

ABSTRACT

Title of Thesis: DIFFERENCES IN PSYCHOPATHOLOGY
AMONG SUBSTANCE USERS IN
RESIDENTIAL TREATMENT RELATED TO
HIV STATUS

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HIV-positive individuals engage in substance use at higher rates than the general population and are more likely to also suffer from concurrent psychiatric disorders and substance use disorders. Despite this, little is known about the unique clinical concerns of HIV-positive individuals entering substance use treatment. This study examined the clinical characteristics of clients ($N=1712$) entering residential substance use treatment as a function of self-reported HIV status (8.65% HIV-positive). Results showed higher levels of concurrent substance use and psychiatric disorders for HIV-positive individuals, who were also significantly more likely to meet criteria for bipolar disorder and borderline personality disorder. Past diagnoses of depression, posttraumatic stress disorder, and social phobia were also significantly more common. Study findings indicate a need to provide more intensive care for HIV-positive individuals, including resources targeted at concurrent psychiatric problems, to ensure positive treatment outcomes following residential substance use treatment discharge.

DIFFERENCES IN PSYCHOPATHOLOGY AMONG SUBSTANCE USERS IN
RESIDENTIAL TREATMENT RELATED TO HIV STATUS

by

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Demographics Variables as a Function of HIV Status

Total N = 1712	Total Sample	HIV Status		<i>p</i> value	χ^2/F
		HIV-positive (N≤ 148)	HIV-negative (N≤1564)		
Demographics					
Age [<i>M (SD)</i>]	42.8 (10.9)	45.3 (9.3)	42.5 (11.0)	.003	8.96
Gender (% male)	65.9	55.6	66.8	.005	7.77
Race (% African American)	89.3	87.4	89.5	.426	0.64
Income (% <\$10,000)	79.3	84.1	78.9	.132	2.27
Education (% <HS education)	39.2	40.4	39.0	.744	0.11
Marital Status (% single)	66.5	64.0	66.7	.495	0.47
Employment Status (% unemployed)	75.4	81.8	74.9	.062	3.47
Treatment and Other Experiences					
Referral Status (% court mandated)	69.3	68.0	69.4	.719	0.13
Inpatient/outpatient treatment for SUDs	72.6	79.5	72.0	.048	3.94
Inpatient/outpatient psychiatric treatment	62.4	73.3	61.4	.004	8.37
Previous 12-step group attendance	66.1	76.5	65.2	.005	7.84
Psychiatric medication (current)	45.2	57.1	44.1	.002	9.26
Psychiatric medication (lifetime)	55.1	68.7	53.9	.001	12.1
Spent time in jail or prison	92.9	89.9	93.1	.141	2.17

p values are based on chi-square analyses and ANOVAs. Significant analyses are bolded.

Table 2.

Psychiatric Disorders as a Function of HIV Status

Current SCID Diagnoses	Total (%)	HIV Status		p-value ^a	Odds Ratios (95% C.I.)
		HIV-positive (N≤ 148)	HIV-negative (N<1564)		
Any Psychiatric Disorder Current ^a	53.1	65.1	52.1	.001	1.64 (1.16-2.33)
Any Mood Disorder Current ^b	26.8	34.9	26.1	.033	1.48 (1.03-2.11)
Bipolar I Disorder	5.6	10.5	5.2	.010	2.14 (1.20, 3.81)
Major Depressive Disorder Current	20.9	24.8	20.6	.435	1.17 (0.79, 1.74)
Major Depressive Disorder Past	35.5	44.6	34.7	.020	1.50 (1.07, 2.10)
Psychotic Symptoms Current	14.3	14.1	14.3	.811	0.94 (0.57, 1.56)
Psychotic Symptoms Past	19.4	21.2	19.2	.799	0.94 (0.61, 1.47)
Any Anxiety Disorder Current ^c	21.6	28.4	21.0	.071	1.42 (0.97, 2.07)
Panic Disorder Current	3.3	4.7	3.2	.552	1.28 (0.57, 2.90)
Panic Disorder Past	4.9	7.5	4.7	.272	1.45 (0.75, 2.82)
Social Phobia Current	4.7	7.5	4.4	.096	1.75 (0.91, 3.37)
Social Phobia Past	4.8	10.3	4.3	.002	2.56 (1.43, 4.58)
OCD Current	1.9	3.4	1.8	.100	2.26 (0.85, 5.99)
OCD Past	1.8	2.7	1.7	.252	1.87 (0.64, 5.46)
PTSD Current	10.3	11.6	10.2	.745	1.10 (0.63, 1.90)
PTSD Past	17.7	25.4	17.1	.039	1.54 (1.02, 2.32)
GAD Current	8.5	10.1	8.3	.513	1.20 (0.69, 2.12)
GAD Past	6.0	9.1	5.8	.591	1.41 (0.40, 4.94)
Borderline Personality Disorder	13.3	19.3	12.7	.045	1.60 (1.01, 2.52)
Antisocial Personality Disorder	23.2	24.1	23.1	.391	1.20 (0.79, 1.80)

