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Authors

Lodi, Sara
Rossi, Sarah
Bendiks, Sally
et al.

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Correlates of intersectional HIV and substance use stigma affecting people with HIV and substance use in St. Petersburg, Russia

Sara Lodi[1], **Sarah L Rossi**[2], **Sally Bendiks**[2], **Natalia Gnatienko**[2], **Christine Lloyd-Travaglini**[1], **Marina Vetrova**[3], **Olga Toussova**[3], **Natalia Bushara**[3], **Elena Blokhina**[3], **Evgeny Krupitsky**[3,4], **Maria L Ekstrand**[5,6], **Dmitry Lioznov**[3], **Jeffrey H. Samet**[1,2,7], **Karsten Lunze**[2,7]

[1] Boston University School of Public Health, Boston, MA, USA

[2] Department of Medicine, Boston Medical Center, Boston, MA, USA

[3] Laboratory of Clinical Psychopharmacology of Addictions, First Pavlov State Medical University of Saint Petersburg, St. Petersburg, Russia

[4] Department of Addiction, Bekhterev National Medical Research Center for Psychiatry and Neurology, St. Petersburg, Russia

[5] Center for AIDS Prevention Studies, School of Medicine, University of California San Francisco, San Francisco, CA, USA

[6] St. John's Research Institute, St. John's National Academy of Health Sciences, Bangalore, India

[7] School of Medicine, Boston University, Boston, MA, USA

Abstract

People with HIV (PWH) who inject drugs often experience coexisting HIV- and substance use-related stigma manifestations. We assessed correlates of HIV stigma (Berger HIV stigma scale), substance use stigma (Substance Abuse Self-Stigma scale) and intersectional HIV and substance use stigma in a cohort of PWH with a lifetime history of drug use in St. Petersburg, Russia. Intersectional stigma was defined as having a score greater than the median for both forms of

stigma. Of the 208 participants, 56 (27%) had intersectional stigma. Depressive symptoms and alcohol dependence were significantly associated with a higher HIV and substance stigma score, but not with intersectional stigma. Individual and community interventions to reduce the impact of HIV stigma and substance use stigma affecting PWH who inject drugs should consider assessing and addressing mental health and unhealthy substance use. Further work with longitudinal data is needed to understand mechanisms leading to intersectional stigma.

Resumen

Las personas infectadas por el VIH que se inyectan drogas a menudo experimentan manifestaciones de estigma relacionadas con el uso de sustancias y el propio VIH. En este estudio evaluamos los correlatos de estigma asociado al VIH (escala de estigma asociado al VIH de Berger), el estigma asociado al uso de sustancias ("Substance Abuse Self-Stigma Scale") y el estigma interseccional del VIH y el uso de sustancias en una cohorte de personas infectadas por el VIH con antecedente de uso de drogas en San Petersburgo, Rusia. El estigma interseccional se definió como una puntuación superior a la mediana para ambas formas de estigma. De los 208 participantes, 56 (27%) tenían estigma interseccional. Los síntomas depresivos y la dependencia del alcohol se asociaron significativamente con una puntuación más alta de estigma relacionado con el VIH y las sustancias, pero no con el estigma interseccional. Las intervenciones individuales y comunitarias para reducir el impacto del estigma asociado al VIH y al uso de sustancias que afectan a las personas con VIH que se inyectan drogas deben tener en cuenta la salud mental y el uso nocivo de sustancias. Se necesitan estudios con datos longitudinales para comprender mejor los mecanismos que conducen al estigma interseccional.

Keywords

HIV; substance use; stigma; intersectional stigma

Introduction

Stigma is defined as the social exclusion and dehumanization of individuals assigned to an undesirable social category (1). When people with HIV (PWH) perceive negative attitudes and experience or expect stigma and discrimination, they might endorse the negative feelings and beliefs held by others about their HIV status and apply these feelings to themselves (2). In the presence of a power imbalance, enacted, anticipated, and internalized stigma may make PWH feel inferior to others and lower their social status (3). Several studies have shown that such HIV stigma manifestations adversely impact the initiation and adherence to antiretroviral treatment (ART), HIV status disclosure, and physical and mental health among PWH (4–11).

