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Sexual HIV Risk Behaviors in a Treatment-Refractory Opioid-Dependent Sample

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Abstract

The propensity to engage in risk behaviors confers an elevated risk of HIV and other infectious disease transmission in opioid-dependent populations. Although drug abuse treatment may decrease drug-related risk behaviors such as needle-sharing, additional intervention may be needed to reduce HIV risk behavior. In this investigation, we assessed sexual HIV risk behaviors in opioid-dependent patients who were engaging in regular drug use despite ongoing counseling and methadone maintenance therapy. Potential risk and protective factors for engaging in sexual HIV risk behavior were examined. Taking into account demographic, psychiatric, substance use, and psychological variables, the only significant predictor of risk behavior was age. Specifically, younger patients were more likely to engage in sexual HIV risk behavior. The implications of these results for reducing sexual HIV risk behavior and for HIV prevention in methadone-maintained, treatment-refractory opioid-dependent patients are discussed.

Keywords

age; HIV; methadone; opioids; risk behaviors; substance dependence

Substance use disorders are often characterized by elevated impulsivity (see Verdejo-Garcia, Lawrence & Clark 2008 for a review), poor decision-making (Petry, Bickel & Arnett 1998), and a tendency to discount long-term consequences in favor of more immediate rewards (Kirby & Petry 2004; Coffey et al. 2003). This confluence of tendencies in substance abusers may explain elevated rates of risky behaviors, such as sexual HIV risk behaviors (e.g., Beckett 2003; Hutton et al. 2008; Tyndall et al. 2002). Practicing risky sex (e.g., without a condom, with multiple partners, under the influence of psychoactive substances) greatly increases the likelihood of contracting and transmitting HIV and other sexually transmitted diseases (CDC 2008). Individuals with the combined risk of intravenous drug

use and sexual HIV risk behavior have a particularly high risk for HIV transmission (Santibanez et al. 2006).

Although engagement in substance abuse treatment may reduce HIV risk behaviors such as needle use, the efficacy of drug abuse treatment for also reducing sexual risk behavior is more limited (Gowing et al. 2008). Specifically, a large quantitative review of the literature found that receipt of opioid agonist treatment may yield some reduction in rates of engaging in sex with multiple partners, but does not impact other important factors, such as condom use (Gowing et al. 2008). Thus, although substance abuse treatment may reduce HIV risk through reductions in needle-sharing behavior, risky sexual behaviors remain an important target for intervention. Among individuals with substance use disorders, the identification of risk and protective factors for engagement in sexual HIV risk behaviors is important to the development and implementation of preventative interventions.

A large body of research has examined predictors of sexual HIV risk behavior. Studies have identified risk and protective factors in multiple domains, including sociodemographic, environmental, psychological (e.g., personality, affect, and mental health), and attitudinal/motivational (e.g., Safren et al. 2010; Senn et al. 2006; Hall et al. 2007; Crepaz & Marks 2003; Rees et al. 2001; Hoyle, Fejfar & Miller 2000). These findings suggest that in any given population, it is likely that a combination of factors contribute to increased likelihood of engaging in risky sexual behaviors (e.g., Reynolds et al. 2010). Given that risk factors often co-occur (Lescano et al. 2007), and that certain populations may be at a greater risk of engaging in such behaviors, the identification of specific risk factors within vulnerable populations is of particular importance.

The purpose of this investigation was to examine factors associated with risky sexual behavior in a particularly vulnerable population—low income opioid-dependent patients with continued drug use patterns despite ongoing counseling and methadone maintenance treatment. Although studies have yielded potential risk and protective factors for risky sexual behaviors among individuals who abuse substances, few studies have specifically examined risky sexual behaviors among individuals receiving opioid agonist therapies, such as methadone maintenance. Inconsistent findings in this area to date may be attributable to the heterogeneity of substance use disorders; thus, examination of risk factors in specific subgroups may bring greater clarity to this literature. In this study, we examined a range of potential risk factors for engaging in sexual HIV risk behaviors. Consistent with previous investigations of risk factors in other substance use disorder samples, we hypothesized that lack of stable living situation (e.g., Towe et al. 2010), co-occurring psychiatric symptoms (e.g., Klein, Elifson & Sterk 2008; Shrier, Harris & Beardslee 2002), greater substance use severity (e.g., Morrill et al. 2001; Woody et al. 1999), and high levels of anxiety sensitivity (e.g., Wagner 2001), and sensation seeking (e.g., Desrichard & Denarie 2005; Kahn et al. 2002) would be associated with engaging in risky sexual behaviors in an opioid-dependent sample.

