the current study were diagnosis of opioid dependence, use of opioids to get high (i.e., not to treat a physical condition), and requiring medical management of opioid withdrawal. Exclusion criteria were medical management of alcohol or benzodiazepine withdrawal, acute mania, psychosis, or suicidality, history of heart disease or seizure disorder, and pregnancy. Of 176 patients who were admitted to the unit with a diagnosis of opioid dependence, 55 were enrolled into the electroacupuncture study (105 did not meet eligibility criteria, 12 were not interested in participating, and 4 were discharged before being approached). Three participants were excluded from the current analysis because they did not use heroin or oxycodone, and two participants did not complete a baseline assessment. This left a final sample of 50 participants.

After providing written informed consent, participants completed a baseline assessment that combined structured interviews and self-report measures. Assessments were completed on the inpatient unit, and participants received no compensation for their participation. This study was approved by the McLean Hospital Institutional Review Board.

Measures

Substance use—An abbreviated version of the Addiction Severity Index (ASI-Lite), an interviewer-administered survey, was used to assess problems in medical, occupational, drug, alcohol, legal, social, and psychiatric domains in the past 30 days (13). Timeline follow-back methodology was used to assess opioid and other substance use in the 30 days prior to admission (14). Urine samples were collected and analyzed for drug metabolites to corroborate self-reports. Participants were categorized as heroin or oxycodone users based on which drug they reported to be the major problem on the ASI. The Severity of Dependence Scale, a 5-item questionnaire, was used to assess severity of dependence on opioids, using a 4-point scale (15).

HIV risk behavior—The Risk Behavior Survey, an interviewer-administered survey, was used to assess HIV risk behavior in the past 30 days. This interview covers both drug risk (e.g., sharing of injection paraphernalia) and sexual risk (e.g., number of partners, frequency of condom use). Participants were also asked whether or not they had engaged in sex with strangers, while intoxicated, or in exchange for drugs or money in the past 30 days, and whether or not they had been tested for HIV in the past year. High-risk sexual behavior was defined as sexual intercourse without a condom, with multiple partners, and/or with strangers (yes vs. no).

Data Analysis

Heroin and oxycodone users were compared on demographic, substance use, and HIV risk behaviors using t-tests and chi-square tests. A binary logistic regression model was used to assess the relationship between primary opioid use and high-risk sexual behavior after controlling for age, gender, ethnicity, and marital status.

RESULTS

Table 1 describes the participant characteristics by primary opioid group (i.e., heroin versus oxycodone). The sample included 27 heroin users and 23 oxycodone users. They ranged in age from 18 to 57 years (M = 27.1, SD = 8.6). Most were male (71%), Caucasian (89%), heterosexual (95%), and single (77%). The majority (95%) graduated from high school, and 21% had a 4-year college degree. Heroin and oxycodone users did not differ on any of these demographic variables. All participants reported being HIV-negative.

Overall, participants had used substances on average for 10.6 (SD = 6.4) years and opioids for 5.1 (SD = 4.8) years. There were no differences on years of use for any substance, including opioids. In the 30 days prior to admission, participants had used drugs on an average of 25.1 (SD = 6.9) days. Oxycodone users reported more days of opioid use (27.7 vs. 21.1, $p < .01$) and marijuana use (13.1 vs. 2.3, $p < .01$). Based on the ASI, they also had more severe problems related to drug use (0.32 vs. 0.36, $p < .05$). There were no group differences on severity of opioid dependence or problems in other domains.

Table 2 describes the rate of HIV risk behavior by primary opioid group. Injection drug use occurred exclusively among heroin users. Most heroin users (89%) had injected drugs in the past month, and 37% had engaged in injection risk behaviors (33% shared paraphenalia, 29% split drug solution, and 12% injected with unsterile needles). Overall, 66% of participants were sexually active in the past month. Among sexually active participants, oxycodone users had more partners (1.7 vs. 1.1, $p < .05$), and they were more likely to have had multiple partners (39% vs. 6%, $p < .05$). On average, participants had intercourse weekly, and 24% engaged in unprotected intercourse, 74% had sex while intoxicated, and 19% had sex with strangers. No one reported trading sex for money or drugs. Finally, heroin users were more likely to have been tested for HIV in the past year (71% vs. 33%, $p < .05$).

Table 3 presents the results of the logistic regression model predicting high-risk sexual behavior. After controlling for demographic factors (age, gender, ethnicity, and marital status), oxycodone users were 4.1 times more likely than heroin users to engage in some form of high-risk sexual behavior ($p < .05$).

