Published in final edited form as:

Subst Use Misuse. 2011 ; 46(14): 1716–1725. doi:10.3109/10826084.2011.611960.

Depressive Symptoms, Substance Use and HIV-Related High Risk Behaviors among Opioid-Dependent Individuals: Results from the Clinical Trials Network

Daniel Pilowsky, M.D., M.P.H.,

Epidemiology at Columbia University, 722 West 168th St., NY, NY 10032; Phone 212-3046554

Li-Tzy Wu, Sc.D.,

Department of Psychiatry and Behavioral Sciences, School of Medicine, Duke University Medical Center, Durham, NC 27710, USA

Bruce Burchett, Ph.D.,

Department of Psychiatry and Behavioral Sciences, School of Medicine, Duke University Medical Center, Durham, NC 27710, USA

Dan G. Blazer, M.D., Ph.D., and

Department of Psychiatry and Behavioral Sciences, School of Medicine, Duke University Medical Center, Durham, NC 27710, USA

Walter Ling, M.D.

Department of Psychiatry and Behavioral Sciences, NPI/Integrated Substance Abuse Programs, David Geffen School of Medicine, University of California, Los Angeles, CA 90025, USA

Daniel Pilowsky: dp14@columbia.edu

Abstract

The sample included 343 opioid-dependent adults enrolled in two national multisite studies of the National Drug Abuse Treatment Clinical Trials Network (CTN001-002). Opioid-dependent individuals were recruited from 12 sites across the United States from January 2001 to July 2002. We examined associations between depressive symptoms, co-occurring substance use (i.e. the use of substances other than opioids), and HIV-related sexual and injection risk behaviors. Data were collected using the Addiction Severity Index (ASI) and the HIV Risk Behavior Scale, and analyzed using linear regression. Depressive symptoms were associated with an increased level of injection risk behaviors, but were not associated with risky sexual behaviors. The co-occurring use of amphetamines also increased the likelihood of risky sexual behaviors. The study limitations and clinical implications are noted. The study was funded by the U.S. National Institute on Drug Abuse.

INTRODUCTION

Opioid-dependent individuals have a high prevalence of depression. According to a literature review, current rates of major depression are approximately 15% among patients with opioid dependence (Strain, 2002). These data are similar to those found in other US and Canadian studies (Maddux, Desmond, & Costello, 1987; Romach, Sproule, Sellers, Somer, & Busto, 1999). An Australian study that included heroin-dependent individuals entering

Corresponding Author: Daniel Pilowsky, M.D., M.P.H, Epidemiology at Columbia University, 722 West 168th St., NY, NY 10032; dp14@columbia.edu; Phone 212-3046554.

Ethical Approval: This work was approved by the Duke University Institutional Review Board.

treatment and not in treatment found that the prevalence of major depression was 23% and 16% in the treatment and non-treatment groups, respectively (Teesson et al., 2005).

Several studies that used community samples of adolescents and young adults have found associations between depressive symptoms and one or more risky sexual behaviors (Brown et al., 2006; Khan et al., 2009; Lehrer, Shrier, Gortmaker, & Buka, 2006; Rubin, Gold, & Primack, 2009; Shrier, Harris, Sternberg, & Beardslee, 2001). Others have reported such associations in specific populations, such as men who have sex with men (Perdue, Hagan, Thiede, & Valleroy, 2003), and syringe exchange site attendants (Perdue et al., 2003), among other populations considered in the literature. However, results are not consistent (Crepaz & Marks, 2001; Kalichman & Weinhardt, 2001).

Several studies have reported associations between depressive symptoms and injection drug use, as well as injection risk behaviors (Latkin & Mandell, 1993; Mandell, Kim, Latkin, & Suh, 1999; Perdue et al., 2003; Plotzker, Metzger, & Holmes, 2007; Stein, Solomon, Herman, Anderson, & Miller, 2003; Williams & Latkin, 2005). These associations appear to be more consistent but have not received nearly as much attention as the putative association between depression and sexual risk behaviors.

