Mental health in HIV seronegative and seropositive IDUs in South Florida

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Abstract

About one-third of HIV-infected people in the USA have a history of injection-drug use. Injecting drugs are a primary vector for HIV transmission. Drug and alcohol use are significant contributors to sexual transmission of the virus. In South Florida, urban injection-drug users (IDUs) represent a substantial population at risk for infection. Substance use management in this group is critical. As part of a larger study of at-risk populations in South Florida, we examined mental health differences among IDUs ($n = 117$), HIV seropositive IDUs ($n = 130$), and HIV seronegative non-IDUs ($n = 169$). We explored factors associated with depression and anxiety between groups, and found HIV seronegative and seropositive IDUs not receiving antiretroviral (ARV) treatment to have poorer overall mental health than both HIV seropositive participants on ARVs and non-IDU participants. Our data support systems enhancement to meet the various psychosocial and health care needs among IDUs and highlight the need for resource allocation to target community-based integrated mental health services in urban populations. In addition, our data underscore the need for primary and secondary HIV prevention interventions to address the drug-use risk behaviors among IDUs to reduce the likelihood of HIV infection and transmission in this population.

Keywords

HIV; IDU; urban; mental health; prevention

Introduction

When faced with stressful life conditions in an urban environment, individuals may resort to different coping strategies in order to preserve their mental health (Jackson, 2008). However, many of the behavioral coping strategies designed to reduce stress may then lead to physical health morbidities, e.g., heart disease, diabetes, obesity, as well as infectious diseases, e.g., HIV, sexually transmitted diseases, hepatitis. Such coping strategies may include the consumption of comfort (e.g., culture specific, usually simple, high carbohydrate) foods, use of alcohol, nicotine, substance use, and sex (Dallman et al., 2003; Jackson, 2008; Jackson,

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Covell, Drake, & Essock, 2007). Individuals engaging in these activities have the potential to become addicted to these behaviors, which may lead to negative physical, social, psychological, and occupational consequences. The psychological consequences of chronic substance use, e.g., depression, anxiety, addiction, are then associated with the exacerbation of negative health consequences such as HIV, accelerating morbidity and mortality (Cook et al., 2007; Ickovics et al., 2001).

Injection-drug use is a significant risk factor for HIV transmission. About one-third of HIV-infected people in the USA have a history of injection-drug use (Barash, Hanson, Buskin, & Teshale, 2007; Centers for Disease Control [CDC], 2003). A substantial proportion of the total adult population (1.4%) may be injection-drug users (IDUs; Lieb et al., 2004) and are at high risk of becoming infected with HIV and other blood-borne pathogens through sharing injection-drug equipment with HIV-infected persons or by engaging in unprotected sex. In outpatient settings, health care associated with injection-drug use does not appear to be adequately addressed (Lieb et al., 2004), resulting in increasing numbers of marginalized individuals who may have limited access to medical care. IDUs are more than twice as likely to have one or more emergency room visits annually and almost twice as likely to be hospitalized. Among those who are HIV seropositive, CD4 and viral load testing is half as likely to be performed for IDUs in the recommended six-month period (Lieb et al., 2004). IDUs are significantly more likely to have HIV-related morbidity and co-infection with other diseases, such as hepatitis C as well as mental illness (Bing et al., 2001). In South Florida, Miami IDUs were found to present with a late diagnosis of AIDS; 16.3% of IDUs were diagnosed within one month of death, in comparison with other HIV populations, such as men who have sex with men (MSM; 12.0% Florida Department of Health, IDU preliminary findings, 2007).