To investigate this question, baseline data from a clinical trial examining psychological treatments for treatment-resistant opioid-dependent patients were examined. Participants were examined in two cohorts. Sample 1 was administered a self-report measure of sexual HIV risk behavior. Data from this sample were examined to provide an effect size estimate of the association between hypothesized risk and protective factors and presence of sexual HIV risk behavior in the past month. Participants in Sample 2 completed a clinician-administered measure of risk behaviors. In this sample, hypothesized risk and protective factors were further analyzed. An alternative approach to analyzing these data is to collapse the self-report and clinician-administered measures of sexual risk behavior and analyze both

samples together. This approach yielded similar results, and thus given the potential flaws in collapsing these two measures, we elected to present these findings separately.

METHODS

Participants

Participants were recruited from an urban methadone maintenance clinic as part of a randomized controlled treatment outcome study. The trial evaluated psychological treatment for patients who were nonresponsive to treatment as usual, consisting of methadone maintenance therapy and outpatient group counseling. Patients experiencing chronic stress were recruited to test a novel psychological treatment focused on changing maladaptive responses to stress and distress. Criteria for inclusion in the study included a current *Diagnostic and Statistical Manual for Mental Disorders, Fourth Edition (DSM-IV-TR; APA 2000)* diagnosis of opioid dependence, a minimum of four months of receipt of methadone maintenance therapy, stable dose of methadone for two weeks prior to enrollment (to ensure that recent treatment modification had not been made), current illicit drug use (defined as positive oral toxicology screens for at least two tests during the month prior to enrollment), and presence of chronic stress (defined by unemployment/underemployment and/or current mood or anxiety disorder). Participants were excluded from the study for the following reasons: significant unstable medical condition, psychotic or uncontrolled bipolar disorder, and use of medication affecting methadone metabolism (e.g., rifampin). After providing informed consent, participants completed an initial screen assessing psychological disorders followed by a baseline assessment.

Twenty-eight participants were included in Sample 1. The mean age of participants was 44.0 years ($SD = 10.2$) and the sample consisted of 14 women and 14 men. Participants self-reported race and ethnicity. Half of the sample self-reported as Caucasian and half as African American; 11% of the sample identified as Hispanic or Latino/a. The median reported monthly income (including money from illegal sources) was \$667 per month (mean = \$663, $SD = \$278$).

Sixty-five participants were included in Sample 2; two participants provided incomplete data and were excluded from analysis. The mean age of participants was 38.8 years ($SD = 10.8$) and the sample consisted of 30 women and 33 men. Participants self-reported race and ethnicity; 76% reported race as Caucasian, 21% as African American, 1% as Asian, and 1% as Native Hawaiian or Pacific Islander. The majority of the sample was not Hispanic or Latino (92%). The median reported monthly income (including money from illegal sources) was \$701 per month (mean = \$960, $SD = \$1,026$).

Procedures

Participants completed a battery of interviewer-administered and self-report indices following provision of written informed consent. Diagnostic information was collected at baseline using the Structured Clinical Interview for DSM-IV (SCID; First et al. 1996), which assesses current and past Axis I disorders. All studies received Boston University and Massachusetts General Hospital Institutional Review Board approval.

Measures

Participants in Sample 1 completed a five-minute self-report paper and pencil measure of HIV sexual risk behavior. This was assessed with standard questions about the frequency of unprotected sex using a seven-point Likert-scale, ranging from “never” to “nearly every day.” Questions were asked separately about male and female partners, and according to HIV status (positive, negative, unknown) of partners. For men, questions were asked about

vaginal, insertive and receptive anal, and insertive and receptive oral sex. For women, questions were asked about receptive vaginal, anal and oral sex with male partners, and performing or receiving oral sex, “fisting,” and “rimming” with female partners. Risky sexual behavior was coded dichotomously as presence or absence of risk behaviors in the past 30 days.

A clinician-administered measure of sexual risk behavior was administered in Sample 2. The Risk Behavior Assessment (RBA; NIDA 1993) is an interviewer-administered measure assessing HIV transmission-risk behaviors occurring in the 30 days prior to the assessment. Questions focus on injection of drugs, sexual behaviors, and safety behaviors to reduce HIV transmission (i.e., use of condoms). Adequate psychometric properties have been reported for drug-abusing populations (Needle et al. 1995; Weatherby et al. 1994). For this study, risky sexual behavior was used as the primary outcome measure.

The Addiction Severity Index (McLellan et al. 1992) is an interviewer-administered measure of seven domains of functioning often used with substance-abusing populations. Composite scores can be calculated for each of these domains. In this analysis we used the drug use section composite score—which represents overall severity and incorporates frequency of drug use, distress and interference related to use—as an index of current drug use severity and the psychiatric composite score as a measure of co-occurring psychological symptoms. The Addiction Severity Index has been widely evaluated and demonstrates sound psychometric properties including retest reliability and concurrent, predictive, and discriminative validities (McLellan et al. 2006).

