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Risk Factors for Drinking among HIV-Positive African American Adults: The Depression–Gender Interaction

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Abstract

Background—Alcohol misuse disproportionately affects people living with HIV. People who struggle with alcohol are also likely to be concurrently struggling with depression. Although there is evidence linking depression to HIV, depression to alcohol, and alcohol to HIV, there is limited research that simultaneously examines the interlocking associations between all three factors.

Objective—To investigate the interaction between depression symptomatology and gender on alcohol misuse, while controlling for motivation to reduce drinking, among HIV-positive African Americans. This population was examined because of their increased risk for developing alcohol dependence.

Methods—Data analysis was conducted on baseline survey data of HIV-positive African American adults ($N = 88$) who drink and were enrolled in the Project PLUS (Positive Living through Understanding and Support) intervention to examine the correlates (i.e., gender, motivation, depression) of drinking in the past 30 days.

Results—Hierarchical linear regression analysis showed a significant interaction between gender and depression to predict total drinks reported ($R^2 = .56$, $p < .001$). While depression was the sole predictor of drinking for men and suppressed the role of motivation, the reverse was true for women; depression was not a significant predictor after controlling for motivation to reduce drinking.

Conclusion—African American men and women living with HIV have different risk factors for recent drinking.

Scientific significance—Understanding the link between depression, gender, and motivation to reduce drinking for HIV-positive adults with alcohol problems is crucial for the development of gender and culturally relevant treatments.

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Declaration of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

Keywords

alcohol; African Americans; HIV; depression; gender

Alcohol misuse and HIV are a common co-occurrence (1). Previous research has shown that the abuse of alcohol by HIV-positive individuals has been linked to HIV disease progression through a mediational path, such that alcohol is often strongly associated with liver decomposition (2) and poor medication adherence (3,4). African Americans are disproportionately affected by HIV and the alcohol misuse rates among African Americans are not declining.

Mulia et al. (5) found that although African Americans and Hispanic drinkers had lower rates of alcohol use, they had higher rates of alcohol dependence in comparison to white Americans. At higher levels of alcohol use severity, African Americans were found to be less likely than white Americans to seek treatment for alcohol use (6). As the rates of alcohol misuse remain stable for African Americans (especially for men) (7,8) and the rates for new HIV infections continue to steadily rise amongst this racial group, research must focus on how to treat alcohol misuse among HIV-positive African Americans. Attention to the co-occurrence of alcohol misuse and HIV must also include research on the psychosocial and demographic factors that may increase an HIV-positive person's risk for drinking despite the possible health complications that it poses.

African Americans who struggle with alcohol are also likely to be concurrently struggling with depression (9). One study found that dually diagnosed individuals may have been ready to change their drinking but were not always ready to address their mental health (10). These findings underscore the importance in considering how mental health influences the behavior change process.

Gender differences have been well documented in depression research (11); women are likely to report higher levels of depression in comparison to men. Gender differences are also more pronounced when race is considered (12,13); for African Americans in comparison to whites, African American women are more likely to consistently report the highest levels of depression across the life span. The relationship between gender and depression is also strengthened by the context of alcohol use. Among alcohol abusers, African American women have greater levels of depression than men (13). Depression is also higher for African Americans, especially women (14) who have an HIV-positive diagnosis. Rates of depression among HIV-positive men and women have been found to be as high as 20% (15). Research should be extended to investigate how gender affects the relationship between alcohol and depression among HIV-positive African Americans.

The current study examines alcohol consumption in a 30-day period by African Americans who are living with HIV and have known alcohol problems. This study attempts to understand the interaction between depression and gender on alcohol misuse, while controlling for motivation to reduce drinking. Motivation to change and its relationship with alcohol use have been studied extensively (16) and the various multidimensional aspects of motivation (e.g., intention and self-efficacy) have been directly linked to drinking behaviors in various populations (17). Early research by DiClemente and Prochaska (18) found that a person's motivation to reduce substance use was one of the critical factors related to the actual reduction of problem behaviors. Although motivation has been cited frequently as a main contributor to the reduction of alcohol consumption, the purpose of this study is to investigate the influence of depression symptomatology while controlling for motivation on alcohol misuse within the intersecting contexts of race, gender, and HIV.

