Longitudinal analysis of alcohol use and intimate partner violence perpetration among men with HIV in northern Vietnam

Rebecca B. Hershow[a,*], H. Luz McNaughton Reyes[a], Tran Viet Ha[b], Geetanjali Chander[c,d],
Nguyen Vu Tuyet Mai[b,1], Teerada Sripaipan[a], Constantine Frangakis[c,d], David W. Dowdy[c,d],
Carl Latkin[c,d], Heidi E. Hutton[d], Audrey Pettifor[a], Suzanne Maman[a], Vivian F. Go[a]

[a] *University of North Carolina at Chapel Hill Gillings School of Global Public Health, 135 Dauer Drive, 302 Rosenau Hall, Chapel Hill, NC, 27599, USA*
[b] *UNC Project Vietnam, Yen Hoa Health Clinic, Lot E2, Duong Dinh Nghe Street, Hanoi, Viet Nam*
[c] *Johns Hopkins University Bloomberg School of Public Health, 615 N. Wolfe Street, Baltimore, MD, 21205, USA*
[d] *Johns Hopkins University School of Medicine, 600 N. Wolfe Street, Baltimore, MD, 21205, USA*

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ABSTRACT

Background: Alcohol use is a known risk factor for male-perpetrated intimate partner violence (IPV), although few studies have been conducted globally and among men with HIV (MWH). We estimated the longitudinal effects of alcohol use on IPV perpetration among MWH.

Methods: This study is a secondary analysis of randomized controlled trial data among male and female anti-retroviral treatment patients with hazardous alcohol use in Thai Nguyen, Vietnam. Analyses were restricted to male participants who were married/cohabitating (N = 313). Alcohol use was assessed as proportion days alcohol abstinent, heavy drinking, and alcohol use disorder (AUD) using the Timeline Followback and Mini International Neuropsychiatric Interview questionnaire. Multilevel modeling was used to estimate the effects of higher versus lower average alcohol use on IPV perpetration (between-person effects) and the effects of time-specific deviations in alcohol use on IPV perpetration (within-person effects).

Results: Participants with higher average proportion days alcohol abstinent had decreased odds of IPV perpetration (adjusted Odds Ratio [aOR] = 0.43, p = 0.03) and those with higher average heavy drinking and AUD had increased odds of IPV perpetration (Heavy drinking: aOR = 1.05, p = 0.002; AUD: aOR = 4.74, p < 0.0001). Time-specific increases in proportion days alcohol abstinent were associated with decreased odds of IPV perpetration (aOR = 0.39, p = 0.02) and time-specific increases in AUD were associated with increased odds of IPV perpetration (aOR = 2.95, p = 0.001). Within-person effects for heavy drinking were non-significant.

Conclusions: Alcohol use is associated with IPV perpetration among Vietnamese men with HIV. In this context, AUD and frequent drinking are stronger correlates of IPV perpetration as compared to heavy drinking.

1. Introduction

Male-perpetrated intimate partner violence (IPV) is a pervasive and urgent public health problem. Globally, 30 % of women have ever experienced IPV (World Health Organization [WHO], 2013), defined as psychological, physical, or sexual abuse perpetrated towards an intimate partner (WHO, 2010, 2013; Mitchell et al., 2016). Experiencing IPV leads to a range of health consequences, including HIV/STI infection, substance abuse, depression, physical injury, and death (WHO, 2013; Li et al., 2014).

There is substantial evidence that alcohol use is associated with male-perpetrated IPV (Fulu et al., 2013; Jansen et al., 2016), including three meta-analyses showing small to moderate effects of alcohol use on IPV perpetration (Ferrer et al., 2004; Foran and O'Leary, 2008; Stith et al., 2004). While nearly all studies included in these meta-analyses are cross-sectional, there are longitudinal studies demonstrating alcohol use leads to IPV perpetration (Crane et al., 2016; Temple et al., 2013; Yu et al., 2019). The relationship between alcohol use and IPV perpetration is often explained using two theoretical models. First, alcohol use may lead to IPV perpetration through immediate

psychopharmacological effects of alcohol, such as lowered inhibitions or distorted perceptions of cues, or through expectancy effects regarding the link between intoxication and aggression (Crane et al., 2016; Kachadourian et al., 2014; Reyes et al., 2012). Second, alcohol use may lead to increased relationship conflict, in turn leading to IPV perpetration (Fischer et al., 2005; Fischer and Wiersma, 2012; White and Chen, 2002). For example, alcohol use may lead to arguments with a partner about the amount of alcohol consumed and time together (Fischer and Wiersma, 2012; Foran and O'Leary, 2008).