DISCUSSION

To our knowledge, this is the first study to compare HIV risk behavior in heroin versus oxycodone users. Not surprisingly, heroin users were more likely to engage in injection drug risk behavior. This is consistent with national trends (2). Most of the heroin users had injected drugs in the past month, and about a third had shared needles and other paraphernalia. In contrast, none of the oxycodone users had injected drugs. Heroin users were more likely than oxycodone users to have been tested for HIV in the past year. This may be due to the widespread awareness of the high risk of HIV transmission associated with injection drug use. Therefore, heroin users, many of whom inject drugs, may have been more motivated to get tested for HIV. Health care professionals may also be more likely to recommend HIV testing to heroin users than oxycodone users because of the higher rate of injection drug use.

Most participants reported sexual activity in the past month. Among these participants, 22% had multiple partners, 24% had sex with strangers, 69% had unprotected intercourse, and 74% had sex while intoxicated. These rates of sexual risk behavior are consistent with previous studies of injecting and non-injecting heroin users (5,9,16–18). However, none of the participants reported trading sex for money or drugs, possibly due to a relatively higher socioeconomic status. Contrary to our hypothesis, the rates of sexual risk were similar across the opioid groups, except that oxycodone users had more partners and were more likely to have

multiple partners in the past month. After controlling for demographic factors, oxycodone users were approximately 4 times more likely to have engaged in high-risk sexual behavior.

One possible explanation for the higher rate of sexual risk in oxycodone users is their higher frequency of marijuana use. A recent study of young heterosexual adults found that marijuana use was predictive of sexual risk behavior (19). Another study of young adults found that many used marijuana to enhance sensations and arousal during sex, and that marijuana use was associated with more sex partners and unprotected intercourse (20). However, a study of men who have sex with men found no association between marijuana use and sexual risk (21). Further research is necessary to understand the relationship between marijuana use and sexual risk behavior, particularly among young drug users.

The drug use histories of the heroin and oxycodone users in this sample were remarkably similar. Despite their young age, they had abused substances for an average of 10 years and opioids for 5 years. All participants used drugs for the sole purpose of getting high; no one was prescribed opioids for a medical condition, and no one reported using them to manage physical pain. There was also no difference between heroin and oxycodone users in their current severity of opioid dependence. However, oxycodone users had used drugs and opioids on more days in the past month, and they reported more severe problems related to their drug use. In contrast, previous studies have found that heroin users, compared to opioid analgesic users, have more problems related to their drug use, including more years of opioid use and more use per day, more money spent on opioids, more illegal activity and drug-related arrests, and more severe impairment related to drug use (22,23). Further research is needed to better characterize oxycodone users and the context in which sexual behavior occurs, and to examine the effect of frequency of opioid and polysubstance use on risk behaviors over time.

The results of the current study suggest that HIV prevention efforts should target both heroin and oxycodone users. While treatment of substance use disorder is associated with decreased injection drug risk over time, it is less effective in reducing sexual risk behaviors (5,24–26). Therefore, adjunctive HIV prevention services may be necessary to reduce sexual risk behavior among opioid users. Behavioral interventions are effective in reducing sexual risk behaviors among crack and injection drug users (27,28); however, oxycodone and other opioid analgesic users have not previously been targeted for such interventions. Drug abuse treatment programs may be ideal settings in which to deliver HIV prevention interventions for this population.

Several limitations of this study should be noted. First, the sample size was modest, and results should be replicated in studies with larger and more diverse samples. Second, this study focused on oxycodone, which may or may not be similar to other opioid analgesics (e.g., hydrocodone and methadone). Future studies might examine HIV risk behavior in more heterogeneous samples of opioid analgesic abusers. Third, self-report data are subject to response bias, and the face-to-face interview may have suppressed reporting of sensitive material. However, this remains the current standard for assessing HIV risk behavior, and other studies of substance abusers have documented test-retest reliability and predictive validity of self-reported sexual and drug use behaviors (29,30). Finally, use of a convenience sample of volunteers for a clinical trial raises the possibility of bias. Results may not generalize to opioid dependent adults who are not in drug abuse treatment, are of different cultural and socio-economic backgrounds, and/or live in other regions of the United States.

In conclusion, the results of this study suggest that both heroin and oxycodone users are at risk for HIV infection. Only heroin users reported injection risk behaviors, but both groups reported sexual risk behaviors. In fact, oxycodone users may even engage in sexual risk behaviors with more partners, possibly in the context of more frequent opioid and polysubstance abuse. Further research is needed to identify the most effective risk reduction intervention strategies for

oxycodone users. Given the recent rise in oxycodone and other opioid analgesic abuse in the United States, HIV prevention efforts should begin to target opioid dependent adults more broadly.

