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Alternate Routes of Administration among Prescription Opioid Misusers and Associations with Sexual HIV Transmission Risk Behaviors

Mance E. Buttram, PhD[1] and **Steven P. Kurtz, PhD**[2]

[1]Assistant Professor and Associate Director, Center for Applied Research on Substance Use and Health Disparities, Nova Southeastern University, 2 NE 40th Street, Suite 404, Miami, FL 33137 USA

[2]Professor and Director, Center for Applied Research on Substance Use and Health Disparities, Nova Southeastern University, 2 NE 40th Street, Suite 404, Miami, FL 33137 USA

Abstract

Literature suggests that young adult prescription opioid misusers who are using alternate routes of administration (e.g., snorting, injecting) may be engaging in sexual and non-sexual HIV risk behaviors. This study examines demographics, substance use, sexual risk behavior, and health and social problems associated with alternate routes of administration of prescription opioids among a sample of young adult prescription opioid misusers. Data are drawn from baseline assessments from a behavioral intervention trial. Eligible participants were ages 18–39, and reported recent (past 90 days) heterosexual sex, and recent and regular substance use and attendance at large recognized local nightclubs. The analyses include 446 racially/ethnically diverse participants. In bivariate regression models, compared to those who did not, participants reporting alternate routes of administration (n=209) were more likely to be White (p<0.025) and report group sex participation history (p=0.002), sex with an injection drug user (p=0.003), sexual victimization history (p=0.003), and severe mental distress (p<0.000). White race, group sex participation history, and severe mental distress remained significant in the multivariate model. Alternate routes of administration of prescription opioids are associated with sexual HIV transmission risk behaviors. Early prevention and intervention efforts that address sexual and non-sexual HIV risk behaviors are warranted.

Keywords

prescription opioid misuse; alternate routes; HIV; sexual risk behavior

Misuse prescription opioids has become a nationwide problem, especially for young adults (SAMHSA 2011, SAMHSA 2012). Significant increases in lifetime prescription opioid misuse have been observed among 18–25 year-olds between 2002 and 2010 (SAMHSA

Corresponding Author: Mance E. Buttram, PhD, Center for Applied Research on Substance Use and Health Disparities, 2 NE 40th Street, Suite 404, Miami, FL 33137, Tel: 305-571-2774; Fax: 305-571-8468, mance.buttram@nova.edu.

2011). Although a modest decline in use among 18–25 year olds was noted in 2011 (SAMHSA 2012), prescription opioids remain the second most commonly used drug in the past month after marijuana among this age group. At the same time, data show net declines in cocaine use among young adults from 2002 to 2010 (SAMHSA 2012), suggesting that the misuse of prescription drugs may be replacing other types of substance use among this cohort.

The misuse of prescription opioids among young people is associated with several health and social problems, including mental distress, victimization, and homelessness (Schrager et al. 2014, Mackesy-Amiti, Donenberg, and Ouellet 2015, Jessell et al. 2015). The use of alternate routes of administration of prescription opioids, including snorting, smoking, or injecting, may result in increased vulnerability, as the effects of the drug are intensified and the risk of addiction is elevated (Compton and Volkow 2006). Moreover, injecting prescription opioids puts young adults at greater risk for acquiring HIV or Hepatitis C infection because of prevalent needle risk behaviors (Mateu-Gelabert et al. 2015, Surratt, Kurtz, and Cicero 2011, O'Grady, Kurtz, and Surratt 2012, Johnson et al. 2013).

Several studies have found elevated sexual risk behaviors among people who inject drugs, including, risky injection practices, having an injecting sex partner, and having condomless sex with multiple sex partners (Surratt, Kurtz, and Cicero 2011, Meade, McDonald, and Weiss 2009; Miller et al. 2002; Centers for Disease Control and Prevention 2012). Yet, limited information has been published regarding sexual HIV transmission risk behaviors among young adults engaging in alternate routes of administration of prescription opioids. Emerging data suggest that prescription opioid misusers, including those who report alternate routes of administration of opioids, are engaging in sexual risk behavior, including condomless vaginal and anal sex and group sex (Mateu-Gelabert et al. 2015, Buttram and Kurtz 2015, Johnson et al. 2013). In addition, in-depth research conducted among young adult prescription opioid misusers shows that both men and women report a variety of sexual behaviors and risks, including increased sexual encounters, implicit and explicit exchanges of drugs and sex, sexual victimization, and casual sex with other prescription opioid misusers (Johnson et al. 2013, Mateu-Gelabert et al. 2015, Jessell et al. 2015).

