A Cross-Sectional Study of Depressive Symptoms and Risky Alcohol Use Behaviors among HIV Primary Care Patients in New York City

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Abstract

An association between problem drinking and depression among HIV-infected individuals has been previously demonstrated; however, which specific risky drinking behaviors are associated with higher levels of depression has not yet been investigated. Using an adult sample of HIV-infected primary care patients (78% male, 94% Black or Hispanic), we investigated whether depressive symptoms are associated with various risky drinking behaviors. Participants were administered the Beck Depression Inventory-II (BDI-II) to assess depressive symptoms, and the Alcohol Use Disorders and Associated Disabilities Interview Schedule-IV (AUDADIS-IV) to evaluate alcohol involvement. Participants with depressive symptoms (26%) were at higher risk for alcohol dependence [adjusted odds ratio=3.8; 95% CI 2.0—7.2], regular binge drinking [AOR=2.0; 95% CI 1.1—3.8], and regular daytime drinking [AOR=2.1; 95% CI 1.2—3.8], in comparison with their non-depressed counterparts. Because both depression and unhealthy drinking negatively affect medication adherence and clinical outcomes, a better understanding of the association between depression and certain risky drinking behaviors among HIV-infected individuals is vital to improving their care and prognoses.

Keywords

Alcohol dependence; binge drinking; daytime drinking; depressive symptoms; HIV

INTRODUCTION

Risky alcohol use is more prevalent among individuals living with human immunodeficiency virus (HIV) than among their non-infected counterparts(1–5). The prevalence of heavy drinking among persons living with HIV (PLWH) receiving medical treatment has been found to be two times that of the general population(6, 7). Additionally, the rates of alcohol

use disorder (AUD) among HIV-positive males have been found to be twice that of their HIV-negative counterparts(2). This high prevalence of heavy and problematic drinking among PLWH is especially important because of the adverse effects alcohol can have on HIV patients' medication adherence(1, 3, 8–12), CD4 cell count in HIV-infected patients not receiving antiretroviral therapy (ART)(13), viral suppression(14), disease progression(13, 15), psychiatric comorbidity(16, 17), as well as engagement in risky sexual behavior(1, 18, 19).

In addition to heavy alcohol use, PLWH are also at an increased risk for depression(2, 11, 20–22). A meta-analysis of 10 studies found that HIV-positive individuals were nearly twice as likely to be diagnosed with major depressive disorder as their HIV-negative counterparts(21). This increased risk for depression is important because evidence suggests that depression negatively affects adherence to ART regimens(23–25), HIV-infected individuals' immune function(26) and may lead to an increase in viral load and disease progression(27). Furthermore, HIV-infected women with chronic depressive symptoms may also have higher rates of AIDS-related deaths(28).

Unhealthy alcohol consumption and depression are often comorbid among PLWH. In one study, PLWH with current alcohol dependence reported more depressive symptoms compared to their non-dependent counterparts(29). In another study, depression was linked to previous history of alcohol dependence among PLWH(30).

Due to the high prevalence of this comorbidity among PLWH, assessing problematic drinking behaviors that are deleterious to the health of PLWH but are subthreshold in and of themselves for AUD could help providers identify patients at risk for this dangerous comorbidity and thus screen or intervene more promptly, potentially averting problems incurred as alcohol problems progress to dependence. The link between alcohol dependence and depression has been demonstrated in previous research; however, fewer studies examine the association between depression and risky alcohol use behaviors that do not in and of themselves constitute alcohol dependence. Binge drinking is prevalent(31) and can be a deadly form(32) of alcohol use in the United States. Binge drinkers are at an increased risk for engaging in HIV risk behaviors such as injection drug use and risky sexual behavior(33). Binge drinking has also been shown to be associated with nonadherence to ART(3). Regular engagement in binge drinking is explored as one of the risky alcohol use behaviors for the current study due to its high prevalence and harmful health outcomes among PLWH(3, 34). Daytime drinking is also included in this study on a more exploratory basis, as it captures a less common drinking pattern that may be more likely to interfere with work/life responsibilities. The well-known CAGE questionnaire utilizes morning drinking as one of the four specific indicators of problem drinking(5); this questionnaire has been found to reliably distinguish whether an individual has an AUD(35). To our knowledge, there are no studies examining the association between daytime drinking and depression among individuals with HIV, a gap we intend to fill.