South Florida drug and alcohol users represent a substantial population at risk for infection (Latkin et al., 2008), and substance use prevention and management in this population is critical. A CDC (Centers for Disease Control and Prevention [CDC], 2001) survey found that 1.6% of high-school students in Miami had injected a drug at least once during their lifetime. Of those infected with HIV, approximately 14% are IDUs and 2% are MSM who are also IDUs. Given an HIV seroprevalence rate of 19% (Chitwood et al., 2000) there are approximately 23,700 IDUs in Miami, i.e., approximately 1.4% of the total Miami metropolitan population aged 18 years or older. Gender differences are apparent in Miami. Males are about 2.5 times more likely than females to be IDUs, meaning that the IDU population represents 2.0% of all males aged 18 years or older and 0.8% of all females aged 18 years or older (Lieb et al., 2004). Additionally, both HIV and IDU are associated with depression (Valverde et al., 2007) and brain neurotoxicity, and their coexistence may lead to increased dysfunction of brain metabolic processes (Georgiou et al., 2008).

IDUs in South Florida are most often minority group members (Institute of Medicine [IOM], 2004; Lieb et al., 2004) and most are socioeconomically disadvantaged. They have an increased likelihood of having co-morbid psychological disorders, e.g., major depression, anxiety, schizophrenia, as well as physical disorders, with low access to medical care and poor health literacy (Cook et al., 2007; Kutner, Greenberg, & Baer, 2005). An HIV diagnosis in this population confers an increased level of health care eligibility and substantial

medication management that is not available to those IDUs who are seronegative. This study examined mental health differences in both HIV seropositive and seronegative IDUs living in South Florida, and explored factors associated with mental health in these populations.

Methods

This study was drawn from two projects conducted among HIV seropositive and negative IDUs. Participants were recruited over a three-year period between 1 September 1999 and 31 March 2006; preliminary findings from these projects focused on neuropsychological functioning have been described in previous literature (Waldrop, Ownby, & Kumar, 2004; Waldrop-Valverde, Ownby, & Kumar, 2005). University of Miami, Miller School of Medicine IRB approval was obtained prior to the onset of the study.

Participants, HIV seropositive IDUs, HIV seronegative IDUs, and controls were residents of Miami-Dade county and were enrolled from the Miami community using an outreach program conducted from the downtown county hospital, Jackson Memorial/University of Miami, Miller School of Medicine Hospital. Most of the recruitment was done on the street using outreach workers who frequented IDU gathering places or was respondent recruited, in which participants referred others appropriate to the study. A total of 1144 potential participants were interviewed (58.5% male and 41.3% female), and 728 were found to be ineligible due to confounding medical history (9.1%), history of severe clinical depression or psychosis (10.6%), non-IDU (29.8%), post-completion of quota for group (1.4%), unable to read English or cooperate with instructions (1.4%), under or over age (<18 or > 60), dropped from the study (11.5%), failure to appear (11.1%), unknown HIV status (2.3%), declined to participate (0.5%), and multiple exclusion criteria met (22.3%). The majority of those screened were African American (67.8%), followed by Hispanic (15.8%), and non-Hispanic White (15.4%). Of those screened, 83% were unemployed while 16% reported regular or steady work. Eight percentage were aged in their 20s, 30% in their 30s, 43% in their 40s, and 16% in their 50s. Most had less than a high-school education (39.6%), 32% at least 12 years of education, and 26% had some post-secondary education. Eight percentage did not know their HIV status, 35% were HIV seropositive, and 56% were HIV seronegative.

HIV-positive participants were required to bring verification of their serostatus, and their serostatus was then verified using PCR amplicor method (Roche Diagnostics; the Clinical Immunology Laboratory in the Department of Medicine, the University of Miami School of Medicine) to detect peripheral plasma viral load. HIV-positive participants were free of any AIDS-defining symptoms at the time of the study. Verification of HIV seronegative status was not required.