Analyses that are bolded are significant.

- a. Includes mood disorders, anxiety disorders, psychotic symptoms, borderline personality disorder, and antisocial personality disorder.
- b. Includes major depressive disorder, bipolar I, and bipolar II, which was not included alone here due to low base rates.
- c. Represents all anxiety disorders included in this table

Table 3.

Prevalence of Participants with Substance Dependence as a Function of HIV Status

Total N = 1712 SCID Diagnosis (%)	Total (%)	Referral Source		p-value ^a	Odds Ratios (95% C.I.)
		HIV-positive (N≤148)	HIV-negative (N≤1564)		
Alcohol Dependence Current	30.6	33.6	30.4	.629	1.09 (0.76, 1.57)
Alcohol Dependence Past	30.9	38.5	30.3	.099	1.38 (0.94, 2.01)
Cannabis Dependence Current	10.3	7.0	9.7	.607	0.84 (0.43, 1.65)
Cannabis Dependence Past	24.9	24.6	25.0	.492	1.16 (0.77, 1.75)
Cocaine Dependence Current	35.7	55.5	34.0	.001	2.21 (1.56, 3.14)
Cocaine Dependence Past	37.5	58.9	35.7	.001	2.23 (1.51, 3.30)
Opioid Dependence Current	18.5	20.5	18.3	.885	1.03 (0.67, 1.58)
Opioid Dependence Past	20.3	18.2	20.5	.222	0.74 (0.46, 1.20)
Hallucinogen/PCP Dependence Current	13.5	9.0	13.9	.819	0.82 (0.44, 1.52)
Hallucinogen/PCP Dependence Past	19.6	12.8	20.2	.098	0.65 (0.39, 1.08)
Any Current Substance Dependence	72.3	83.8	71.3	.009	1.84 (1.17, 2.90)
Current SUD / Psychiatric Disorder	42.5	56.1	41.4	.002	1.72 (1.22, 2.42)

Analyses that are bolded are significant.
a. Pearson's chi-square test.

Table 4.

Total Number of Disorders as a Function of HIV Status

Total N = 1712	Total M (SD)	HIV Status		p- value ^a	F
		HIV-positive (N= 148)	HIV-negative (N=1564)		
Total Number of Disorders	2.03 (1.82)	2.46 (1.84)	1.99 (1.81)	.002	9.53
Total Psychiatric Disorders	.98 (1.31)	1.24 (1.41)	.96 (1.30)	.013	6.18
Total Substance Use Disorders	1.04 (.91)	1.22 (.83)	1.03 (.92)	.010	6.63
Total Mood Disorders	.26 (.46)	.35 (.51)	.25 (.45)	.009	6.75
Total Anxiety Disorders	.27 (.60)	.36 (.70)	.26 (.59)	.056	3.64

Introduction

HIV infection, HIV transmission, and substance use disorders (SUDs) are highly associated with each other—substance users are more likely to be infected with HIV (Drumright, Patterson, & Strathdee, 2006; Plankey et al., 2007; Schneider, Chersich, Neuman, & Parry, 2012) and HIV-positive individuals use substances at higher rates than the general population (Bing et al., 2001). HIV-positive substance users show increased rates of medical, psychiatric, and substance use disorders, which are associated with poorer HIV medication adherence and higher morbidity and mortality compared to HIV-positive peers who do not use substances (Altice, Kamarulzaman, Soriano, Schechter, & Friedland, 2010).

