Substance Use Outcomes of an Integrated HIV–Substance Use Treatment Model Implemented by Social Workers and HIV Medical Providers

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Substance use is highly prevalent among people living with HIV (PLWH) and associated with poor health outcomes. Although understudied, integrating substance use and medical care for PLWH may decrease substance use. Using a quasi-experimental design, the authors tested an integrated model of substance use treatment provided by social workers located in HIV medical care settings in North Carolina. Participants were interviewed at baseline ($N = 204$), six months ($n = 157$), and 12 months ($n = 138$) using the Addiction Severity Index–Lite (ASI). In linear mixed analyses, statistically significant decreases were detected in ASI alcohol use ($p = .003$) and drug use ($p = .023$) severity scores after treatment participation. This was true regardless of gender, race, sexual orientation, education, self-rated health status, and age, suggesting there were no differences in integrated treatment outcomes across demographic groups. In addition, greater reductions in anxiety and depression were associated with lower ASI alcohol and drug severity scores after treatment participation. Study findings suggest that integrated care in HIV clinics with enhanced communication between social workers and HIV medical providers may deliver improved treatment outcomes for PLWH.

KEY WORDS: *HIV/AIDS; integrated care; substance use treatment*

Alcohol and drug use are highly prevalent among people living with HIV (PLWH) (Altice, Kamarulzaman, Soriano, Schechter, & Friedland, 2010; Bing et al., 2001; Korthuis et al., 2008; Skeer et al., 2012) and are associated with negative outcomes, including poor medication adherence, greater morbidity and mortality, and increased HIV-risk behavior among PLWH (Altice et al., 2010; Hinkin et al., 2007; Mellins et al., 2009; Tobias et al., 2007). Younger age and heterosexual sexual identification have been associated with greater substance use (Bing et al., 2001; Lightfoot et al., 2005). In addition, depression and other mental disorders frequently co-occur with substance use among PLWH and are also associated with poorer outcomes (Galvan, Burnam, & Bing, 2003; Mellins et al., 2009; Moore et al., 2012).

Unfortunately, substance use often remains undertreated among PLWH because of lack of access to substance use treatment, HIV-related stigma, low motivation, mental illness, and other barriers (Andersen et al., 2005; Calsyn et al., 2004; Korthuis et al., 2008;

Orwat et al., 2011). Previous research has shown that over half of individuals with HIV and co-occurring substance use are not receiving substance use treatment, with some estimates indicating that as few as 10 percent to 15 percent are in treatment at any given time (Broadhead et al., 2002; Orwat et al., 2011; Weaver et al., 2008).

Integrated care may improve substance use treatment usage and outcomes among PLWH. Several researchers have written about integrating mental health and primary care practices and proposed systems for conceptualizing integrated care (for example, Blount, 2003; Miller, Kessler, & Peek, 2011). Recently, researchers have reviewed the previous integrated care taxonomies and proposed a single, standard framework that incorporates the key ideas into six levels of integrated care falling within three categories: coordinated, colocated, and integrated care (Heath, Reynolds, & Romero, 2013). In this framework, *coordinated care* refers to separate facilities and systems for behavioral health and primary care providers and can be at either level 1, in which

providers rarely communicate about patients, or level 2, in which providers occasionally communicate about a patient because of a specific issue. *Colocated care* refers to behavioral health and primary care providers sharing the same facility and can be at either level 3, in which providers refer patients to each other but lack definition on how they collaborate, or level 4, in which a single practice schedules appointments for all providers, all providers share the same electronic medical record (EMR), and providers communicate with each other about patients with complex health problems. *Integrated care* refers to frequent communication between behavioral health and primary care providers and can be at either level 5, in which the providers function as a team and have restructured some but not all systems to achieve patient goals, or level 6, in which no single discipline predominates and systems have been changed to treat the whole person for all patients and not just specific patient groups. To qualify for a specific higher level, sites must also engage in the integrated components of the previous level. Clinical social workers can provide behavioral health care to PLWH under any of these levels of integrated care.