METHODS

Participants

Data analysis was conducted on the baseline data of 88 HIV-positive African American adults who met the criteria for alcohol dependence (determined through the Alcohol Use Disorders Identification Test (AUDIT) (19)) or hazardous drinking (16 standard drinks per week for men or 12 standard drinks per week for women (20)) enrolled in the Project PLUS (Positive Living through Understanding and Support) intervention trial, geared at decreasing alcohol use and increasing highly active antiretroviral therapy (HAART) adherence. For a complete discussion of Project PLUS participants, refer to (21) (Measure). This sample consisted of 40 females (45.5%) and 48 (54.5%) males. The overall average age for the participants was 46.16 (SD = 6.33). The majority of participants (average was 73% across the types of drugs listed, including but not limited to cocaine, coke, heroin, opiate, and marijuana) in this sample did not report any drug use in the last 6 months.

Procedure

Briefly, for the larger PLUS study a total of 311 participants were recruited from July 2002 to August 2005, through a variety of strategies, including flyers placed in clinic waiting rooms and active recruitment at HIV-related community events throughout the New York City area. The following were the criteria used for the study: being HIV-positive, at least 18 years of age, English speaking, and having alcohol problems greater than those associated with other drugs. Participants were all prescreened using the AUDIT and self-reported whether they felt that their alcohol problems were their most significant substance abuse issues. Only participants who indicated that their alcohol abuse was their greatest problem and met all other criteria were enrolled in the study. Participant usages on nine types of drugs were asked as part of the screening and baseline interview. A general assessment for mental health, such as the Structured Clinical Interview for DSM-IV Axis I or II Disorders (SCID), was not used. All study participants gave written informed consent, and all study procedures were reviewed and approved by the Institutional Review Board of Hunter College.

All participants underwent a baseline interview and assessment, which measured sociodemographic and biopsychosocial variables such as recent alcohol use, depression, motivation to reduce drinking, viral load, and CD4 counts. The majority of the assessment was completed on an audio computer-assisted self-interview (ACASI) in which the participant responded to questions on a computer screen that they could either read or listen to with headphones.

Measures

The primary measures for these analyses were biological and self-report measures of drinks consumed, depression, and motivation to reduce drinking.

Sample Characteristics—Participants self-reported their gender. For the purpose of these analyses gender was restricted to those who identified themselves as being either biologically male or female. Participants were also asked to report their age.

Drinking—Participants were asked how many drinks they consumed in the last 30 days using the timeline follow-back technique for assessing past alcohol consumption outlined by Sobell and Sobell (22). The number of drinks reported was then summed into a single variable.

Biological Measures—All blood draws were conducted on-site by a certified phlebotomist and were analyzed by Specialty Laboratories (Santa Monica, CA, USA). HIV viral load was measured by reverse transcriptase polymerase chain reaction (RT-PCR) using the HIV-1 Ultraquant assay (Specialty Laboratories), and results were log-transformed to adjust for skew. CD4 cell counts were measured by flow cytometry.

Motivation to Reduce Alcohol—Motivation was operationalized to be self-efficacy for not drinking and intentions to reduce alcohol consumption. Self-efficacy was assessed using the *Alcohol Abstinence Self-Efficacy (AASE) scale* (23), which is a brief 20-item psychometrically validated measure with four subscales (negative affect, social/positive, physical and other concerns, and withdrawal and urges), each containing five items that measure confidence for alcohol abstinence. The response to each item is based on a 5-point scale (1 = *not at all* and 5 = *extremely*). Participants are asked to rate how confident they are that they would not drink in situations such as *When I feel depressed* and *When I am experiencing some physical pain or injury*. The participant's mean scale score was used in subsequent analyses. Mean scores for drinking self-efficacy ranged from 1 to 4.90.

Intentions to reduce drinking were assessed using the *University of Rhode Island Change Assessment (URICA) scale*. The 25-item modified scale was adapted from the original 32-item self-report measure (24) that includes four subscales measuring the stages of change: pre-contemplation, contemplation, action, and maintenance. Responses are given on a 5-point Likert scale (1 = *strongly disagree* and 5 = *strongly agree*). Sample items for this scale include *I am finally doing some work on my problem* and *I've been thinking that I might want to change something about myself*.

Depression Symptomatology—The 20-item *Center for Epidemiologic Studies-Depression (CES-D) scale*, self-report inventory of depressive symptoms (25), was used to assess participants' levels of depression. The CES-D scale can be used as an indicator of "clinical" depression through the use of cutoff scores; it is also effective as a continuous measure to assess the amount of depressive symptoms (26,27). Responses are given on a 4-point Likert scale (1 = *rarely or none of the time* and 4 = *Most or all of the time*). Higher sum scores indicate more depressive symptoms. Example items include *I was bothered by things that usually don't bother me* and *I felt depressed*. Participants are asked to rate how often they have felt this way for each item in the last 3 months.