Drug abuse itself is associated with HIV-related risky behaviors in several ways. First, drug abusers are more likely to engage in sexual risk behaviors than non-drug abusers (Brewer, Zhao, Metsch, Coltes, & Zenilman, 2007; Neaigus, Miller, Friedman, & Des Jarlais, 2001; Steffanie A. Strathdee & Sherman, 2003). Second, injection drug users (IDUs) often engage in injection risk behaviors, such as sharing needles with fellow IDUs without cleaning them with bleach (Des Jarlais, Braine, Yi, & Turner, 2007; Page et al., 2006), and some non-IDUs are at high risk of progressing to injection drug use (Arria, Fuller, Strathdee, Latkin, & Vlahov, 2002; Fuller et al., 2002; Sherman et al., 2005), thus increasing their risk of becoming HIV-infected.

Because all study participants used and were dependent on heroin/opioids, the role of these substances could not be examined. However, the rich data that the National Drug Abuse Treatment Clinical Trials Network (CTN) gathered using rigorous study designs enabled us to examine the prevalence of co-occurring substance use for multiple substances, and control for the effect of co-occurring substance use when assessing the effect of depressive symptoms among study participants.

The present study focuses on associations between current depressive symptoms and (1) sexual risk behaviors; and (2) injection risk behaviors, as reflected in summary scores for these behaviors (see Methods), among treatment-seeking opioid-dependent adults participating in two U.S. national trials that assessed the effectiveness of two methods for opioid detoxification (Ling et al., 2005). We also examined whether the following variables were associated with an increased likelihood of sexual and injection risk behaviors: (1) symptoms of anxiety, which are often associated with depression; and (2) non-specific indicators of mental health problems (e.g. medication treatment of these problems) in order to ascertain whether any associations between depressive or anxiety symptoms and these behaviors might be attributed to the overall non-specific impact of mental health problems.

We hypothesized that current depressive symptoms would be associated with current sexual and injection risk behaviors; and that the associations would remain statistically significant after considering the effect of co-occurring substance use and other potential confounders. While injectable drugs could be associated with sexual risk behaviors, any association between injecting substances and injection risk would be tautological (i.e. injecting substances is often a source of injection risk behaviors).

2. METHODS

2.1 Data source/Treatment Program

Data are from the National Drug Abuse Treatment Clinical Trials Network. These clinical trials assessed the effectiveness of buprenorphine–naloxone and clonidine for opioid detoxification (Ling et al., 2005). The Clinical Trials Network (CTN) currently includes 13 nodes based in research centers that are allied with substance abuse treatment providers in 39 sites across the United States and Puerto Rico. The National Institute on Drug Abuse (NIDA) initiated the National Drug Abuse Treatment Clinical Trials Network with the stated purpose of facilitating the translation of science-based treatments for addictive disorders into community-based treatment settings (Tai, Sparenborg, Liu, & Straus, 2011). All data used to prepare this report was gathered at baseline, i.e. before the initiation of addiction treatment. Briefly, after the baseline assessment patients received standard counseling, as practiced in each program, and were randomly assigned to 13-day detoxification with buprenorphine–naloxone or with clonidine. Participants received \$25 in gift certificates for completing the screening interview. All medications and counseling services were provided free of charge to participants during detoxification. Programs were located in eastern, southeastern, midwestern, or western regions of the United States. The Duke University Institutional Review Board approved use of these data for this study, and written participant consent was obtained.

2.2 Sample

Eligible patients were treatment-seeking adults aged 18 years or older who met *Diagnostic and Statistical Manual, Version IV* (DSM-IV) criteria for opioid dependence and required medical management for opioid withdrawal. Inpatients (N=113) were recruited from six programs located in eastern, southeastern, midwestern, or western regions of the United States (CTN 001) from 26 February 2001 to 30 July 2002; outpatients (N=230) were recruited from six programs located in eastern, midwestern, or western regions of the United States (CTN 002) from 9 January 2001 to 26 February 2002 (Ling et al., 2005). Eligible patients included treatment-seeking adults aged 18 years or older who met DSM-IV criteria for opioid dependence and were in need of medical management for opioid withdrawal.