More studies exist on the integration of mental health and primary care than substance use and primary care (Heath et al., 2013). However, some studies have shown there is a benefit to integrated medical and substance use care for non-HIV-infected patients. One study testing a colocated care treatment found that participants randomized to methadone treatment consisting of counseling and pharmacological services who had medical services added were significantly more likely to receive medical care than were those randomized to a stand-alone methadone treatment clinic (Umbricht-Schneiter, Ginn, Pabst, & Bigelow, 1994). In another study, an integrated care treatment consisting of routine alcohol screening paired with services from a clinical nurse specialist collaborating with liver specialists and providing psychotherapy and psychotropic medication prescriptions was associated with reductions in alcohol use and increased initiation of hepatitis C antiviral therapy in liver clinics (Knott et al., 2006).

Yet the number of studies that have examined the outcomes of integrating substance use treatment among PLWH is surprisingly small. A 2004 review by Soto, Bell, and Pillen for the HIV/AIDS Treatment Adherence, Health Outcomes and Cost Study Group uncovered no outcome studies of integrated HIV–substance use treatment, although they found many reports of efforts to use multidisciplinary collaboration to engage and retain HIV-infected substance users in HIV care. Almost a decade later, published studies of integrated HIV–substance use treatment are few. In New York City, Rothman et al. (2007) reported increased use of HIV medical care when HIV care was colocated at drug treatment centers. A similar result was found for HIV-infected injection drug users in a methadone clinic in Baltimore (Lucas et al., 2006). Altice et al. (2010) called for more studies on integrated HIV–substance use treatment.

Few studies have examined integrated HIV and substance use care in the southeastern United States, an area that has been disproportionately affected by HIV (Reif et al., 2014). Significant barriers to HIV services in the southeast exist, including high levels of HIV stigma, high poverty rates, and lack of transportation (Reif et al., 2014). Innovative approaches are needed to ensure greater participation in substance use treatment by individuals with HIV. Integration of substance use treatment services into HIV medical clinics is one such approach that needs additional testing.

In this article, we describe the components and treatment outcomes of a program designed specifically for individuals with HIV and co-occurring substance use. The program includes clinical social workers who are integrated within the HIV medical care system and provide evidence-based substance use treatment. Using the standard framework (Heath et al., 2013), we classified the integrated social work–HIV treatment as integrated care, level 5, because clinical social workers and HIV treatment providers shared facilities and the EMR, communicated frequently about complex patients, understood each other's roles, and restructured care in some areas to maximally meet patients' goals. This treatment builds on a previous program for PLWH that created and piloted a colocated (levels 3 and 4) substance use treatment program in HIV medical care settings in North Carolina. Over time, the level of integration progressed and we recruited new patients for an updated study. The results from the study of the earlier program, which have been published elsewhere (Proeschold-Bell, Heine, Pence, McAdam, & Quinlivan, 2010), demonstrated positive outcomes in terms of reduction in alcohol use and a trend for reduction of drug use. In this article, we report changes in alcohol and drug use patterns

for participants in the treatment study and examine whether there were differences in drug and alcohol use after treatment participation that were associated with certain participant characteristics. In addition, we examined whether changes in depression and anxiety after treatment participation were associated with changes in substance use.

METHOD
Study Recruitment

The data used for this study were collected as part of another study that evaluated integrated HIV and substance use treatment in three infectious disease clinics in North Carolina between January 2007 and June 2012. At each clinic, patients with HIV infection were routinely screened for substance use by the HIV medical provider's interview, by self-administration of the Substance Abuse and Mental Illness Symptoms Screener (Whetten et al., 2005), or by both. The Substance Abuse and Mental Illness Symptoms Screener has excellent sensitivity (86 percent) and moderate specificity (75 percent) for identifying HIV patients with active substance use disorders (Pence et al., 2005). Eligibility criteria were HIV infection, age 18 years or older, English speaking, receiving medical care on site, and interest in substance use treatment for any type or amount of substance. Participants completed a baseline interview, which focused on substance use, HIV medications and adherence, and social context. Study participants completed follow-up interviews at six and 12 months of treatment. The interview was only available in English because staff members were not fluent in other languages.