Although research suggests a link between alternate routes of administration of prescription opioids and sexual HIV transmission risk behaviors among young adults, no study has examined this phenomenon among a large sample. The current study examines the relationship between alternate routes of administration of prescription opioids and health and social problems related to sexual HIV transmission risk among a sample of young adult prescription opioid misusers. Specifically, we tested the hypothesis that young adults who report alternate routes of administration of prescription opioids will also report elevated sexual HIV transmission risk behaviors.

Methods

Site

Miami-Dade County, Florida, is a diverse community of more than 2.6 million people with large numbers of foreign-born residents (51%) (U.S. Census Bureau 2010). Hispanics

(65.0%) are the largest ethnic group, with African Americans/Blacks representing 18.9%, and non-Hispanic Whites 15.4% of the county population. The Miami metropolitan area reports the highest HIV and AIDS incidence rates in the U.S. (CDC 2009). At the same time, Miami has become a national and international destination for partying, sexual tourism, and club drug use. It has been noted that South Beach has also become an East Coast center for club culture, setting substance use trends that are emulated and replicated elsewhere in the United States (Kurtz et al. 2013).

Sample

Data are drawn from a behavioral substance use and sexual risk reduction intervention trial that was designed for young adults in the club drug scene. A total of 498 participants completed baseline comprehensive health and social risk assessments between September 2011 and November 2014. The present analyses are based on a sub-sample of these participants who report past 90 day prescription opioid misuse (n=446; 89.6% of the total sample). To be eligible for the trial, participants reported: 1) sex with a partner of the opposite gender during the past 90 days; 2) being between the ages of 18–39; 3) use one or more club drugs (defined as powder cocaine, ecstasy, GHB, methamphetamine, ketamine, and LSD) at least three times during the past 90 days; 4) non-medical use of one or more psychoactive prescription medications at least once during the past 90 days; and 5) regular attendance at large recognized local nightclubs.

Participants were recruited through respondent-driven sampling (RDS) (Heckathorn, 1997), a form of chain referral sampling, which has been shown to reduce sources of respondent bias (such as age, race/ethnicity, gender, and drug of choice) as successive branches or waves of respondents are enrolled and then solicited for additional contacts (Heckathorn, 1997, 2002). In this study, initial respondents (“seeds”) were recruited through outreach at local nightclubs and existing contacts in the club culture. Each seed and subsequent study participant was provided with recruitment coupons to give to other club drug users in their social network, with the understanding that they would earn $50 for the recruitment of each additional eligible respondent. Each respondent/recruiter was limited to five coupons to prevent a few participants with large social networks from biasing the overall sample toward those with similar demographic and drug using profiles (homophily) (Heckathorn 1997).

Informed consent was obtained from all participants prior to study participation. As per the study design, participants were randomized to complete baseline assessments via a Computer-Assisted Personal Interview (CAPI) or an Audio-Assisted Computer Self Interview (ACASI). Participants were given a $50 stipend for their time and travel expenses following the interview. This study was approved by the Nova Southeastern University Institutional Review Board.

Measures

Demographic measures included age, gender, race/ethnicity, and education. Age was dichotomized into “young” (i.e., 18–24) versus not. Race/ethnicity was assessed by asking participants if they were Hispanic or Latino, followed by asking them what race/ethnicity

they consider themselves to be. Years of education was assessed with the question, “What is the highest grade or year you completed in school?”

