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Substance Use and HIV Outcomes among Prison Releasees in Zambia: A Cohort Study

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BACKGROUND

- Little is known about HIV outcomes and risk factors for poorly controlled HIV disease in PLHIV returning to the community after incarceration ("releasees") in sub-Saharan Africa.
- We aimed to describe viral suppression among releasees at community follow up in Zambia, and examine the association between post-release substance use and viral suppression to identify actionable targets for a HIV transitional care pilot.
- We hypothesized that post-release hazardous alcohol and/or drug use would be associated with HIV viremia in the period soon after prison release.

METHODS

- We prospectively enrolled incarcerated people at 5 correctional facilities in Zambia having the following eligibility criteria: ≥18 years old; documented HIV infection; release scheduled <30 days from study screening; enrolled in the national HIV treatment program; if on treatment, had been receiving ART for ≥30 days; planned to live in the Lusaka area upon release; and willing and able to provide voluntary informed consent and locator information.
- Study participants were recruited, screened, enrolled, and completed a baseline study visit prior to release. At ~6 months post-release, participants underwent one study follow-up visit. Study visits included viral load testing and collection of clinical, socio-demographic, and psychosocial data.
- We calculated summary statistics for variables of interest, and summarized time to unsuppressed viral load (≥1,000 c/mL) following enrolment using Kaplan-Meier methods.
- For participants who underwent both viral load testing and substance use screening at follow up, we estimated the association between post-release substance use and viral load suppression (<1,000 c/mL) using Cox proportional hazard modeling, controlling for potential confounding.

Among PLHIV on ART being released from prison in Zambia, **female sex** and **hazardous alcohol and/or drug use** was significantly associated with **unsuppressed viral load post-release.**

Table 1. Sociodemographic and clinical characteristics at study enrolment for participants on ART ≥30 days prior to release (N=267).

Characteristic		Participants on ART ≥30 days prior to release
Median Age at baseline* (IQR)		35.0 (30.1, 41.7)
	≤20 years	4 (1.5%)
	21-29 years	63 (23.6%)
	30-39 years	120 (40.5%)
	≥40 years	80 (27.0%)
Sex		
	Male	210 (78.7%)
	Female	57 (21.3%)
Marital Status		
	Married	152 (56.9%)
	Cohabiting/De-facto/Common Law	1 (0.4%)
	Widowed	23 (8.6%)
	Divorced/Separated	51 (19.1%)
	Never Married	40 (15.0%)
Education Level*		
	No education	80 (30.0%)
	Primary	123 (46.1%)
	Secondary	48 (18.0%)
	Post-secondary	15 (5.6%)
Detention Type		
	Sentenced/ convicted	259 (97.0%)
	Remandee awaiting trial	7 (2.6%)
Median time incarcerated at time of release, months (IQR)		7.8 (3.9, 16.0)
Baseline WHO stage**		
	I	156 (58.4%)
	II	22 (8.2%)
	III	18 (6.7%)
	IV	1 (0.4%)
	Unknown	70 (26.2%)
Median CD4 count at baseline (IQR)**		390 (256, 507)
	Missing CD4 count, n (%)	14 (5.2%)
Baseline Viral Load**		
	Undetectable (<40 c/ml)	193 (72.3%)
	Suppressed (<400 c/ml)	228 (85.4%)
	Suppressed (<1,000 c/ml)	235 (88.0%)
	Unsuppressed (≥1,000 c/ml)	21 (7.9%)
	Missing	11 (4.1%)

*Highest level of educations completed; **Baseline is defined as date of participant enrollment into the study

Figure 1. Kaplan-Meier failure estimates for participants with and without reported hazardous alcohol and/or drug use among participants who completed both post-release viral load testing and substance use screening (N=209).

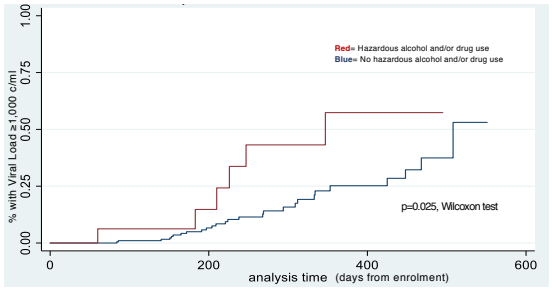


Table 2. Associations between characteristics of interest and unsuppressed viral load at a threshold of ≥1,000 copies/ml among participants who completed both post-release viral load testing and substance use screening using validated tools and had complete data for co-variates of interest (N=201).

Characteristic		% with Characteristic (n/N)	Unadjusted HR* (95% CI)^	Adjusted HR* (95% CI)^	p-value
Sex	Male	79.1% (159/201)	1	1	0.050
	Female	20.9% (42/201)	1.94 (0.92, 4.09)	2.16 (1.00, 4.65)	
Age, years	≥40	32.3% (65/201)	1	1	0.082
	<40	67.7% (136/201)	2.32 (0.89, 6.09)	2.40 (0.90, 6.46)	
Baseline CD4+ count (cells/mm³)	≥200	86.6% (174/201)	1	1	0.002
	<200	13.4% (27/201)	2.75 (1.22, 6.18)	3.84 (1.64, 9.02)	
Psychosocial support (per the mMOS-SS)@	21st-100th percentile	80.1% (161/201)	1	1	0.531
	<20th percentile	19.9% (40/201)	1.38 (0.62, 3.07)	1.30 (0.57, 2.98)	
Hazardous Alcohol and/or Drug use (per the AUDIT/ DUDIT)#	No	92.5% (186/201)	1	1	0.008
	Yes	7.5% (15/201)	2.62 (1.08, 6.36)	3.53 (1.39, 8.98)	

*HR: Hazard ratio; ^CI: 95% confidence interval; @modified Medical Outcomes Study Social Support Survey; #WHO Alcohol Use Disorder Identification Test (AUDIT)/ Drug Use Disorders Identification Test (DUDIT)

RESULTS

- From March 2017—December 2018, we screened 396 incarcerated people and enrolled 296 (75%) who met eligibility criteria. Of these, 267 (90%) had been on ART for ≥30 days and were included in the analysis (**Table 1**).
- Of those included, most were men (n=210, 78.7%), of median age 35 years (IQR:30.1–42.7), with baseline CD4 count of 390 cells/mm^3 (IQR:256–507); 235 (88%) had viral suppression (<1,000 c/mL) at baseline.
- 201 participants (75%) completed both follow-up viral load testing and substance use screening at an average of 7.3 months (IQR:5.3–10.5) post-release and had non-missing covariate date. Of these, 15 (7.5%) reported interval hazardous alcohol and/or drug use per the Alcohol/ Drug Use Disorders Identification Tests (AUDIT/ DUDIT), and 169 (84%) had viral suppression (<1,000 c/mL).
- In the time-to-event analysis, releasees with, versus those without, hazardous alcohol and/or drug use **were significantly more likely** (p=0.025) to have unsuppressed viral load post-release (**Figure 1**).
- In the multi-variable Cox proportional hazard analysis, releasees with, versus those without, hazardous alcohol and/or drug use were **3.5 times (95% CI:1.4–9.0)** as likely to have unsuppressed viral load post-release (**Table 2**).

CONCLUSIONS

- In one of the first studies from sub-Saharan Africa to prospectively follow incarcerated PLHIV after prison release, we observed a numerical decrease in the proportion of people with viral suppression post-release.
- We also observed that female sex and post-release hazardous alcohol and/or drug use was significantly associated with unsuppressed viral load after release.
- New transitional HIV care models are needed in Zambia and the region to support HIV care engagement and address co-morbid substance use in this key population.

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