PWH with ongoing or past substance use might also internalize societal stigma because of their substance use, leading to lower self-respect and decreased self-esteem. Analogous to HIV stigma, substance use stigma adversely affects an individual's chance to engage in substance use treatment (12–14). When individuals experience both forms of stigma, the resulting intersectional stigma might adversely impact their health care and health in a way that is not merely additive (15–17). For example, previous studies have shown that among

PWH who use substances, high levels of both internalized HIV and substance use stigma were negatively associated with health status and health service utilization compared to those with low levels of at least one type of stigma (15, 18, 19).

Ending the HIV epidemic globally requires reducing and eliminating stigma as a health care barrier for the key HIV population of PWH who inject drugs. Therefore, interventions addressing intersectional substance use and HIV stigma are needed to improve care for this key population by helping them cope with stigma. This is particularly relevant in settings where HIV incidence and prevalence continue to rise due to injection drug use. In the Russian Federation (Russia) where more than one million people are registered with HIV (20, 21) 47% of incident HIV cases with a known mode of transmission are among people who inject drugs (22).

In order to develop interventions targeting stigma that affects PWH who inject drugs, we need to understand what individual characteristics correlate with intersectional HIV and substance use stigma. For instance, women seem to be more affected than men by various forms of stigma, particularly women who use substances (23–27). Other factors amenable to targeted interventions like depressive symptoms, social support, and substance use are commonly associated with various forms of health-related stigma (28). However, to our knowledge, the association between these predictors and intersectional HIV and substance use stigma have not been investigated quantitatively in the key population of PWH who inject drugs (29).

In a cohort of PWH in St. Petersburg, Russia, who had a lifetime history of drug use and were ART-naïve at enrollment, we examined whether gender, social support, alcohol dependence, depressive symptoms, recent injection drug use, history of transactional sex, and time since HIV diagnosis were associated with intersectional stigma.

Methods

Study design and population

We performed a secondary analysis of the Russia Alcohol Research Collaboration on HIV/AIDS (ARCH) cohort, a prospective observational study conducted in St. Petersburg, Russia (30). The ZINC trial was a nested double-blinded randomized controlled trial of zinc supplementation within the Russia ARCH cohort (31).

Participants in the Russia ARCH cohort (n=351, nested ZINC trial n=254) were recruited between November 2012 and June 2015 in St. Petersburg from clinical HIV and addiction care sites, among participants who had previously completed clinical studies at Pavlov State Medical University (e.g., through NGOs), and through snowball recruitment. Eligibility criteria were the following: 18–70 years old, documented HIV infection, documented ART-naïve status at enrollment, the ability to provide contact information for two contacts to assist with follow-up, stable address within 100 kilometers of St. Petersburg, possession of home or mobile phone, past month risky drinking as defined by NIAAA criteria (ZINC participants only) (32). Participants were excluded if they were not fluent in Russian or had a cognitive impairment as assessed by the research assessor resulting in the inability

to provide informed consent. The baseline assessment included the following sections: demographics (33), sex partners and behaviors (34), screening for harmful drinking and alcohol dependence per AUDIT, drug use (modified Risk Behavior Survey) (35, 36), and the VR-12 Health Survey (37). Demographic characteristics included gender, age, education (up to nine grades vs. ten grades or more of education), and employment status (working full or part time vs. not employed). Laboratory values such as CD4 count levels and HIV-1 viral loads were collected at baseline and 3 months unless clinically indicated for more. CD4 count was measured by flow cytometry. All assessments were conducted by trained research assessors and administered in Russian. Particularly sensitive sections of the assessment, including sex behaviors, were self-administered by the participant.

