Biomarker Measure Strengthens Alcohol use Association with HIV Viral Non-Suppression in PWH on ART 1002

Cristina Espinosa da Silva[1], Robin Fatch[1], Winnie Muyindike[2], Evgeny Krupitsky[3], Nneka Emenyonu[1], Sarah Puryear[1], Aaron Scheffler[1], Kaku So-Armah[4], Gabriel Chamie[1], Brian Beesiga[5], Kara Marson[1], Frank Palella[6], Phyllis Tien[1], Judith Hahn[1], on behalf of the MACS WIHS Combined Cohort Study and International URBAN Alcohol Research Collaboration on HIV/AIDS Center

[1]University of California San Francisco, San Francisco, CA, USA, [2]Mbarara University of Science and Technology, Mbarara, Uganda, [3]V.M. Bekhterev National Medical Research Center for Psychiatry and Neurology, St. Petersburg, Russia, [4]Boston University, Boston, MA, USA, [5]Infectious Disease Research Collaboration, Kampala, Uganda, [6]Northwestern University, Chicago, IL, USA

BACKGROUND

- Alcohol use among persons with HIV (PWH) predicts poor antiretroviral (ART) adherence and co-morbidities
- Association of alcohol use and HIV viral non-suppression is **inconsistent** due to **limits of alcohol self-report**
- Biomarker phosphatidylethanol (**PEth**): objective blood-based measure correlated with past month alcohol use

We examined the association between levels of alcohol use and HIV viral suppression using multiple alcohol use measures: a composite variable (PEth + self-report), self-report alone, and PEth alone.

METHODS

We pooled data from PWH on ART for ≥ 6 months from three RCTs (DIPT, Extend, St PETER HIV) and three observational studies (MWCCS, Russia ARCH I, ADEPT-T) from 2012-2022 in Uganda, Russia, and the United States.

We measured alcohol use using (1) alcohol biomarker PEth and (2) self-reported screener Alcohol Use Disorders Identification Test – Consumption (AUDIT-C)

- PEth testing for homologue 16:0/18:1 undertaken at USDTL and the University of Colorado
- Categorized composite PEth/AUDIT-C alcohol use as:
  **If PEth and AUDIT-C discordant, selected higher-risk group*

a) **No/low risk**: PEth < 50 ng/mL and AUDIT-C 0-2/women or 0-3/men

b) **Moderate risk:** 50 ≤ PEth < 200 ng/mL and AUDIT-C 3-5/women or 4-5/men

c) **High risk:** PEth ≥ 200 ng/mL and AUDIT-C ≥ 6

Employed mixed effects logistic regression modeling associations between alcohol use and **HIV viral non-suppression (≥250 copies/mL)** accounting for within-individual and between-study clustering

- Adjusted for sex, age, ART regimen, other substance use, study design, and location

Examined associations using PEth alone and AUDIT-C alone ; explored interaction by covariates

Alcohol use associated with **HIV viral non-suppression**, particularly among *men* with HIV on ART

Use of *alcohol biomarker* (versus self-report) **strengthened** observed associations

RESULTS

- 4,137 pooled observations from 2,447 participants (DIPT [N=680], Extend [N=269], St PETER HIV [N=262], MWCCS [N=865], Russia ARCH I [N=70], ADEPT-T [N=301])
- 50% male, 8% HIV virally non-suppressed
- Median PEth = 50 ng/mL (IQR= <8-273)
- Median AUDIT-C = 4 (IQR= 1-7)

Significant association between PEth/AUDIT-C and HIV viral non-suppression

- Using composite alcohol use variable: high vs. no/low adjusted odds ratio (aOR)= 1.88 (95% confidence interval [CI]= 1.07, 3.31)
- Stronger associations for PEth/AUDIT-C and PEth alone compared to AUDIT-C alone

Significant interaction by sex

- Using composite alcohol use variable: high vs. no/low aOR= 5.40 (95% CI= 1.82, 15.99) in men and aOR= 1.05 (95% CI= 0.47, 2.37) in women

CONCLUSIONS

Alcohol use measured by a composite of biomarker/self-report was associated with HIV viral non-suppression among PWH on ART, particularly among men. Associations using alcohol biomarker PEth were stronger than when using self-report alone.

Objective measurement of alcohol use may lead to more accurate findings regarding relationship between alcohol use and HIV outcomes.

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CONTACT

Cristina.EspinosadaSilva@ucsf.edu
Judy.Hahn@ucsf.edu

Table 1. Associations between alcohol use and HIV viral non-suppression among PWH on ART using different alcohol measurement strategies

Level of alcohol use		**Composite** PEth/AUDIT-C		**Biomarker** PEth		**Self-Report** AUDIT-C	
		aOR for VNS (95% CI)	p‡	aOR for VNS (95% CI)	p‡	aOR for VNS (95% CI)	p‡
All	Medium vs. No/Low	0.96 (0.51, 1.83)	0.02	0.74 (0.42, 1.32)	0.003	1.11 (0.65, 1.89)	0.28
All	**High vs. No/Low**	**1.88* (1.07, 3.31)**		**2.00* (1.17, 3.42)**		1.49 (0.90, 2.46)	
Women	Medium vs. No/Low	0.53 (0.22, 1.30)	0.25	0.64 (0.26, 1.55)	0.60	0.70 (0.31, 1.57)	0.64
Women	High vs. No/Low	1.05 (0.47, 2.37)		0.94 (0.39, 2.62)		1.01 (0.41, 2.51)	
Men	Medium vs. No/Low	3.36 (0.99, 11.41)	0.008	1.00 (0.43, 2.29)	0.001	1.77 (0.81, 3.84)	0.15
Men	**High vs. No/Low**	**5.40* (1.82, 15.99)**		**3.91* (1.73, 8.80)**		1.89 (0.97, 3.67)	

Abbreviations: aOR= adjusted odds ratio, ART= antiretroviral therapy, CI= confidence interval, p= p-value, PEth= phosphatidylethanol, PWH= persons with HIV, VNS=HIV viral non-suppression
*statistical significance (alpha=0.05)
‡global p-values