In particular, co-occurring psychiatric disorders are highly prevalent among HIV-positive substance users (Bing et al., 2001; Turrina et al., 2001). The combination of psychiatric disorders and substance use among individuals living with HIV is associated with greater psychopathology and worse prognosis compared to the effects of a psychiatric disorder or substance use disorder alone (Nnadi et al., 2002). People who are triply diagnosed with HIV, a substance use disorder, and a psychiatric disorder are thought to be overrepresented in the patient populations of many treatment settings due to the severity and chronic nature of their symptomatology (Gupta, Kumar, & Garg, 2013). Several studies with HIV samples have shown substance use disorders at rates of 32-44% (Burnam et al., 2001; Stall & Leigh, 1994; Whetten et al., 2005), psychiatric disorders among 10-60% (Lyketsos et al., 1994; Whetten et al., 2005), and concurrent diagnoses of psychiatric and substance use disorders for between 23% and 79% (Dew et al., 1997; Maj et al., 1994; Stall &

Leigh, 1994; Whetten et al., 2005). These findings are concerning given research that has demonstrated psychiatric disorders can interfere with effective substance use treatment among HIV-positive and HIV-negative individuals alike. For example, substance users with co-occurring psychopathology are more likely to drop out of treatment, to experience substance use relapse, and to be readmitted for additional treatment in the future (Alterman, McLellan, & Shifman, 1993; Brown et al., 1998; Greenfield et al., 1998; Hasin et al., 2002; Moos, Mertens, & Brenna, 1994). Therefore, to provide the best clinical care to HIV-positive substance users, it is important to determine what specific substance use and psychiatric disorders affect this population.

Despite the clear link between HIV infection and substance use disorders, relatively little is known about the unique mental health characteristics of HIV-positive individuals engaged in substance use treatment. In one study, Turrina and colleagues (2001) compared rates of depression among injection drug users who were HIV-positive and HIV-negative, and found that a major depression diagnosis was roughly twice as common for HIV-positive injection drug users (36.2% vs. 15.7%). However, this work was limited in its scope as it focused exclusively on depression and select personality factors, and only included substance users who injected drugs. It also recruited its HIV-negative sample from a separate treatment site from the HIV-positive group. A multitude of studies have shown that non-injection drug use is associated with HIV infection, transmission, and clinical course (see Van Tieu & Koblin, 2009), which points to the importance of including non-injection drug users who are HIV-positive in future work. Another difficulty is that much of the extant

literature on HIV-positive substance users has focused on the impact that a mental health or substance use disorder has on adherence to highly active antiretroviral therapy (HAART; Chander, Himelhoch, & Moore, 2006). While HAART medication adherence is undoubtedly an important outcome, the focus on adherence has meant less attention has been paid to factors that may relate to successful substance use treatment outcomes. No study has examined rates of psychopathology among HIV-positive individuals in substance use treatment using an HIV-negative comparison group.

To better characterize the unique treatment needs of HIV-positive substance users, the current study utilized data from HIV-positive and HIV-negative individuals entering a substance use treatment center in Washington, DC. We examined rates of substance dependence, psychiatric disorders, and their co-occurrence as a function of HIV status using the Structured Clinical Interview for the DSM-IV and the Diagnostic Interview for Personality Disorders. In comparing psychopathology across these two groups, we utilized a count total of the number of current disorders for each participant. Next, we focused on rates of disorders in mental health categories including substance use disorders, mood disorders, anxiety disorders, psychiatric disorders, and co-occurring substance use disorders and psychiatric disorders. Finally, we narrowed comparison analyses to specific individual DSM-IV diagnoses with the goal of painting a contrasting picture of the clinical needs of substance users who are HIV-positive versus HIV-negative.

