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To cite this article: Lorra Garey, Jafar Bakhshaie, Carla Sharp, Clayton Neighbors, Michael J. Zvolensky & Adam Gonzalez (2015) Anxiety, depression, and HIV symptoms among persons living with HIV/AIDS: the role of hazardous drinking, *AIDS Care*, 27:1, 80-85, DOI: [10.1080/09540121.2014.956042](https://doi.org/10.1080/09540121.2014.956042)

To link to this article: <http://dx.doi.org/10.1080/09540121.2014.956042>



Published online: 16 Sep 2014.



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## Anxiety, depression, and HIV symptoms among persons living with HIV/AIDS: the role of hazardous drinking

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(Received 21 March 2014; accepted 13 August 2014)

Hazardous drinking is common among persons living with HIV/AIDS (PLWHA) and associated with numerous negative health consequences. Despite the well-established negative effects of hazardous drinking among PLWHA, scholarly work has neglected to explore the role of such drinking in regard to anxiety/depressive symptoms and HIV symptom expression. The current study investigated associations between hazardous drinking and anxiety/depressive symptoms and HIV symptoms among PLWHA. Participants ( $n = 94$ ; 88.3% male;  $M_{\text{age}} = 48.55$ ;  $SD = 9.15$ ) included PLWHA recruited from AIDS service organizations in the northeast. Hazardous drinking was significantly associated with anxiety/depressive symptoms and HIV symptom expression above and beyond the variance accounted for by sex, race, recruitment site, and CD4 T-Cell count, as well as other cognitive-affective variables (emotion dysregulation, distress intolerance, and anxiety sensitivity). The present results provide empirical support that hazardous drinking is indeed related to depressive and anxiety symptoms as well as HIV symptom distress and that this effect is not attributable to other factors commonly related to both alcohol use problems and emotional distress among PLWHA. Results highlight the importance of alcohol interventions for excessive drinking specifically tailored for PLWHA to facilitate better mental and physical health adjustment.

**Keywords:** HIV symptoms; anxiety; depression; hazardous drinking; AIDS

Hazardous drinking is common among persons living with HIV/AIDS (PLWHA; Conigliaro, Justice, Gordon, & Bryant, 2006). Among PLWHA, hazardous drinking is associated with numerous HIV negative health behaviors (Braithwaite et al., 2005; Gonzalez, Barinas, & O'Cleirigh, 2011; Palepu, Horton, Tibbetts, Meli, & Samet, 2004; Parienti et al., 2004; Samet, Horton, Meli, Freedberg, & Palepu, 2004; Shuper, Joharchi, Irving, & Rehm, 2009; Stein et al., 2005; Vidrine, Marks, Arduino, & Gritz, 2012). Based on such findings, scholars suggest that hazardous drinking may contribute to premature death among PLWHA (Galvan et al., 2002).

Less scientific attention, however, has focused on the role of hazardous drinking in regard to anxiety/depressive symptoms or HIV symptom distress (HIV-SD) among PLWHA. One study found that heavy drinking significantly predicted the likelihood of anxiety and/or depressive disorders (Bing et al., 2001). Other work suggests PLWHA may engage in hazardous drinking to help relieve subjective HIV-SD (Chander, Lau, & Moore, 2006; Kaplan, Marks, & Mertens, 1997). Yet, it is unclear whether hazardous drinking among PLWHA is related to elevated anxiety/depressive symptoms or HIV-SD. Moreover, because other cognitive-affective vulnerability factors (Brandt, Gonzalez, Grover, & Zvolensky, 2013; Brandt, Zvolensky, & Bonn-Miller, 2013; Gonzalez, Zvolensky, Parent, Grover, & Hickey, 2012) have

been linked to substance use problems and anxiety/depressive disorders as well as HIV-SD among PLWHA, it is important to establish the clinical significance of hazardous drinking by virtue of its incremental predictive validity relative to these factors.