The study sample included 204 individuals completing the baseline interview, 157 (78 percent) completing the interview conducted six months after treatment initiation, and 138 (67 percent) completing the interview conducted after 12 months of treatment. Bivariate analyses using chi-square and *t* tests were used to examine differences between those completing and not completing the 12-month interview. No differences were detected in demographic variables, baseline drug or alcohol use severity scores, or depression. Slightly higher baseline anxiety scores, $p = .047$, were identified in the group that did not complete the 12-month interview.

Substance Use Treatment

Integrated Care Features. Study participants consented to receiving 12 months of integrated HIV–substance use treatment. Licensed clinical social workers (LCSWs) were colocated in the infectious disease clinic, such that they provided group and individual therapy in the clinic. Both HIV medical providers and clinical social workers accessed the shared EMR, such that HIV medical providers knew if a patient was engaged in on-site substance use treatment. Clinical social workers used the shared EMR to access patient appointment schedules and then approached HIV medical providers for informal case conferences on patients' appointment days. These informal case conferences were used to devise joint treatment plans in which each provider encouraged the participant to engage in needed aspects of care (for example, attending group therapy or trying new behaviors to adhere to antiretroviral therapy). The relationship between clinical social workers and medical care providers was an important consideration of the integrated treatment. Although the strength and equality of the relationships varied depending on the personality and work styles of the individual social workers and medical providers, there was generally an atmosphere of mutual respect and appreciation for the contribution of each discipline. This was fostered by education regarding the substance use treatment program for medical providers and education regarding medications and other pertinent medical issues for clinical social workers.

Using the standard framework (Heath et al., 2013), we classified the treatment as integrated care, level 5, because of the features of colocation, frequent communication, restructured care in the form of shared EMR use and informal case conferencing, and strong understanding of each provider's role. This was not a level 6 integrated care treatment in part because providers' roles were kept distinct, there were no scheduled case conferences, and clinics retained a priority for HIV care. As might be expected from multiple clinics and providers across five years, there was occasional variability in the integrated care features. Specifically, at times, cross-provider communication may have occurred primarily for complex patients rather than for all patients, more suggestive of level 4 integrated features.

Therapy Content. Treatment consisted of 12 months of group and individual therapy. The ideal treatment was a combination of weekly group therapy for aspects of social support and norms and individual therapy as needed to focus on issues specific

to the participant. The study had a goal of at least two participant contacts during every monthly period, and clinical social workers reached out to participants falling shy of this goal. Individual therapy was offered by phone if participants were unable to get to the clinic because they lacked transportation. Group therapy time was divided between psychoeducational content and process psychotherapy. Psychoeducational content was guided by a standardized manual (available on request) containing session outlines on the interplay between HIV and substance use (for example, how substance use affects adherence to antiretroviral therapy, side effects management, nutrition, and comorbid medical conditions) and substance use treatment (for example, identification of triggers). Group therapy was open to accommodate immediately any new referrals. Clinical social workers had discretion in choosing what material would be most beneficial to the current group members.

The clinical social workers used cognitive–behavioral therapy (CBT) and motivational enhancement therapy (MET), which are two evidence-based treatments for substance use and mental illness (Crepaz et al., 2008; McGovern & Carroll, 2003), to advance behavior change. In addition, the clinical social workers' perspectives were informed by the transtheoretical model (Prochaska & DiClemente, 1982), and they used assertive patient outreach and attention to the patient's social environment to maximize patient engagement (Drake et al., 2001). It is important to note that they took a patient-centered harm-reduction approach (Marlett, 1998).