Exclusion criteria were: (1) a serious medical or psychiatric condition that would put patients at increased risk for serious adverse events (e.g., suicidal behavior necessitating admission to a psychiatric facility, uncontrolled diabetes); (2) had a known allergy or sensitivity to buprenorphine, naloxone, or clonidine; (3) were receiving medications contraindicated with clonidine or had a systolic blood pressure <100 mm Hg or pulse <56 beats per minute; (4) recent (past 30 days) enrollment in a methadone treatment program or participation in another investigational drug study; and (5) being unable to remain in the area for the duration of active treatment. Dependence on other drugs (e.g., cocaine, alcohol, stimulants and depressants) did not exclude individuals from participation unless immediate medical attention was required to manage these disorders because excluding these individuals would diminish the generalizability of study findings by selecting individuals that are different from those typically seeking community based treatment in the U.S., i.e. it would exclude those using or dependent on multiple drugs of abuse (Ling et al., 2005). Pregnant or lactating women were excluded, and female participants were required to have a negative pregnancy test prior to randomization.

2.3 Study variables

Demographic variables included age at study intake, gender, race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, and other [Asian or Native American]), years of

education, marital status, employment status, and personal income in the past 30 days (from legal sources [employment, welfare, pension, family members] and any illegal sources).

Mental Health variables—The following categorical mental health variables (yes/no) were considered in this study: depressive symptoms, anxiety symptoms, and suicidal ideation/attempts. These variables were part of the Psychiatric Domain of the Addiction Severity Index (ASI)—a standardized clinical interview widely used to assess substance use-related problems (McGahan PL, 1982; McLellan et al., 1985).

Depressive Symptoms—Individuals were considered to have current symptoms of depression if they answered affirmatively a question that lists salient depressive symptoms associated with impaired daily functioning. The respondent was told that the following question referred to the preceding 30 days: “Have you had a significant period of time, (that was not the direct result of drug or alcohol use), in which you have experienced serious depression-sadness, hopelessness, lost of interest, difficulty with daily function?”. Because current depressive symptoms were ascertained using a single question from the ASI, we examined associations between depressive symptoms and other variables that are part of the depressive syndrome (e.g. suicidal ideation/attempts), or are expected to be associated with depression (see Results).

Suicidal ideation/attempts—Suicidal ideation/attempts were considered present when an individual responded affirmatively to *either or both* of the following ASI questions in reference to the preceding 30 days: (1) “Have you had a significant period of time, (that was not the direct result of drug or alcohol use), in which you have experienced serious thoughts of suicide?” (Interviewer guidance: “patient seriously considered a plan for taking his/her life”); (2) “Have you had a significant period of time, (that was not the direct result of drug or alcohol use), in which you have attempted suicide?” (Interviewer guidance: “include actual suicidal gestures or attempts”).

Anxiety Symptoms—These symptoms were ascertained by asking the following ASI question in reference to the preceding 30 days: “Have you had a significant period of time, (that was not the direct result of drug or alcohol use), in which you have experienced serious anxiety/tension-uptight, unreasonably worried, inability to feel relaxed?”.

SF-36—The SF-36 is a reliable and valid subject-administered instrument, and it measures health-related quality of life in physical and social functioning, psychological distress, pain, role limitations due to physical health or emotional problems, vitality (energy or fatigue), and general health perceptions. The scale has acceptable reliability (C. A. McHorney, Ware, Lu, & Sherbourne, 1994) and validity (Colleen A. McHorney, Ware, & Raczek, 1993). The SF-36 was used in this study to support the validity of the “depressive symptoms” categorical variable by examining associations between this variable and SF-36 variables expected to correlate with depressive symptoms (see Results).

HIV risk—HIV-related risky behaviors were examined using the HIV Risk Behavior Scale (HRBS), an instrument with demonstrated reliability and construct validity among drug users (Darke, Hall, Heather, Ward, & et al., 1991; Petry, 2001). This questionnaire assesses sexual and injection risk behaviors in the preceding month. It includes the following sexual risk behaviors: number of sexual partners, condom use (separately asked for regular, casual, and commercial partners), number of anal sex episodes, and use of condoms during these episodes; as well as the following behaviors associated with injection risk: frequency of injection drug use, needle sharing episodes, number of individuals who have used a needle before and after the interviewee, needle cleaning overall and with bleach. Responses to each

item were coded on a six-point scale (0–5), with higher scores associated with more risky behaviors. Associations between depression and two summary scores, reflecting sexual and injection risk behaviors, were examined. Consistent with prior research, the individual items of the HRBS were summed to create a sexual and an injection risk score (Petty, 2001).