Acknowledgments

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Table 1

Participant characteristics by primary opioid group

	Heroin n = 27	Oxycodone n = 23	Statistic	*p*-value
Age (years), M (SD)	26.0 (6.7)	25.9 (7.8)	$t(48) = 0.05$	.96
Male, %	63.0%	82.6%	$\chi^2(1) = 2.38$	.12
Caucasian, %	81.5%	95.6%	$\chi^2(1) = 2.36$	.12
Heterosexual, %	92.6%	100%	$\chi^2(1) = 1.78$	.18
Education (years), M (SD)	14.2 (1.8)	13.5 (1.6)	$t(48) = 1.35$	.18
Income (past month), M (SD)	$1338 (1453)	$1846 (2165)	$t(48) = -0.99$	.33
Currently single, %	81.5%	91.3%	$\chi^2(1) = 1.00$	.32
Years of substance use, M (SD)				
Any substance, including alcohol	10.9 (6.0)	10.0 (5.9)	$t(48) = 0.53$	.60
Any drug	10.0 (5.9)	8.0 (4.0)	$t(48) = 1.41$	.16
Any opioid	5.7 (5.9)	4.3 (3.0)	$t(48) = 1.08$	.28
Primary opioid	3.6 (5.7)	4.2 (3.0)	$t(48) = -0.50$	.62
Marijuana	6.7 (5.4)	7.5 (4.2)	$t(48) = -0.57$	.57
Cocaine	4.2 (4.1)	2.8 (3.0)	$t(48) = 1.40$	.17
Severity of dependence, M (SD)	11.5 (3.1)	12.1 (1.7)	$t(48) = -0.77$	.45
Days of use (past month), M (SD)				
Any Drug	22.3 (8.4)	28.4 (2.8)	$t(48) = -3.50$	.001
Any Opioid	21.1 (9.7)	27.7 (4.2)	$t(48) = -3.19$	.003
Heroin	21.3 (9.0)	0.6 (1.5)	$t(48) = 11.71$	.000
Oxycodone	1.6 (3.4)	26.3 (5.6)	$t(48) = -18.53$	.000
Marijuana	2.3 (6.1)	13.1 (13.5)	$t(48) = -3.55$	.001
Cocaine	2.8 (6.4)	2.5 (4.5)	$t(48) = 0.24$	.81
Severity of problems, M (SD)				
Medical	0.19 (0.31)	0.24 (0.38)	$t(48) = -0.45$	.69
Occupational	0.47 (0.22)	0.38 (0.16)	$t(48) = 1.68$	.10
Drug	0.32 (0.07)	0.36 (0.07)	$t(48) = -2.04$	.05
Alcohol	0.07 (0.15)	0.11 (0.17)	$t(48) = -0.84$	.40
Legal	0.21 (0.23)	0.19 (0.22)	$t(48) = 0.30$	.76
Social	0.33 (0.25)	0.23 (0.21)	$t(48) = 1.58$	.12
Psychiatric	0.38 (0.24)	0.46 (0.12)	$t(48) = -1.56$	.13

Table 2

HIV risk behaviors in the past month by primary opioid group

	Heroin n = 27	Oxycodone n = 23	Statistic	*p*-value
Injection drug use, %	88.9%	0%	$\chi^2(1) = 39.32$	< .001
Any injection risk behavior[1], %	37.0%	NA	NA	NA
Sexual activity, %	59.3%	78.3%	$\chi^2(1) = 2.06$	.15
Number of partners[2], M (SD)	1.1 (0.3)	1.7 (1.1)	$t(32) = -2.30$	.03
Multiple (≥ 2) partners[2], %	6.3%	38.9%	$\chi^2(1) = 5.02$	.03
Frequency of intercourse[3,4], M (SD)	3.1 (1.7)	3.2 (1.2)	$t(31) = -0.20$	.84
Frequency of condom use[3], %				
Never	73.3%	44.4%	$\chi^2(2) = 4.60$	.10
Sometimes	0%	22.2%		
Always	26.7%	33.3%		
Sex while intoxicated[2], %	76.9%	71.4%	$\chi^2(1) = 0.11$	.75
Sex with a stranger[2], %	23.1%	28.6%	$\chi^2(1) = 0.11$	.75
Sex trading for drugs/money[2], %	0%	0%	NA	NA
HIV test, past year	71%	33%	$\chi^2(1) = 5.84$	.02

[1] Among participants who injected drugs

[2] Among participants who were sexually active

[3] Among participants who had sexual intercourse (2 sexually active participants had oral sex only).

[4] On a 1–7 scale (1 = once/irregularly, 3 = about once a week, 5 = about once a day, 7 = 4 or more times a day)

Table 3

Logistic regression models predicting any high-risk sexual behavior (N = 50)

	Univariable models		Multivariable model	
	Odds ratio	95% confidence interval	Odds ratio	95% confidence interval
Older age	0.94	0.87–1.00	0.98	0.86–1.10
Female	1.84	0.56–6.04	3.48	0.59–20.51
Caucasian	0.50	0.08–2.98	0.79	0.08–7.69
Single	0.65	.28–1.54	0.94	0.19–4.73
Oxycodone user	2.86	0.89–9.19	4.05	1.11–14.81