Although the relationship between alcohol use and IPV perpetration has been well-established, most of this research has been conducted in Western countries (Crane et al., 2016; Ferrer et al., 2004; Foran and O'Leary, 2008). Few rigorous studies have examined the alcohol-IPV relationship in Vietnam, despite pervasive alcohol use and the high prevalence of IPV (Jansen et al., 2016; Lincoln, 2016; Luu et al., 2014). Over half (58 %) of women reported experiencing IPV by their husbands (General Statistics Office, 2010) and 37 % of men reported having ever perpetrated IPV against their wife (Yount et al., 2015). Alcohol use and IPV perpetration are largely shaped by sociocultural norms and practices (WHO, 2010; Horton and Rydstrom, 2011), suggesting that the association between alcohol use and IPV perpetration may differ across cultural contexts. This is supported by the results from a multi-country study in Asia and the Pacific which found the strength of the alcohol-IPV relationship varied across countries and the relationship was non-significant in Muslim-majority societies (Fulu et al., 2013). To develop effective alcohol and IPV reduction interventions for implementation in Vietnam, it is critical to understand whether the associations between alcohol use and IPV perpetration among men in Vietnam are similar or different to other settings.

Further, there is a dearth of research on alcohol use and IPV perpetration among men with HIV globally. Although there is limited evidence, research suggests men with HIV may be at particularly high risk for IPV perpetration and forward HIV transmission (Hershow et al., 2020). Men with HIV have an elevated prevalence of hazardous alcohol use (Crane et al., 2017; Tran et al., 2013), a known correlate of IPV perpetration (Fulu et al., 2013; Gilchrist et al., 2017; Jansen et al., 2016) and other HIV transmission risk factors, such as poor antiretroviral treatment (ART) adherence, condomless sex, and unsupressed HIV viral load (Blashill et al., 2015; Glynn et al., 2019; McMahon et al., 2019). Research with sub-groups such as men with HIV should be a priority to improve men's health and wellbeing (Hatcher et al., 2019; Okafor et al., 2018) and to prevent forward HIV transmission (Chander et al., 2006; Hendershot et al., 2009; Tran et al., 2014).

In this study, we estimate the longitudinal effects of alcohol use on IPV perpetration among men with HIV and hazardous alcohol use in northern Vietnam. Hazardous alcohol use refers to a spectrum of alcohol use behavior, including exceeding weekly drinking limits and heavy episodic/binge drinking. As a meta-analytic review found that the effect size for the association between alcohol use and IPV perpetration varied by alcohol measure (Foran and O'Leary, 2008), three measures of alcohol use were used in analyses: *proportion of days alcohol abstinent, number of heavy drinking days,* and *alcohol use disorder (AUD).* Specific hypotheses include:

- At time points when men report higher levels of alcohol use than their own average, men will report increased IPV perpetration.
- Men who report higher as compared with lower mean levels of alcohol use will report increased IPV perpetration over time.

2. Material and methods

2.1. Design

This study is a secondary analysis of data from a three-arm randomized controlled trial (RCT) among clinic patients with HIV and hazardous alcohol use (N = 440) in Thai Nguyen (Go et al., 2020). Thai Nguyen is a semi-urban province in northern Vietnam located approximately 75 km north of Hanoi with a population of approximately 1 million. The RCT compared the effects of two evidence-based, manual-guided, individually delivered interventions on alcohol use and viral load. There were three study arms: (1) Brief Intervention (two in-person sessions and two phone call sessions); (2) Combined Intervention (six in-person sessions and three optional group sessions); and (3) standard of care (Go et al., 2020; Hutton et al., 2018). Participants were randomly assigned to one of the three study arms in a 1:1:1 ratio.

2.2. Participants

Study participants were recruited from seven ART community clinics in Thai Nguyen. Once all ART clients were approached for recruitment in one clinic, recruitment efforts moved to the next clinic. The order of clinics that ART clients were recruited from was random. Inclusion criteria for eligibility included: (1) current client on ART at the clinic; (2) Alcohol Use Disorders Identification Test (AUDIT-C) score ≥ 4 for men or ≥ 3 for women (Babor et al., 2001); (3) 18 years of age or older; and (4) plan on residing in Thai Nguyen for the next 24 months. Exclusion criteria for eligibility included: (1) unable to participate due to psychological disturbance, cognitive impairment or threatening behavior towards study/clinic staff (assessed by study staff); (2) unwilling to provide locator information or informed consent; and (3) currently participating in other alcohol or drug use or HIV program or study. Of the 1559 individuals screened for eligibility, 1078 were not eligible, often due to screening negative for hazardous alcohol use based on the AUDIT-C (N = 1040/1078).