Substance Use—Questions on current (past-month) substance use are from the ASI. They were examined to determine specific substance use, including nicotine/tobacco products, alcohol, heroin, other opioids, sedatives/tranquilizers, marijuana, inhalants, hallucinogens, cocaine, and amphetamines. Because very few patients used hallucinogens or inhalants (less than 1%), they were not examined in the subsequent analysis.

2.4 Interview Administration

The ASI was administered by trained interviewers. SF-36 are self-reports.

2.5 Data Analysis

First, we determined whether patients' demographic characteristics, suicidal ideation/attempts, and SF-36 variables differed significantly by depression status using χ^2 test for proportions and t-test for continuous variables. Next, we conducted a series of unadjusted linear regression analyses to examine the association of injection risk scores with depression, other mental health characteristics, and substance use variables, respectively. Similar unadjusted linear regression analyses were conducted to determine the association of sexual risk scores with depressive symptoms, other mental health characteristics, and substance use variables, respectively. In the next step, we examined whether the association between injection risk scores and depressive symptoms, as well as the association between sexual risk scores and these symptoms, were influenced by demographic variables, including gender, race/ethnicity, age, education, employment, and marital status as control variables. Finally, we estimated whether depressive symptoms were associated with injection risk scores even after controlling for demographic and other substance use variables. To reduce the chance of false positive associations, only substance use variables associated with HIV risk scores ($p < 0.05$) from the prior analysis were examined in the final adjusted analysis. Because sexual risk was not associated with depressive symptoms in these analyses, it was not included in the final analysis.

3. RESULTS

3.1 Demographic characteristics by depression status (Table 1)

As shown in Table 1, there were no differences in demographic characteristics of individuals with and without depressive symptoms except that there were more African-American in the non-depressed group than in the group with depressive symptoms (37.0% vs. 18.6%, $p < 0.001$), while there were more Hispanics in the group with depressive symptoms than those in the non-depressed group (31.0% vs. 14.8%, $p < 0.001$). Among the subjects participating in this study, 61.9% were current injection drug users (IDUs) (70.5% among subjects with depressive symptoms vs. 57.6% among subjects without these symptoms; χ^2 [df=1], $p = 0.021$) (data not shown).

3.2 Mental health and SF-36 subscales by depression status (Table 2)

As shown in Table 2, individuals with depressive symptoms were more likely to report suicidal ideation/attempts than those without these symptoms (12.4% vs. 1.7%; $p < 0.001$). Similarly, all SF-36 subscale scores (except physical functioning) were significantly associated with the presence of depressive symptoms in the expected direction.

3.3 Regression analysis of HRBS injection and sexual risk scores (Table 3)

As shown in Table 3, with one exception, none of the variables examined was associated with sexual risk behaviors. Users of non-injected amphetamines, compared to non-users, were more likely to engage in sexual risk behaviors (adjusted $\beta=0.68$; $SE=0.29$; $p=0.018$). Injecting cocaine and amphetamines (vs. not injecting) was associated with increased injection risk, but this finding is tautological, i.e. injecting a substance is intrinsically associated with injection risk. These variables were considered in order to estimate their impact on sexual risk behaviors, and none was evident.

Depressive and anxiety symptoms were associated with an increased likelihood of injection risk behaviors. However, after adjusting for potential confounders (demographic variables), only depressive symptoms remained associated with an elevated likelihood of engaging in these behaviors. Experiencing depressive symptoms increased the likelihood of injection risk behaviors (adjusted regression coefficient=0.27; $p=0.043$). Because the distribution for HRBS injection risk in this sample is 1–27 units, this represents a modest but statistically significant increase of injection risk behaviors.