Men and women in the injecting drug-use group were required to have injected drugs, i.e., heroin or cocaine, at least six times in a one-year period. All participants were interviewed using the Substance Use module of the Structured Clinical Interview for DSM-IV Axis I Diagnosis (SCID), through which a diagnosis of dependence or abuse using the SCID criteria was made. To qualify for the study as a control participant, the individual could have no current or past substance dependence, however, individuals with past substance abuse diagnoses were not excluded (if the substance abuse had been in remission for at least two

years). Individuals with a current substance abuse diagnosis who did not meet the criteria for injection-drug use were excluded from participation. All participants completed a comprehensive lifetime drug-use interview that detailed information about drug-use patterns with all forms of cocaine, opiates, including heroin, marijuana, anxiolytics, and amphetamines. All participants were required to have abstained from drugs and/or alcohol for at least 12 hours prior to the study, which was verified by self-report and urine toxicology screens. Participants found to be acutely intoxicated were rescheduled.

Measures

Profile of Mood States

(POMS; McNair, Lorr, & Droppleman, 1992) was used to measure transient fluctuating affective states. The measure is a standardized, 65-item, self-report adjective checklist which characterized participants' overall distress over the prior week using a five-point Likert rating scale using 65 words or phrases describing common feelings which are combined to yield six subscale scores; anxiety, depression, anger, vigor, fatigue, and confusion. The sum of the all subscales minus the vigor-activity subscale score yielded the total mood disturbance (TMD) score. The POMS has been validated to assess affective states and psychological adjustment in HIV patients.

Beck Depression Inventory

(BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) was used to assess depressive symptoms, and is a 21-item Likert type measure of symptoms experienced within the last week. Items are scored 0–3, with a possible maximum score of 63. The score for each item is summed to derive a total index of depressive symptoms. Total scores less than 10 are indicative of minimal depression; 10-18 is indicative of mild to moderate depression, 19-29 is indicative of moderate to severe depression and scores greater than 30 are suggestive of severe depression. Because the somatic items on the BDI, such as those related to loss of appetite, fatigue, sleeplessness, can be related to HIV, the items of the BDI were grouped into subscales of somatic (0–42) and non-somatic (0–21) content. For the purposes of this study, only the non-somatic scale is used for statistical comparisons on the level of depression.

Structured Interview Guide for the Hamilton Anxiety and Depression

(SIGH-AD; Hamilton, 1959, 1960) was used to provide clinical ratings of depression and anxiety and was used as a secondary distress outcome measures to supplement the POMS and the BDI. Values over 15 represent clinically significant levels of anxiety or depression, although a threshold score of 10 may indicate the possibility of subclinical, but relevant, levels of distress. Values are presented in organic and non-organic subscales due to symptoms of HIV, which may be interpreted as organic symptoms of depression. Anxiety and depression subscale scores are grouped as minimal 0–5, mild to moderate 6–10, moderate to severe 11–15, and severe > 15 (Shear et al., 2001; Williams, 1988, 1996).

Results

At the time of enrollment, participants provided informed consent and then completed a demographic assessment (see Table 1), as well as substance use, anxiety, depression, and cognitive functioning (see Table 2). Participants were identified based on their abuse of or dependence on heroin, cocaine/crack cocaine, marijuana, anxiolytics, and alcohol in the last week. Male ($n = 232$) and female ($n = 184$) participants were categorized in three groups: HIV-1 seropositive IDUs; HIV-1 seronegative IDUs; and HIV-1 seronegative non-IDUs. The majority of the HIV seronegative and seropositive IDUs reported poly-drug use, regular or dependent usage of at least two substances.