Drawing from negative reinforcement models of drug dependence (e.g., Koob & Le Moal, 2001), some PLWHA may use alcohol to escape or delimit aversive emotional or physical symptoms. Subsequently, such drinking may become a primary motivational goal in negative reinforcement self-regulation, possibly contributing to hazardous drinking. From this perspective, hazardous drinking may offer unique explanatory value regarding anxiety/depressive symptoms and HIV-SD among PLWHA. To test this hypothesis, we evaluated hazardous drinking in relation to anxiety and depressive symptoms and HIV-SD after adjusting for sex, race, recruitment site, CD4 T-Cell count, and cognitive-affective variables (i.e., emotion dysregulation, distress intolerance, and anxiety sensitivity) associated with substance use problems and anxiety/depressive disorders as well as HIV-SD.

### Methods

#### Participants

PLWHA ( $n = 94$ ; 88.3% male;  $M_{\text{age}} = 48.55$ ;  $SD = 9.15$ ) were recruited from AIDS service organizations (ASOs)

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and hospital-based medical clinics in Vermont and New Hampshire (VT/NH) as well as New York City (NYC). Participants were eligible if they were at least 18-years-old and self-reported a diagnosis of HIV/AIDS. Exclusion criteria for the current analyses included being a non-drinker; 48 participants were excluded based on this criterion. Eligible participants provided informed consent and completed a self-report battery. Participants received \$25 for their time. The Institutional Review Board at each study site approved the study protocol; all study procedures and treatment of human subjects were conducted in compliance with ethical standards of the American Psychological Association.

### Measures

#### Demographics and Medical History Questionnaire

This questionnaire assessed sex, age, race, educational level, recruitment site, and income as well as medical information, including HIV/AIDS status and most recent CD4 T-Cell count.

#### Inventory of Depression and Anxiety Symptoms

The Inventory of Depression and Anxiety Symptoms (IDAS; Watson et al., 2007) is a 64-item self-report measure indexing symptoms of anxiety and depression. Items are rated by participants on Likert-type scale (1 = *not at all* to 5 = *extremely*). In the current study, the general depression subscale served as an index of depressive symptoms, and the panic and social anxiety subscales served as indicators of anxiety (Watson et al., 2007). The IDAS subscales showed good internal consistency (Cronbach's  $\alpha$ 's observed range: 0.78–0.91).

#### Alcohol Use Disorders Identification Test

The Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, & Grant, 1993) total score was dichotomized to index hazardous drinking. Hazardous drinking was indexed by an AUDIT score of more than 8 and non-hazardous drinking was indexed by AUDIT score of 8 or less (Saunders et al., 1993). The AUDIT consistently demonstrates good psychometric properties (Reinert & Allen, 2002; Saunders et al., 1993). Internal consistency of the AUDIT was good (Cronbach's  $\alpha = 0.86$ ).

#### Distress Tolerance Scale

The Distress Tolerance Scale (DTS; Simons & Gaher, 2005) is a 15-item self-report scale on which respondents indicate on a 5-point Likert-type scale (1 = *strongly agree* to 5 = *strongly disagree*) the extent to which they perceive they can tolerate distressing emotional states (Simons & Gaher, 2005). The DTS total evidenced good internal consistency (Cronbach's  $\alpha = 0.89$ ).

Table 1. Demographic characteristics of participants.

Dimension	<i>N</i>	Non-hazardous drinkers ( <i>N</i> = 65)	Hazardous drinkers ( <i>N</i> = 29)	$\chi^2$	<i>p</i>
<i>Sex</i>					
Male	84	60	24	1.923	.17
Female	10	5	5		
<i>Race</i>					
White	40	27	13	0.089	.77
Non-White	54	38	16		
<i>Recruitment site</i>					
VT/NH	39	28	11	0.219	.64
NYC	55	37	18		
<i>AIDS diagnosis</i>					
No	44	29	15	0.798	.37
Yes	47	35	12		
<i>Cigarette use</i>					
No	50	37	13	1.178	.28
Yes	44	28	16		
<i>Marijuana use</i>					
No	33	23	10	0.007	.93
Yes	61	42	19		

Note: *N* = 94; group frequencies presented according to drinking status. VT/NH = Vermont/New Hampshire; NYC = New York City; AIDS Diagnosis "No" = self-reported HIV+; AIDS Diagnosis "Yes" = self-reported AIDS.