Analytic Overview

A two-part analytic approach was used. First, bivariate associations with the outcome variable, the number of drinks reported in the last 30 days, were done by conducting Pearson's product-moment *r*-tests, and point biserial *r*-tests. Next a hierarchical regression analysis was used to assess the moderation effect of gender on depression symptomatology, while controlling for motivation to reduce drinking all on the number of drinks reported in the last 30 days.

RESULTS

Correlates of Number of Drinks Reported

Pearson's product-moment *r*-tests were conducted to examine relationships among total number of drinks reported in the last 30 days, psychological variables, and biological variables. Depression ($r = .64, p < .001$), drinking self-efficacy ($r = -.36, p < .001$), and intention to reduce drinking ($r = .25, p < .05$) were all significantly related to the total number of drinks reported in the last 30 days. A point biserial *r*-test was used to assess the relationship between gender (males = 1) and total number of drinks reported, $r_{pb} = .23 (p < .$

05). Contrary to previous findings, males ($m = 42.40$; $SD = 25.96$) reported significantly higher levels of depression than females ($m = 31.25$; $SD = 20.96$). Neither CD4 count ($r = .07$, $p > .05$) nor log viral load ($r = .07$, $p > .05$) was related to the number of drinks consumed in the last 30 days. However, CD4 count was significantly related to viral load ($r = -.39$, $p < .001$), self-efficacy to reduce drinking ($r = .05$, $p > .01$), intention to reduce drinking ($r = .25$, $p > .05$), and gender ($r_{pb} = -.24$, $p < .05$). Females ($m = 557.73$; $SD = 369.68$) in this sample had higher CD4 counts than males ($m = 407.27$; $SD = 229.76$) (Table 1).

Multivariate Analysis to Predict Total Drinks Reported

Hierarchical linear regression analysis was used to investigate how much the interaction between gender (1 = male) and depression contributed to the model to predict total drinks reported over and above participants' biological and psychological characteristics, such as the motivation to reduce drinking variables. Using simultaneous entry at each step, a significant model was achieved in four steps. Gender was a significant predictor in the initial step; however, it did not remain significant in the following steps. Both measures of motivation were significant: self-efficacy to reduce drinking ($\beta = -.33$; 95% CI = -14.13 to -3.68) and intention to reduce drinking ($\beta = .24$; 95% CI = $.16$ – 1.54) when entered into the second step. The motivation variables remained significant throughout the following steps. The final step yielded an R^2 of 56% with an R of $.75$ ($F(5, 82) = 21.02$, $p < .001$); the interaction between gender and depression had an R^2 change of 4.3% and was the largest contributor to the final model ($\beta = .34$; 95% CI = $.30$ – 1.72) (Table 2).

Figure 1 shows the interaction of gender by depression for total number of drinks reported in the last 30 days. Men with high levels of depression reported the highest number of drinks in the past 30 days in comparison to men with less than average depression scores. However, women were more likely to report consuming more drinks when they had less than average depression scores when compared to women who were above the average. To further explore the effects of the interaction in the overall model, the modified regression model (motivations to change were entered in Step 1 followed by depression in Step 2) was run for each gender separately; depression was the sole significant predictor for the total number of drinks reported for men. For women, the second step for depression did not significantly contribute to the model once motivations to reduce drinking behavior variables were controlled.

DISCUSSION

The current study found that there is a significant interaction between gender and depression when predicting the number of drinks consumed in the past 30 days by HIV-positive African American adults with drinking problems. Figure 1 showed a pattern whereby men who were above the sample mean for depression symptomatology were the most likely to report consuming the most drinks in the past 30 days. Women who were above the sample mean for depression symptomatology, however, reported the least amount of drinks. A closer examination of the effects of the interaction revealed that when the regression analysis was restricted to just the men, depression symptomatology was the most significant predictor of self-reported drinking, regardless of their motivation to reduce drinking. In fact, when depression symptomatology was introduced in the second step of the model, motivations to reduce drinking variables were no longer significant. Thus, depression symptomatology for African American men mediates the relationship between motivation and drinking. In contrast for the African American women the findings were in the opposite direction depression symptomatology added no statistically significant power to the model in the second step after the relationship among motivation to reduce drinking variables and the number of drinks consumed was accounted for.