Based on previous literature, a number of hypotheses were made regarding clinical characteristics expected to relate to HIV status. First, individuals entering

substance use treatment were hypothesized to meet for a greater number of DSM-IV diagnoses overall if they were HIV-positive. In terms of individual psychiatric disorders, we expected elevated rates of Major Depressive Disorder (MDD) and Posttraumatic Stress Disorder (PTSD), as both are more highly prevalent among individuals living with HIV (Katz & Nevid, 2005; Komiti et al., 2003; Martinez, Israelski, Walker, & Koopman, 2002; Safren, Gershuny, & Hendriksen, 2003). MDD and PTSD are also known to co-occur with substance use disorders (Swendsen & Merikangas, 2000). We also hypothesized that HIV-positive individuals would show higher rates of disorders across categories including substance use disorders, mood disorders, anxiety disorders, general psychiatric disorders, and concurrent substance use and psychiatric disorders. Finally, in addition to predicting higher rates of substance dependence overall, we made hypotheses for specific substances. HIV-positive individuals were expected to endorse higher rates of current and past opioid and cocaine dependence. Historically, injection of heroin has been associated with HIV epidemics through the sharing of needles and works as well as through related sexual risk behaviors (Battjes, Pickens, & Amsel, 1991; Centers for Disease Control, 1990). Transmission of HIV has also been linked to risky sexual behavior, including sex exchange, in the context of crack cocaine use (Edlin et al., 1994). Thus, HIV-positive individuals engaged in substance use treatment may present with elevated rates of dependence on heroin and crack cocaine compared to their HIV-negative peers. In summary, the current study aimed to test the hypothesis that HIV-positive substance users come to treatment with higher levels of overall psychopathology and

with co-occurring mental health problems that manifest in a unique clinical presentation.

Methods

Participants

Participants ($N=1712$) were sequential admissions to a residential substance use treatment center in Northeast Washington D.C. from March 2009 through June 2014. The mean age of the sample was 42.8 years old (SD 10.9). The majority of the sample identified as African American (89.3%), followed by Hispanic (4.3%), Caucasian (3.5%), American Indian/Alaskan Native (.4%), Asian (.3%), and individuals identifying as “other” (2.1%). Participants were recruited during their first week of residential treatment after completing detoxification and submitting a negative urine screen. The length of treatment contracts at this facility typically ranges from 28 to 180 days and depends on the agency providing funding for the client. More than 30% of clients in this setting enter treatment voluntarily through the Addiction Prevention and Recovery Administration (APRA). The remainder are court-mandated to attend the program by criminal justice institutions: Court Services and Offender Supervision Agency (CSOSA) and Pretrial Services Agency (PSA). Treatment programming includes a variety of groups from 8 am to 9 pm daily based on the 12-step philosophy, as well as small groups that focus on specific client needs, such as Anger Management, Grief and Loss, Family Issues and Trauma, and Dual Diagnosis. Clients are only permitted to leave the facility for approved scheduled appointments with psychiatrists, primary care physicians, and for court appearances.

Recruitment and consent

During their first week of treatment, all participants in this study received a diagnostic assessment administered by University of Maryland doctoral level graduate students and senior research staff as a part of the treatment center's intake process. In addition to providing diagnostic information to the clinical treatment staff of the center, the assessment was also used to gather data for the current study. Upon finishing the interview, clients were invited to be involved with research and informed consent was obtained. In order to limit coercion, counselors were unaware of whether clients agreed to participate in research. The current data presented here are only from individuals who consented to participate in research (< 5% refused research participation). The University of Maryland Institutional Review Board reviewed and approved all aspects of the study protocol.

Procedures

All interviewers were extensively trained and comprehensively supervised to ensure the accuracy of diagnoses. Trainees first watched the full video protocol for the Structured Clinical Interview for the DSM-IV (SCID-IV; First, Spitzer, Gibbon, & Williams, 1995). After reviewing the protocol, trainees next conducted two mock interviews using the SCID-IV and the Diagnostic Interview for Personality Disorders (DIPD; Zanarini, Frankenburg, Chauncey, Gunderson, 1987). The final stages of the training included observing two full diagnostic assessments performed by experienced interviewers at the treatment center, completing a final certification practice interview with the training director, and administering two real interviews

observed by supervisors at the treatment center. Once training was completed, all interviewers participated in an ongoing weekly supervision meeting led by a clinical psychologist. Any clinical questions regarding specific clients or diagnoses were addressed through group discussion and feedback.

Measurements

Demographic Variables and HIV Status. Participants self-reported their HIV status, gender, age, race, marital status, income, education, previous treatment for substance use or psychiatric disorders, incarceration history, and drug use frequency.

