Social Determinants of HIV Status and Reporting Viral Load Suppression Among Transgender Women in South Africa

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Introduction

Transgender women represent a population with estimated HIV prevalence of $\geq 50\%$ in South Africa. Identifying key medical and social factors influencing HIV outcomes can help develop effective prevention and treatment strategies tailored to this population. Some unique HIV vulnerabilities on transgender women in South Africa:

- high risk sexual partnerships and high frequency of receptive anal sex
- more substance use
- stigma and different types of violence

Data Structure

- Target population: transgender women in South Africa
- Collection time: June–November, 2018 [2]
- $N = 213$ independent and valid sample survey responses from transgender women of three urban areas in South Africa
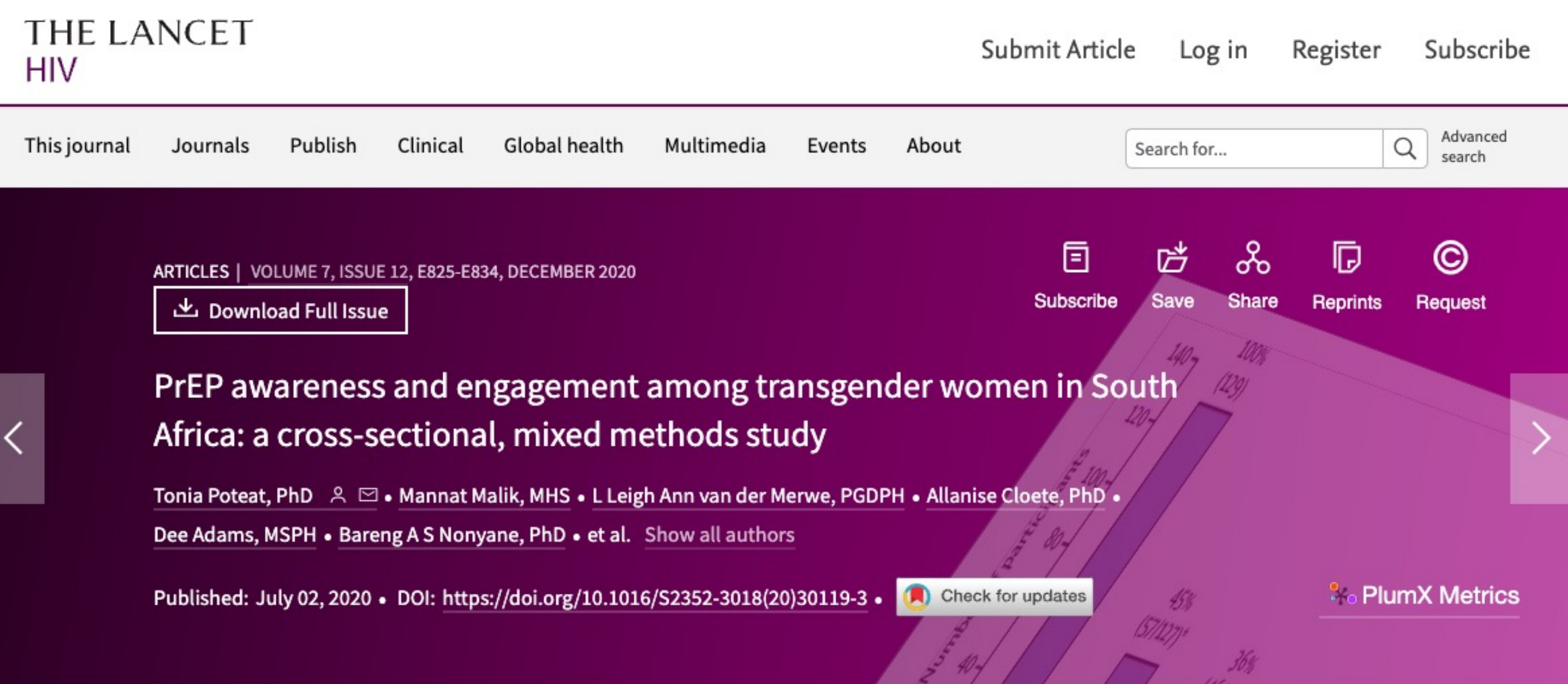- HIV-negative: $N = 129$; Living with HIV: $N = 67$; Unknown: $N = 17$