#### Difficulties in Emotion Regulation Scale

The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) was used to assess emotional dysregulation. This scale consists of 36 items, rated on a 5-point Likert-type scale (1 = *almost never*, 5 = *almost always*). The combined score of these items comprises a

Table 2. Mean differences between drinking status.

Construct	Non-hazardous drinkers	Hazardous drinkers	<i>t</i>	<i>p</i>
	Mean ( <i>SD</i> )	Mean ( <i>SD</i> )		
DTS	44.23 (12.30)	39.34 (12.14)	1.79	.077
DERS	86.21 (25.63)	103.07 (24.01)	-3.00	.003
Anxiety sensitivity	24.77 (16.90)	32.26 (18.40)	-1.93	.057
General depression	41.92 (13.40)	52.32 (16.03)	-3.58	.001
Panic	12.00 (5.07)	16.24 (7.00)	-3.32	.001
Social anxiety	9.26 (3.73)	12.45 (4.38)	-3.63	<.001
HIV symptom distress	27.15 (16.11)	38.41 (15.73)	-3.15	.002

Note: *N* = 94.

DTS = Distress Tolerance Scale total score; DERS = Difficulties in Emotion Regulation Scale total score; Anxiety sensitivity = Anxiety Sensitivity Index-III total score; General depression = Inventory of Depression and Anxiety Symptoms subscale; Panic = Inventory of Depression and Anxiety Symptoms subscale; Social anxiety = Inventory of Depression and Anxiety Symptoms subscale.

Table 3. Study variable point-zero correlations, means, and standard deviations.

	1	2	3	4	5	6	7	8	9	10	11	12
(1) Sex	–											
(2) Race	–0.17	–										
(3) Recruitment site	–0.18	0.67***	–									
(4) CD4 T-Cell	0.02	0.02	0.01	–								
(5) Hazardous drinking	0.08	–0.03	0.05	0.04	–							
(6) DTS	–0.21*	0.02	–0.08	0.06	–0.18	–						
(7) DERS	0.12	0.06	0.18	–0.12	0.30**	–0.68***	–					
(8) ASI-3	0.04	0.12	0.25*	–0.01	0.20	–0.48***	0.62***	–				
(9) General depression	0.31**	0.02	–0.02	–0.13	0.35**	–0.60***	0.65***	0.44***	–			
(10) Panic	0.12	0.24*	0.24*	–0.14	0.33**	–0.40***	0.42***	0.47***	0.59***	–		
(11) Social anxiety	0.25*	0.01	0.03	–0.09	0.35***	–0.48***	0.65***	0.46***	0.78***	0.64***	–	
(12) HIV symptom distress	0.15	–0.01	–0.09	–0.13	0.31**	–0.42***	0.50***	0.34**	0.56***	0.53***	0.50***	–
Mean (or %)	88.3 (Male)	42.5 (White)	41.5 (VT)	0.59	1.31	42.72	91.41	27.10	45.44	13.34	10.25	30.65
SD	–	–	–	0.50	0.46	12.39	26.21	17.62	15.12	6.02	4.12	16.70

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .Note:  $N = 94$ .

Sex: 1 = Male and 2 = Female; Race: 1 = White and 2 = Other; Recruitment site: 0 = VT/NH and 1 = NYC; Hazardous drinking: 0 = No and 1 = Yes; DTS = Distress Tolerance Scale total score; DERS = Difficulties in Emotion Regulation Scale total score; Anxiety sensitivity = Anxiety Sensitivity Index-III total score; General depression = Inventory of Depression and Anxiety Symptoms subscale; Panic = Inventory of Depression and Anxiety Symptoms subscale; Social anxiety = Inventory of Depression and Anxiety Symptoms subscale; HIV symptom distress = AIDS Clinical Trials Group Symptoms Distress Module total score.

global index of emotion dysregulation (Gratz & Roemer, 2004). The DERS demonstrated good internal consistency (Cronbach's  $\alpha = 0.90$ ).