Participants' HIV status was corroborated with records from the medical staff at the treatment center.

Diagnostic assessments. The Structured Clinical Interview for the DSM-IV (SCID-IV; First, Spitzer, Gibbon, & Williams, 1995) was used to assess the following Axis I disorders: major depressive disorder, bipolar I disorder, panic disorder, social phobia, obsessive compulsive disorder, posttraumatic stress disorder, generalized anxiety disorder, and drug dependencies. Participants were also assessed for the presence or absence of psychotic symptoms using a screener included in the SCID-IV. Substance abuse was not assessed given the severity of the drug use among this inpatient sample. Participants were diagnosed with current substance dependence if they endorsed three or more dependence symptoms for at least one month during the last year. Past substance dependence was diagnosed when participants met this threshold for at least a one month period outside of the last 12 months (but was only assessed for any drugs for which the client already had not already met criteria for current dependence on that drug). In order to differentially diagnosis Axis I disorders that

were substance-induced or the result of other underlying causes, interviewers established a comprehensive symptom timeline with each participant, ensuring that diagnoses were made only in cases when symptoms were not the direct result of the pharmacological effects of substance use or a general medical condition. We also assessed participants for antisocial personality disorder (ASPD) using the SCID-IV and borderline personality disorder (BPD) using the DIPD. Proponents of the DIPD have argued that it is a more comprehensive and precise measure of BPD than the SCID-IV (Zanarini, Frankenburg, Chauncey, & Gunderson, 1987). These Axis II disorders were chosen because previous work has shown that they are particularly prevalent among substance users (Kokkevi, Stefanis, Anastasopoulou, & Kostogianni, 1998; Torrens, Gilchrist, & Domingo-Salvany, 2011).

Analytic strategy

Data were analyzed using ANOVA's for continuous variables and chi-square tests for categorical variables to examine the significance of group differences by HIV status. Odds ratios and effect sizes were calculated for the relevant analyses. Variables were created to compare groups for the presence of a diagnosis in disorder categories (e.g. mood disorders, anxiety disorders, substance use disorders, and psychiatric disorders) as well as the total number of disorders across those categories. More detailed explanation of these variables is provided in the tables below. Regression analyses with relevant significant demographic differences such as age and gender entered as covariates were performed to confirm that significant outcomes held, and all associations remained significant at the $p < .05$ level.

Results

Demographic and background information

Of the total 1712 participants in this sample, 8.65% ($n=148$) identified as HIV-positive. HIV-positive and negative participants did not differ significantly by race, income, education, or marital status (see Table 1). However, HIV-positive participants were older and more likely to be female. A significantly greater proportion of HIV-positive individuals had attended previous treatment for substance use disorders and for other psychiatric help. They were also more likely to take mental health medication both currently and in the past (all p 's $< .05$; see Table 1). The majority of both groups had spent time in jail or prison and were court-mandated to attend treatment at the center, with no significant differences by HIV status on these variables.

Psychiatric disorder diagnoses

HIV-positive participants were significantly more likely to currently meet diagnostic criteria for any Axis I or II psychiatric disorder than their HIV-negative counterparts (65.1% vs. 52.1%, $p = .001$; see Table 2). Overall, they were significantly more likely to have a current mood disorder (34.9% vs. 26.1%, $p = .033$), Bipolar I Disorder (10.5% vs. 5.2%, $p = .010$), or borderline personality disorder (BPD; 19.3% vs. 12.7%, $p = .045$). In terms of past psychiatric diagnoses, only 34.7% of HIV-negative participants met diagnostic criteria for major depressive disorder (MDD), as compared to 44.6% of HIV-positive participants. Past diagnoses of posttraumatic stress disorder (PTSD) and social phobia were also significantly

more common in the HIV-positive group. Rates of antisocial personality disorder (ASPD) and other psychiatric disorders did not differ as a function of HIV status (all p 's > .05).