For the present study, we restricted inclusion to individuals who reported a lifetime history of drug use at baseline, and who completed an HIV stigma and a substance use stigma questionnaire during a study visit. The lifetime history of drug use was defined as reporting a past or recent use of drugs including heroin, opioid, cocaine, amphetamine, marijuana, or a sedative. We used baseline data for all variables except for the substance use stigma that was measured once at either baseline or a follow-up visit. In all patients who participated in the nested ZINC trial, the baseline data were collected before receiving the trial intervention.

All participants provided written informed consent, and interviews were conducted in a private space at the research center located at the Pavlov State Medical University. All participants received 600 – 1,500 Russian rubles in cash at each visit (depending on the procedures at the respective visit, the equivalent of about US $14–35 at the time of study) as compensation for their time and transportation costs. The Institutional Review Boards of Boston University Medical Campus and the First St. Petersburg Pavlov State Medical University approved this study.

Outcomes/dependent variables

We analyzed the following outcomes separately: intersectional HIV and substance use stigma (primary outcome), HIV stigma and substance use stigma (separately, secondary outcomes).

HIV stigma was quantified using the abbreviated "Berger HIV Stigma Scale," (38) a previously validated tool that includes 10 items with subscales for personalized stigma, disclosure concerns, negative self-image, and concerns with public attitudes toward HIV-positive people (i.e., "I have stopped socializing with some people because of their reaction to my having HIV"). The response options ranged from 1 "strongly disagree" to 4 "strongly agree." The HIV stigma score was calculated as the sum of each participant's response to all questions and could range from 10 to 40 points.

Substance use stigma manifestations were quantified using an abbreviated Substance Abuse Self-Stigma Scale (SASSS) (39), a previously validated tool to measure stigma among individuals with a history of substance use, as well as the Stigma-related rejection scale (SRS) (19, 40). The abbreviated SASSS consisted of 12 items with four questions in each of the three following subscales: (1) internalized/stigma, self-devaluation (4 items; e.g., "I have the thought that a major reason for my problems with substances is my own poor

character", 1=never or almost never to 5=very often), (2) fear of enacted stigma (4 items; e.g., "People think I'm worthless if they know about my substance use history", 1=few people to 5=almost everyone), (3) anticipated stigma and related avoidance (4 items; e.g., "I would choose to avoid someone who seemed interested in my friendship if I knew they had never used substances", 1=never or almost never true to 5=always or almost always true which was scored from). The substance use stigma score was calculated as the sum of each participant's response to all questions and could range from 12 to 60 points. Internal consistency of the HIV stigma and of the substance use stigma scores was assessed using a Cronbach alpha, in which a score equal or higher than 0.7 is acceptable (41).

Intersectional HIV and substance use stigma was quantified as an ordinal variable with 3 mutually exclusive categories: i) intersectional stigma defined as a high score (above the median) for both HIV *and* substance use stigma; ii) single stigma defined as either a high HIV stigma *or* a high substance use stigma score (defined as > median), with the other form of stigma low; iii) low stigma defined as lower stigma scores (median) for both HIV and substance use stigma. As a sensitivity analysis we used the 75th percentile instead of the median as cut off for high versus low stigma score.

Independent variables

Potential correlates of intersectional stigma were chosen a priori, and included social support, injection drug use in the past 30 days, depressive symptoms, gender, alcohol dependence, transactional sex, and time since HIV diagnosis (<1 year versus 1 year) measured at baseline. Social support was defined as a binary variable using the Social Support Scale (42), which is a 5-item questionnaire. Social support was defined as having a score above or equal to the 75th percentile. Depressive symptoms were defined as a score 16 on CES-D (43, 44).

Alcohol dependence in the past 12 months was defined as screening positive for probable alcohol dependence with an AUDIT score 13 in women and 15 in men (45). Transactional sex was defined as reported lifetime history of *selling* sex for money, drugs, or alcohol.

Statistical analyses

Frequencies, medians, and interquartile range [IQR] were calculated to describe the study population. We computed Spearman correlation coefficients to detect potential pairs of highly correlated independent variables, defined as a correlation > 0.4.