Figure 1. The primary study on this survey data

Study Objectives

1. What social factors are associated with living with HIV (vs. being HIV negative) in this study population ($N = 196$)?
2. Among participants living with HIV and on antiretroviral therapy (ART) what factors are associated with reporting an undetectable viral load ($N = 63$)?

This study aims to use appropriate quantitative methods to investigate these objectives and find evidence on important factors associated with these outcomes.

- Two outcomes:
  HIV status ($N = 196$) and whether an undetectable viral load was reported ($N = 63$)
- Covariates (factors): education background, income level, homelessness, sexual violence, threats violence, physical violence, sex work history, community connectedness, alcohol use disorder, food insecurity, substance use, ever on ART, medical mistrust, etc.

Summary Statistics

	Objective 1	Objective 2
Group	HIV-pos vs. neg	reported vs. not reported
Sample size by group	67 vs. 129	50 vs. 13
Lifetime homelessness	46% vs. 9%	38% vs. 62%
Having sexual violence history	77% vs. 49%	71% vs. 92%
Having sex work history	90% vs. 53%	92% vs. 77%
Income > poverty bound	59% vs. 39%	57% vs. 58%
Low medical mistrust	-	36% vs. 33%

Table 1. Selected summary statistics results

Analysis Workflow

Step 0: Select a model form from a set of candidate models (including all considered covariates) based on the AUC value

- Logistic regression
- Probit regression
- Negative binomial regression
- Linear regression

Step 1: Univariate regressions (using the selected model) to select variables (using p-value < 0.15)