Eligible participants were asked to consent to enroll. Participants who provided written informed consent were assigned a unique identification number and completed the baseline questionnaire and Timeline Followback (TLFB) to measure daily alcohol use over the past 30 days (Sobell et al., 1996).

From March 2016 to June 2018, quantitative assessments were administered through face-to-face interviews in a private room at an ART clinic by trained interviewers at baseline, three, six, and 12 months. Participants also provided blood samples at every study visit to test for CD4 T-cell count, HIV viral load, and hepatitis B surface antigen rapid test. The duration of each visit was approximately two hours. The intervention was delivered to intervention participants between the study visits at baseline and three months. The assessment collected data on alcohol and drug use, involvement in community violence, exposure to violence as a child, and IPV. In the full sample, retention was 94 % (405/430) at three months, 96 % (410/427) at six months, and 94 % (390/414) at 12 months excluding those who were incarcerated (n = 11/440; 2.5 %) or died (n = 15/440; 3.4 %) during the study period.

The study protocol received ethical approval from the Institutional Review Boards at the University of North Carolina Gillings School of Global Public Health, the Johns Hopkins University Bloomberg School of Public Health and the Thai Nguyen Center for Preventive Medicine.

2.3. Measures

2.3.1. IPV perpetration

Recent psychological, physical, and sexual IPV perpetration among any current or previous partner was measured with the widely used and validated six-item shortened Conflict Tactics Scale 2 (CTS2) (Murshid and Murshid, 2018; Nguyen, 2006; Straus and Douglas, 2004). Psychological, physical, and sexual IPV perpetration were each measured using two items. Response options varied based on the study visit. At baseline, participants were asked about any events of IPV in the past year. At the following study visits, the recall period was three months. Due to the differences in recall periods across study visits, the outcome will be referred to as "recent IPV perpetration." As the number of recent IPV events were skewed, the outcome variable was dichotomized to those who reported perpetrating psychological, physical, or sexual IPV

at least once and those who did not (Benebo et al., 2018). Those who refused to or didn't know the answer were marked as missing.

2.3.2. Alcohol use

Alcohol use was measured using TLFB, a tool that has been shown to be valid and reliable across multiple settings and populations (Fiellin et al., 2013; Vakili et al., 2008). The TLFB is an interviewer-administered assessment that reconstructs a daily behavior calendar to help prompt memory recall for alcohol consumption. Using the TLFB, alcohol use was assessed as *proportion of days alcohol abstinent in past 30 days (0–1)* and *number of heavy drinking days in past 30 days.* A heavy drinking day was defined as having more than four standard drinks per day for men (Alcohol Research: Current Reviews Editorial Staff, 2018). Prior to the study, a chemical analysis of commonly consumed alcoholic beverages in Thai Nguyen was conducted to define a "standard drink" that contained approximately 3% alcohol by volume (Hutton et al., 2018). For example, one can of beer and 2.3 shots of rice wine were each equivalent to one standard drink (Hutton et al., 2018). The number of standard drinks per day was calculated based on the type and number of alcoholic beverages that participants reported consuming.

To capture patterns of severity of hazardous alcohol use, AUD was measured using the Mini International Neuropsychiatric Interview questionnaire (MINI) Diagnostic and Statistical Manual of Mental Health Disorders, 4th edition (DSM IV) tool (Francis et al., 2015). The MINI consists of a set of items that measures alcohol dependence and a set of items that measures alcohol abuse, which are defined by level of drinking and mental or physical harm due to drinking (Babor et al., 2001). Based on the standard scoring method, participants who scored three or more on the alcohol dependence items and/or one or more on the alcohol abuse items were categorized as having an AUD (Francis et al., 2015).