The Global Appraisal of Individual Needs (GAIN, v. 5.4) (Dennis 2006) was the primary component of the standardized baseline assessments. This instrument has several core sections (e.g., background, substance use, physical health, sexual risk behaviors, mental health, and victimization), with each containing questions on the recency of problems, breadth of symptoms, and recent (past 90 day) and lifetime frequencies in days or times. Substance use measures included past 90 day frequencies of use of a variety of substances including alcohol, marijuana, cocaine (powder and crack), ecstasy, LSD, hallucinogens (e.g., mushrooms; PCP; ketamine), methamphetamine, GHB, heroin and the non-medical misuse of prescription sedatives (e.g., Xanax), opioids (e.g., Percocet), stimulants (e.g., Adderall), and antipsychotics (e.g., Seroquel). Participants were also asked whether they had injected drugs during the past 90 days. For analysis, substance use and drug injection measures were dichotomized into “yes” and “no”. Participants who reported prescription opioid misuse were also asked to describe all routes of opioid administration during the past 90 days. All routes besides swallowing a whole pill or liquid were categorized as an alternate route of administration, which included swallowing a crushed pill, placing it under the tongue, placing it inside the vagina and/or anus, smoking, snorting, injecting, and parachuting (swallowing a crushed pill inside of a piece of paper tissue or toilet paper).

Sexual behavior questions included counts of past 90 day condomless vaginal intercourse and condomless anal intercourse. Group sex participation was assessed by asking participants if they had ever participated in group sex (defined as three or more people, including the participant). Additional questions asked, if during the past 12 months, a participant had bought sex, (i.e., “use money or drugs to purchase or get sex”), traded sex (i.e., “have sex to get drugs, gifts, or money”), or had sex with an injection drug user. High risk sex was defined as recent condomless vaginal and/or anal intercourse in the context of a non-monogamous relationship or with a non-primary/casual partner during the past 90 days. Finally, being high for sex was assessed with the question, “How often in the past 90 days were you ‘high’ on either alcohol or drugs when you were having sex with another person?” Responses were based on a five point scale ranging from “never” to “almost all the time.” For analysis, this measure was dichotomized into being “high for sex half the time or more” versus not.

Victimization histories were assessed by affirmative responses to the following events: being attacked with a weapon or being beaten so as to cause bruises, cuts, or broken bones (physical) or being forced to participate in sexual acts against one’s will (sexual). The GAIN includes the General Mental Distress Scale (GMDS), which includes past year symptoms of somatization (four items, e.g., sleep trouble; shortness of breath or lump in the throat), depression (nine items, e.g., feeling sad, lonely or hopeless; feeling tired or having no energy), and anxiety (ten items, e.g., feeling nervous, anxious or tense; unable to control worries). The GMDS is further reducible to classifications indicating clinical significance: subclinical, moderate, and severe (Dennis 2006). This scale was dichotomized into “severe” and “not severe” for analysis. Substance dependence was assessed by the endorsement of three or more of seven Diagnostic and Statistical Manual of Mental Disorders, 4th edition

(DSM-IV) symptoms during the past 90 days (e.g., needing more drug to get the same effect; experience withdrawal symptoms; being unable to quit or cut down). Participants were also asked whether they had ever been arrested, which was dichotomized into “yes” and “no” for analysis.

Data Analyses

All analyses were conducted using IBM SPSS Statistics version 21. Descriptive statistics for the study sample were calculated for the variables of interest. Bivariate logistic regression models were constructed to examine alternate routes of administration of prescription opioids among participants who reported recent prescription opioid misuse. Variables in the bivariate models included demographics, HIV/STI risk behavior, mental health and victimization. Those measures that exhibited significant associations in the bivariate models were included in a multivariate logistic regression model.

Results

As shown in Table 1, the study includes 446 young adult prescription opioid misusers. The mean age is 25.14 (SD=5.395). The racially/ethnically diverse sample was 64.1% Hispanic, 21.7% African American/Black, 11.2% White and 2.9% “other” race/ethnicity. Nearly half (45.3%) of participants were female. Twelve or more years of education was reported by 85.0% of participants.

Most participants reported the recent use of alcohol (99.8%%), marijuana (95.3%), cocaine, (93.7%), and ecstasy (98.2%). Additional substances used include crack cocaine (28.5%), LSD (50.2%), hallucinogens (58.3%), methamphetamine (25.6%), GHB (17.3%), and heroin (23.1%). Participants also reported the misuse of additional prescription drugs including stimulants (49.8%), sedatives (93.5%), antidepressants (26.9%), and antipsychotics (29.6%). Injection drug use during the past 90 days (14.8%;) was also reported. An alternate route of administration of a prescription opioid was reported by 35.2%.