The purpose of the current study was therefore to assess the association of depression with two prevalent risky alcohol use behaviors, namely regular binge drinking and regular daytime drinking, in addition to the more often-studied alcohol dependence, in a sample of

HIV primary care patients. Patients were part of a large clinical trial aiming to reduce heavy drinking in HIV comprehensive care(36). Using this data, we examined whether HIV-positive individuals who reported depressive symptoms are at a higher risk for alcohol dependence, regular binge drinking and regular day drinking than their non-depressed counterparts. We hypothesize that among HIV patients, depressive symptoms will be associated with alcohol dependence, regular binge drinking and regular day drinking.

METHODS

Participants and procedures

Participants were patients at a New York City HIV primary care clinic who participated in a randomized clinical trial between 2007 and 2010 that compared three brief interventions for drinking-reduction(36). Patients were referred by clinic staff to bilingual counselors (English and Spanish) for prescreening to determine eligibility status. Participants were eligible for the trial if they met the following criteria: HIV-positive; consumed four or more drinks on at least one occasion in the past 30 days; ability to speak English or Spanish; aged 18 years or older; and were an established patient at the HIV primary care clinic at which the study was conducted. Patients were excluded if they exhibited active psychosis (n=4), gross cognitive impairment (n=1), or were at risk for suicide (none met this criterion). The Structured Clinical Interview for diagnostic statistical manual of mental disorders (DSM-IV), non-patient version (SCID-I/NP, psychotic screening module)(37) was used to assess active psychosis, and suicidality was determined using the Beck Depression Inventory-II (BDI-II) suicidality item(38). Gross cognitive impairment was assessed using a trail making test (Halstead-Reitan Trails A)(39). If eligible, patients were formally screened into the trial by study counselors, who also administered baseline study assessments. Of the 254 randomized participants, data were missing from three participants on relevant variables, yielding 251 participants for the current analyses. All participants gave written informed consent to participate, and all study procedures were approved by institutional review boards at New York State Psychiatric Institute and the participating HIV primary care clinics.

Measures

All measures used in the current study were collected during patients' regular clinic visit at baseline, prior to participation in any intervention.

Demographic characteristics.—Demographic characteristics included age (in years), gender (male or female), race (Hispanic, White, African American), and high school education (yes or no).

Depression.—The Beck Depression Inventory-II (BDI-II), a widely used self-report measure of depressive symptomatology (40), was used to measure depressive symptoms. Consisting of 21 groups of several distinct statements, a computerized version of the BDI-II asked participants to choose the one statement from each group that best described the way they had been feeling during the past two weeks, including the day the test was administered. Their answers were used to generate an index score. The BDI-II manual(38) suggests that scores of 0 to 13 constitutes minimal depression, 14 to 19 constitutes mild

depression, 20 to 28 constitutes moderate depression, and 29 to 63 constitutes severe depression. Comparing the BDI-II to a 'gold standard' of major depressive disorder assessed by the Composite International Diagnostic Interview (CIDI) using a large cohort of HIV-infected patients, a study has shown that sensitivity and specificity were maximized at a cut-off score of 17(41). For this study, participants were classified as exhibiting depressive symptoms if their BDI-II score was 17 or greater. The BDI-II has demonstrated reliability and validity in previous research(38, 42–45), including among African American patients in a medical setting(46), Spanish-speaking populations(47), and U.S. HIV-infected patients (41).