Last, we modeled the likelihood of engaging in injection and sexual risk behaviors (Table 4). Although statistically significant, comparisons of injecting vs. not injecting substances are not shown in Table 4 because the findings referred only to injection risk and were tautological as explained above. The model included all demographic variables, depressive symptoms (as a categorical yes/no variable), as well as substance use variables shown to be associated ($p < 0.5$, adjusted linear regression, Table 3) with injection or sexual risk. Depressive symptoms remained significantly associated with an increased likelihood of injection risk behaviors (adjusted $\beta=0.25$; $p=0.039$), and non-injecting amphetamine use remained significantly associated with an increased likelihood of engaging in sexual risk behaviors (adjusted $\beta=0.68$; $p=0.019$).

4. DISCUSSION

Study findings suggest that depressive symptoms were associated with an increased likelihood of injection risk behaviors among treatment-seeking opioid-dependent users, even after adjusting for a wide range of potential confounders. Furthermore, this association was independent of co-occurring substance use (cocaine and amphetamine use). These findings concur with those reported in a large community sample ($N=499$) of IDUs (Mandell et al., 1999). In their study, a greater number of depressive symptoms was positively associated with needle sharing, including the sharing of needles that had and had not been cleaned with bleach (Mandell et al., 1999). This relationship remained significant (odds ratio [OR]=1.66) after adjusting for multiple potential confounders, and the authors suggested that depressive symptoms are a predisposing factor for needle-sharing behavior. Similarly, depressive symptoms were one of several factors associated with injection risk behaviors in a sample of IDUs receiving methadone treatment ($N=152$) (Kang & De Leon, 1993). Even in a setting with adequate accessibility to sterile needles, depressed injection drug users were more likely to share needles than their non-depressed counterparts (S. A. Strathdee et al., 1997).

How depressive symptoms may predispose individuals to engage in injection risk behaviors? In a community sample of adolescents, hopelessness was found to mediate the association between depressive symptoms and health-related risk taking (Testa & Steinberg, 2010). Furthermore, increased levels of depression may be associated with suicide attempts among heroin users (Chen et al., 2010). Not caring about injection risk behaviors may reflect indifference to the possibility of harming oneself. Using potentially infected needles is a risk-taking behavior that is not associated with thrill seeking, but instead with hopelessness

and despair. Although a speculative formulation, it is based on the literature pointing to an elevated risk of suicide attempts among heroin users (Chen et al., 2010).

Others have focused on the antecedents of depression among injection drug users. For example, Strathdee et al. found an association between depression and needle sharing but this association was not independent of prior sexual abuse (S. A. Strathdee et al., 1997). Thus, depression and its antecedents are likely to be associated with a heightened needle risk through either direct or indirect pathways. For example, sexual abuse in childhood may increase risk for depression, and depression may heighten risk for injection risk behaviors. Another path may include the association between early adversity and alcohol dependence (Pilowsky, Keyes, & Hasin, 2009), and between alcoholism and HIV-related risk behaviors (Newville & Haller, 2010).

Contrary to expectations, neither depressive nor anxiety-related symptoms were positively associated with an increased likelihood of risky sexual behaviors. Because depressive symptoms have been associated with sexual risk behaviors in previous studies, this null finding deserves further consideration. Several studies reported associations between depression and sexual risk behaviors in community-based samples (Brown et al., 2006; Khan et al., 2009; Kosunen et al., 2003; Lehrer et al., 2006; Rubin et al., 2009; Shrier et al., 2001). Their risk profile may differ from that of drug users. Furthermore, this association is not well established in other population subgroups. A meta-analysis that included studies that focused on a variety of populations, such as men having sex with men, patients from alcohol treatment centers, and untreated substance abusing samples, found little evidence that negative affect (a construct that includes depressive symptoms, anxiety, and anger) was associated with sexual risk behaviors. A recent longitudinal study, however, found an association between depression and having sex with multiple partners (Williams & Latkin, 2005) (OR=1.55; 95% confidence interval [CI]: 1.12, 2.14), with IDUs (OR=1.57; 95% CI: 1.11, 2.2), and with crack users (OR:1.37; 95% CI: 1.02, 1.86). Participants were street-recruited drug users (Williams & Latkin, 2005). In contrast, we examined treatment-seeking individuals who are often different from those not seeking treatment, e.g. the number of comorbid psychiatric disorders is often different, with a higher prevalence of comorbid disorders among those seeking treatment (Cohen & Cohen, 1984; Hasin, Stinson, Ogburn, & Grant, 2007). Treatment-seeking IDUs might also be less impulsive than those not seeking treatment, and therefore less likely to engage in risky sexual behaviors, even when depressed. Although speculative, this is an intriguing possibility.