To accommodate the ordinal nature of the primary outcome, intersectional stigma (a 3-category variable: intersectional stigma, single stigma, low stigma), we used multinomial logistic regression models to examine its association between the independent variables. With this approach two logistic regression models are estimated simultaneously: one for the logit of intersectional stigma versus single stigma and one for the logit of single stigma versus low stigma.

We also used linear regression models to identify dependent variables associated with the continuous HIV stigma score and substance use stigma scores (secondary outcomes).

For all outcomes, we first estimated a series of unadjusted models, one for each independent variable in turn. Then, we estimated one overall model adjusting for all these variables without any further selection.

Two individuals with missing values on the transactional sex variable were excluded from the adjusted analyses.

Statistical significance for all models was set at 0.05 and all tests were two-sided. Analyses were conducted using the statistical package SAS 9.4 (SAS Institute, Inc. NC, USA).

Results

Of 351 individuals enrolled in the Russia ARCH study, 318 reported lifetime history of drug use. The present study included 208 out of 318 individuals who completed the HIV stigma and the substance use stigma questionnaire. Individuals who were excluded were more likely to be males, to have had recent drug use, to have social support, and to have higher CD4 cell count (Appendix Table I). Baseline characteristics for the 208 study participants are shown in Table I. The median [IQR] age of participants was 33 years [31,37], and 141 (68%) were male. Among 160 individuals with an available CD4 cell count, the median [IQR] was 470 cells/ml^3 [305,710]. Depressive symptoms were common (46%), as was alcohol dependence (56%). Eighty-one participants (39%) reported injection drug use in the past 30 days and 17 (8%) reported a history of transactional sex.

The median [IQR] HIV stigma score, with a possible range of 10 to 40, was 21 [17,25]. The median [IQR] substance use stigma score, with a possible range of 12 to 60, was 29 [23,37]. Cronbach alpha values for HIV stigma score and for substance use stigma score were 0.90 and 0.91, respectively, indicating internal consistency.

A total of 57 participants (27%) were classified as having higher intersectional stigma (both HIV and substance use stigma score above the median), 74 (36%) reported single stigma (a score above the median in only one of the two stigma forms), and 77 (37%) reported low stigma (both stigma scores equal to or below the median). Spearman correlation coefficients were estimated between pairs of independent variables and there was no pair with correlations greater than 0.4.

Table II shows the results of linear regression models for continuous HIV stigma scores and for continuous substance use stigma scores. In the fully adjusted models, depressive symptoms and alcohol dependence were significantly associated with a higher HIV stigma score with β parameters of 4.01 (95% confidence intervals (CI) 2.55,5.47, t=5.42, p<0.0001) and 1.68 (95% CI 0.22,3.15, t=2.27, p=0.0245), respectively. While a history of transactional sex correlated with increased HIV stigma, this variable was not significant in the adjusted model (t=1.70, p=0.0912). Depressive symptoms, recent injection drug use, and alcohol dependence were significantly associated with higher substance use stigma scores with adjusted β parameters of 6.99 (95% CI 4.54,9.43, t=5.63, p<0.0001), 4.71 (95% CI 2.22,7.21, t=3.73, p=0.0003), and 3.31 (95% CI 0.85,5.76, t=2.66, p=0.0085), respectively.

Table III shows the results of the multinomial logistic regression models. The last two columns on the right report the unadjusted and adjusted estimated odds ratios (OR) between the independent variables and the logit of single stigma versus low stigma. An OR greater than 1 indicates that increases in the independent variable lead to a higher likelihood of experiencing single stigma versus no stigma. The odds of single stigma versus low stigma in individuals with depressive symptoms were 8.06 (95% CI 3.52,18.52, Chi-square=24.23, p<0.0001) times the odds of individuals without depressive symptoms. Individuals with alcohol dependence had 2.54 (95% CI 1.18,5.49, Chi-square=5.67, p=0.0172) times the odds of a single form of stigma versus low stigma of individuals with no alcohol dependence. The adjusted model indicated that individuals who had been diagnosed with HIV for more than 1 year had 0.10 (95% CI 0.02,0.57, Chi-square=6.80, p=0.0091) the odds of a single form of stigma versus low stigma than individuals with a more recent diagnosis.