During the past 90 days, a majority of participants reported condomless vaginal intercourse (90.6%), and 40.1% reported condomless anal intercourse. Group sex participation was reported by 41.0% of the sample. Smaller numbers of participants engaged in the past year sexual risk behaviors of buying sex (11.0%), trading/selling sex (14.3%), and sex with an injection drug user (12.6%;). However, a majority of the sample reported recent high risk sex (69.1%; n=308) and being high for sex half the time or more (78.5%).

Physical abuse history was reported by 43.3% and sexual abuse history was reported by 19.1% of participants. More than half (52.0%) of participants reported past year severe mental distress. A majority of the sample reported recent substance dependence (58.5%) and arrest history (64.8%).

Bivariate logistic regression models are shown in Table 2. Age and gender were not associated with alternate routes of administration of prescription opioids. Employing White as a reference category, all other race/ethnicity categories were associated with lower odds of using alternate routes of administration of opioids, which included Hispanic (OR=0.364;

95% CI=0.197, 0.674; *P*=0.001), African American/Black (OR=0.207; 95% CI=0.099, 0.432; *P*<0.000), and other race/ethnicity (OR=0.200; 95% CI=0.049, 0.818; *P*=0.025). Two sexual HIV transmission risk behaviors were associated with higher odds of using alternate routes of administration including group sex participation (OR=1.876; 95% CI=1.264, 2.784; *P*=0.002), and sex with an injection drug user (OR=2.389; 95% CI=1.356, 4.209; *P*=0.003). Sexual abuse history (OR=2.089; 95% CI=1.294, 3.375; *P*=0.003) and past year severe mental distress (OR=2.087; 95% CI=1.400, 3.111; *P*<0.000) were also associated with higher odds of using alternate routes of administration.

Significant associations from the bivariate logistic regression models were combined into a multivariate model, shown in Table 3. Employing White as a reference category, all other race/ethnicity categories were associated with lower odds of using alternate routes of administration of opioids, which included Hispanic (OR=0.378; 95% CI=0.198, 0.722; *P*=0.003), African American/Black (OR=0.211; 95% CI=0.098, 0.454; *P*<0.000), and other race/ethnicity (OR=0.161; 95% CI=0.037, 0.699; *P*=0.015). Group sex participation history (OR=1.641; 95% CI=1.076, 2.503; *P*=0.021) and past year severe mental distress (OR=1.799; 95% CI=1.161, 2.789; *P*=0.009) also remained significant in the model, with higher odds of alternate routes of administration.

Discussion

This is one of the first studies to examine alternate routes of administration of prescription opioids and associated sexual HIV transmission risk behaviors and other health and social problems among a sample of young adults. The total number of participants completing baseline assessments was 498, of which nearly 90% (N=446) reported recent prescription opioid misuse and were included in the present analyses. This finding suggests that even though Florida enacted a prescription drug monitoring program and regulated opioid dispensaries, or “pill mills” in 2010 and 2011 (Surratt et al. 2014, Rutkow et al. 2015), the majority of young adults in the sample were recruited after 2011 and maintained access to and continued misusing prescription opioids. In addition, more than 35% of recent prescription opioid misusers reported alternate routes of administration, which is worrying because HIV and hepatitis C are potentially transmissible through the sharing of injection and snorting equipment (Aaron et al. 2008, MacDonald, Crofts, and Kaldor 1996). In addition, participants engaging in alternate routes of administration may be more vulnerable to addiction or overdose (Young, Havens, and Leukefeld 2010, Hall et al. 2008, Surratt, Kurtz, and Cicero 2011).

The findings related to sexual HIV transmission risk behaviors in the multivariate model confirm our hypothesis. Alternate routes of administration were associated with group sex participation history. Group sex participation is of concern because it has the potential to transmit HIV to multiple individuals in rapid succession, and literature suggests that young adult group sex participants report elevated rates of HIV discordance and condomless sex (Friedman, Mateu-Gelabert, and Sandoval 2011, Friedman et al. 2008). Group sex events often include participants from multiple populations, including substance users, injection drug users, non-substance users, men who have sex with men, sex buyers or exchangers, and others; thus group sex events may also function as bridge environments allowing for HIV to

be transmitted to multiple populations (Friedman, Mateu-Gelabert, and Sandoval 2011, Friedman et al. 2008). Thus prescription opioid misusers may be engaging in sex with members of other high risk populations, potentially leading to greater vulnerability with regard to sexual HIV or hepatitis C transmission or infection.

