SUBSTANCE USE DISORDERS ASSOCIATED WITH MORTALITY AMONG HIV+ IN WASHINGTON, DC

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BACKGROUND

- As of the end of 2017, 13.2% of the estimated 13,003 people living with HIV in Washington, DC have a history of injection drug use.
- Non-injection substance use disorders (SUDs) are also common among people living with HIV.
- These associations between SUDs and mortality among PLWH in the post-single-tablet regimen era are not well-characterized.
- Comorbid SUDs may make continuous engagement in HIV care, ART adherence, and viral suppression challenging to achieve, but the associations have not been reported among PLWH in Washington, DC.
- A better understanding of the impact of SUDs on health outcomes for PLWH in Washington, DC is needed for public health planning and service delivery.

OBJECTIVES

1. Quantify and describe SUDs experienced among a cohort of clinic-attending HIV-infected persons
2. Assess the association of SUD with all-cause mortality
3. Evaluate outcomes along the HIV Care Continuum for people with HIV and SUD
4. Assess the association between SUD with HIV Care Continuum outcomes

METHODS

Source of Data: DC Longitudinal HIV Cohort Study
Study Design: prospective, longitudinal cohort study
Population: PLWH receiving care at 14 clinical sites in Washington, DC
Years of Analysis: 2011-2017
Substance Use Disorders (SUD): Any history of substance use disorders (SUD) was based upon medical chart review at enrollment and/or ICD-9/10 codes throughout follow-up period. SUD was an outcome (Table 1) and a predictor (Tables 2 and 3).
Covariates: Age at HIV diagnosis, gender, race/ethnicity, mode of HIV transmission, CD4 cell count (cells/µl) at enrollment, percent time above 200 copies/ml, and SUD (for mortality and HIV Care Continuum outcomes)
Outcomes:

1. All-cause mortality
2. Engagement in HIV care:
   - HIV Visits + Labs: at least 1 HIV medical visit, CD4, or viral load test within the analysis year
   - Note: Analysis year was determined by using the most recent year during which the participant was "active" in the DC Cohort.

Statistical Methods:

- Associations between participant characteristics and the presence of a SUD were assessed using frequencies (%) and medians (IQR) utilizing chi-square and Kruskal-Wallis where appropriate.
- Generalized estimating equations using log-binomial regression to assess the association of age at HIV diagnosis, race/ethnicity, gender, and mode of HIV transmission with SUD
- Multivariable cox proportional hazards model to assess association of SUD with all-cause mortality, controlled for demographics, CD4, and percent time with viral load above 200 copies/ml
- Generalized estimating equations using log-binomial regression to assess the association of SUD with engagement in HIV care, controlled for age at HIV diagnosis, gender, race/ethnicity, and mode of HIV transmission

RESULTS

Figure 1a. Distribution of any vs. no lifetime history of SUD among DC Cohort participants (n=8,507)

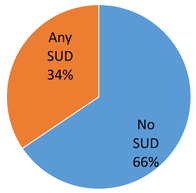


Figure 1b. Distribution of single and combination SUDs among those with any lifetime history of SUD (n=2,929)

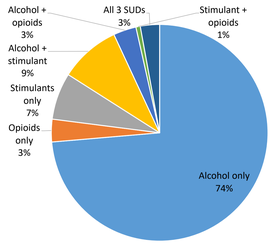


Table 1. Frequencies and associations of demographic factors and mode of transmission with history of any substance use disorder among DC Cohort participants (n=8,501[a])

				Likelihood of any SUD	
	No SUD	Any SUD	Any SUD vs. No SUD	Univariate	Multivariate
	n (col. %)	*n (col. %)*	*P-value*	*PR (95% CI)*	*aPR (95% CI)*
Total number of persons	5,578	2,929			
Age at HIV diagnosis, Years (median, IQR)	45.6 (35.1, 53.6)	49.9 (40.1, 56.3)	<.0001	1.01 (1.01, 1.02)	1.01 (1.01, 1.01)
CD4 at Enrollment (cells/µl)					
<200	538 (10.3)	309 (11.0)	0.2666	Not modeled	Not modeled
200-500	1805 (34.5)	997 (35.6)			
>500	2887 (55.2)	1496 (53.4)			
Race/ethnicity[a]					
White	801 (14.4)	280 (9.6)	<.0001	Ref	Ref
Black	4142 (74.3)	2443 (83.4)		1.43 (1.29, 1.59)	1.37 (1.23, 1.53)
Latino	315 (5.7)	150 (5.1)		1.25 (1.06, 1.47)	1.29 (1.10, 1.52)
Other or Unknown	320 (5.7)	56 (1.9)		0.58 (0.44, 0.75)	0.60 (0.46, 0.77)
Gender					
Male	3868 (69.3)	2156 (73.6)	0.0002	Ref	Ref
Female	1599 (28.7)	726 (24.8)		0.87 (0.81, 0.93)	0.75 (0.69, 0.81)
Transgender	111 (2.0)	47 (1.6)		0.83 (0.65, 1.06)	0.94 (0.74, 1.19)
Mode of HIV transmission[b]					
MSM	2325 (41.7)	908 (31.0)	<.0001	Ref	Ref
PWID	255 (4.6)	394 (13.5)		2.16 (1.99, 2.35)	1.89 (1.73, 2.07)
Heterosexual	1762 (31.6)	1020 (34.8)		1.31 (1.21, 1.41)	1.37 (1.26, 1.49)
Other or Unknown	1231 (22.1)	606 (20.7)		1.17 (1.08, 1.28)	1.20 (1.10, 1.31)

[a] Race/Ethnicity: Other includes Asian, American Indian, Alaska Native, Multiracial, Native Hawaiian, Pacific Islander, or Other.
[b] Mode of HIV Transmission: PWID includes MSM/PWID. Other includes perinatal, hemophilia, transfusion, other, or unknown.