The second and third columns of Table III report the unadjusted and adjusted estimated OR between the independent variables and the logit of intersectional stigma versus a single form of stigma. An OR greater than 1 indicates that increases in the independent variable lead to a higher likelihood of experiencing intersectional stigma versus a single form of stigma. In the unadjusted model, individuals with depressive symptoms had 2.25 (95% CI 1.07,4.76, Chi-square=4.55, p=0.0330) times the odds of experiencing intersectional stigma versus single stigma than individuals without depressive symptoms. No other independent variable was significantly associated with intersectional stigma in the unadjusted and adjusted models. These results did not materially change in the sensitivity analysis using the 75th percentile as a cut-off to define high versus low stigma (Appendix Table II).

Discussion

Stigma related to HIV and substance use is considered to be widespread among PWH who use drugs in Russia and elsewhere. We examined individual and contextual correlates of stigma manifestations in the key population of PWH who use drugs. We found that depressive symptoms and alcohol dependence - but not social support, gender, history of transaction sex and time since HIV diagnosis - were independently associated with both increased HIV and substance use stigma scores. Recent injection drug use was a significant predictor of an increased substance use stigma score, but not of HIV stigma score. We did not find any significant association between any of the examined factors and intersectional HIV and substance use stigma.

The lack of association between the examined factors and intersectional stigma can be due to the overall small sample size of the study and the relatively small number and proportion of individuals classified as having intersectional stigma (i.e., 57 [27%] in the main analysis when we used the median as cut-off and 16 [8%] when we used the 75th percentile as cut-off). This suggests that individuals in which the two forms of stigma intersected according to our operationalization (i.e., manifested in high stigma scores for both scales) were not common in our sample.

Alternatively, the instruments we used might not have been adequate to quantify how HIV and substance use stigma intersect in this sample. Intersectional stigma has been

defined as the presence of a statistical interaction between two forms of stigma in several studies estimating the effect of intersectional stigma on health outcomes (15, 18, 19, 46). In our study, we adapted this concept of stigma co-existence to a situation where the intersectional stigma is an outcome, by defining intersectional stigma as the concurrent presence of high levels of both stigma scores. It is possible that categorizing the stigma variables misses certain aspects of stigma intersectionality: our previous qualitative research suggests that intersectional stigma manifests inconsistently, specific to varying contexts which the instruments we used did not capture. More work is needed to reach a consensus on instruments and statistical methods to quantify intersectional stigma (47).

Despite the lack of association between the potential predictors and intersectional stigma, our models were able to capture factors associated with HIV and substance use stigma. For example, this study confirms the association found in other studies between depressive symptoms and HIV stigma and substance use stigma (15, 48). Depressive symptoms are among the most common mental health symptoms experienced by PWH and they were present in 46% of the PWH with history of drug use included in this analysis (49, 50).

Our findings, suggesting that alcohol dependence in the past 12 month is associated with experiencing increased HIV and substance use stigma scores, are also consistent with previous studies in Russia and elsewhere (51). HIV and substance use stigma might reduce people's ability to address their alcohol use, possibly exacerbated by stigma-related stress and their maladaptive unhealthy alcohol use. Likewise, even in Russia, alcohol use that exceeds normative drinking might further increase people's vulnerability to HIV and substance use stigma and discrimination. Of note, over half of the study participants were at risk of alcohol dependence based on AUDIT screening, reflecting the inclusion criterion of heavy alcohol drinking for the nested randomized controlled trial in this cohort. This high prevalence is also representative of the widespread unhealthy alcohol consumption in Russia, particularly common among people with HIV and those with a history of other substance use (52–55).

In this study involving people with a lifetime history of drug use, more than a third of participants (38%) reported injection drug use in the past 30 days. We found that recent injection drug use correlated with both an increased substance use stigma score and with having any form of stigma score high versus low stigma, but not with HIV stigma or intersectional stigma. This is consistent with a previous study that found no link between substance use outcomes and HIV stigma in a similar population in St. Petersburg (56).