Alcohol dependence and consumption.—All alcohol variables were assessed with measures from the Alcohol Use Disorders and Associated Disabilities Interview Schedule (AUDADIS-IV)—a fully structured computer-assisted diagnostic interview(48). While the AUDADIS-IV broadly measures substance use and psychiatric disorders, the current study only utilizes the module on alcohol use and alcohol use disorders. In this module, participants were queried about symptom items that assessed DSM-IV AUD diagnoses and drinking measures such as usual quantity of drinks consumed on drinking days in the past year and frequency of daytime drinking on any day of the week in the past year. Consistent with DSM-IV criteria, current alcohol dependence was defined as manifesting 3 or more of the 7 DSM-IV dependence symptoms in the past 12 months. Regular binge drinking and daytime drinking were also assessed. The current study used the same threshold quantity for current binge drinking, as accepted by the Substance Abuse and Mental Health Services Administration (SAMHSA)(49). For the current study, participants were classified as regular binge drinkers if they consumed four or more drinks (for women) or five or more drinks (for men) on average every time they drank in the past 12 months, indicating that they are engaging in binge drinking on a regular basis. To determine whether participants were regular daytime drinkers, they were asked how often they drank during the day, before 3 PM, in the past 12 months. Response categories were from 1–11, representing "every day" to "never in the last year". Participants who drank during the day (including weekdays and/or weekends) once a week or more often in the past 12 months were categorized as regular day drinkers. The alcohol consumption and alcohol use disorder modules of the AUDADIS-IV have demonstrated concurrent validity(50) and good to excellent reliabilities in U.S. clinical(51) and general population samples(52, 53). The Spanish version of the AUDADIS has demonstrated procedural and criterion validity, and good to excellent test-retest reliability in a primary care sample of low-income Puerto Ricans(54).

Statistical Analysis

First, we generated descriptive information (for demographics, alcohol use behaviors) for the full sample, and for depressed and non-depressed subsamples. We evaluated differences between depressed and non-depressed subsamples using chi-squared tests. Finally, to examine the associations between depressive symptoms and alcohol dependence, regular binge drinking, and regular daytime drinking, controlled for demographic covariates, we used three logistic regressions with depression as the predictor and alcohol involvement as the outcome. The logistic regression analyses were conducted using the Proc Logistic procedure in SAS/STAT® software, Version 9.3(55). The models controlled for the following

covariates: age, gender, race, and education. Odds ratios (ORs), adjusted odds ratios (AORs), and 95% Confidence Intervals (95% CIs) were examined. All statistical tests employed an alpha level of 0.05.

RESULTS

Descriptive information

Demographic characteristics of the sample are presented in Table 1. The majority of the participants were male, and African American or Hispanic. Participants were on average 45.6 (s.d. = 8.1) years old, and more than half had completed at least a high school education. Depressed versus non-depressed participants did not differ by any demographic variables except for race/ethnicity (p<0.04), with Hispanics experiencing more depressive symptoms.

The range of BDI-II depression scores was 0 – 53, with a mean score of 11.5 (SD=10.2). Sixty-five participants (26%) scored at or above the BDI threshold of 17, indicating clinically significant depression.

With respect to DSM-IV alcohol dependence, the number of dependence criteria ranged from 0–7, with a mean score of 2.8 (SD=2.5). Nearly half of participants (49%; n = 122) met criteria for alcohol dependence (Table 1). During days that participants drank, the mean number of drinks consumed was 5.7 drinks ($SD = 3.5$). More than half (56%; n = 141) of participants exhibited regular binge drinking behavior, while 44% (n = 110) did not. Nearly half (41%; n=103) of participants exhibited regular daytime drinking, while 59% (n=148) did not. Depressive symptoms were positively associated with all risky alcohol use behaviors in unadjusted analyses (p values   0.01) (Table 2).

Logistic Regressions

In adjusted regression models (Table 2), depressive symptoms were associated with increased risk for alcohol dependence (AOR = 3.8 [95% CI (2.0, 7.2)]), binge drinking (AOR = 2.0 [95% CI (1.1, 3.8)]), and daytime drinking (AOR = 2.2 [95% CI (1.2, 3.8)]).