Social Worker Training. The clinical social workers were all LCSWs with training in CBT. All but one were credentialed as a licensed clinical addiction specialist during the study. We augmented previous clinical social worker training in MET (McGovern & Carroll, 2003) with an additional 30 hours of training. Throughout the study, the clinical social workers met monthly for group supervision with an LCSW expert in MET.

Substance Use Measure. Alcohol and drug use were measured using the Addiction Severity Index–Lite (ASI), which is a structured interview that assesses the severity and patterns of alcohol and drug use (McLellan et al., 1992). Interviewers were trained in ASI administration by Rae Jean Proeschold-Bell. For alcohol and substance use, the ASI provides a subjective severity rating and a more objective and standardized composite score ranging from 0 to 1. The ASI is designed to provide scores useful in measuring alcohol and drug use change over time; reductions in ASI composite scores from baseline are considered reliable and valid measures of improvement in the respective domains (McGahan, Griffith, Parente, & McLellan, 1986). The ASI has been shown to have adequate reliability and validity among varied populations and individuals with demographics similar to those of the study population, such as minorities and homeless individuals (McLellan et al., 1985; Zanis, McClellan, Cnaan, & Randall, 1994).

Depression and Anxiety Measures. We measured depressive symptoms using the Patient Health Questionnaire (PHQ), which consists of nine items on the frequency of depression symptoms during the past two weeks. Depression severity scores range from zero to 27. Probable depression is identified as a score of 10 or higher (Kroenke, Spitzer, & Williams, 2001).

We measured anxiety using the anxiety portion of the Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983). It has seven items that are measured using a four-point ranking for a total scale range of zero to 28. As recommended by Bjelland, Dahl, Haug, and Neckelmann (2002), we considered scores of eight and higher to indicate cases of anxiety.

Perceived Health Measure. We included an item on self-perceived health: "How would you rate your overall health right now?" Response options were 5 = excellent, 4 = very good, 3 = good, 2 = fair, and 1 = poor (DeSalvo, Fan, McDonell, & Fihn, 2005).

Statistical Analysis

Descriptive statistics were used to examine patient characteristics, including ASI alcohol and drug use severity scores at baseline and at six- and 12-month follow-up. We used linear mixed models to examine the significance of changes in alcohol and drug use severity scores over time. Linear mixed models are appropriate for longitudinal, repeat-observation data, as they account for the dependency between multiple observations on the same individuals (Fitzmaurice, Laird, & Ware, 2004). All analyses were performed using Stata Statistical Software, Version 10 (StataCorp, 2007).

We estimated linear mixed multivariable models to look for independent effects of baseline participant characteristics on drug and alcohol use severity after substance use treatment participation.

Specifically, to assess the relationship of baseline participant characteristics on alcohol use severity, we included ASI alcohol use severity scores at six- and 12-month follow-up in the linear mixed model as the dependent variable, and independent variables included baseline alcohol and drug use severity, demographic variables, self-reported physical health and disability, wave (six- or 12-month interview), and mental health measures. The mental health measures included baseline anxiety and the change in anxiety between baseline and six- and 12-month follow-up. Because the correlation between depression and anxiety was too high (.71) to include both depression and anxiety in a single model, two multivariate models were estimated: one with baseline anxiety and change in anxiety between baseline and six and 12 months and one with baseline depression and change in depression between baseline and six and 12 months.

To assess the effects of baseline participant characteristics on drug use severity, we estimated additional models that substituted ASI drug use severity scores at six- and 12-month follow-up as the dependent variable. As with the alcohol use severity models, we estimated two models, one with anxiety and change in anxiety between baseline and six and 12 months and another with depression and change in depression between baseline and six and 12 months. Aside from the correlation between depression and anxiety, which was handled by modeling these variables in separate equations, calculation of variance inflation factors and pairwise correlations between independent variables indicated no additional concerns regarding multicollinearity (Mansfield & Helms, 1982).