HIV seronegative IDUs reported significantly higher levels of depression and anxiety than both the HIV seronegative non-IDUs and the seropositive IDUs (see Table 2) on several measures. We reasoned that limited access to health care might account for the differences in psychological indices between serostatus groups among the IDU participants. From the subgroup of seropositive participants, we conducted an analysis of variance (ANOVA) comparing those receiving treatment with antiretrovirals (ARVs) with those not on treatment, and found that those on ARV treatment had lower levels of BDI non-somatic depression [$F(1, 115) = 3.56$, $p = 0.04$] in comparison with those not on ARVs, however, ARV treatment and treatment duration were not associated with measures of depression or anxiety. In contrast, when we compared those IDUs who were HIV seropositive and not receiving ARVs with those IDUs who were HIV seronegative, we found that those who were seropositive and seronegative reported similar levels of depression [$F(1, 148) = 0.972$, $p = 0.326$]. Among those participants identified as currently taking medication, there was no correlation between length of treatment with ARVs and level of reported depression (BDI non-somatic, $r = 0.145$, $p = 0.289$; BDI somatic, $r = 0.128$, $p = 0.354$). We also reasoned that dysphoria might arise from those attempting to control their drug use without adequate health care. In fact, we found that among HIV seronegative non-IDU participants, those currently in recovery from substance use reported higher levels of depression than those currently using drugs [$F(1, 157) = 6.568$, $p = 0.011$].

We then conducted an analysis of potential demographic covariates related to the BDI non-somatic depression score among those HIV seropositive and seronegative IDU participants not on ARV treatment. First, all potential covariates were examined in correlational analyses with each dependent variable (the alpha level for the correlations was 0.001 to adjust for multiple comparisons). No demographic variables (gender, age, race, years of education, employment, and HIV status) were found to have a significant relationship with depression. We then evaluated potential substance use covariates related to the BDI non-somatic depression score (amount, dependence, abuse, and abstinence rates for marijuana, heroin, crack-cocaine, anxiolytics, and alcohol) and found anxiolytic abuse ($r = 0.31$, $p < 0.001$) and dependence ($r = 0.355$, $p < 0.001$) and abstinence from heroin use ($r = -0.395$, $p < 0.001$) to be associated with depression. A linear regression was used to assess the relative weight of anxiolytics and heroin on depression. Heroin abstinence, which explained 0.01% of the variance ($R^2 = 0.01$, $p = 0.01$, $F(1, 142) = 8.8$, $p = 0.004$, was entered at Step 1, followed by anxiolytic dependence at Step 2, which accounted for an additional 17% ($R^2 = 17.2$, $p < 0.001$). Finally, we examined the correlation of the psycho-physiological factors of anger (r

= 0.691, $p < 0.001$), fatigue ($r = 0.645$, $p < 0.001$), confusion ($r = 0.669$, $p \quad 0.001$), and vigor ($r = -0.38$, $p < 0.000$) with the BDI non-somatic depression score, and added them to the model, following anxiolytic dependence and heroin abstinence. The total variance explained by the model as a whole was 61%, $F(4, 137) = 37.93$, $p < 0.001$. Anger, fatigue, confusion, and vigor accounted for 43% of the variance, $R^2 = 0.432$. In the final model, anxiolytic dependence, anger, and vigor were statistically significant, with anger recording a higher β value (β = 0.458, $p < 0.001$) than anxiolytics (β = 0.138, $p = 0.019$) or vigor (β = −0.19, $p = 0.002$).

Discussion

This study examined mental and physical health among seronegative IDUs, and compared them with seropositive and non-seronegative IDUs in urban South Florida. Seronegative IDUs were higher in depression, anxiety, and fatigue and lower in vigor than seropositive IDUs and higher in all measures of depression in comparison with seronegative non-IDUs. However, those seropositive IDUs on ARVs did not differ from seronegative IDUs in depressive symptoms, while those IDUs on ARVs were lower in depression than those not on ARVs, seronegative IDUs having the highest levels of depression. Among seronegative IDUs, anger and anxiolytic dependence were highly associated with symptoms of depression and those in recovery reported higher levels of depression than seronegative non-IDUs currently using illegal drugs.