The literature includes studies that do and do not support an association between depression and sexual risk behaviors (Crepaz & Marks, 2001). According to the DSM-IV, depressive symptoms are associated with difficulties in sexual functioning in some individuals (e.g., anorgasmia in women, erectile dysfunction in men, or a decrease of sexual desire in both genders), and these difficulties may account for the decrease of risky sexual behaviors found in some studies. Additionally, depression is often associated with hopelessness and a lack of care for one's own survival. This feature of depression may account for the reported increase of injection and sexual risk behaviors among depressed individuals. Several other features of depression may be associated with increased or decreased sexual risk behaviors, such as taking action to relieve depression through sexual excitement, or depressed individuals assigning a greater weight to potential risks, compared to their non-depressed counterparts (Crepaz & Marks, 2001). Thus, associations between depression and risky sexual behaviors might hinge on which features of depression predominate in a given case.

We also examined the effects associated with the use of substances other than heroin/opioids. Among these substances, only the co-occurring use of non-injecting amphetamines was found in the final model to be positively associated with risky sexual behaviors. Several

studies have found that amphetamines, and especially methamphetamine, are positively associated with risky sexual behaviors among IDUs and non-IDUs (Centers for Disease & Prevention, 2006; Koblin et al., 2007). While the proportion of amphetamine users who used methamphetamine cannot be determined from the CTN data, large-scale addiction treatment data in the United States have estimated that more than 90% of treatment-seeking amphetamine users use methamphetamine (Substance Abuse and Mental Health Services Administration, 2004).

Several limitations are noteworthy. This is a treatment-seeking sample and the findings reported here are not necessarily generalizable to opioid-dependent individuals in the community, including the many out-of-treatment drug users. Another limitation is the ascertainment of depressive symptoms using a single question from the ASI. We sought to support its validity by examining associations with suicidal ideation/attempts, with eight subscales of the SF-36, and with an SF-36 question specifically measuring depressive symptoms (“down in the dumps”). These analyses consistently showed that participants reporting depressive symptoms were clearly distinct from participants not reporting these symptoms, when these measures were used to compare them. Nevertheless, we do not know to what extent the answer to a single question reflects depression, a complex construct that includes multiple psychological and somatic indicators. Recall bias is a minor limitation because these data are based on reports of recent events. Last, associations reported here are not necessarily causal due to the cross-sectional nature of the data.

Notwithstanding the above limitations, the multisite Clinical Trials Network has noteworthy strengths. Participants were recruited from 12 major treatment programs across the US, and therefore the sample is more likely to be representative of US treatment-seeking opioid-dependent individuals than participants in single site studies. Across sites participants were assessed using the same standardized instruments (e.g., HIV Risk Behavior Scale, SF-36, ASI) with demonstrated validity and reliability in treatment samples.

Conclusions and Clinical Implications

Depressive symptoms were independently associated with an increased level of injection risk behaviors among American treatment-seeking opioid-dependent individuals. We do not know to what extent these findings are applicable to opioid-dependent individuals who are not seeking treatment and to those treated in other countries. Although the increased likelihood of injection risk associated with depressive symptoms was modest, all factors associated with an increased HIV risk are important given the severity of this condition. Furthermore, depression is a potentially modifiable factor, i.e. depression can and often is successfully treated (Balon, 2006; Kennedy, 2005). Thus, treatment of depression can make a contribution to decreasing injection risk among opioid-dependent IDUs, especially if combined with other risk-reduction interventions. This study also revealed that non-injecting amphetamine use was independently associated with sexual risk behaviors among opioid-dependent individuals.