All procedures were approved by the Duke University Medical Center and the University of North Carolina institutional review boards. All patients provided written consent. Research and substance use treatment were performed using the National Association of Social Worker's ethics code (National Association of Social Workers, 2008).

RESULTS

As shown in Table 1, the majority of study participants were men (63 percent) and African American (86 percent), with an average age of 47 years. Nearly one-third (30 percent) of participants had less than a high school education, 88 percent were unemployed, and 61 percent qualified for disability. At baseline, 45 percent had a PHQ score indicating probable depression, and 52 percent had a HADS—

Table 1: Participant Characteristics at Baseline Interview (N = 204)					
Characteristic	n	%	M	Mdn	Range
Gender					
Men	128	63			
Women	76	37			
Age (in years)			46.5	47.3	20–63
Race or ethnicity[a]					
African American	174	86			
Caucasian	31	15			
Hispanic	5	2.5			
Education					
1–11 years	62	30			
12 or more years	142	70			
Employed (full-time or part-time)	25	12			
Qualified for disability, self-reported	125	61			
Heterosexual orientation	137	69			
Moderate or more severe depression indicated by PHQ-9 score	88	45			
Moderate or more severe anxiety indicated by HADS-A score	100	52			
ASI alcohol use score (range 0–1)			.10	.095	0–.76
Any alcohol use in the last 30 days	110	54			
ASI drug use score (range 0–1)			.063	.027	0–.28
Any crack or cocaine use in last 30 days	73	36			
Any marijuana or hashish use in last 30 days	49	24			
Any heroin use in last 30 days	4	2			

Notes: PHQ-9 = Patient Health Questionnaire-9; HADS-A = Hospital Anxiety and Depression Scale, anxiety portion; ASI = Addiction Severity Index–Lite.
[a]Ethnicity proportions total more than 1.0 as clients could endorse more than one ethnicity.

Anxiety score that indicated probable anxiety. At baseline, 54 percent reported using alcohol in the last 30 days. For drug use in the last month, 36 percent reported using crack or cocaine and 24 percent reported marijuana use.

Analysis results indicated a statistically significant reduction in alcohol use over time as measured by ASI alcohol use severity scores ($\beta = -.0167$, $p = .003$) (see Table 2). Drug use severity scores also decreased over the 12 months of treatment ($\beta = -.0053$, $p = .023$).

Multivariable Predictors of Alcohol and Drug Use Severity

The multivariable model predicting ASI alcohol use scores at six- and 12-month follow-up that controlled for baseline alcohol use and included anxiety and changes in anxiety as independent variables detected no association of demographic characteristics, self-reported physical status, or disability on alcohol use at follow-up (see Table 3). Baseline anxiety was not associated with alcohol use severity at follow-up ($\beta = .0029$, $p = .079$); however, a decrease in anxiety from baseline to follow-up was associated with lower alcohol use severity at follow-up ($\beta = -.0047$, $p = .002$). When changes in depression were modeled in place of changes in anxiety (as noted earlier, the correlation between depression and anxiety was too high to include both variables in one model), baseline depression was not associated with alcohol use severity ($\beta = .0015$, $p = .22$), but greater reductions in depression ($\beta = -.0026$, $p = .030$) were related to lower alcohol use severity at follow-up (see Table 4). In this model, no statistically significant association of self-reported physical status or disability with alcohol use severity was identified. However, women showed a trend for being associated with greater alcohol use severity at follow-up ($\beta = -.031$, $p = .050$)

The multivariable analysis findings for drug use severity identified no baseline demographic or medical characteristic, including self-reported physical health status and disability, that predicted drug use severity at follow-up. However, both greater baseline depression ($\beta = .0014$, $p = .035$) and greater

Table 2: Change in Addiction Severity Index–Lite (ASI) Alcohol and Drug Use Scores from Baseline to Six- and 12-Month Follow-Up

Measure	Baseline		Six-Month Follow-Up		12-Month Follow-Up		Change over Time	
	Score	n	Score	n	Score	n	Coefficient	p
ASI alcohol use	.10	192	.068	139	.067	132	−.0167	.003
ASI drug use	.063	204	.054	154	.052	141	−.0053	.023

Note: The regression coefficient was estimated using linear mixed models, which account for the dependency between multiple observations on the same individuals.