DISCUSSION

As hypothesized, the results of this study found that depressive symptoms were associated with 12-month alcohol dependence, regular binge drinking, and regular daytime drinking among patients in treatment at an HIV primary care clinic. These findings suggest that, in light of the plethora of deleterious effects that both depression and problem drinking can have on PLWH(1, 9, 11–13, 22), this comorbidity is an important therapeutic target. Both depression and alcohol use have been shown to be associated with decreased medication adherence(1, 8–12) and poor clinical outcomes(13–15, 26–28). Because ART and other medication adherence is vital to survival for PLWH, the findings of this study highlight areas of opportunity for detection of patients at risk for an important comorbidity. It is important to treat these conditions, separately and together, and to evaluate whether such interventions translate into improved health outcomes.

A previous longitudinal study(29) found a significant association between current alcohol dependence and heavy drinking with depressive symptoms among HIV-infected individuals before adjusting for confounding factors. In this previous study, while the association between alcohol dependence and depressive symptoms remained significant in adjusted models, the effect of depression on heavy drinking was no longer significant. The authors noted that this might be due to the fact that their sample had a significant burden of depressive symptoms at baseline, which may have masked the effects of less severe alcohol use on depressive symptoms. While not fully comparable due to differences in controlled variables, the current study reported results to the contrary, highlighting an association between depressive symptoms and two risky alcohol use behaviors that do not in and of themselves constitute alcohol dependence or abuse, potentially indicating a lower threshold for detecting problems before they reach the level of alcohol dependence.

A more recent longitudinal study examined the impact of varying levels of alcohol use on depressive symptoms in a HIV-infected and uninfected study cohort and found alcohol dependence or abuse as well as hazardous and binge drinking to be associated with more depressive symptoms in both groups(56). The current study corroborates some of these findings by reporting an association of depressive symptoms with current alcohol dependence and binge drinking.

The current study has certain limitations. First, our sample consisted of patients from one HIV primary care clinic in New York City, the vast majority of whom were Hispanic or African American, and male. Thus, our findings may not be completely generalizable to other subgroups of the HIV population (e.g., women, White individuals, and non-patients) and to rural and other geographical areas. Additionally, per the inclusion criteria set by the original clinical trial our participants were a part of, our sample consisted of individuals who had engaged in at-risk drinking at least once in the past 30 days. Thus, our sample excludes individuals who never engage in risky drinking, which may pose limitations to generalizability. However, we argue that our findings still have important clinical implications. As both depression and unhealthy alcohol use are prevalent among HIV-infected individuals(2, 5, 6, 11, 22), by highlighting a link between depressive symptoms and risky alcohol use behaviors that are not in and of themselves alcohol dependence, the current study aims to guide primary care providers in identifying and screening patients who are at risk for this dangerous comorbidity and thus to potentially intervene more promptly. Second, our analyses were not longitudinal, and thus we could not make any inferences as to whether risky alcohol use preceded depression or vice versa. Future research should aim to elucidate the issue of temporal sequence. For example, research could clarify whether individuals are drinking to cope with depressive symptoms, or whether individuals' mood may be influenced by alcohol's depressive effects. Third, the BDI-II is not a diagnostic measure, and thus we were not able to definitively diagnose major depressive disorder (MDD). However, the BDI-II is a widely used depression screening measure, found to have high reliability and validity. Additionally, while we used a highly validated and reliable instrument for measuring alcohol dependence and consumption, we had no biological data on alcohol use to corroborate participants' reports. Fourth, future research should be conducted using a sample that includes individuals with limited alcohol use or abstinence to serve as a comparison group, while controlling for a number of additional variables such as

ART status, medication adherence, hepatitis C antibody status, years in HIV primary care, and route of infection. Finally, our daytime drinking variable did not account for day of the week, preventing distinction between weekend drinking (which may be more socially acceptable, i.e., weekend brunch) versus weekday drinking (which may be more disruptive to daily responsibilities), requiring further study. Despite these limitations, this study has several strengths including a large mixed gender sample, an urban HIV primary care setting, a reliable and valid diagnostic interview for measuring alcohol dependence and consumption, and a reliable and valid measure of depressive symptoms.

