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Social support modifies the association between hazardous drinking and depression symptoms among ART clients in Vietnam

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Abstract

Introduction: Hazardous drinking is widespread among people with HIV (PWH). PWH are also vulnerable to depression due to HIV-related social stigma, and social support can play an important role in improving mental health for this population. No studies have explored whether

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Conflict of Interest

No conflict declared

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social support modifies the association of hazardous drinking and depressive symptoms among PWH.

Methods: We used baseline data from a randomized controlled trial of two evidence-based alcohol reduction interventions among antiretroviral therapy clients in Vietnam. Hazardous alcohol use was defined as having a score ≥ 8 for men and ≥ 7 for women on the Alcohol Use Disorders Identification Test. The presence of depression symptoms was defined as a score ≥ 5 on the Patient Health Questionnaire-9. Social support was measured with a 5-question modified version of the Medical Outcomes Study Social Support Instrument. Crude (CPRs) and adjusted prevalence ratios (aPRs) of the association were presented.

Results: Hazardous drinking was significantly associated with increased likelihood of having depressive symptoms (aPR=1.26;95%CI 1.04–1.52). Hazardous drinking and depression symptoms were not associated among those with high social support (aPR=1.01;95%CI 0.76–1.35), but were associated among those with medium (aPR=1.24;95%CI 0.92–1.69) and low social support (aPR=1.71;95%CI 1.25–2.34).

Conclusions: Social support significantly modified the association between hazardous drinking and depression symptoms among ART clients in Vietnam. Interventions to decrease hazardous alcohol use are broadly indicated for PWH in Vietnam and other low-resource settings, but special attention or modifications may be needed to support mental health among those with lower levels of social support.

Keywords

hazardous alcohol use; people living with HIV; depression; Vietnam; social support; effect measure modification

Introduction

Depression is the most common mental health problem affecting people living with (PWH) (1). HIV-positive men and women are almost 3 to 4 times and 1.6 to 2 times more likely to be diagnosed with depression relative to their HIV-negative counterparts (2). The prevalence of depression symptoms among PWH is very high, ranging from 36 to 65% (3–8). Depression can lead to numerous negative health outcomes for PWH. A strong association between depression and poor adherence has been demonstrated, with patients having various levels of depression symptoms being 35%–64% less likely to adhere to their antiretroviral therapy (ART) (9, 10). Moreover, depressed mood and various inflammatory reactions of the immune system are closely linked with each other (11). As a consequence, depression among PLWH can lead to decreased CD4 T lymphocytes, increased viral load, worse disease progression and higher mortality rates (12).

Hazardous alcohol use is another widespread problem among PWH. Hazardous drinking is defined as a quantity or pattern of alcohol consumption that increases adverse health outcomes for an individual (13). Studies have consistently shown a positive association between hazardous drinking and depression (14–16). Hazardous drinking is strongly associated with increased risk of depression in the general population as well as among PWH (14, 15). A longitudinal study of patients both with and without HIV infection in the

US found that the risk of depression symptoms among persons with hazardous drinking was 2.5 times that of those without hazardous alcohol use (15).

Nonetheless, no studies have explored the role of social support in the association between hazardous drinking and depression symptoms among PWH. Social support is defined as “aid and assistance exchanged through social relationships and interpersonal transactions”(17). Social support can be classified into four types: emotional support, instrumental support, informational support and appraisal support(18). Since PWH are particularly vulnerable to depression due to social stigma and discrimination(19, 20), social support can play a key role in preventing depression symptoms in this population. There are various mechanisms through which social support might positively impact depression and other mental health problems. Social support has the potential to directly improve one’s mental well-being by creating companionship, and enhancing one’s sense of belonging and selfworth(17, 21). Moreover, social support may buffer stress or have direct positive effects on well-being(17, 21, 22), and individual coping resources and community resources can also be enhanced by social support (17, 21–23). Evaluating the influence of social support on the association between hazardous drinking and depression symptoms could help identify groups of PWH in whom hazardous drinking and depression symptoms are most strongly associated, thereby informing targeted interventions dedicated to these individuals.