Study results highlight the fact that though individuals may resort to drug use to cope with HIV, seronegative drug users were actually higher in depression than their HIV seropositive counterparts. This suggests that those persons who are HIV positive have additional health care resources available to them, which may assist in reducing the depression and anxiety found in seronegative IDUs. In contrast, individuals on ARVs were higher in depression than those not on ARVS, and may experience negative side effects or difficulties associated with medication that may have increased depression, though there was no association between the length of time on medication and the type of treatment and depression. As protease inhibitors (Pis) are most commonly associated with difficult side effects, it would be expected that PI treatment would be the most likely to be associated with depression. Only participants identified as on treatment for the analyses were currently taking medication. Further examination of the association between ARV use and depression should be conducted.

Among seronegative IDUs, anger and anxiolytic dependence were highly associated with symptoms of depression. Anger and fatigue have both been associated with depression and with bipolar disorder, both of which have been associated with substance use. In addition, anger and depression are mood states associated with withdrawal from anxiolytics, such as benzodiazepines. Thus, higher levels of anger, fatigue, depression, and anxiety may be the result of substance dependence and/or withdrawal in this sample. Similarly, those seronegative non-IDU participants in recovery from other drugs reported higher levels of depression than those seronegative non-IDUs using other drugs, suggesting that their drug use may indeed buffer depression in this population and emphasizing the importance of support services for those in recovery, as noted above.

This study reflected the results of previous surveys of depression, lack of resources, co-infection with hepatitis C, and limited health care among South Florida IDUs (Florida Dept. of Health, 2007) and in the general population (Joseph, Stoff, & van der Horst, 2005). Urban stressors and frustrations associated with limited economic and social opportunities may drive some individuals to resort to substance use as a coping strategy to preserve mental health (Jackson, 2008). Anger arising from repeated frustrations may be internalized as depression and anxiety, leading to continued coping through chronic poly-substance use. Mental illness, in the form of depression, anxiety, schizophrenia (Dinwiddie, Reich, & Cloninger, 1992; Sulkowski & Thomas, 2005), and substance dependence may go largely untreated in this marginalized population. Attempts at recovery from addiction without mental health services may be thwarted by the inability to change the circumstances, which initially lead to dependence. Without illegal drugs to reduce the stress of the environment and limited resources to improve their situation, the only "mental health" option may be substance use. Finally, depression and anxiety may act to undermine attempts to recover from dependence and obtain treatment from health care services.

This study was limited by the eligibility criteria, which limits its applicability to the larger population, e.g., older and younger IDUs, serious mentally ill, non-English speaking. Future studies should also include these marginalized populations. Additionally, lack of information regarding participants' stage in HIV progression, which may be related to depression or anxiety, also limits the interpretation of results related to emotional state. However, the advent of ARV treatment has made disease progression less informative as a marker as individuals typically increase their CD4/T-cell counts following ARV treatment.

Injection-drug use continues to add to the reservoir and spread of HIV (Des Jarlais, Dehne, & Casabona, 2001) and remains hard to reach and outside of the majority of the allocation of scarce health care resources (Lieb et al., 2004). Barriers to obtaining care include motivation, lifestyle instability, drug use, mental illness, lack of health insurance, providers, and the health care environment itself (Broman, Neighbors, Delva, Torres, & Jackson, 2008; Lansky et al., 2007; Mehtaa et al., 2005). A comprehensive approach for IDUs is required that includes increased access to health care, pre and post-test HIV counseling, clinical treatment and management of addiction and community-based interventions (Estrada, 2005). Public policy change is especially needed to respond to the needs of IDUs for integrated health care in order to make effective reductions in HIV infection.

Acknowledgments

References

Barash ET, Hanson DL, Buskin SE, Teshale E. HIV-infected injection drug users: Health care utilization and morbidity. Journal of Health Care for the Poor and Underserved. 2007; 3:675–686.

Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. Archives of General Psychology. 1961; 4:53–63.