2.3.3. Covariates

Covariates for the relationship between alcohol use and IPV perpetration were selected based on substantial theoretical or empirical evidence of potential confounding (Cunradi et al., 2014; Dasgupta et al., 2018; Gilchrist et al., 2017; Go et al., 2013; Jansen et al., 2016; Machisa et al., 2016; Tschann et al., 2005). Exposure to violence as a child comprised three items asking about ever witnessing interparental violence, experiencing physical abuse, or experiencing sexual abuse as a child. Responses were categorized as having been exposed to violence as a child if a participant answered yes to any of the three questions or no if a participant answered no to all three questions. Involvement in community violence ever was measured using two items that asked if they had ever been physically violent towards someone in their community or had ever experienced physical violence by someone in their community (Dahlberg et al., 1998). As experiencing and perpetrating community violence are known risk factors for IPV perpetration (Beyer et al., 2015; Gilchrist et al., 2017; Jansen et al., 2016; Reed et al., 2009), we created a composite variable for involvement in community violence ever.

The remaining covariates, including education (primary school or less/secondary school or less/high school or less/technical training or college or university or less), age, employment status (employed full- or part-time/unemployed or retired), and injection drug use in the past three months, were collected via self-report. As both alcohol reduction interventions significantly reduced alcohol use at each follow-up study visit as compared to the standard of care group (Go et al., 2020), intervention arm was also included as a covariate to control for intervention effects on alcohol use and IPV perpetration. Intervention arm was documented during the computer-generated randomization process.

2.4. Analyses

We restricted our analysis to male participants who reported being married or cohabitating with a partner at baseline (N = 313). Previous research among men with HIV in Vietnam has shown that the alcohol-IPV relationship operates differently for men who were married or cohabitating versus those who were not (Hershow et al., 2020).

The longitudinal effects of alcohol use on IPV perpetration were estimated with multilevel growth models using maximum likelihood based on the Laplace estimation (Breslow and Clayton, 1993). The models were specified at two levels in which the repeated measure of the outcome (level one) was nested within individuals (level two). This approach allowed for the separation of the total variance in IPV perpetration into variation in an individual's IPV perpetration over time and variation across individuals in IPV perpetration. As a result, we were able to examine both the time-varying (within-person) and proximal (between-person) effects of alcohol use on IPV perpetration.

Linear and quadratic functional forms were tested to determine the best-fitting unconditional growth model for IPV perpetration. If the variance component for the random effect could not be estimated, it was removed from the model; if the fixed effect was then found to be non-significant, it was also removed from the model.

Centering strategies were used with all variables included in the analysis (Enders and Tofighi, 2007). The variable for wave of data collection was re-coded to start at zero so that the intercept represents the log odds of IPV perpetration at baseline. Alcohol use variables estimating time-varying effects were person-mean centered and alcohol use variables estimating proximal effects were grand-mean centered after calculating the person means. Other categorical covariates were dummy coded and age (years) was grand-mean centered.

Analysis was conducted using SAS 9.4 (SAS Institute Inc., Cary, NC). The same analytic approach was used for each of the three alcohol use variables. After determining the best-fitting unconditional growth model, the centered alcohol use variables and covariates were added to the model. The adjusted conditional growth model tested the time-varying and proximal effects of alcohol use on IPV perpetration adjusting for covariates (see Fig. 1).

3. Results

3.1. Descriptive statistics

The sample comprised 313 male participants who were married or cohabitating (see Table 1). The mean age of participants was 40.8 years (SD = 5.6) at baseline. Most participants had a high school education or less (N = 189; 60.4 %). At baseline, 14.4 % (N = 45) of participants had not achieved viral suppression (less than 20 copies/mL).

Median percent days alcohol abstinent in the past 30 days increased over the study from 36.7 % (SD = 33.1) at baseline to 76.7 % (SD = 36.9) at 12-month follow-up. Median number of heavy drinking days in the past 30 days decreased over the study from 2.0 days (SD = 10.1) at baseline to 1.0 day (SD = 8.7) at 12-month follow-up. The proportion of participants screening positive for AUD decreased from 39.6 % (N = 124) at baseline to 19.4 % (N = 54) at 12-month follow-up.

At baseline, 94 participants (30.0 %) reported any form of IPV perpetration in the last 12 months; psychological IPV was the most prevalent (N = 82; 26.2 %; see Table 2). At three-month follow-up, the prevalence of any form of recent IPV perpetration decreased to 15.4 % (N = 44), as expected due to the shorter reference period. The prevalence estimates remained around this level throughout the rest of the study (six-month follow-up: N = 47, 16.1 %; 12-month follow-up: N = 42, 15.1 %).