In Vietnam, alcohol use and alcohol-related problems are common, especially among men (24). Alcohol home brewing is a popular practice, with some private homes producing hundreds of millions of liters annually (25, 26). As a consequence, alcohol use is a leading risk factor for death and disability in Vietnam (27). Hazardous alcohol use is even more prevalent among Vietnamese PWH, and they usually face multiple cultural and contextual barriers at different levels to reducing alcohol use, such as the widespread availability, affordability of alcohol and high social pressure to drink (28, 29). A study by Tran et al. in 2013 reported a prevalence of hazardous drinking of 30% and a prevalence of binge drinking of 22% among PWH on ART in Vietnam (30). However, the literature on the association between drinking and depression symptoms among PWH in Vietnam as well as the role of social support in this association remains scarce.

To address these gaps, our study aimed to: (1) evaluate the association between hazardous drinking and depression symptoms among a cross-sectional sample of ART clients in Thai Nguyen, Vietnam and (2) examine the potential effect measure modification of this association by level of social support. We hypothesized that there was a positive association between hazardous drinking and depression symptoms, and that social support modified this association so that it was weaker for those with higher levels of social support.

Methods

Study context and settings

This is a secondary analysis using baseline screening data from the study “Reducing hazardous alcohol use & HIV viral load: a randomized controlled trial in ART clinics in Vietnam” (REDART)(31). REDART was a three-arm randomized controlled trial (RCT) of two interventions aiming to reduce alcohol use among hazardous drinking HIV-positive ART

clinic patients in Thai Nguyen, a mountainous province located in Northeast Vietnam(31). REDART compared two evidence-based alcohol interventions that both combined motivational enhancement therapy (MET) and cognitive behavioral therapy (CBT). The study's investigators culturally adapted components of MET and CBT into a combined intervention to be more applicable to alcohol use behaviors in the Vietnamese context (32). The brief intervention also combined elements from both CBT and MET, but condensed them into a 1- or 2-session format. The effects of the combined intervention and brief intervention on alcohol use and HIV viral load were compared both against each other and with an assessment-only control.

Baseline screening data was collected from March 2016 to May 2017. The seven highest-volume outpatient ART clinics in Thai Nguyen were chosen for the study. Participants were included in the baseline screening survey if they were: 1) a current client on ART at the clinic and 2) at least 18 years of age. Participants were excluded if they were: 1) unable to participate in study activities due to psychological disturbance, cognitive impairment or threatening behavior (study staff will assess sobriety) or 2) unwilling to provide baseline informed consent. The baseline screening survey was administered to all eligible clients in these seven clinics. The RCT only included participants with hazardous alcohol use, measured by the Alcohol Use Disorders Identification Test-Concise (AUDIT-C) scale. In this analysis, we included all ART clients in the clinics eligible for the baseline screening survey, regardless of their alcohol use.

Measurements

The baseline screening survey included questions on socio-demographics, depression symptoms, hazardous alcohol use, drug use, sexual behaviors, injecting drug use, self-reported adherence to ART, HIV stigma, social support, experiences with health care providers and intimate partner violence. In this study, we used the full version of the Alcohol Use Disorders Identification Test (AUDIT) scale to assess hazardous drinking. The AUDIT questionnaire contained 10 questions that evaluated the frequency and amount of alcohol consumption, with a score of 8 or more for men and 7 or more for women indicating hazardous alcohol use (33). Depression symptoms were assessed with the Patient Health Questionnaire (PHQ-9), which consisted of 9 items. These items were rated on the frequency of the symptoms such as loss of interest or pleasure, feeling down or depressed in the last 2 weeks, with the following answer choices: “*Not at all*” (0 days), “*Several days*” (1–7 days), “*More than half of the days*” (8–10 days) and “*Nearly every day*” (11–14 days). These options corresponded to a score of 0, 1, 2 and 3, respectively, for a total maximum score of 27. Participants scoring at least 5 points were classified as having depression symptoms (34). Social support was measured with a 5-question modified version of the Medical Outcomes Study Social Support Instrument (MOS-SS) (35). The original scale MOS-SS consists of 19 items that covered four domains of social support: emotional/informational support, tangible support, positive social interaction and affection(35). The 5 items in the modified version were selected based on previous performance in other studies in Vietnam and appropriateness for this study's context(36, 37). Participants were asked to specify how often they received positive social interaction (three items: “*someone to have a good time with*”, “*someone to get together with for relaxation*”, “*someone to do something*