Severe mental distress was also associated with alternate routes of administration in the multivariate model. This link is unsurprising given the literature documenting multiple mental health problems associated with prescription opioid misuse, including among young adult injection drug users (Mackesy-Amiti, Donenberg, and Ouellet 2015). However, mental health problems are also associated with HIV transmission risk among substance users (German and Latkin 2012). Therefore, the co-occurrence of risk factors for HIV and hepatitis C related to alternate routes of administration, group sex participation, and severe mental distress are especially worrisome.

Although not significant in the multivariate model, bivariate analyses also revealed several sexual HIV risk behaviors associated with alternate routes of administration, including engaging in sex with an injection drug user. Moreover, condomless anal intercourse and trading/selling sex were very nearly significantly associated with alternate routes of administration in the bivariate models. These practices are documented risk factors for sexual HIV infection among substance users (Ibañez et al. 2010, Celentano, Latimore, and Mehta 2008). Sexual victimization history, another HIV transmission risk factor, was also associated with alternate routes of administration. These risk factors may be exacerbated when combined with other behaviors associated with prescription opioid misuse, including risky injection practices and sex while high (Mateu-Gelabert et al. 2015, Jessell et al. 2015, Meade et al. 2014).

These findings have implications for sexual HIV risk reduction and prevention. First, previous research among young adult substance users suggests that administering comprehensive assessments of substance use, sexual behavior, and related health and social problems may have a strong intervention effect (Kurtz et al. 2013). Such comprehensive assessments may be useful in identifying prescription opioid dependent individuals who require additional clinical or sexual risk reduction intervention (Meade et al. 2014). In addition, risky injection practices and HIV and Hepatitis C transmission among prescription opioid misusers has been documented (Johnson et al. 2013, Lankenau et al. 2012, Surratt et al. 2011). Current findings suggest that sexual risk behavior, including group sex, is also an important HIV risk factor for this population (Mateu-Gelabert et al. 2015, Buttram and Kurtz 2015). Therefore, substance use prevention and intervention programs must address HIV transmission risks related to sexual and substance use behaviors among polysubstance-using young adults and prescription opioid misusers.

Finally, several harm reduction strategies have been implemented to address the growing problem of prescription opioid misuse and alternate route of administration practices such as injection. Evidence demonstrates that needle and syringe exchange programs reduce injection risk behavior and prevent HIV and hepatitis C transmission (MacArthur et al. 2014) and supervised injection facilities, although currently prohibited in the U.S., are linked to reductions in overdose mortality (Marshall et al. 2011). In addition, the use of medication-

assisted treatment such as methadone and buprenorphine is associated with decreases in opioid use (Zaller, Yokell, Green, Gaggin and Case 2013). It has been argued that engaging young adults in harm reduction services must be a key element of the public health response to the prescription opioid epidemic (Marshall et al. 2016). Findings from the current study suggest that coupling sexual HIV risk reduction education and intervention with harm reduction services may have a greater impact on HIV and hepatitis C transmission among this population.

Limitations

Although recruitment procedures resulted in a sample broadly inclusive of the racial/ethnic makeup of Miami-Dade County, our ability to generalize the findings to other young adult club drug users and/or prescription opioid misusers who report alternate routes of administration is limited by the study eligibility requirements. Furthermore, all data are based on self-report, potentially leading to underreporting of socially undesirable behaviors. Given the high levels of substance use and sexual risk behaviors we found, however, underreporting of these and other stigmatized behaviors would appear to be uncommon.