3.2. Trajectories of IPV perpetration: unconditional growth model

The best fitting unconditional model for IPV perpetration included a random intercept with random and linear fixed effects for time (see
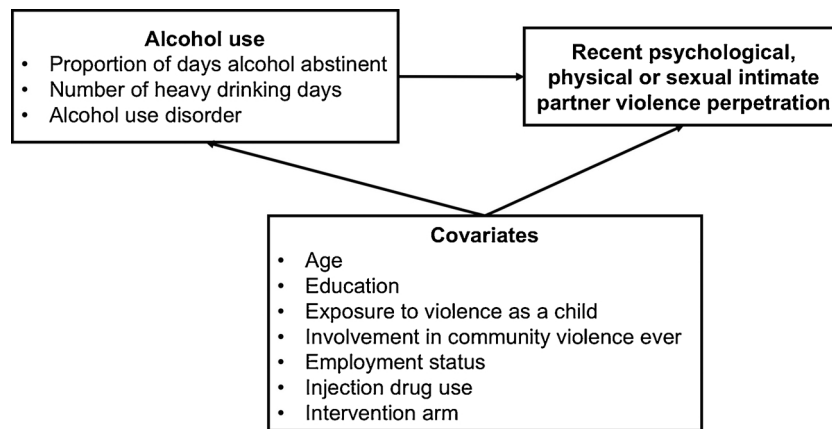
Fig. 1. Analytic model.

Table 1

Characteristics of male participants who were married or cohabiting with a partner (N = 313)[a].

	Baseline (N = 313) N (%)	3 months (N = 287)	6 months (N = 292)	12 months (N = 279)
Sociodemographics				
Mean age in years (SD)	40.8 (5.6)			
Highest level of education				
Technical training/ College or university or less	52 (16.6)			
High school or less	189 (60.4)			
Secondary school or less	48 (15.3)			
Primary school or less	24 (7.7)			
Employment status				
Employed full- or part-time	262 (83.7)	243 (84.7)	255 (87.3)	245 (87.8)
Unemployed/Retired	51 (16.3)	44 (15.3)	37 (12.7)	34 (12.2)
Viral suppression[b,c]				
No	45 (14.4)	39 (13.6)	35 (12.0)	42 (15.1)
Yes	268 (85.6)	247 (86.4)	257 (88.0)	237 (84.9)
Alcohol Use				
Median percent days abstinent in past 30 days (SD)	36.7 (33.1)	70.0 (35.6)	76.7 (37.3)	76.7 (36.9)
Median number of heavy drinking days in past 30 days (SD)	2.0 (10.1)	1.0 (8.7)	0.0 (8.6)	1.0 (8.7)
Alcohol use disorder (AUD)				
No	189 (60.4)	210 (73.2)	223 (76.4)	225 (80.6)
Yes	124 (39.6)	77 (26.8)	69 (23.6)	54 (19.4)
Psychosocial Factors				
Injection drug use in past 3 months[c]				
No	244 (78.0)	226 (79.0)	228 (78.1)	222 (79.6)
Yes	69 (22.0)	60 (21.0)	64 (21.9)	57 (20.4)
Exposed to violence as a child[d]				
No	199 (63.6)			
Yes	114 (36.4)			
Ever involved in community violence[c]				
No	178 (56.9)	176 (61.5)	173 (59.2)	140 (50.2)
Yes	135 (43.1)	110 (38.5)	119 (40.8)	139 (49.8)

Note: SD = Standard deviation.

[a] Percentages may not sum to 100 due to rounding.

[b] Achieving viral suppression was defined as having less than 20 copies/mL.

[c] Missing data due to refused to answer or don't know: Viral suppression at 3 months: N = 1; Injection drug use at 3 months: N = 1; Ever involved in community violence at 3 months: N = 1.

[d] Exposed to violence as a child includes having ever witnessed interparental violence as a child or experienced physical or sexual abuse as a child.

Table 2

Prevalence of intimate partner violence perpetration across study visits[a].

	Baseline (N = 313) N (%)	3 months (N = 287)	6 months (N = 292)	12 months (N = 279)
Recent Psychological IPV Perpetration[b]				
No	231 (73.8)	250 (87.4)	252 (86.3)	242 (86.7)
Yes	82 (26.2)	36 (12.6)	40 (13.7)	37 (13.3)
Recent Physical IPV Perpetration				
No	298 (95.2)	282 (98.3)	285 (97.6)	275 (98.6)
Yes	15 (4.8)	5 (1.7)	7 (2.4)	4 (1.4)
Recent Sexual IPV Perpetration				
No	293 (93.6)	276 (96.2)	285 (97.6)	270 (96.8)
Yes	20 (6.4)	11 (3.8)	7 (2.4)	9 (3.2)
Recent Physical/Sexual IPV Perpetration				
No	280 (89.5)	272 (94.8)	279 (95.5)	266 (95.3)
Yes	33 (10.5)	15 (5.2)	13 (4.5)	13 (4.7)
Any Form of Recent IPV Perpetration[b]				
No	219 (70.0)	242 (84.6)	245 (83.9)	237 (84.9)
Yes	94 (30.0)	44 (15.4)	47 (16.1)	42 (15.1)

Note: IPV = Intimate partner violence.