enjoyable with”) and emotional/informational support (two items: “*someone you can count on to listen to you when you need to talk*” and “*someone to confide in or talk to about yourself or your problems*”). Each item was rated a score from 1 to 10, with 1 indicating “*None of the time*”, and 10 indicating “*Most of the time*”. Total social support scores were converted to a 0–100 score, according to original scale’s scoring instructions, with higher scores indicating higher levels of social support (35). Since social support was the effect measure modifier of interest, we decided to create ordered categories of social support to make findings easier to interpret. Based on the distribution of the social support score in our population, the social support level was first classified into 4 quartiles, with 25% of participants in each quartile. When we conducted further analyses of effect measure modification by social support, the association between hazardous drinking and depression symptoms in the 3rd and 4th quartiles had very similar point estimates and confidence intervals. Therefore, we combined these two quartiles, resulting in three levels of social support: low (1st quartile), medium (2nd quartile) and high (3rd and 4th quartiles). HIV stigma was assessed with a scale previously used for PWH in Vietnam(36, 38). Participants were asked to state their level of agreement with statements indicating internalized, experienced or anticipated HIV stigma, and they were classified as having HIV stigma if they reported any level of agreement with at least one statement.

Data analysis

Descriptive statistics (means and proportions) were used to present data on sociodemographic characteristics, prevalence of hazardous drinking and depression symptoms among participants. Since this was a cross-sectional analysis, the prevalence ratios of depression symptoms comparing those with and without hazardous drinking were calculated. Multiplicative (“interaction”) terms between hazardous drinking and social support were added to the model to test the statistical significance of effect measure modification by social support. Based on the literature, the following covariates were originally included in the model as potential confounders: age, gender, education, marital status, employment and HIV stigma (37, 39–41). Potential confounders were then re-evaluated so that only covariates that changed the beta coefficients of associations between hazardous drinking and depression symptoms at different levels of social support by more than 10% were kept. In the end, all confounders determined a priori met this criterion and were retained in the final multivariable model. To further evaluate effect measure modification of the hazardous drinking-depression symptom association according to social support, crude and adjusted prevalence ratios (PRs) along with p-values and confidence intervals (CIs), stratified by social support, were calculated. The statistical significance level was set at p-value <0.05. All data were analyzed with SAS 9.4 (SAS Institute, Inc., Cary, North Carolina).

The study was reviewed and approved by the University of Chapel Hill Institutional Review Board (IRB) and the local IRB at the Thai Nguyen Center for Preventive Medicine.

Results

Characteristics of the study sample

A total of 1559 PWH at study clinics were screened during the baseline visit. We excluded 196 patients with either missing hazardous drinking or depression symptoms data. Therefore, 1363 participants were included in the final analyses. Only one person had missing data on social support (this person was excluded from the multivariable models), and no data were missing for other covariates.

Table 1 presents sociodemographic characteristics of participants. Participants' ages ranged from 20 to 66, and the mean age was 39.8 years old (standard deviation (SD)=6.4). The majority of participants were male (78%), had at least some high school education (91%), were currently married (63%) and were employed full-time or part-time (78%). More than a quarter of participants (26%) scored 5 or more on the PHQ-9, indicating the presence of depression symptoms. Moreover, 59% of PWH in the study experienced any HIV stigma.

The mean score on the AUDIT scale was 7.44 (Standard Deviation=6.3). Forty one percent did not consume alcohol, while the prevalence of hazardous alcohol use was 39%.

Association between hazardous drinking and depression symptoms

In the univariate analysis, those with hazardous drinking were 1.20 times more likely to have depression symptoms (crude PR (cPR) =1.20; 95%CI 1.00 – 1.43). After controlling for confounders, the overall association between hazardous drinking and depression symptoms did not change substantially (adjusted PR (aPR) =1.26; 95%CI 1.04–1.52).