Self-report measures evaluating constructs hypothesized to be associated with risky behaviors were also administered. These included the Anxiety Sensitivity Index (Peterson & Reiss 1992), a 16-item instrument measuring the degree of fear associated with anxiety-related sensations. The Anxiety Sensitivity Index demonstrates strong psychometric properties including good retest reliability and construct validity (Reiss et al. 1986) and strong internal consistency reliability in the current samples ($\alpha = .89$). Items are rated on a Likert scale of 0–4 and a total score is calculated by summing all items. The Zuckerman Sensation Seeking Scale (SSS; Zuckerman & Link 1968) is a 40-item self-report assessment examining the tendency to engage in behaviors associated with arousal along four dimensions: thrill and adventure seeking, experience seeking, disinhibition, and boredom susceptibility. For each item, participants select one of two statements that best describes them; item scores are then summed for total and subscale scores. Multiple studies examining the psychometric properties indicate adequate validity and reliability (Sarramon et al. 1999; Beck et al. 1995) and adequate internal consistency reliability in the current samples ($\alpha = .75$).

Statistical Analysis

Sample 1—Thirty participants were enrolled in Sample 1; two provided incomplete data and were excluded from analysis. Purported risk and protective factors for sexual risk behavior in the past 30 days were evaluated. In this preliminary study, analyses were conducted without correction for multiple tests to provide effect size estimates to guide the analysis (along with theoretical considerations) in Sample 2. Variables exhibiting differences in the magnitude of a medium effect size or larger were identified for inclusion in Sample 2 analyses.

Sample 2—A logistic regression was used to evaluate the association between independent variables and risky sexual behaviors. Variables identified as potential risk factors in Sample 1 (based on a medium effect size estimate or larger) were examined (see below). Stepwise regression with forward entry was used due to high correlations among some of the

hypothesized predictors and to take a conservative approach to the examination of multiple predictors.

RESULTS

Sample 1

Of the 28 participants including in this analysis, 18 reported no sexual behavior in the past 30 days and ten reported the presence of sexual HIV risk behavior. Of the variables examined, four exhibited group differences in the magnitude of a medium effect size or larger. Participants endorsing sexual risk behavior in the past month were younger (mean difference = 8.6 years, $t[26] = 2.31$, $p < .05$, $d = 0.90$), had lower anxiety sensitivity (mean difference = 11.3, $t[24] = 2.10$, $p = .05$, $d = 0.86$), higher sensation seeking (mean difference = -3.21, $t[20] = -1.60$, $p = .12$, $d = 0.72$), and were more likely to be male ($\chi^2 = 5.60$, $p < .05$, $d = 0.99$). These findings were consistent with trends in the literature, with the exception of anxiety sensitivity (which is typically a risk, not protective factor). Thus, these variables were then selected for inclusion in Sample 2.

Sample 2

Twenty-two (35%) participants reported engaging in sexual HIV risk behaviors in the previous 30 days. A linear regression was conducted, with age, sex, anxiety sensitivity, and sensation seeking as independent variables. In the regression, only age emerged as significant (OR = 0.95, $B = -0.06$, $SE = 0.03$, $p < .05$) and the model ($\chi^2 [1] = 4.41$, $p < .05$) predicted between 8.5% and 10% of the variance in risk behavior. For this association, risky sexual behaviors were associated with younger age. Effect size estimates for predictor variables in Sample 1 and Sample 2 are presented in Table 1.

To further examine the nature of this effect, quartiles were calculated for age and a one-way analysis of variance was used to test the association between age quartile and presence of sexual HIV risk behaviors. The model was significant ($F[3, 59] = 5.98$, $p < .01$) and post-hoc tests using Bonferroni correction indicated that the youngest quartile (age 21 to 30 years) was significantly more likely to engage in risk behaviors than the other three quartiles (all p s $< .01$). There were no significant differences among any of the other age groups. See Table 2.

DISCUSSION

In this study of sexual HIV risk behaviors among opioid-dependent patients failing to respond adequately to counseling and methadone maintenance treatment, we found that, despite considering a range of demographic, substance use, psychiatric, and personality variables, only age emerged as a significant correlate of sexual HIV risk behavior. Specifically, younger patients were significantly more likely to engage in risky sexual behaviors with the youngest 25% of the sample (ranging in age from 21 to 30 years) exhibiting the greatest likelihood to engage in risk behaviors. These results are consistent with previous studies of risk factors for risky sexual behavior (e.g., Beyez-Kashesya et al. 2011); however, results with respect to age have been mixed, with other studies reporting no association or the opposite association (e.g., Reynolds et al. 2010; Towe et al. 2010).