[a] Percentages may not sum to 100 due to rounding.

[b] Missing data due to refused to answer or don't know: Recent psychological IPV perpetration at 3 months: N = 1; Any form of recent IPV perpetration at 3 months: N = 1.

Table 3

Unconditional growth model: Trajectories of intimate partner violence perpetration over time (N = 313).

	Coefficient (SE) or OR (95 % CI), p-value	
Fixed Effects		
Intercept	−1.09 (0.14)	< 0.0001
Time	0.45 (0.34, 0.59)	< 0.0001
Random Effects		
Variance Components		
Covariance	0.53 (0.54)	
Variance	0.12 (0.24)	
Model Fit		
AIC	1090.05	
BIC	1105.04	
Neg 2 LL	1082.05	

Note: SE = Standard error; OR = Odds ratio; CI = Confidence Interval; AIC = Akaike information criterion; BIC = Bayesian information criterion; Neg 2 LL = Negative 2 log likelihood.

Table 3). The linear parameter for time showed that the odds of IPV perpetration significantly decreased over time (OR = 0.45, 95 % CI 0.34, 0.59, p < 0.0001). There was also significant variance in IPV perpetration between participants at baseline (Intercept: b = −1.09, SE = 0.14, p < 0.0001).

Table 4
Adjusted conditional growth models: Time-varying and proximal effects of alcohol use on intimate partner violence perpetration across three alcohol measures[a] (N = 313).

	Proportion days alcohol abstinent		Heavy drinking		Alcohol use disorder (AUD)[b]	
	Coefficient (SE) or aOR (95 % CI), p-value					
Fixed Effects						
Intercept	−0.73 (0.41)	0.08	−0.55 (0.41)	0.09	−0.94 (0.42)	0.03
Time	0.53 (0.41, 0.70)	< 0.0001	0.50 (0.38, 0.65)	< 0.0001	0.53 (0.40, 0.70)	< 0.0001
Alcohol use						
Time-varying	0.39 (0.17, 0.88)	0.02	0.99 (0.96, 1.02)	0.61	2.95 (1.59, 5.46)	0.001
Proximal	0.43 (0.20, 0.91)	0.03	1.05 (1.02, 1.08)	0.002	4.74 (2.31, 9.71)	< 0.0001
Random Effects						
Variance Components						
Covariance	−0.007 (0.25)		−0.10 (0.26)		−0.10 (0.19)	
Variance	0.56 (0.55)		0.71 (0.58)		0.74 (0.47)	
Model Fit						
AIC	1052.89		1052.37		1025.82	
BIC	1112.82		1112.31		1085.76	
Neg 2 LL	1020.89		1020.37		993.82	

Note: SE = Standard error; aOR = Adjusted odds ratio; CI = Confidence Interval; AIC = Akaike information criterion; BIC = Bayesian information criterion; Neg 2 LL = Negative 2 log likelihood.
  [a] Controlling for education, grand-mean centered age, exposure to violence as a child, employment status, injection drug use, involvement in community violence ever, and intervention arm.
  [b] A random slope for time-varying AUD was added to this model as model fit improved when it was included.

3.3. Adjusted analyses

3.3.1. Proportion days alcohol abstinent

As expected, the time-varying and proximal effects of proportion days alcohol abstinent on IPV perpetration were negative (see Table 4). The time-varying effect demonstrates that at time points when participants reported higher proportion days alcohol abstinent than average, they were 0.39 times as likely to report IPV perpetration (95 % CI 0.17, 0.88, p = 0.02). The proximal effect shows that participants who reported higher as compared to lower average proportion days alcohol abstinent over the study period were 0.43 times as likely to report IPV perpetration over time (95 % CI 0.20, 0.91, p = 0.03). As higher proportion days alcohol abstinent indicate less alcohol use, these inverse relationships between proportion days alcohol abstinent and IPV perpetration were expected.