Substance dependence diagnoses

In the overall sample, 72.3% of individuals met diagnostic criteria for a current substance dependence diagnosis. Rates of dependence on specific substances differed as a function of HIV status (see Table 3). As expected, HIV-positive participants were significantly more likely to meet diagnostic criteria for cocaine dependence (both current and past) in comparison to HIV-negative individuals (55.5% vs. 34% for current cocaine dependence, $p = .001$). Contrary to our hypotheses, there was not a corresponding higher rate of opioid dependence for the HIV-positive group; the rate of current and past opioid dependence was roughly 20% across both groups. Dependence rates across other substances did not differ as a function of HIV status. In line with predictions, HIV-positive participants did show higher levels of concurrent substance use and psychiatric disorders (56.1% vs. 41.4%, $p = .002$). Coming to treatment with a current substance dependence diagnosis was also more likely, with 83.8% of HIV-positive participants meeting criteria for at least one drug versus 71.3% of the comparison HIV-negative group.

Total number of disorders by HIV status

We also examined the total number of disorders each participant met criteria for in a number of diagnostic categories. Here, the average total number of disorders was roughly 2.5 for HIV-positive and 2.0 for HIV-negative individuals. Broken down

further, members of the HIV group met for a higher number of psychiatric disorders, substance use disorders, and mood disorders. The number of anxiety disorders also trended toward significance, with a slightly higher average for the HIV-positive group.

Discussion

This study aimed to compare individuals entering inpatient substance use treatment across HIV status, to identify any differences in clinical profiles between the two groups. HIV-positive individuals with substance use problems represent an important population to examine in depth, as substance use and mental health problems are associated with worse HIV medication adherence and higher mortality rates (Altice et al., 2010). This is particularly concerning given half of clients with concurrent psychiatric disorders who attend substance use treatment report that they received no mental health treatment during their substance use care (Watkins et. al., 2004). Moreover, less than half of substance use treatment programs conduct mental health screenings at intake (42%; SAMHSA, 2009). This context makes gathering more information on the clinical concerns unique to HIV-positive substance use treatment clients even more relevant to ensuring their long-term physical and mental health. To our knowledge, this paper marks the first effort to examine rates of psychiatric and substance use disorders among HIV-positive clients in an inpatient substance use setting compared to their HIV-negative peers.

There were significant differences in the presence of substance dependence and psychiatric disorders as a function of HIV status. In our inpatient substance-using

sample, HIV-positive clients were more likely to present with a history of major depressive disorder, posttraumatic stress disorder, and social phobia, as well as current diagnoses of bipolar disorder and borderline personality disorder. The increased likelihood of a history of MDD and PTSD are in line with expectations given similar findings from the extant literature for HIV-positive individuals in a variety of samples and settings (Katz & Nevid, 2005; Komiti et al., 2003; Martinez, Israelski, Walker, & Koopman, 2002; Safren, Gershuny, & Hendriksen, 2003). For example, Turrina and colleagues (2001) showed that a current major depression diagnosis was more than twice as common for injection drug users who were HIV-positive (36% vs. 16%). Our results differed in that there was not a significant difference in current MDD by HIV status, and this may be a function of the relatively high levels of current depression in the overall sample and HIV-negative group (21% overall and for HIV-negative vs. 25% among HIV-positive). Still, nearly half of this study's HIV-positive clients met criteria for a past depression diagnosis, meaning they were significantly more likely to have experienced prior episodes of depression than their HIV-negative counterparts (45% vs. 35%). Because individuals with a history of depression are at increased risk of future episodes, preventative mental health resources and psychoeducation for this group are likely to have protective effects and lead to better treatment outcomes across the board. Similar to depression, the overall number of clients presenting with a current PTSD diagnosis in our sample was relatively large for a setting not focused specifically on trauma or mental health (roughly 10% of the HIV-negative group met current criteria vs. 12% of HIV-positive group). Clients at this center report histories of child sexual abuse, sexual assault, gun

violence, and other traumatic events at much higher rates than the general population. HIV-positive individuals were more likely to have experienced a traumatic event and to meet criteria for a past diagnosis of PTSD (25% among HIV-positive vs. 17% HIV-negative). Clients also evidenced a greater history of social phobia, which was not among the clinical characteristics initially predicted to differ between groups. More work is needed to explore this association, but one relevant factor may be the fear of disclosure of HIV status in social situations.