Table 3: Association of Alcohol and Drug Use at Six and 12 Months of Treatment Participation with Participant Characteristics (Anxiety Model)

Characteristic	ASI Alcohol Use Score (n = 253)		ASI Drug Use Score (n = 257)	
	Coefficient	95% CI	Coefficient	95% CI
ASI alcohol use baseline	.38**	.29, .47	−.0082	−.055, .038
ASI drug use baseline	.0016	−.21, .24	.48**	.36, .60
Anxiety baseline	.0029	−.00033, .0061	.0017*	.000055, .0034
Change in anxiety	−.0047**	−.0077, −.0017	−.0019*	−.0033, −.00050
Women	−.027	−.058, .0042	−.0011	−.017, .015
African American	−.029	−.069, .010	−.0036	−.024, .017
Age	−.0010	−.0027, .00068	−.00062	−.0015, .00029
Sexual identity, straight	.0073	−.028, .042	−.00045	−.023, .014
High school education	.0079	−.022, .038	−.0015	−.017, .014
Physical health status	.0076	−.0042, .020	.0053	−.00095, .012
Disabled, self report	.011	−.016, .038	.0090	−.0054, .023
Wave (six vs. 12 months)	.0095	−.016, .038	.0016	−.0081, .011

Notes: ASI = Addiction Severity Index–Lite; CI = confidence interval. The correlation between anxiety and depression was too high to include both in the model. Models were estimated using linear mixed models, which accounts for the dependency between multiple observations on the same individuals.
*$p < .05$. **$p < .01$.

Table 4: Association of Alcohol and Drug Use at Six and 12 Months of Treatment Participation with Participant Characteristics (Depression Model)

Characteristic	ASI Alcohol Use Score (n = 253)		ASI Drug Use Score (n = 257)	
	Coefficient	95% CI	Coefficient	95% CI
ASI alcohol use baseline	.38**	.30, 0.47	−.0043	−.050, .041
ASI drug use baseline	.013	−.22, 0.24	.48**	.36, .60
Depression baseline	.0015	−.00093, .0040	.0014*	.000097, .0026
Change in depression	−.0026*	−.0050, −.00026	−.0016**	−.0027, −.00045
Women	−.031*	−.062, .000058	−.0018	−.018, .014
African American	−.030	−.070, .010	−.0024	−.023, .019
Age	−.0013	−.0030, .00038	−.00075*	−.0017, .00015
Sexual identity	.0062	−.029, .041	−.0052	−.023, .013
High school education	−.00014	−.029, .030	−.0033	−.019, .012
Physical health status	.0064	.0060, .019	.0054	−.0012, .012
Disabled, self report	.0092	−.018, .036	.0073	−.0071, .022
Wave (six vs. 12 months)	.0087	−.015, .032	.0013	−.0083, .011

Notes: ASI = Addiction Severity Index–Lite; CI = confidence interval. The correlation between depression and anxiety was too high for model to include both. Models were estimated using linear mixed models, which accounts for the dependency between multiple observations on the same individuals.
*$p < .05$. **$p < .01$.

baseline anxiety ($\beta = .0017$, $p = .043$) were predictive of higher drug use severity at follow-up, compared with those with lower depression and anxiety at baseline. Reduction in depression ($\beta = −.0016$, $p = .006$) and reduction in anxiety ($\beta = −.0019$, $p = .008$) from baseline to follow-up were both predictive of lower drug use severity at follow-up.

