Decreased alcohol use (even without abstinence) is associated with better viral load

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Background

- Alcohol use is common among people living with HIV (PLWH)
- Alcohol use is associated with detrimental health outcomes acting as a barrier to the HIV continuum of care, including poor engagement in longitudinal HIV care, a lower likelihood of receiving antiretroviral therapy (ART), decreased adherence to ART, lack of viral suppression and increased mortality
- Poor rates of viral suppression impact morbidity, mortality, and potential HIV transmission
- Interventions for hazardous alcohol use exists; however, many PLWH may moderate their use but not abstain
- Many studies of alcohol use and HIV treatment outcomes have not accounted for occurring drug use, have been cross-sectional or only focused on baseline use, limiting the ability to evaluate longitudinal associations, particularly among those whose severity of use has changed over time
- We conducted this study to examine the potential impact of decreasing alcohol use on viral load (VL) with or without abstinence and how this differs based on alcohol use patterns

Methods

Study Population

- We used data from 7 U.S. sites in the Centers for AIDS Research Network of Integrated Clinical Systems (CNICS) cohort across the U.S.
- Eligible PLWH were 18 years of age or older, completed the CNICS clinical assessment including alcohol use at least twice on or after 2010, reported alcohol use at their initial assessment, and had 32 VL measures collected as part of clinical care

Alcohol and Drug Use

- PLWH in CNICS complete a 10-12 minute clinical assessment with touch-screen tablets approximately every 6 months as part of routine clinical care
- The CNICS clinical assessment includes measures of alcohol use (Alcohol Use Disorders Identification Test (AUDIT-C), drug use (modified Alcohol, Smoking, and Substance Involvement Screening Test [ASSIST]), and other domains
- We examined frequency of alcohol use (days per month), frequency of binge drinking, and alcohol use severity (AUDIT-C score)

Table 1. Baseline demographic and clinical characteristics of people living with HIV by who drank alcohol at baseline

Characteristic	N (%) *unless otherwise specified*
N	**7137**
Age mean (SD)	43 (11)
Female	834 (12)
Predominant Race	White
	3719 (52)
Frequency of alcohol use (in prior 30 days) among those currently drinking, number of days (SD)	5 (6)
Binge alcohol use	3692 (52)
Frequency of binge alcohol use (in prior 30 days) among those with binge drinking, number of days (SD)	2 (6)
Current use, number of days (SD)	
Marijuana	2877 (40)
Cocaine/crack	750 (11)
Methamphetamine/crystal	838 (12)
Heroin and other illicit opioids	241 (3)
Frequency of drug use (in prior 30 days) among those with current use, number of days (SD)	
Marijuana	11 (14)
Cocaine/crack	3 (7)
Methamphetamine/crystal	5 (10)
Heroin and other illicit opioids	8 (12)
Number of drugs used	
0	3706 (52)
1	2416 (34)
≥2	1015 (14)
Viral load copies/mL, median (IQR)	UD (UD-241)
CD4 count cells/mm³, median (IQR)	498 (323-694)

Figure 1. *Frequency of alcohol use at baseline and change in alcohol use frequency during follow-up among people living with HIV*

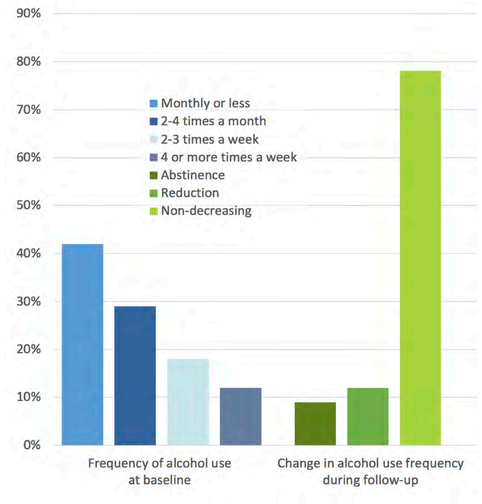
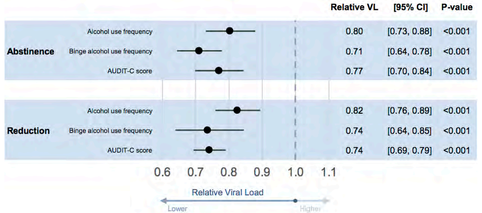


Figure 2. *The associations of decreasing or abstinence of alcohol use with relative viral load*



Outcome

- The outcome was VL (copies/ml) at each time point, which was log transformed (in base10) due to skew. We then back-transformed VL coefficients by raising them to the power of 10. We calculated relative VL values, which were defined as the ratio of VL for PLWH with abstinence or reduction divided by the VL of PLWH who had non-decreasing alcohol use
- In addition, we examined viral suppression, defined as an undetectable VL (≤400 copies/mL)
- VL measures within 3 months of each drug use assessment were included

Analysis plan

- Linear mixed models with time-updated alcohol use and VL were used to examine associations between changes in alcohol use and VL (log10 transformed) adjusting for age, sex, race, frequency of illicit substance use by individual drug category, and calendar year
- We estimated a joint model of longitudinal and survival data, using the survival curve to model informative drop-outs from the mixed logistic model to examine time-updated alcohol use and VL suppression in adjusted models
- Models were repeated, stratified by Hepatitis C virus (HCV) status

Results

- Among 7137 PLWH who drank alcohol at baseline there were 61,315 VL measures, mean baseline VL was 22,709 copies/mL (geometric mean 118) and 71% were undetectable (<100 copies/mL)
- Mean age was 43, half (52%) reported binge drinking, and alcohol was used a mean of 5 of the prior 30 days (Table 1)
- Frequency of alcohol use did not decrease over time in the majority of individuals (Figure 1)
- Stopping alcohol use was associated with decreased VL for all alcohol measures (p values<0.05)
- Decreased alcohol use among those who continued to drink (not abstinent) was associated with lower VL for all three alcohol measures (Figure 2)
- Compared to those who did not decrease alcohol, those who decreased their alcohol use frequency had a mean 18% lower VL (95% confidence interval (CI) 11%-24%, p <0.001), those who decreased their binge drinking frequency had 26% lower VL (95% CI 15%-36%, p <0.001), and those who decreased their AUDIT-C score had 26% lower VL (95% CI 21%-31%, p <0.001)
- Even a 1-point AUDIT-C score decrease was significant
- All effects were attenuated or non-significant among those with HCV in stratified analyses
- In adjusted joint models focused on detectable VL, abstinence was associated with less likelihood of detectable VL (OR 0.76: 95% CI 0.66-0.88), as was reducing frequency of alcohol use (OR 0.78: 95% CI 0.69-0.89)
- Similarly, stopping binge drinking was associated with less likelihood of detectable VL (OR 0.64: 95% CI 0.55-0.74) as was reducing frequency of binge drinking (OR 0.69: 95 CI 0.56-0.84)

Conclusions

- We demonstrated that alcohol cessation was associated with decreased VL
- In addition, decreasing alcohol use without abstinence was associated with a lower VL, which could lead to improved health outcomes for PLWH as well as public health benefits in terms of decreased transmissibility
- The decreased VL could be via improved ART adherence or more direct biological effects of alcohol
- This suggests that supporting decreased alcohol use could help patients achieve their VL goals regardless of achieving abstinence

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