Bing EG, Burnam MA, Longshore D, Fleishman JA, Sherbourne CD, London AS, et al. Psychiatric disorders and drug use among human immunodeficiency virus-infected adults in the United States. Archives of General Psychiatry. 2001; 58:721–728. [PubMed: 11483137]

Broman CL, Neighbors HW, Delva J, Torres M, Jackson JS. Prevalence of substance use disorders among African Americans and Caribbean Blacks in the national survey of American life. American Journal of Public Health. 2008; 98(6):1107–1114. [PubMed: 17971551]

Centers for Disease Control (CDC). Division of HIV/AIDS prevention: Fact sheets. 2003 Sep 12. 2008 http://www.cdc.gov/hiv/pubs/facts.htm

Centers for Disease Control and Prevention (CDC). Youth risk behavior surveillance system. 2001 Sep 12. 2008 http://apps.nccd.cdc.gov/YRBSS/index.asp

Chitwood DD, Sanchez J, Comerford M, Page JB, McBride DC, Kitner KR. First injection and current risk factors for HIV among new and long-term injection drug users. AIDS Care. 2000; 12:313–320. [PubMed: 10928209]

Cook JA, Grey DD, Burke-Miller JK, Cohen MH, Vlahov D, Kapadia F, et al. Illicit drug use, depression and their association with highly active antiretroviral therapy in HIV-positive women. Drug Alcohol Dependence. 2007; 89(1):74–81. (Epub February 8, 2007). [PubMed: 17291696]

Dallman MF, Pecoraro N, Akana SF, La Fleur SE, Gomez F, Houshyar H, et al. Chronic stress and obesity: A new view of comfort food. Proceedings of the National Academy of Sciences of the United States of America. 2003; 100(20):11696–11701. [PubMed: 12975524]

Des Jarlais DC, Dehne K, Casabona J. HIV surveillance among injecting drug users. AIDS. 2001; 15(Suppl. 3):S13–S22.

Dinwiddie SH, Reich T, Cloninger RC. Psychiatric comorbidity and suicidality among intravenous drug users. Journal of Clinical Psychiatry. 1992; 53:364–369. [PubMed: 1429476]

Estrada AL. Health disparities among African-American and Hispanic drug injectors – HIV, AIDS, hepatitis B virus and hepatitis C virus: A review. AIDS. 2005; 19(Suppl. 3):S47–S52. [PubMed: 16251828]

Florida Department of Health. National HIV behavioural surveillance: IDU cycle preliminary findings. FL: Bureau of AIDS; 2007 Jul.

Georgiou MF, Gonenc A, Waldrop-Valverde D, Kuker RA, Ezuddin SH, Sfakianakis GN, et al. Analysis of the effects of injecting drug use and HIV-1 infection on ^{18}F-FDG PET brain metabolism. Journal of Nuclear Medicine. 2008; 49:1999–2005. [PubMed: 18997046]

Hamilton M. The assessment of anxiety states by rating. British Journal of Medical Psychology. 1959; 32:50–55. [PubMed: 13638508]

Hamilton M. A rating scale for depression. Journal of Neurology, Neurosurgery, and Psychiatry. 1960; 23:56–61.

Ickovics JR, Hamburger ME, Vlahov D, Schoen-baum EE, Schuman P, Boland RJ, et al. Mortality, CD4 cell count decline, and depressive symptoms among HIV-seropositive women: Longitudinal analysis from the HIV epidemiology research study. JAMA. 2001; 285(11):1466–1474. [PubMed: 11255423]

Nielsen-Bohlman, L.Panzer, A., Kindig, DA., editors. Institute of Medicine (IOM). Health literacy: A prescription to end confusion. Washington, DC: National Academy Press; 2004.

Jackson CT, Covell NH, Drake RE, Essock SM. Relationship between diabetes and mortality among persons with co-occurring psychotic and substance use disorders. Psychiatric Services. 2007; 58(2):270–272. [PubMed: 17287387]

Jackson, J. Keynote address; 2008, August 30; 10th international congress of behavioral medicine; Tokyo.