DISCUSSION

Solutions addressing substance use and mental illness among PLWH are needed, particularly in geographic regions with high levels of HIV stigma and poverty and limited access to health care, such as the southeastern United States, where this study was conducted (Reif et al., 2014). Despite the logic of integrating clinical social workers in infectious disease clinics, there have been few published studies of integrated HIV–substance use care models and their outcomes. In the current study, PLWH received integrated substance use treatment from clinical social workers operating as a team with HIV medical providers. Findings identified decreases in alcohol and drug use severity scores at six and 12 months of treatment participation. Alcohol and drug use outcomes did not differ by gender, race, sexual identity, education, self-rated health status, or age.

The statistically significant reductions in ASI alcohol and drug use severity scores found among the study participants are consistent with the magnitude of improvement in ASI scores with treatment observed in community samples of substance-using patients, although the baseline and end-of-treatment scores were higher in the other samples, reflecting populations drawn from primary substance use treatment programs (Buchholz et al., 2010; Patkar et al., 2004).

Greater reductions in anxiety and depression were associated with lower severity of alcohol and other drug use at follow-up. These findings emphasize the need to address and abate co-occurring mental health issues among individuals participating in substance use treatment. Dual diagnosis is common among individuals with HIV, thus warranting particular attention when assessing and treating individuals with both HIV and substance use disorders (Galvan et al., 2003). However, the directionality of the relationship is not fully understood, as depression and anxiety, as well as substance use severity, shift over time, making it difficult to determine the influence of one on the other. Future research that includes more frequent assessments may assist in disentangling the relationship between change in substance use and change in mental health among PLWH in substance use treatment. Nevertheless, this study's findings suggest that it is essential to address dual diagnoses, and clinical social workers are uniquely positioned to address dual diagnoses as well as to integrate care with medical providers in infectious disease treatment settings.

Our study is limited by self-reported data and geographic region; findings may not be generalizable to areas outside of the southeastern region of the United

States. The lack of a control group prohibits us from causally inferring that the improvement in outcomes is solely due to the effects of treatment participation. A further concern is the follow-up response rate of 67 percent; it is possible that those lost to follow-up had higher degrees of substance use. However, our analysis required data at only two and not all three time points, allowing analysis of the 78 percent of participants who provided data at six months. Also, analysis of the demographic characteristics and substance use of those available at follow-up and those lost to follow-up identified few differences between these groups. A further limitation is our lack of ability to control for the impact of individual clinical social workers in the analysis, as detailed data regarding the amount of time spent with each clinical social worker were not available. Further, group treatment was routinely provided by two clinical social workers, making it impossible to tease out the effects of a single social worker.

In addition, our findings are limited by the use of the ASI, which offers only 30-day and lifetime time frames and provides a change score for both alcohol and substance use patterns but does not assess a change in actual quantity consumed. Researchers conducting future studies should assess quantity of alcohol or drugs consumed to avoid the subjective perception items included in the ASI, especially because PLWH may consider alcohol use to be less risky than substance use. Finally, some researchers have expressed reservations on the validity of the ASI among populations with severe and persistent mental illness (Melberg, 2004; Zanis, McClellan, & Corse, 1997). However, this was less of a concern in this study, because although symptoms of depression and anxiety were found to be prevalent, the presence of severe and persistent mental illness was reported to be low.

Substance use and symptoms of anxiety and depression among PLWH have been found to relate to poor health outcomes, such as lack of medication adherence and retention in care (Justice, Sullivan, & Fiellin, 2010); therefore, addressing these comorbidities is critical. Clinical social workers are uniquely positioned to provide substance use and mental health treatment in a medical clinic setting. They possess the collaboration and interpersonal skills needed to partner with HIV medical providers to create joint treatment plans, as well as the psychotherapy skills needed to address substance use and mental illness. Integrated care in HIV clinics with enhanced communication between clinical social workers and HIV medical providers can deliver improved treatment outcomes for PLWH and become a model for effective health care delivery for this population. **HSW**

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