Selected variables $X_1, X_2, \ldots, X_p$
The outcome: Y

Step 2: Multivariable modelling
$Y \sim f(X_1, X_2, \ldots, X_p)$

Fit the outcome using the selected model and report the p-values by each covariate
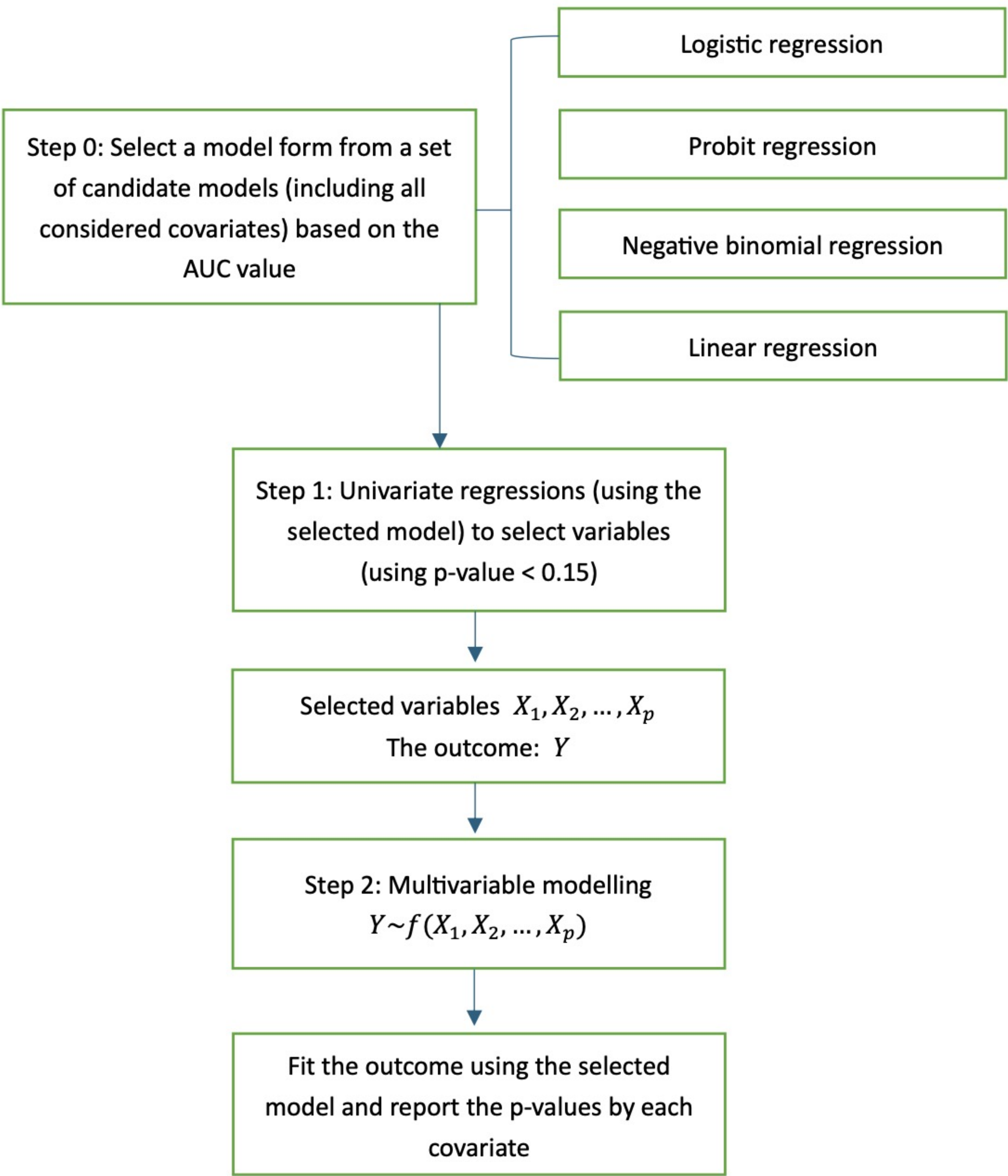
Figure 2. Logistic regression is **winner** of Step 0. AUC: area under the ROC curve (ROC: receiver operating characteristic). Y: outcome. X: covariate.
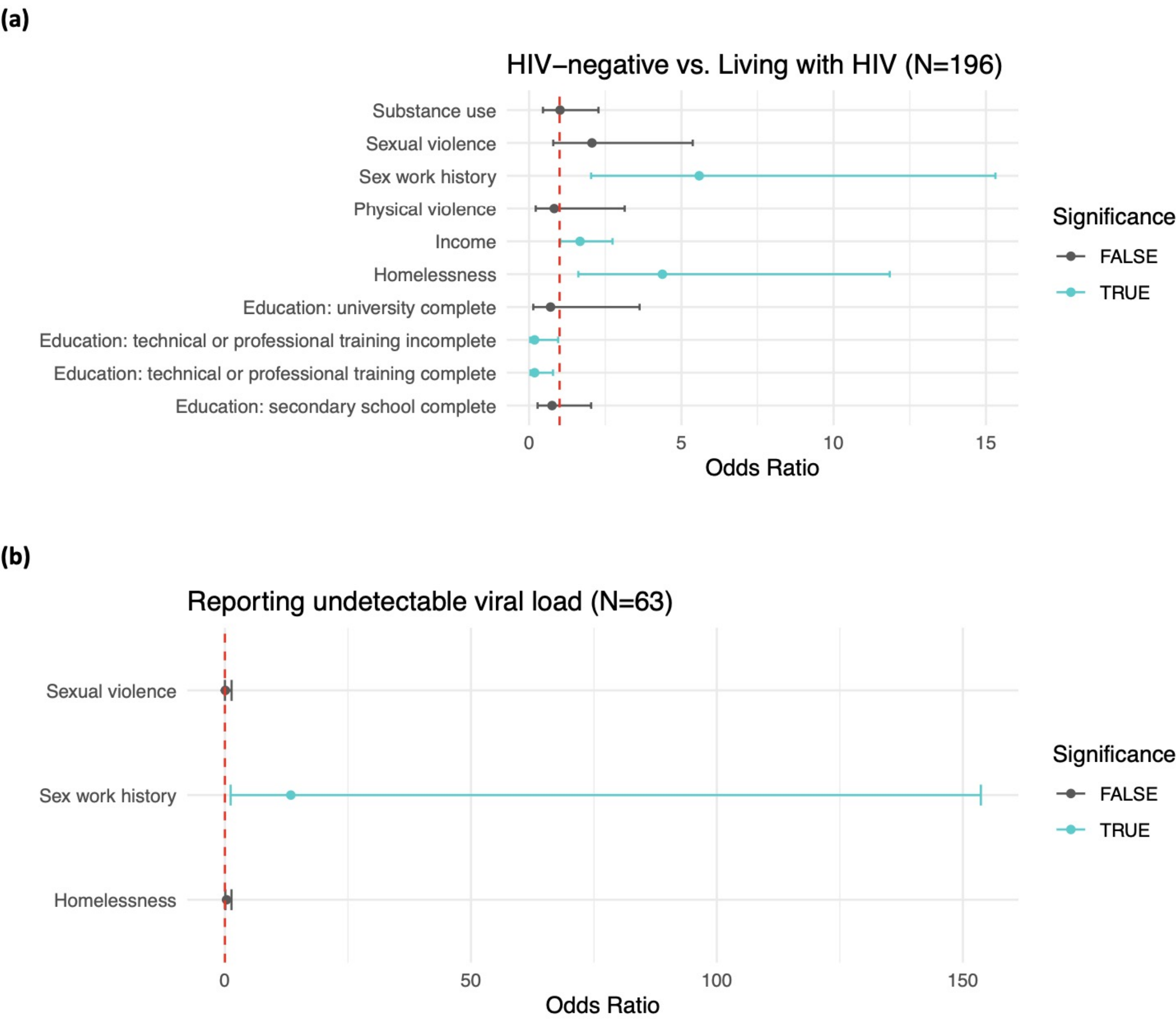
Key Results