#### Anxiety Sensitivity Index-III

The Anxiety Sensitivity Index-III (ASI-3; Taylor et al., 2007) assesses sensitivity and fear regarding anxiety-related sensations. Respondents report, on Likert-type scale (0 = *not at all* to 4 = *very much*), the degree they are concerned about possible negative consequences of anxiety-related sensations. The ASI-3 showed excellent internal consistency (Cronbach's  $\alpha = 0.95$ ).

#### AIDS Clinical Trials Group Symptoms Distress Module

The AIDS Clinical Trials Group Symptoms Distress Module (ACTG-SDM; Justice et al., 2001) measured HIV-SD. Participants respond to 20 symptoms using a Likert-type scale (0 = *I do not have this symptom* to 4 = *It bothers me a lot*) to what extent they experience distress related to each item. This scale has demonstrated good construct validity (Justice et al., 2001). Items' responses were summed to index HIV-SD. The ACTG-SDM evidenced good internal consistency in the current sample (Cronbach's  $\alpha = 0.92$ ).

Table 4. Hierarchical regression analyses predicting psychiatric and HIV symptoms.

Criteria	Adj. $R^2$	Predictors	$B$	SE $B$	$t$	$\beta$	$Sr^2$	$F$
<i>General depression</i>								
Step 1	.08	Sex	13.29	4.19	3.17**	.32	.32	2.97*
		Race	2.74	4.11	0.67	.09	.07	
		Recruitment site	-0.54	4.13	-0.13	-.02	-.01	
		CD4 T-Cell count	-0.01	0.01	-1.37	-.14	-.14	
Step 2	.50	Distress tolerance	-0.30	0.13	-2.42*	-.25	-.18	14.06***
		Emotion dysregulation	0.24	0.07	3.69***	.42	.27	
		Anxiety sensitivity	0.08	0.08	0.91	.09	.07	
Step 3	.52	Hazardous drinking	5.95	2.46	2.41*	.18	.17	13.72***
<i>Panic</i>								
Step 1	.08	Sex	3.04	1.67	1.83	.19	.18	3.13*
		Race	2.01	1.63	1.23	.17	.12	
		Recruitment site	2.00	1.64	1.22	.16	.12	
		CD4 T-Cell count	0.00	0.00	-1.50	-.15	-.15	
Step 2	.28	Distress tolerance	-0.09	0.06	-1.54	-.19	-.14	6.16***
		Emotion dysregulation	0.01	0.03	0.39	.05	.03	
		Anxiety sensitivity	0.11	0.04	2.75**	.32	.24	
Step 3	.33	Hazardous drinking	3.13	1.16	2.69**	.24	.23	6.69***
<i>Social anxiety</i>								
Step 1	.04	Sex	3.09	1.19	2.61*	.27	.27	1.91
		Race	0.15	1.16	0.13	.02	.01	
		Recruitment site	0.56	1.17	0.48	.07	.05	
		CD4 T-Cell count	0.00	0.00	-0.94	-.10	-.10	
Step 2	.43	Distress tolerance	-0.01	0.04	-0.15	-.02	-.01	11.00***
		Emotion dysregulation	0.09	0.02	4.60***	.56	.36	
		Anxiety sensitivity	0.03	0.02	1.25	.13	.10	
Step 3	.45	Hazardous drinking	1.56	0.73	2.13*	.17	.16	10.59***
<i>HIV symptom distress</i>								
Step 1	.01	Sex	6.60	4.81	1.37*	.14	.14	1.21
		Race	3.88	4.71	0.82	.12	.09	
		Recruitment site	-4.80	4.74	-1.01	-.14	-.11	
		CD4 T-cell count	-0.01	0.01	-1.33	-.14	-.14	
Step 2	.26	Distress tolerance	-0.18	0.17	-1.07	-.13	-.10	5.71***
		Emotion dysregulation	0.24	0.09	2.73**	.38	.24	
		Anxiety sensitivity	0.09	0.11	0.79	.09	.07	
Step 3	.29	Hazardous drinking	7.11	3.32	2.14*	.20	.19	5.78***

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

Note:  $N = 94$ .