Table 2. Association of substance use disorder status of DC Cohort participants with all-cause mortality after enrollment[a]

	Hazard of death after DC Cohort enrollment (n=388) [a]	
	Univariate	Multivariate [b]
	HR (95% CI)	*aHR (95% CI)*
Age at HIV diagnosis (y)	1.05 (1.04, 1.06)	1.05 (1.04, 1.07)
% Time VL above 200 copies/ml	1.01 (1.01, 1.02)	1.02 (1.01, 1.02)
Race/ethnicity [c]		
White	Ref	Ref
Black	1.70 (1.20, 2.41)	1.07 (0.72, 1.59)
Latino	0.86 (0.43, 1.74)	1.27 (0.62, 2.60)
Other	1.18 (0.60, 2.32)	1.12 (0.53, 2.37)
Gender		
Male	Ref	Ref
Female	1.07 (0.86, 1.34)	0.97 (0.74, 1.27)
Transgender	0.54 (0.20, 1.45)	1.01 (0.34, 3.19)
Mode of HIV transmission [d]		
MSM	Ref	Ref
PWID	4.71 (3.45, 6.43)	2.54 (1.76, 3.66)
Heterosexual	2.04 (1.54, 2.70)	1.54 (1.09, 2.16)
Other or unknown	2.48 (1.84, 3.35)	1.91 (1.36, 2.68)
CD4 at enrollment (cells/µl)		
<200	Ref	Ref
200-500	0.51 (0.39, 0.67)	0.68 (0.51, 0.92)
≥500	0.26 (0.19, 0.34)	0.43 (0.32, 0.59)
History of substance use disorder		
None	Ref	Ref
Any	1.57 (1.29, 1.92)	1.21 (0.97, 1.51)

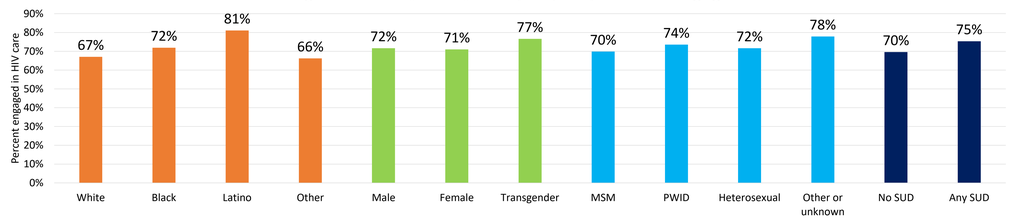
[a] Number of deaths = 388. Follow-up time for hazard ratio was calculated from the effective date of participant enrollment through last active date available or until inactive date, or 18 months post last viral load measure.
[b] Number of participants used in multivariate analysis = 7772.
[c] Race/Ethnicity: Other includes Asian, American Indian, Alaska Native, Multiracial, Native Hawaiian, Pacific Islander, or Other.
[d] Mode of HIV Transmission: PWID includes MSM/PWID. Other includes perinatal, hemophilia, transfusion, other, or unknown.

Table 3. Statistically significant predictors of higher engagement in HIV care among DC Cohort participants[a]

	Engagement in Care (HIV Visits + Labs)
	aPR (95% CI)
Race/ethnicity	
Black vs. White	1.08 (1.03, 1.13)
Latino vs. White	1.22 (1.15, 1.29)
History of substance use disorders	
Any SUD vs. No SUD	1.07 (1.04, 1.09)

[a] Model controlled for current age, race/ethnicity, gender, mode of HIV transmission. Only the statistically significant variables are shown.

Figure 2. Engagement in HIV care (visits + labs) by race/ethnicity, gender, mode of HIV transmission, and history of substance use disorder among DC Cohort participants (n=8,501). Overall engagement in HIV care was 72%.



KEY FINDINGS

- 34% of DC Cohort participants had any lifetime history of SUD.
- Alcoholism was the most diagnosed single SUD in the DC Cohort.
- SUDs disproportionately affected Blacks, Latinos, men, and risk groups other than MSM.
- Compared to MSM, PLWH with any other mode of HIV transmission were at higher risk of death.
- In univariate analysis, any SUD was associated with all-cause mortality, but in multivariate analysis, this association was no longer statistically significant.
- CD4 count above 200 cells/µl at enrollment was associated with lower hazard of death.
- Any SUD (vs. no SUD) was associated with slightly higher engagement in HIV care.

LIMITATIONS

- Substance use disorders may be under-documented by HIV care providers. Since the DC Cohort relies on documentation in the medical record, the analysis presented may be an under-estimate of SUD prevalence in this population.
- The study sample was PLWH enrolled in the DC Cohort study, which may not be generalizable to all PLWH in DC since it represents a population in care.

DISCUSSION

- More than 1/3 of DC Cohort participants had a documented SUD.
- In unadjusted analysis, SUD was associated with a nearly 60% increased risk of death.
- After adjusting for demographic factors, CD4, and viremia, SUD was not independently associated with mortality. Additional exploration of the relationship between cumulative viremia, SUD, and death, is needed.
- In multivariable analysis, SUD was associated with higher engagement in care. This finding may be explained by more frequent visits to HIV care providers to assess adherence and address co-occurring conditions, but more in-depth analysis of this finding may be warranted.

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