CONCLUSIONS

The goal of our study was to highlight and further investigate the relationship of depressive symptoms with alcohol dependence and two risky alcohol use behaviors among HIV patients from an urban primary care clinic. Participants who reported depressive symptoms exhibited 3.8 times the odds of alcohol dependence, twice the odds of regular binge drinking and 2.2 times the odds of regular day drinking when compared with participants in the non-depressed group. The implications of this study are widespread. By assessing disruptive drinking behaviors that are indicative of comorbid depressive symptoms, our findings can help providers identify patients who are at risk for this dangerous comorbidity, leading to more prompt intervention and referral as the risky drinking behaviors we have highlighted are likely recognizable or easily screened for in doctor's appointments.

As both depression and unhealthy alcohol use are common among HIV patients, and both have been shown to lead to decreased medication adherence and poor clinical outcomes, treatment plans should be sure to include depression and alcohol screening/treatment as well. The results of our study help illustrate a more complete picture of the relationship between alcohol use and depressive symptoms, and point to specific drinking behaviors that should be evaluated and addressed when developing comprehensive treatment plans for people with HIV/AIDS.

Acknowledgments

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Table I

Demographic Characteristics and Risky Alcohol Use Behaviors of Study Participants[a]

Characteristic	Full Sample (N = 251)	BDI Depressive Symptoms (≥ 17) (n = 65)	Low BDI Depressive Symptoms (<17) (n = 186)	χ^2	p value
Demographic Characteristics	*M (SD)*				
Age	45.6 (8.1)	45.8 (7.9)	45.6 (8.1)	0.01	0.90
	% (N)				
Gender				0.27	0.60
Female	22.3 (56)	28.6 (16)	71.4 (40)		
Male	77.7 (195)	25.1 (49)	74.9 (146)		
Race				6.63	0.04
African American Non-Hispanic	49.4 (124)	20.2 (25)	79.8 (99)		
White Non-Hispanic	5.6 (14)	14.3 (2)	85.7 (12)		
Hispanic	45.0 (113)	33.6 (38)	66.4 (75)		
High School Education Status				0.12	0.73
High School Diploma/GED	58.2 (146)	26.7 (39)	73.3 (107)		
Less than High School	41.8 (105)	24.8 (26)	75.2 (79)		
Risky Alcohol Use Behaviors					
Current DSM-IV Alcohol Dependence	48.6 (122)	36.9 (45)	63.1 (77)	14.94	<0.001
No Current DSM-IV Alcohol Dependence	51.4 (129)	15.5 (20)	84.5 (109)		
Regular Binge Drinking	56.2 (141)	31.9 (45)	68.1 (96)	6.07	0.01
No Regular Binge Drinking	43.8 (110)	18.2 (20)	81.8 (90)		
Regular Day Drinking	41.0 (103)	34.0 (35)	66.0 (68)	5.95	0.01
No Regular Day Drinking	59.0 (148)	20.3 (30)	79.7 (118)		

[a]Study of co-occurrence of risky alcohol use behaviors and depressive symptoms: New York City primary care patients with at-risk drinking (≥ 4 drinks on at least one occasion in the past 30 days) at baseline.

Table II

The Association between Depression and 12-Month DSM-IV Alcohol Dependence, Regular Binge Drinking, and Regular Daytime Drinking among Primary Care Patients Living with HIV[a]

	Odds Ratios (95% CI) DSM-IV Alcohol Dependence		Odds Ratios (95% CI) Regular Binge Drinking		Odds Ratios (95% CI) Regular Day Drinking	
	Unadjusted	Adjusted[b]	Unadjusted	Adjusted[b]	Unadjusted	Adjusted[b]
BDI Depression (>17)						
Yes	3.2 (1.74, 5.81)	3.8 (1.99, 7.20)	2.1 (1.2, 3.8)	2.0 (1.10, 3.78)	2.0 (1.1, 3.6)	2.2 (1.18, 3.83)
No		ref		ref		ref

[a]Unadjusted and adjusted logistic regression models and 95% confidence intervals

[b]Adjusted models controlled for gender, age, race, and high school education (yes versus no)