Relatively few studies have examined the potential association of chronic mental health conditions such as bipolar disorder and personality disorders with HIV infection. The presence of Axis II diagnoses among individuals who are currently negative but at-risk for HIV infection means they are more likely to contract HIV in the future (Jacobsberg et al., 1995), while other studies have established a relatively high proportion of individuals living with HIV have concurrent personality disorders (James et al., 1991; Pace et al., 1990; Perkins et al., 1993). Borderline personality disorder and antisocial personality disorder in particular have been associated with HIV infection, yet these studies have been limited by methodological issues and were not focused on substance using samples. Nevertheless, our results showing elevated rates of bipolar disorder and borderline personality disorder in the HIV-positive group fits with past work, which highlights impulsivity a common factor underlying HIV-risk behaviors as well as BPD and bipolar disorder. Antisocial personality disorder was diagnosed in roughly one in five individuals in both groups, and may not have been associated with HIV status due to the extensive level of prior criminal justice

involvement among our sample. Approximately 90% of participants reported prior incarceration in jail or prison, for an average of 10 years total in both groups.

In line with expectations regarding substance use, current and past cocaine dependence diagnoses were more prevalent among HIV-positive clients in this treatment setting. Contrary to hypotheses, opioid dependence was not associated with HIV status. This may be due to regional differences in substance use characteristics or the fact that new HIV infection attributable to injection drug use (8%) is quite low compared to that for sexual contact including that which occurs in the context of sex exchange for drugs (88%; CDC, 2012).

In addition to distinguishing levels of specific disorders, the current study found that HIV-positive clients met for a greater number of disorders overall, especially substance use and mood disorders. These clients were also overrepresented in larger diagnostic categories, and as such, were also more likely than their HIV-negative peers to present with concurrent substance use and psychiatric disorders at treatment entry. The impact of increased rates of disorders and concurrent diagnoses on treatment outcomes for this sample is not known, however previous work suggests the potential for a detrimental influence

Although data from the current study provide a unique clinical snapshot of HIV-positive substance users entering in residential treatment, these results should be interpreted in the context of the work's limitations. First, the lack of information on when individuals contracted HIV meant we were unable to link substance use and mental health problems to HIV casually in either direction. Future retrospective work may be able to establish a timeline of disorders and HIV infection, but a prospective

study with individuals at risk of HIV infection, substance use disorders, and mental health problems will be necessary to begin to disentangle these complex associations.

Similarly, data on treatment outcomes such as dropout and relapse were not collected for the majority of the participants in our sample. Extant literature suggests that because the HIV-positive individuals from this sample evidenced higher psychopathology overall, and concurrent SUD and psychiatric disorders in particular, that they are more likely to experience negative treatment outcomes. This dataset did not allow us to test that hypothesis. Another potential limitation is that we chose to rely on participants' self-report of their HIV status with corroboration from medical information at the treatment center. We elected not to perform HIV tests to verify HIV status, because HIV testing is not a part of the routine intake process for this and many other substance use treatment centers. Our goal was to model what information is typically available to clinicians when their clients come to treatment, and regular HIV tests are fairly routine among our sample. Indeed, a recently completed research study (n=263) at this treatment center revealed that 100% of clients had been tested for HIV in their lifetime, and most had been tested within the past year either in jail, through a mobile testing van, or with a health care provider. Finally, while overall we see the setting of this study as a strength, the urban treatment center associated with low-income substance users may limit the generalizability of these findings.

Despite its limitations, this study has important clinical implications and highlights the importance of considering HIV status in the assessment and treatment of clients entering residential substance use programs. Because HIV-positive individuals are more likely to present with elevated levels of psychopathology, it is

important for each client's HIV status to be considered by referral agencies and treatment providers in planning care and resources, especially in cases when there are limited or no resources to conduct diagnostic assessments. This work suggests clinicians may need to provide more intensive care for HIV-positive individuals, including resources targeted at concurrent psychiatric problems, to ensure positive treatment outcomes following residential discharge.

In conclusion, we believe that this study is the most rigorous comparison of the clinical characteristics of residential substance users as a function of HIV status to date. This work opens the door to future research to attempt to reproduce these findings in other settings while examining the relation to treatment outcomes. Further, extensions of this work may identify potential mechanisms underlying the relation between HIV infection and psychopathology among substance users, as well as the directionality of any causal relationships.

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