Table 2 shows the crude and adjusted prevalence ratios for the regression model evaluating the prevalence of depression symptoms in the full sample of participants. In addition, employment was significantly associated with lower prevalence of depression symptoms (aPR=0.69; 95%CI 0.58–0.83), while HIV stigma was positively associated with depression symptoms (aPR=2.58; 95%CI 2.04–3.26) in the adjusted analyses.

Effect measure modification according to social support

When evaluated across three strata of social support, the association between hazardous drinking and depression symptoms was stronger at lower levels of social support (Figure 1). Among those with high social support (3rd and 4th quartiles), hazardous drinking was not associated with depression symptoms (aPR=1.01; 95%CI 0.76–1.35), whereas hazardous drinking was increasingly associated with depression symptoms among those with moderate (2nd quartile) and low (1st quartile) levels of social support (aPR=1.24; 95%CI 0.92–1.69 among those with moderate social support and aPR=1.71; 95%CI 1.25–2.34 among those with low social support).

The test of the global null hypothesis comparing two nested models (with and without the interaction terms) yielded a p-value of 0.034, suggesting that social support was a statistically significant effect measure modifier.

Discussion

This secondary analysis of baseline screening data from a three-arm randomized controlled trial aiming to reduce alcohol use among ART clients in Thai Nguyen, Vietnam, found that hazardous drinking and depression symptoms were both common, with the prevalence of hazardous drinking and depression symptoms being 39% and 26%, respectively. Hazardous drinking was significantly associated with depression symptoms in the overall sample, both in the univariate and adjusted analyses. Among those with high social support, hazardous drinking was not associated with depression symptoms; however, with those experiencing low levels of social support (below the median value seen in this sample), hazardous drinking was associated with increasing severity of depression symptoms.

The high prevalence of hazardous drinking and depression symptoms was consistent with findings from other studies among PWH in Vietnam (37, 42, 43). The literature on the association between hazardous drinking and depression symptoms has shown mixed results. Among both HIV-infected and HIV-uninfected populations in the US, hazardous and binge drinking were associated with 2.65 times higher odds of having depression symptoms, compared to past alcohol and non-hazardous use (15). However, one study reported a positive association between current alcohol dependence and depression symptoms, but not between heavy drinking and depression symptoms (16). In this study, alcohol dependence – a more serious form of alcohol use-related disorder – was diagnosed using the standard Composite International Diagnostic Interview. Heavy drinking was defined as having >4 drinks on one day or >14 drinks per week on average for men; >3 or >7, respectively, for women, while depression symptoms was evaluated with the Center for Epidemiologic Studies Depression Scale scale. Differences in how heavy/hazardous drinking and depression symptoms were defined and assessed might explain the discrepancy in these findings.

Levintow et al. found that current alcohol use among people who inject drugs living with HIV in Vietnam was associated with lower prevalence of depression symptoms (37), with a prevalence odds ratio of depression symptoms 2.35 times higher among those with no current alcohol use. A potential explanation for this inverse relationship was that those with no alcohol use usually suffered from social isolation, making them more likely to have depression symptoms (37). Our study stratified the association between hazardous drinking and depression symptoms by levels of social support and found that when social support was high, hazardous alcohol use was not associated with depression symptoms. For those with lower levels of social support, hazardous drinking was associated with increased prevalence of depression symptoms, and the association was statistically significant among those with lowest social support. These findings suggested a role of social support in potentially mitigating the association between hazardous drinking and depression symptoms among PWH.