Some of our results are not supported by the literature on HIV and substance use stigma. For instance, several studies, mostly using qualitative methods, found that women experienced greater levels of substance use-related stigma than men (57–60) (29). In contrast, we detected no association between gender and either HIV or substance use stigma. The reason for this discrepancy is unclear and could be explained by the high level of stigmatization of people of both genders for their substance use and HIV (61). In a previous study in a similar population, we found that women were likely to experience sexual and other forms of violence, and future research should explore the stigma's role in this vulnerability (62).

Previous studies have found a protective relationship between social support and HIV-related stigma in PWH (63, 64). The lack of association between social support and HIV or substance use stigma in this study might be attributable to the generic measurement of social support, which did not assess the source of the potential support. In contrast, a prior study using a more specific social support instrument found that social support from friends, but not support from family or others, to be associated with less HIV stigma (65).

Although other studies have shown increased levels of HIV stigma among sex workers living with HIV (66, 67), we found no evidence of an association with report of transactional sex. This might be due to the small number (17 [8%]) of individuals who reported a history of selling sex and the consequent lack of statistical power to detect an association.

There are several limitations to this study that future work might expand upon. First, given this study's cross-sectional design, no conclusions can be drawn concerning causality or directionality, and thus additional research is needed to clarify the nature of the examined associations. Further qualitative research and future longitudinal studies with stigma data collection at multiple time points are needed to explore potential determinants of intersectional stigma and the mechanisms causing it. Second, although the Berger HIV stigma scale and the SASSS substance use stigma scale have been widely used, it is difficult to translate an observed magnitude of scores into a clinically meaningful effect. Third, we defined the outcome intersectionality based on the quartiles of the distribution of the HIV stigma score and of the substance use stigma score. We acknowledge that this limits the generalizability of our findings to populations with a different distribution of these two stigma scales. Fourth, many people in our study had a history of unhealthy alcohol use and, albeit this is not uncommon in this population, the findings from this study might thus not be representative of all people with HIV who use drugs in St. Petersburg or in Russia.

Conclusions

Among a cohort of PWH who reported a lifetime history of drug use in Russia, depressive symptoms and high risk of alcohol dependence were linked to higher levels of HIV stigma and of substance use stigma. Recent injection drug use was associated with higher levels of substance use stigma. We did not identify correlates of intersectional stigma in this population using our instruments.

Given the complex intersection of these two layered stigma identities, future studies should examine the longitudinal associations of HIV and substance use stigma among PWH with substance use to better understand factors and causal paths that lead to the co-existence of these forms of stigma in Russia and elsewhere. Such work is central to informing the urgently needed political, social, and clinical changes to promote access to HIV and addiction services in the key population of PWH who use drugs. Stigma interventions may be of value to help affected people cope with harmful substance use and with the negative effects of stigmatization.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Funding:

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Table I.

Demographic and clinical characteristics of 208 persons with HIV and a lifetime history of drug use.

Age	Median [IQR]		34 [31, 37]
Gender	N (%)	Male	141 (67.8)
		Female	67 (32.2)
Time since HIV Diagnosis	N (%)	1 year	192 (92.3)
		< 1 year	16 (7.7)
Education	N (%)	> 9 grades	162 (77.9)
		9 grades	46 (22.1)
Employment	N (%)	Working full or part time	101 (48.6)
		Not employed	107 (51.4)
CES-D Depression Scale	N (%)	Moderate to severe depressive symptoms (16)	95 (45.7)
		<16	113 (54.3)
Alcohol dependence (AUDIT)	N (%)	Yes	116 (55.8)
		No	92 (44.2)
Recent Drug Use (past 30 days)	N (%)	Yes	90 (43.3)
		No	118 (56.7)
Recent injection drug use (past 30 Day)	N (%)	Yes	81 (38.9)
		No	127 (61.1)
Ever sold sex for money, alcohol, drugs	N (%)	Yes	17 (8.3)
		No	189 (91.7)
		Missing	2
CD4 Count	N (%)	500	70 (43.8)
		< 500	90 (56.3)
		Missing	48
Social Support Scale	N (%)	75th percentile	79 (38.0)
		< 75th percentile	129 (62.0)

Table II.