Joseph J, Stoff DM, van der Horst C. HIV/ hepatitis C virus co-infection: Basic, behavioral and clinical research in mental health and drug abuse. AIDS. 2005; 19(Suppl. 3):S3–S7. [PubMed: 16251825]

Kutner, M., Greenberg, E., Baer, J. A first look at the literacy of America's adults in the 21st century. Washington, DC: National Center for Education Statistics, US Department of Education; 2005. (National Center for Education Statistics Publication No. 2006-470)

Lansky A, Abdul-Quader AS, Cribbin M, Hall T, Finlayson TJ, Garfein RS, et al. Developing an HIV behavioral surveillance system for injecting drug users: The national HIV behavioral surveillance system. Public Health Reports. 2007; 122(Suppl. 1):48–55.

Latkin CA, Buchanan AS, Metsch LR, Knight K, Latka MH, Mizuno Y, et al. Predictors of sharing injection equipment by HIV-seropositive injection drug users. JAIDS. 2008; 49:447–450. [PubMed: 19186356]

Lieb S, Friedman SR, Zeni MB, Chitwood DD, Liberti TM, Gates GJ, et al. An HIV prevalence-based model for estimating urban risk populations of injection drug users and men who have sex with men. Journal of Urban Health: Bulletin of the New York Academy of Medicine. 2004; 81(3):15–28.

McNair, M., Lorr, M., Droppleman, L. Manual of the profile of mood states. San Diego, CA: EdITS Educational and Industrial Testing Service; 1992.

Mehtaa SH, Thomas DL, Sulkowski MS, Safaeina M, Vlahov D, Strathdeea SA. A framework for understanding factors that affect access and utilization of treatment for hepatitis C virus infection among HCV-mono-infected and HIV/HCV-co-infected injection drug users. AIDS. 2005; 19(Suppl. 3):S179–S189. [PubMed: 16251816]

Shear MK, Vander Bilt J, Rucci P, Endicott J, Lydiard B, Otto MW, et al. Reliability and validity of a structured interview guide for the Hamilton Anxiety Rating Scale (SIGH-A). Depression and Anxiety. 2001; 43:22–46.

Sulkowski MS, Thomas DL. Perspectives on HIV/hepatitis C virus co-infection, illicit drug use and mental illness. AIDS. 2005; 19(Suppl. 3):S8–S12. [PubMed: 16251833]

Valverde EE, Purcell DW, Waldrop-Valverde D, Malow R, Knowlton AR, Gómez CA, et al. Correlates of depression among HIV-positive women and men who inject drugs. Journal of Acquired Immune Deficiency Syndromes. 2007; 46(S21):S96–S100. [PubMed: 18089990]

Waldrop D, Ownby RL, Kumar M. Serial position effects in HIV-infected injecting drug users. International Journal of Neuroscience. 2004; 114:493–516. [PubMed: 15195354]

Waldrop-Valverde D, Ownby RL, Kumar M. Influence of depression and HIV serostatus on the neuropsychological performance of injecting drug users. Psychiatry and Clinical Neurosciences. 2005; 59:372–378. [PubMed: 16048441]

Williams, JBW. The structured interview guide for the Hamilton Anxiety and Depression Rating Scales (SIGH-AD). New York, NY: Biometrics Research Unit, New York State Psychiatric Institute; 1988.

Williams, JBW. Structured interview guide for the Hamilton Depression and Anxiety Scales (SIGH-AD). New York, NY: New York State Psychiatric Institute; 1996.

Table 1

Sociodemographic characteristics of participants by HIV/IDU status ($n = 416$).