There are several potential mechanisms through which low social support might interact with hazardous drinking to exacerbate depression symptoms outcomes for PWH. Coping resources are critical to the population of PWH, who often are simultaneously affected by financial struggles, substance abuse and associated comorbidities. The lack of social support

might deprive PWH of the much-needed resources to cope with mental health issues and drinking problems (17). Indeed, social support has been shown to be positively associated with motivation to change drinking behaviors, and encouraged individuals to interpret problems in more positive ways(22, 44). Without social support and appropriate coping resources, people with hazardous alcohol use are more likely to develop (or already experience) worse depression symptoms for longer periods of time. Moreover, Vietnamese culture associates drinking with masculinity, and there are certain social expectations for men to drink alcohol at social and business gatherings (25, 28). In Vietnamese drinking culture, alcohol intoxication is expected and normalized during social gatherings, where drinkers press each other to drink to intoxication (25). Along with increasing social openness and economic expansion, alcohol consumption in Vietnam doubled in the last decade (25, 27). Therefore, individuals whose hazardous drinking behaviors persist despite low levels of social and peer pressures might be exposed to additional underlying stressors and risk factors of depression. These might be reasons why the association between hazardous drinking and depression symptoms varied across levels of social support.

This study is the first to our knowledge to specifically look at effect measure modification by social support of the association between hazardous drinking and depression symptoms among PWH, a marginalized population vulnerable to both hazardous alcohol use and mental health problems. However, there were several limitations to our study. First, due to the cross-sectional nature of the analysis, we cannot state with confidence the direction of the causal path between hazardous drinking and depression symptoms, and reverse causality might be an alternative explanation to the results. For example, those with pre-existing depression symptoms may have used hazardous drinking as a coping mechanism to alleviate stress and depression, as shown in the literature (45, 46). Second, in our study social support was measured with a shortened version of the MOS-SS. Different shortened versions of the MOS-SS have been validated and used in the literature, and they all showed excellent performance(47, 48). Even though our version has been used in previous studies among PWH in Vietnam(36, 37), it has not been formally validated. The scale only included 5 items, making it difficult to examine social support in different dimensions, such as emotional/informational support, tangible support, positive social interaction, and affection(35). Finally, our sample only consisted of ART clients recruited in Thai Nguyen, a mountainous city in Vietnam. Our findings might not generalize to other settings with different drinking cultures, or to the larger population of PWH (including those not on ART). When compared to other samples of ART clients, the proportion of nondrinkers in our study was similar to data reported for ART clients in Vietnam, but was higher than that among PWH in other countries (30, 49, 50).

Despite these limitations, our study sheds important light on how interpersonal factors such as social support can modify the effects of individual behaviors (alcohol use) to exacerbate mental health outcomes. Longitudinal studies are needed to better characterize the magnitude and direction of the relationships between depression symptoms and hazardous drinking. In addition, more thorough measurements of social support in different domains will help identify the most important types of support affecting mental health status of PWH with hazardous alcohol use. The brief intervention in the parent study was found to be effective in reducing alcohol consumption and viral load among participants (31). Even

though future alcohol reduction interventions in Vietnam and in other low-resource settings should be applied to all PWH with hazardous alcohol use, additional attention and/or tailored interventions may be needed to bolster the mental health of those with low levels of social support. For example, alcohol reduction interventions can be modified to incorporate components to enhance social support from family, friends, peers or other support groups for those with lower social support – as increasing levels of social support might help to mitigate the association between hazardous drinking and depression symptoms in this population.

Conclusions

Social support significantly modified the association between hazardous drinking and depression symptoms among ART clients in Vietnam. The association was stronger among those with lower levels of social support. More rigorous research on the modification roles of different dimensions of social support is warranted. Interventions to mitigate hazardous drinking among PWH in Vietnam and other low-resource settings are broadly indicated, but they should be strengthened or modified to address the mental health needs of the most vulnerable group of PWH with low social support.

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Highlights

- Hazardous drinking and depression symptoms were common among ART clients in Vietnam
- Hazardous drinking was significantly associated with depressive symptoms in the sample.
- Social support modified the association between hazardous drinking and depression symptoms
- When social support was low, hazardous drinking increased the likelihood of depression symptoms by 71%

Figure 1. Prevalence ratios of depressive symptoms comparing participants with and without hazardous alcohol use

Table 1.