Sex: 1 = Male and 2 = Female; Race: 1 = White and 2 = Other; Recruitment site: 0 = VT/N Hand 1 = NYC; Distress tolerance = Distress Tolerance Scale total score; Emotion dysregulation = Difficulties in Emotion Regulation Scale total score; Anxiety sensitivity = Anxiety Sensitivity Index-III total score; Hazardous drinking: 0 = No and 1 = Yes; General depression = Inventory of Depression and Anxiety Symptoms subscale; Panic = Inventory of Depression and Anxiety Symptoms subscale; Social anxiety = Inventory of Depression and Anxiety Symptoms subscale; HIV symptom distress = AIDS Clinical Trials Group Symptoms Distress Module total score.

## Results

First, descriptive data (see Tables 1 and 2) and zero-order correlations (see Table 3) among study variables were examined. Second, the incremental validity of hazardous drinking status was examined using hierarchical multiple regressions (Cohen & Cohen, 1983), with general depression (Model 1), panic (Model 2), social anxiety (Model 3) IDAS subscales, and HIV-SD (Model 4) as criterion. At Step 1, sex, race, recruitment site, and CD4 T-Cell count were entered. At Step 2, DTS, DERS, and ASI-3 were entered. At Step 3, hazardous drinking status was entered. Table 4 presents details of the multiple regression analyses for the IDAS subscales and HIV-SD.

Results from Model 1 with general depression as the criterion showed that additional variance was explained in the outcome with each step. Importantly, hazardous drinking was a significant predictor and explained an additional 2% of the variance after it was added. Results from Model 2 with panic as the criterion showed that additional variance was explained in the outcome with each step. Again, hazardous drinking was a significant predictor and explained an additional 5% of the variance after it was added. Results from Model 3 with social anxiety as the criterion showed that additional variance was explained in the outcome with each step. Hazardous drinking was a significant predictor and explained an additional 2% of the variance after it was added. Results from Model 4 with HIV-SD as the criterion showed that additional variance was explained in the outcome with each step. Hazardous drinking emerged as a significant predictor and explained an additional 3% of the variance after it was added.

## Discussion

As predicted, hazardous drinking was significantly associated with a broad array of negative emotional symptoms. This relation emerged after controlling for cognitive-emotional factors. These findings, in conjunction with past research (Chander et al., 2006; Kaplan et al., 1997), suggest hazardous drinking is related to depressive and anxiety symptoms as well as HIV-SD, and that this effect is not attributable to other factors commonly related to both HIV and alcohol use problems. Clinically, the present findings underscore the importance of assessing hazardous drinking among PLWHA and utilizing evidenced-based alcohol treatments to facilitate better mental health and physical health adjustment. Future work is needed to explicate the mechanisms underlying these effects, including motivational bases of drinking (e.g., drinking to cope with HIV or other problematic symptoms; Chander et al., 2006).

There are several limitations of the present study. First, the sample was limited in terms of age and sex. While men

comprise a large percent of the population with HIV/AIDS (Centers for Disease Control and Prevention [CDC], 2013), future studies would benefit from examining more heterogeneous samples of PLWHA. Second, the study employed a cross-sectional design. Future work is needed to examine possible mediating and moderating factors for the observed associations and aim to prospectively explicate directional effects of the observed relations. Third, self-report measures were employed to assess studied constructs. Future research could modify this approach by utilizing multi-method approaches.

Overall, the present study provides initial empirical support for the role of hazardous drinking in regard to a relatively broad array of negative affect states and HIV physical symptoms among PLWHA. The continued study of hazardous drinking among PLWHA may be fruitful in efforts to improve our understanding of aversive mental and physical symptoms among PLWHA.

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