Characteristics	HIV + /IDU + n (%)	HIV-/IDU + n (%)	HIV–/IDU–n (%)
HIV/IDU status	130 (31.3)	117 (28.1)	169 (40.6)
Gender			
Men	84 (64.6)	81 (69.2)	67 (39.6)
Women	46 (54.4)	36 (31.8)	102 (60.4)
Race/ethnicity			
African-American	100 (76.9)	44 (37.6)	87 (51.5)
Hispanic	14 (10.8)	34 (27.6)	52 (30.8)
White	16 (12.3)	34 (29.1)	52 (30.8)
Age	39.42 (5.14)	38.16 (7.05)	32.14 (8.7) [***]
Years of education	11.61 (2.10)	11.61 (2.10)	13.10 (2.1) [***]
Years since HIV diagnosis	8.86 (5.68)		
Years on HIV treatment	2.71 (2.83)		
Treatment	78 (64)		
Hepatitis C status			
Seronegative	38 (29.2)	25 (21.4)	11 (6.5)
Seropositive	38 (29.2)	72(61.5)	0
Unemployed	110 (84.6)	89 (76.1)	64 (38.3)

[*]
p <0.05;

[**]
p <0.01;

[***]
p <0.001.

Note: Data are number (SD or percentage) unless otherwise indicated. HIV seronegative IDUs ($n = 117$), HIV seropositive IDUs ($n = 130$), and HIV seronegative non-IDUs ($n = 169$).

Table 2

Psychosocial and substance use assessments ($n = 416$).

	HIV + /IDU+ n (%)	HIV−/IDU + n (%)	HIV−/IDU−n (%)
Beck Depression Inventory			
Non-somatic	8.21 (6.68) ***	11.04(8.98) ***	4.16 (5.77) ***
Somatic	4.79 (4.15)	5.50 (4.26)	2.21 (2.93) ***
Total	12.98 (10.01) ***	16.52 (12.50) ***	6.33 (8.17) ***
Profile of Mood States			
Anger	11.93 (9.02)	13.94(11.89)	7.73 (9.02) ***
Vigor	18.19 (6.96)	15.37 (7.23) ***	18.68 (7.26)
Fatigue	8.67 (7.23)	9.75 (7.66)	5.73 (5.70) ***
Confusion	9.24 (6.42)	9.14 (6.17)	6.20 (4.93) ***
Anxiety	11.08 (7.68)	12.98 (8.48)	8.31 (7.20) ***
Depression	15.45 (13.02)	19.14 (16.54)	8.41 (10.91) ***
Total mood			
Disturbance	39.18 (43.41)	49.60 (49.70)	17.70 (35.94) ***
Structured Interview Guide for the Hamilton Anxiety and Depression			
Non-organic	6.31 (6.17)	5.95 (6.82)	3.89 (5.73) **
Organic	7.68 (6.97)	8.50 (7.61)	4.03 (5.76) ***
Anxiety	5.19 (5.80)	8.48 (8.27) ***	4.22 (5.56)
Total	16.62 (10.74)	17.07 (15.06)	8.24 (10.74) ***
Substance dependence			
Heroin	68 (52.3)	93 (79.5)	5(3)
Cocaine	101 (77.7)	70 (59.8)	54 (32)
Marijuana	54 (47.4)	51 (43.6)	33 (19.1)
Anxiolytics	33 (35.4)	44 (37.6)	8 (4.7)
Alcohol	82(63.1)	50 (42.7)	39 (23.1)
Substance abuse			
Heroin	73 (56.2)	94 (80.3)	7 (4.1)
Cocaine	109 (83.8)	78 (66.7)	55 (35)
Marijuana	89 (68.5)	80 (68.4)	55 (35)
Anxiolytics	45 (34.6)	60 (51.3)	20 (11.8)
Alcohol	91 (70)	72(61.5)	60 (35.5)
In recovery from drug use	0(0)	0(0)	64 (37.9)
Body Mass Index (BMI)	25.66 (5.47)	24.23 (4.30)	28.08 (7.04) ***

*
$p < 0.05$;

**
$p < 0.01$;

***
$p < 0.001$.

Note: HIV seronegative IDUs ($n = 117$); HIV seropositive IDUs ($n = 130$); and HIV seronegative non-IDUs ($n = 169$).