Acknowledgments

Data analysis and preparation of this paper was supported primarily by research grants R21DA027503, R33DA027503, R01DA019623, and R01DA019901 (PI: Li-Tzy Wu) from the U.S. National Institute on Drug Abuse of the National Institutes of Health and in part by U10 DA013045 (PI: Walter Ling) and HHSN271200522071C (PI: Dab G. Blazer). The sponsoring agency had no further role in the study design and analysis, the writing of the report, or the decision to submit the paper for publication. The opinions expressed in this paper are solely those of the authors. The authors thank study participants, as well as CTN staff and investigators who contributed to the original studies.

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Table 1

Demographic characteristics of adult patients entering opiate detoxification treatment¹ according to depression status (N=343)

Sample Size N	Overall N 343	Depressed 113	Non-Depressed 230	χ^2 (df)	P-value
Gender					
Male	233	67.3 (4.4)	68.3 (3.1)	0.04 (1)	0.85
Female	110	32.7 (4.4)	31.7 (3.1)		
Race/Ethnicity					
White	155	46.0 (4.7)	44.8 (3.3)	0.04 (1)	0.82
Black	106	18.6 (3.7)	37.0 (3.2)	12.00 (1)	<0.001
Hispanic	69	31.0 (4.4)	14.8 (2.3)	12.40 (1)	<0.001
Other	13	4.4 (1.9)	3.5 (1.2)	0.18 (1)	0.67
Age in years					
18–39	177	57.5 (4.7)	48.7 (3.3)	2.36 (1)	0.12
40 +	166	42.5 (4.7)	51.3 (3.3)		
Education in years					
0–12	206	61.1 (4.6)	59.6 (3.2)	0.07 (1)	0.79
13+	137	38.9 (4.6)	40.4 (3.2)		
Marital Status					
Married	94	27.4 (4.2)	27.4 (2.9)	0.01 (1)	0.99
Separated/divorced./widowed	89	30.1 (4.3)	30.1 (2.8)	1.50 (1)	0.22
Never married	160	42.5 (4.7)	42.5 (3.3)	1.20 (1)	0.28
Employment past month					
Employed	169	50.4 (4.7)	48.7 (3.3)	0.09 (1)	0.76
Not-employed	174	49.6 (4.7)	51.3(3.3)		
Past-month legal income					
	342	1304.1	1541.2	0.64	0.52

Sample Size N	Overall N 343	Depressed 113	Non-Depressed 230	χ^2 (df)	P-value
Mean (SD) ²		% (SE) (1503.5)	% (SE) (3794.7)		
Past-month illegal income	341	467.9 (1371.8)	386.9 (1278.5)	0.52	0.60
Mean (SD) ²					

SE: standard error; SD: standard deviation.

¹ At baseline, before the initiation of detoxification treatment.

² T-test; there was 1 participant with missing data on past month legal income; there were 2 participants with missing data on past month illegal income.

Table 2

Association between depression status¹, suicidal ideation/attempts, and SF-36 variables among adult patients entering opiate detoxification treatment² (N=343)

Variable	Depression ¹	Non-Depression ¹	χ^2 (DF) P-value
	n=113	n=230	
Suicidal ideation/attempts	12.4	1.7	17.28 (1) <0.001
SF-36 quality-of-life scores³	Mean (SE)	Mean (SE)	P-value, t-test
Physical functioning	80.3 (2.2)	84.7 (1.4)	0.097
Role limitation due to physical health	43.6 (4.0)	65.1 (2.7)	<0.001
Role limitation due to emotional problems	38.1 (4.0)	62.6 (2.9)	<0.001
Vitality/energy	38.3 (2.0)	47.8 (1.4)	<0.001
Emotional well-being	46.8 (1.7)	59.6 (1.4)	<0.001
Social functioning	49.5 (2.4)	64.9 (1.8)	<0.001
Pain	55.1 (2.6)	68.1 (1.7)	<0.001
General health	55.0 (1.9)	61.1 (1.4)	0.010
Down in the dumps	3.87 (0.1)	4.55 (0.1)	<0.001

SE: standard error.

¹Depression Status: The term “Depression” refers to the presence of symptoms of depression as evidence by an affirmative answer to the following question in reference to the last 90 days: “Have you had a significant period of time, (that was not the direct result of drug or alcohol use), in which you have experienced serious depression-sadness, hopelessness, lost of interest, difficulty with daily function?” Non-depressed” means that these symptoms were not present, i.e. the above question was answered negatively.