(a)

(b)

Figure 3. Forest plots (95% confidence intervals) for estimated odds ratios of our objectives. Panel (a) is for the model of HIV status ($N = 196$). Panel (b) is for the model of reporting undetectable viral load ($N = 63$).

Concluding Remarks

In this study, we investigated associations of intervenable factors with two salient outcomes related to HIV prevention and treatment (HIV status and reporting an undetectable viral load). Sex work history was significantly associated with both outcomes and had the strongest effect size, suggesting that transgender women sex workers should be prioritized for interventions in this population. [1]

Impact

Expanded HIV services on to address poverty and homelessness as well as engage sex workers may facilitate HIV prevention and viral suppression among transgender women in South Africa.

References

[1] Rutendo Bothma, Cara O'Connor, Jolie Nkusi, Vusi Shiba, Jacob Segale, Luyanda Matsebula, J Joseph Lawrence, L Leigh-Ann van der Merwe, Matthew Chersich, and Naomi Hill. Differentiated hiv services for transgender people in four south african districts: population characteristics and hiv care cascade. *Journal of the International AIDS Society*, 25:e25987, 2022.

[2] Tonia Poteat, Mannat Malik, L Leigh Ann van der Merwe, Allanise Cloete, Dee Adams, Bareng AS Nonyane, and Andrea L Wirtz. Prep awareness and engagement among transgender women in south africa: a cross-sectional, mixed methods study. *The Lancet HIV*, 7(12):e825–e834, 2020.