Several variables that have been related to risky sexual behaviors in other studies did not emerge as significant in this group of opioid-dependent patients receiving methadone maintenance treatment, such as education and psychiatric symptoms (e.g., Towe et al. 2010; Klein, Elifson & Sterk 2008). Given that this sample consisted of a group of polydrug users, it represents a group that already possesses a significant risk factor for engaging in sexual HIV risk behaviors. Thus, it is not surprising that some of the hypothesized variables did not

yield additional risk of engaging in these behaviors, as the incremental prediction of these variables in a treatment-refractory population may have been minimal.

In addition, results did not provide support for an association between personality variables such as sensation seeking and anxiety sensitivity. There are several potential explanations for this finding. First, this may be due to the elevation of such factors in a severe substance-dependent sample, such that the incremental effect of variation at the high range of these variables is minimal. Second, this population is also somewhat unique given the side effects of methadone. Among these is a loss of sexual interest and sexual dysfunction, at least in men (Hallinan et al. 2008; Brown et al. 2005; Steer, Beck & Shaw 1985). Thus, the risk and protective factors for risky sexual behaviors may be somewhat unique in this group that has a diminished sexual drive. It is important to note that despite this, more than one-third of the sample (36% in Sample 1 and 35% in Sample 2) still reported currently engaging in risky sexual behaviors, suggesting that the loss of libido is—at most—partially protective from engaging in these behaviors. Given evidence for greater sexual dysfunction among older men undergoing methadone maintenance (Hallinan et al. 2008; Brown et al. 2005), our results for sexual risk behaviors appear to parallel findings for sexual interest and ability.

These results have important implications for interventions to reduce HIV risk in this population. Although methadone maintenance treatment has been shown to reduce HIV risk due to injection drug use, evidence for decreases in sexual HIV risk behavior with drug abuse treatment is mixed (Gowing et al. 2008). Thus, subgroups of opioid-dependent patients who also engage in sexual HIV risk behavior may benefit from interventions targeted to reducing these behaviors. Specifically, the results of this study suggest that younger patients may be a particularly important group for targeted intervention for sexual HIV risk behavior.

This study has several limitations. This sample was a severe, treatment-resistant group, and thus the generalizability of these results to other substance abusing groups is unclear. However, given that methadone maintenance therapy is a commonly used treatment for opioid dependence, and that this severe group is at particular risk for HIV transmission, the identification of risk factors specific to this population is important. Additionally, the measures used to assess risky sexual behavior did not take into account the temporal association between using substances and having sex (i.e., taking drugs immediately before sex) or whether or not participants were in mutually monogamous relationships. Additionally, data were self-reported and it is possible that subjects underreported behaviors due to social desirability bias or experienced problems of recall that could have impacted the data provided. Information was collected under strictly confidential circumstances and by trained study staff. Participants were asked about the gender of sexual partners, but were not asked about their sexual orientation and thus we were unable to examine this as a covariate. Due to very low rates of endorsing engaging in sexual behaviors with members of the same sex (<5% of the total sample), this was not included in analyses. Examination of the reliability of this finding across sexual orientations is needed. Finally, the relatively small sample size limited the ability to detect significant associations among the variables, particularly given the use of a dichotomous characterization of risky sexual behaviors.

In summary, younger age emerged as a potential risk factor for risky sexual behaviors in this sample of opioid-dependent patients receiving methadone maintenance treatment. Given some inconsistency with previous findings, risk and protective factors may be unique in the population of treatment-resistant polydrug-abusing patients. The identification of factors correlated with risky sexual behaviors is relevant clinically, as such factors could be used to identify patients at greater risk for engaging in these behaviors for intervention and to target risk factors that may be modified with treatment. Future research to replicate these findings

and to identify interventions for reducing risky sexual behaviors in this population is needed to inform such clinical applications. In this population, working with younger patients with HIV risk reduction interventions may be of particular importance.

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TABLE 1

Effect Size (Cohen's d) Estimates of the Association between Risk Behavior and Predictor Variables

	Sample 1 (<i>n</i> =28)	Sample 2 (<i>n</i> = 63)
Age	0.90	0.59
Gender	0.99	0.32
Anxiety Sensitivity	0.86	0.04
Sensation Seeking	0.72	0.06

TABLE 2

Sexual HIV Risk Behaviors in the Past 30 Days by Age Group

% Engaging in Risk Behavior	
21–30 Years	77%
31–38 Years	27%
39–46 Years	25%
47–64 Years	20%

Note. Age ranges correspond with sample quartiles.