Sociodemographic characteristics, prevalence of hazardous drinking and depressive symptoms of participants (n=1363)

Variable (reference)	n (%) ¹		
	Participants without depression symptoms	Participants with depression symptoms	Total
Age			
<i>Less than 30 years old</i>	47 (4.7)	31 (8.7)	78 (5.7)
<i>30–40 years old</i>	540 (53.7)	181 (50.7)	721 (52.9)
<i>40–50 years old</i>	361 (35.9)	126 (35.3)	487 (35.7)
<i>More than 50 years old</i>	58 (5.8)	19 (5.3)	77 (5.7)
Gender			
<i>Male</i>	787 (78.2)	271 (75.9)	1057 (77.6)
<i>Female</i>	219 (21.8)	86 (24.1)	306 (22.4)
Education			
<i>Primary school or less</i>	173 (17.2)	52 (14.6)	225 (16.5)
<i>Some secondary school</i>	540 (53.7)	172 (48.2)	712 (52.2)
<i>Some high school</i>	212 (21.1)	88 (24.7)	300 (22.0)
<i>Some technical training, college or university</i>	81 (8.1)	45 (12.6)	126 (9.2)
Marital status			
<i>Not married</i>	160 (15.9)	71 (19.9)	231 (17.0)
<i>Married</i>	653 (64.9)	200 (56.0)	853 (62.6)
<i>Widowed, divorced or separated</i>	193 (19.2)	86 (24.1)	279 (20.4)
Employed (Yes)	815 (81.0)	253 (70.9)	1068 (78.4)
HIV stigma (Yes)	513 (51.0)	284 (79.5)	797 (58.5)
Social support ²			
<i>High level of social support</i>	485 (48.3)	152 (42.6)	637 (46.8)
<i>Medium level of social support</i>	274 (27.3)	107 (30.0)	381 (28.0)
<i>Low level of social support</i>	246 (24.5)	98 (27.4)	344 (25.3)
Hazardous alcohol use (Yes)	372 (37.0)	153 (42.9)	525 (38.5)

¹Total percentage might not add up to 100% due to rounding;

²One participant had missing value of social support

Table 2.

Prevalence ratios for the associations with depressive symptoms among people with HIV in Thai Nguyen, Vietnam (n=1362)^{1,2}

Variable (reference)	Crude PRs	95%CI	p-value	Adjusted PRs	95%CI	p-value
Hazardous drinking						
<i>No</i>	Ref ³			Ref		
<i>Yes</i>	1.2	1.00–1.43	0.05	1.26	1.04–1.52	0.02
Gender						
<i>Male</i>	Ref			Ref		
<i>Female</i>	1.1	0.90–1.35	0.36	1.21	0.94–1.56	0.14
Age group						
<i><30 years old</i>	Ref			Ref		
<i>30–40 years old</i>	0.63	0.47–0.85	0.003	0.76	0.57–1.01	0.06
<i>40–50 years old</i>	0.65	0.48–0.89	0.007	0.78	0.57–1.07	0.12
<i>>50 years old</i>	0.62	0.39–1.00	0.05	0.73	0.46–1.16	0.18
Education						
<i>Primary school or less</i>	Ref			Ref		
<i>Some secondary school</i>	0.98	0.85–1.12	0.75	1.05	0.81–1.36	0.72
<i>Some high school</i>	0.89	0.77–1.03	0.11	1.18	0.89–1.58	0.27
<i>Some technical training, college or university</i>	1.55	1.11–2.16	0.01	1.32	0.96–1.83	0.09
Marital status						
<i>Unmarried</i>	Ref			Ref		
<i>Married</i>	1.15	1.02–1.28	0.02	0.86	0.69–1.08	0.19
<i>Widowed/Divorced/Separated</i>	1	0.77–1.30	0.98	1.09	0.82–1.44	0.55
Employment (Yes)	0.67	0.56–0.81	<0.001	0.69	0.58–0.83	<0.001
HIV stigma experience (Yes)	2.76	2.19–3.49	<0.001	2.58	2.04–3.26	<0.001
Social support						
<i>High level of support</i>	Ref			Ref		
<i>Medium level of support</i>	0.92	0.83–1.03	0.13	1.14	0.94–1.39	0.2
<i>Low level of support</i>	1.19	0.96–1.48	0.11	1.09	0.88–1.34	0.43

¹Without interaction terms of social support and hazardous drinking

²Final model controlling for age, gender, education, marital status, HIV stigma, employment and level of social support

³Reference group