3.3.2. Heavy drinking

Contrary to expectations, the time-varying effect of heavy drinking on IPV perpetration was inconclusive (aOR = 0.99, 95 % CI 0.96, 1.02, p = 0.61; see Table 4). However, as expected, the proximal effect showed that reporting higher as compared to lower average levels of heavy drinking over the study period was associated with higher odds of IPV perpetration over time (aOR = 1.05, 95 % CI 1.02, 1.08, p = 0.002).

3.3.3. Alcohol use disorder (AUD)

As hypothesized, the time-varying and proximal effects of AUD were associated with higher odds of IPV perpetration (see Table 4). Participants who screened positive for AUD across the study as compared to negative were 4.74 times as likely to report IPV perpetration (95 % CI 2.31, 9.71, p < 0.0001). Controlling for the effect of average tendency to report AUD, participants were 2.95 times as likely to report IPV perpetration at times when they screened positive for AUD (95 % CI 1.59, 5.46, p = 0.001).

4. Discussion

To our knowledge, this is the first study to examine the longitudinal relationship between alcohol use and IPV perpetration among men with HIV. Findings demonstrate that hazardous drinking is associated with IPV perpetration in this population. IPV and HIV prevention interventions targeting this group should incorporate alcohol reduction services into HIV care and treatment. Clinic-based psychosocial counseling interventions targeting men with hazardous alcohol use in the United States and Zambia effectively reduced IPV perpetration (Murray et al., 2020; O'Farrell et al., 2003; Stuart et al., 2003), offering a promising IPV prevention strategy to test in low-resource settings.

Differing types of longitudinal effects were found across alcohol measures, suggesting that the nature of the alcohol-IPV relationship varies by drinking pattern, as shown in other alcohol and violence research (Foran and O'Leary, 2008). For proportion days alcohol abstinent and AUD, increases in alcohol use at one time point increased the odds of IPV perpetration at the same time point. These observed effects may be explained by the proximal effects model, which is used to explain the acute effects of alcohol use on IPV perpetration (Crane et al., 2016; Kachadourian et al., 2014; Reyes et al., 2012). According to this model, the immediate intoxication effects of alcohol increases an individual's focus on insult or anger and reduces focus on affection or empathy, leading to an inability to use nonaggressive conflict resolution strategies with a partner (Clements and Schumacher, 2010; Crane et al., 2016). This model also suggests that individuals' expectancies about the link between alcohol and violence are activated when they are intoxicated, leading to aggression (Kachadourian et al., 2014; Quigley and Leonard, 2006). Additionally, lower average proportion days alcohol abstinent, and higher average heavy drinking and AUD across the study increased the odds of IPV perpetration. These observed effects may be explained by the indirect effects model, which posits that elevated alcohol use leads to poor relationship quality, which in turn leads to IPV perpetration over time (Fischer et al., 2005; White and Chen, 2002). To inform development of IPV prevention interventions for this population, future research should assess whether anger and relationship quality explain the longitudinal effects of alcohol use on IPV perpetration.

The relationship between alcohol use and IPV perpetration may also be explained by unmeasured confounding. The spurious effects model posits that individuals with deviant characteristics, such as antisocial personality traits and hostility, may be prone to engaging in hazardous drinking and IPV perpetration, explaining the alcohol-IPV relationship (Osgood et al., 1988). However, studies have found that the association between alcohol use and IPV perpetration remains after controlling for these potential confounders (Leonard and Senchak, 1993; Pan et al., 1994). For men with HIV, this spurious model may need to be adapted

to consider unique characteristics in this population that may drive hazardous drinking and IPV perpetration, such as HIV-specific coping strategies, anger, or psychological distress (McIntosh et al., 2015; Zhao et al., 2019).

Our hypotheses on the relationship between heavy drinking and IPV perpetration were not fully supported by results. The magnitude of the proximal effect was small and the time-varying effect was non-significant. When compared to results for the other measures of alcohol use, findings suggest that heavy drinking may not be the strongest risk factor for IPV perpetration in this population. There are a couple probable explanations for these results. First, as alcohol use is considered a conduit for men's violent behavior, women may avoid or placate their husbands when they are heavily intoxicated, reducing the opportunity for IPV (Hershow et al., 2017; Rydstrom, 2003). Qualitative research in other settings has suggested women utilize such strategies to avoid experiencing alcohol-related IPV (Wilson et al., 2017). Second, men may not remember or accurately remember perpetrating IPV after drinking heavily, as they may recall the positive social consequences of heavy drinking over the negative (Graham, 2003; Wilson et al., 2017). This is particularly possible among a socially isolated group such as men with HIV, as heavy drinking often occurs at social events, which act as key access points for social support (Hershow et al., 2018; Lincoln, 2016). While reducing heavy drinking is often a primary aim for alcohol and IPV reduction interventions (Fals-Stewart et al., 2002; Stuart et al., 2013), our findings suggest that reducing AUD and frequent drinking is also important for interventions targeting men with HIV in Vietnam.