A limitation to this current study is the reliance on cross-sectional data. Analyses were conducted only on baseline data; the only conclusion to be made is that recent drinking is related to current depression symptomatology and motivation to change. HIV and alcohol abuse are both chronic conditions; to more thoroughly assess how depression symptomatology and motivation to reduce drinking work within a sample of HIV-positive adults, a longitudinal approach may be more informative. While the lack of longitudinal data is a limitation, the statistical strength of the current model clearly indicates a relationship among depression symptomatology, gender, and motivation to reduce drinking for this population. Future research should examine the moderating role of gender on the relationship between depression and alcohol over time. Other potential limitations include the instability of the results due to the sample size. Despite the sample size the regression analysis resulted in a significant amount of variance explained. The current model also adds to the growing discourse on the association between mental health struggles and substance use. Further research should include a comprehensive mental health screener to thoroughly dissect the relationship between mental health and substance use for this specific population. The primary purpose of the parent study, PLUS, was to investigate the role of hazardous drinking on HAART adherence rates; participants were screened for significant drinking problems that they reported to be greater than any other drug use. Although other forms of substance use were captured at assessment, they were not included in this particular model. Future research should also examine whether the concurrent use of alcohol and other drugs alters the relationship between depressive symptoms and recent alcohol use.

In conclusion, African American men and women living with HIV have differential models of risk with regard to recent drinking problems. Understanding the link between mental health and substance using HIV-positive adults is of utmost importance, especially for populations of color who have the fastest growing new infection rates (28). These findings also have major implications regarding the types of treatments and therapies made available in the African American community for those living with HIV. For African Americans, gender should not be overlooked when assessing which commonly used therapeutic treatments (such as cognitive behavioral therapy or motivational interviewing) should be implemented when working toward reducing hazardous health behaviors.

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Figure 1.
The interaction between gender and depression symptomatology for drinking.

TABLE 1Psychological and biological correlates of the number of drinks reported ($N = 88$).

	1	2	3	4	5	6	7	8
1. Drinks reported in 30 days								
2. CD4 count	.07							
3. Log viral load	.07	-.39***						
4. Depression symptomatology	.64***	-.07	.09					
5. Self-efficacy to reduce drinking	-.36***	.05**	.07	-.25*				
6. Intention to reduce drinking	.25*	.25*	.19	.05	-.01			
7. Age	.04	.13	.00	-.01	.04	.17		
8. Gender (1 = male)	.23*	-.24*	.16	.06	-.19	.07	.14	
Mean	37.36	473.08	3.39	18.36	2.71	33.26	46.16	
SD	24.62	309.86	1.37	10.60	.92	6.89	6.33	

Notes: SD, standard deviation.

* $p < .05$,** $p < .01$,*** $p < .001$.

TABLE 2

How motivation to reduce drinking, gender, and depressive symptomatology influence drinks consumed for black HIV-positive adults.

	Demographics			Motivation to reduce drinking			Depression			Gender × depression		
	B	Beta	95%CI	B	Beta	95%CI	B	Beta	95%CI	B	Beta	95%CI
Model <i>F</i>	4.78 *			7.69 ***			22.38 ***			21.02 ***		
df	86			84			83			82		
<i>R</i>	.23			.46			.72			.75		
<i>R</i> ² change	.05 *			.16 ***			.30 ***			.04 **		
<i>R</i> ²	.05			.22			.52			.56		
Constant	31.25 ***		23.76–38.74	29.20		1.30 to 57.10	–1.57		–25.12 to 21.97	8.42		–15.27 to 32.11
Gender (1 = male)	11.15 *	.23	1.01–21.28	7.23	.15	–2.30 to 16.77	6.86	.14	–.66 to 14.37	6.65		–.57 to 13.87
Self-efficacy to reduce drinking				–8.91 ***	–.33	–14.13 to 3.68	–5.21 *	–.20	–9.45 to 0.97	–6.15 **		–10.27 to 2.02
Intention to reduce drinking				.85 *	.24	.16 to 1.54	.75 **	.21	.21 to 1.29	.87 ***		.35 to 1.40
Depression symptomatology							1.32 ***	.57	.96 to 1.68	.67 *		.11 to 1.25
Gender (1 = male) × Depression										1.01 **		.30 to 1.72

* $p < .05$,

**

$p < .01$,

$p < .001$.