²At baseline, before the initiation of detoxification treatment.

³Higher SF-36 scores are indicative of better functioning in that domain., e.g. a pain score of 68.1 indicates less reported pain than a score of 55.1

Table 3

Associations of injection and sexual risk behaviors according to mental health and substance use status among adult patients entering opiate detoxification treatment¹ (N=343)

Covariates	Unadjusted linear regression				Adjusted linear regression ²			
	Injection risk ³	Sexual risk ⁴	P		Injection risk ³	Sexual risk ⁴	P	
Regression coefficient	Estimate (SE)	Estimate (SE)	P		Estimate (SE)	Estimate (SE)	P	
<i>Mental health</i>								
Current depression	0.39(0.13)	0.003	0.003	0.345	0.27(0.13)	0.043	0.043	0.712
Current anxiety	0.27(0.13)	0.033	0.033	0.078	0.07(0.13)	0.567	0.567	0.316
Current medication for mental health	-0.03(0.22)	0.904	0.904	0.165	-0.13(0.22)	0.549	0.549	0.127
Past treatment for mental health problems	-0.02(0.14)	0.904	0.904	0.560	-0.13(0.14)	0.384	0.384	0.813
<i>Current substance use</i>								
Alcohol use	-0.06(0.16)	0.710	0.710	0.982	-0.10(0.16)	0.548	0.548	0.819
Cocaine:	-0.21(0.14)	0.125	0.125	0.472	-0.08(0.13)	0.521	0.521	0.209
non-injecting vs. none								
Cocaine:	1.06(0.16)	<0.001	<0.001	0.138	1.15(0.16)	<0.001	<0.001	0.101
injecting vs. none								
Amphetamines:	0.40(0.31)	0.202	0.202	0.020	0.15(0.31)	0.626	0.68(0.29)	0.018
non-injecting vs. none								
Amphetamines:	1.21(0.44)	0.006	0.006	0.791	1.10(0.43)	0.012	0.012	0.573
injecting vs. none								
Sedatives/tranquilizers ⁵	0.11(0.15)	0.461	0.461	0.151	-0.07(0.16)	0.637	0.637	0.159
Marijuana use	0.07(0.13)	0.601	0.601	0.601	0.01(0.13)	0.932	0.932	0.402
Hallucinogen use	-0.40(0.53)	0.452	0.452	0.466	-0.42(0.51)	0.408	0.408	0.288
Nicotine/tobacco use	0.34(0.18)	0.069	0.069	0.460	0.35(0.18)	0.051	0.051	0.707

SE: standard error.

¹ At baseline, before the initiation of detoxification treatment.

² Each model adjusted for gender, race/ethnicity, age, education, employment, and marital status.

³Based on the following behaviors included in the HIV Risk Behavior Scale (HRBS): frequency of injection drug use, needle sharing episodes, number of individuals who have used a needle before and after the interviewee, needle cleaning overall and with bleach.

⁴Based on the following behaviors included in the HRBS: number of sexual partners, condom use (separately asked for regular, casual, and commercial partners), number of anal sex episodes, and use of condoms during these episodes

⁵Since only one individual injected these substances, injecting use and non-injecting use were combined.

Table 4

Final Model: Injection and sexual risk behaviors among adult patients entering opiate detoxification treatment¹ (N=343)

Covariates	Injection Risk Behaviors		Sexual Risk Behaviors	
Adjusted linear regression ²	Regression coefficients (SE)	P-value	Regression coefficients (SE)	P-value
Current depression				
Yes vs. no	0.25(0.12)	0.039	0.04(0.12)	0.754
Cocaine				
Non-injecting use vs. none	-0.07(0.13)	0.625	-----	-----
Amphetamines				
Non-injecting use vs. none	0.05(0.29)	0.859	0.68(0.29)	0.019

SE: standard error.

¹At baseline, before the initiation of detoxification treatment.

²The adjusted linear regression model included gender, race/ethnicity, age, education, employment, and marital status, as well as the variables previously shown to be statistically significant (see Table 3).