As variables were measured using self-report and the questionnaire was interviewer-administered, responses may have been subject to social desirability and recall bias. Social desirability may have varied by study arm. Intervention participants may have considered the questionnaires as part of the intervention and been more honest than those in the standard of care group. On the contrary, intervention participants may have been more likely to provide socially desirable responses due to exposure to the intervention content. If present, the social desirability bias would have likely led to under-reporting of IPV perpetration (Perinelli and Gremigni, 2016; Sugarman and Hotaling, 1997). However, interviewers underwent extensive training on questionnaire administration, minimizing the likelihood of social desirability bias. Additionally, recall and social desirability bias may have influenced alcohol use estimates, although sub-analyses of the study data conducted by Go et al. (Go et al., 2020) validated the self-report alcohol measures using phosphatidylethanol (PEth), a direct metabolite of alcohol use that acts as a biomarker (Hahn et al., 2012).

We are unable to conclude that all participants were in heterosexual relationships due to missing data (N = 42/313). However, the available data show that all participants only reported having female sexual partners recently and female main partners.

Alcohol use and IPV perpetration have different response frames in the questionnaire. The response frame for alcohol use measures is the last 30 days and the response frames for IPV perpetration varies from the last 12 months to the last three months, depending on the data collection time point (baseline: IPV perpetration in last 12 months; follow-up visits: IPV perpetration in last three months). This mismatch in response frames is a limitation when examining the time-varying effects of alcohol use on IPV perpetration. However, the alcohol use variables are intended to measure alcohol use since the last data collection time point. When using the TLFB, research has shown that a recall period of 30 days can be used to estimate annual consumption (Vakili et al., 2008). Daily diary studies offer an optimal approach for establishing temporality when estimating time-varying effects of alcohol use on IPV perpetration (Sheehan and Lau-Barraco, 2019; Shorey et al., 2014). Nonetheless, the link between alcohol use and IPV perpetration is commonly explained by the immediate psychopharmacological effects of alcohol use on aggression (Crane et al., 2016; Kachadourian et al., 2014; Reyes et al., 2012), suggesting that it is appropriate to examine the alcohol-IPV relationship at the same time point. Additionally, the three-month recall period for the IPV outcome at endline does not fully span the lag between the six- and 12-month study visits, suggesting the magnitude of the proximal effects of alcohol use on IPV perpetration may be underestimated. Further, it is plausible that alcohol use and IPV perpetration have a bidirectional relationship as men may also use alcohol to cope after perpetrating IPV (Kulis et al., 2019). Supplemental analyses suggest baseline alcohol use predicts IPV perpetration (Supplemental Table 1), although future research should explore the possibility of bidirectionality.

5. Conclusions

This longitudinal study contributes important findings on alcohol use and IPV perpetration in a high-risk, understudied population. Results suggest that the strength and nature of the relationship between alcohol use and IPV perpetration may vary across drinking patterns, underscoring the importance of measuring alcohol use in multiple ways and estimating multiple types of longitudinal effects. For all measures of alcohol use, reporting greater levels of alcohol use on average was associated with higher odds of IPV perpetration over time. Further, time-specific increases in alcohol use were associated with higher odds of IPV perpetration for measures of proportion days alcohol abstinent and AUD. To prevent IPV perpetration and forward HIV transmission among men with HIV, psychosocial counseling interventions should address alcohol use with a focus on reducing frequent drinking and AUD.

Contributors

All authors participated in the research and article preparation and approved of the final manuscript before submission to the journal. VFG, TVH, GC, DWD, CL, and HEH oversaw the clinical trial and contributed to writing and reviewing the manuscript; NVTM and TS oversaw data management and reviewed the manuscript; RBH conducted the analyses and drafted the manuscript; HLMR and CF supported the analyses and contributed to writing and reviewing the manuscript; AP and SM contributed to writing and reviewing the manuscript.

Declaration of Competing Interest

None.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at https://doi.org/10.1016/j.drugalcdep.2020.108098.

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