Conclusions

The present study contributes to the literature on alternate routes of administration of prescription opioids by specifically examining health and social problems which may be influencing factors in sexual HIV transmission. Early prevention and intervention efforts that address both sexual and non-sexual HIV and hepatitis C transmission are needed among polysubstance-using young adults. Data suggest that young adult prescription opioid misusers develop riskier drug use and sexual networks as their drug use progresses (Mateu-Gelabert et al. 2015). As a result, early intervention, including comprehensive assessments of substance use and sexual behaviors, and a focus on sexual HIV transmission risks, including group sex, may be warranted.

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Table 1

Sample Characteristics (N=446)

	M	*(SD)*
Age	25.14	(5.395)
	N	***%***
Demographics and Background		
Hispanic	286	64.1%
African American/Black	97	21.7%
White	50	11.2%
Other race/ethnicity	13	2.9%
Female	202	45.3%
Education ≥ 12 years	379	85.0%
Past 90 day Substance Use		
Alcohol	445	99.8%
Marijuana	425	95.3%
Cocaine	418	93.7%
Ecstasy	438	98.2%
Crack cocaine	127	28.5%
LSD	224	50.2%
Hallucinogens	260	58.3%
Methamphetamine	114	25.6%
GHB	77	17.3%
Heroin	103	23.1%
Rx stimulants	222	49.8%
Rx sedatives	417	93.5%
Rx antidepressants	120	26.9%
Rx antipsychotics	132	29.6%
Injection drug use	66	14.8%
Alternate route of administration	157	35.2%
Sexual HIV Transmission Risk Behavior		
Condomless vaginal sex[a]	404	90.6%
Condomless anal sex[a]	179	40.1%
Group sex participation history	183	41.0%
Buy sex[b]	49	11.0%
Trade/sell sex[b]	64	14.3%
Sex with IDU[b]	56	12.6%
High risk sex[a]	308	69.1%
High for sex ≥ half the time[a]	350	78.5%
Health and Social Problems		
Physical abuse history	193	43.3%

	M	*(SD)*
Sexual abuse history	85	19.1%
Severe mental distress[b]	232	52.0%
Substance dependence[a]	261	58.5%
Arrest history	289	64.8%

[a]Past 90 days

[b]Past 12 months

Table 2

Bivariate logistic regression models of administration among prescription opioid misusers (N=446)

	p	OR	95% CI
Demographics			
Younger age (18–24)	0.932	0.983	0.666, 1.451
Female	0.070	0.695	0.468, 1.030
Race/ethnicity[a]			
Hispanic	0.001	0.364	0.197, 0.674
African American/Black	0.000	0.207	0.099, 0.432
Other race/ethnicity	0.025	0.200	0.049, 0.818
Sexual HIV Transmission Risk Behavior			
Condomless vaginal intercourse[b]	0.202	1.595	0.778, 3.267
Condomless anal intercourse[b]	0.054	0.579	0.331, 1.010
Group sex participation history	0.002	1.876	1.264, 2.784
Buy sex[c]	0.692	0.880	0.468, 1.655
Trade or sell sex[c]	0.069	1.644	0.962, 2.810
Sex with IDU	0.003	2.389	1.356, 4.209
High risk sex[b]	0.443	1.181	0.772, 1.806
High for sex ≥ half the time[b]	0.178	1.350	0.872, 2.091
Health and Social Problems			
Physical abuse history	0.540	1.130	0.764, 1.672
Sexual victimization history	0.003	2.089	1.294, 3.375
Severe mental distress[b]	0.000	2.087	1.400, 3.111
Substance dependence[c]	0.067	1.454	0.974, 2.170
Arrest history	0.376	1.204	0.798, 1.816

[a] reference category is White

[b] Past 90 days

[c] Past 12 months

Table 3

Multivariate logistic regression models of alternate routes of administration among prescription opioid misusers (N=446)

	p	OR	95% CI
Race/ethnicity[a]			
Hispanic	0.003	0.378	0.198, 0.722
African American/Black	0.000	0.211	0.098, 0.454
Other race/ethnicity	0.015	0.161	0.037, 0.699
Group sex participation history	0.021	1.641	1.076, 2.503
Sex with IDU[b]	0.121	1.615	0.881, 2.962
Sexual abuse history	0.082	1.600	0.942, 2.717
Severe mental distress[b]	0.009	1.799	1.161, 2.789

[a]Reference category is White

[b]Past 12 months