Unadjusted and adjusted linear regression models for correlates of HIV stigma score and substance use stigma score among PWH with a lifetime history of drug use.

	Outcome			
	HIV stigma		Substance use stigma [a]	
Predictors	Unadjusted β (95% CI)	Adjusted β (95% CI)	Unadjusted β (95% CI)	Adjusted β (95% CI)
Social support (High vs. Low)	−1.45 (−3.03, 0.12)	−0.26 (−1.75, 1.23)	−0.15 (−2.94, 2.64)	2.48 (−0.01, 4.97)
Recent injection drug use (past 30 Day)	1.01 (−0.56, 2.59)	−0.09 (−1.58, 1.40)	6.35 (3.72, 8.99) **	4.71 (2.22, 7.21) **
Moderate to severe depressive symptoms (CES-D score 16 vs < 16)	4.50 (3.08, 5.92) **	4.01 (2.55, 5.47) **	8.05 (5.57, 10.53) **	6.99 (4.54, 9.43) **
Gender (Female vs. Male)	1.18 (−0.46, 2.83)	1.12 (−0.42, 2.66)	−0.95 (−3.85, 1.94)	−1.29 (−3.87, 1.30)
Alcohol Dependence (AUDIT) (yes versus no)	2.30 (0.78, 3.82) **	1.68 (0.22, 3.15) *	4.94 (2.30, 7.58) **	3.31 (0.85, 5.76) **
Transactional sex (yes vs no)	3.31 (0.55, 6.08) *	2.25 (−0.36, 4.87)	3.72 (−1.18, 8.62)	3.10 (−1.29, 7.49)
Time since HIV diagnosis (1 vs. <1 year)	0.04 (−2.85, 2.94)	−1.02 (−3.74, 1.69)	−0.93 (−6.01, 4.15)	−4.24 (−8.78, 0.31)

Note:

*
indicates a p-value <0.5

**
indicates a p-value <0.01

Table III.

Unadjusted and adjusted odds ratios from a multinomial logistic regression model assessing the association between potential predictors and intersectional HIV and substance use stigma among PWH with a lifetime history of drug use.

	Outcome			
	Intersectional stigma versus single stigma		**Single stigma versus low stigma**	
Predictors	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Social support				
Low	1	1	1	1
High	0.78 (0.38,1.60)	1.01 (0.47,2.17)	0.96 (0.50,1.83)	1.77 (0.81,3.86)
Recent injection drug use (past 30 Day)				
No	1	1	1	1
Yes	1.34 (0.67,2.68)	1.20 (0.58,2.49)	1.80 (0.92,3.55)	1.40 (0.65,3.02)
Moderate to severe depressive symptoms				
No (CES-D < 16)	1	1	1	1
Yes (CES-D ≥ 16)	2.25 (1.07,4.76) *	2.10 (0.96,4.58)	6.71 (3.13,14.50) **	8.06 (3.52,18.52) **
Gender				
Male	1	1	1	1
Female	0.80 (0.39,1.67)	0.81 (0.37,1.76)	1.44 (0.72,2.85)	1.45 (0.65,3.24)
Alcohol dependence (AUDIT)				
No	1	1	1	1
Yes	1.75 (0.83,3.67)	1.58 (0.73,3.39)	2.18 (1.14,4.17) **	2.54 (1.18,5.49) *
Time since HIV diagnosis				
<1 year	1	1	1	1
1 year	1.26 (0.39,4.08)	0.93 (0.27,3.23)	0.33 (0.09,1.31)	0.10 (0.02,0.57) **
Transactional sex				
No	1	1	1	1
Yes	1.37 (0.45,4.15)	1.41 (0.43,4.58)	2.54 (0.63,10.20)	0.71 (0.22,2.32)

Note:

*
indicates a p-value <0.5

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**indicates a p-value <0.01

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