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Alcohol use disorders and antiretroviral therapy among prisoners in Argentina

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Abstract

Purpose—While Argentina has significantly improved access to HIV care and antiretroviral therapy (ART) for both the general population and prisoners, the prevalence of alcohol use disorders (AUDs) among HIV-infected prisoners and their relationship to accessing ART in Argentina is currently unknown. This study aims to characterize the substance abuse patterns of HIV-infected prisoners in Argentina and to assess the independent correlates of receipt of pre-incarceration ART.

Design/methodology/approach—An anonymous, cross-sectional survey of 100 HIV-infected federal prisoners was conducted in the Buenos Aires municipality from July–December 2010. AUDs were assessed using the AUDIT scale.

Findings—A majority (63 per cent) of participants met criteria for AUDs, 45 per cent of subjects were diagnosed with HIV in prison and one-quarter had initiated ART during the current incarceration. In addition, over one-third (35 per cent) of participants did not receive ART during the pre-incarceration period despite receiving it upon incarceration. This correlated significantly with the presence of having an AUD (AOR 0.20, 95 per cent CI 0.06–0.74, $p = 0.016$).

Practical implications—AUDs are prevalent among HIV-infected prisoners in Argentina and are significantly related to negative secondary HIV prevention and treatment outcomes. While Argentina has provided an exemplary model of HIV-related health care reform within its prisons, future efforts to provide screening and treatment for AUDs are needed to improve the health of the nation's incarcerated population.

Originality/value—This paper is the first to describe pre-incarceration drug and alcohol use disorders and issues related to access to ART among prisoners in Argentina.

Keywords

Alcohol use disorders; Substance abuse; Social support; HIV/AIDS; Argentina; Criminals; Substance misuse; Personal health

Background

Similar to the global pandemic, HIV and incarceration are closely intertwined in Argentina. While 0.6 per cent of Argentina's general population are estimated to be people living with HIV/AIDS (PLWHA), HIV is more than seven times more prevalent within its prisons compared to the general population (Oficina de las Naciones Unidas Contra la Droga y el Delito (ONUDD), 2009). As HIV testing is not mandatory in prisons, this represents the minimum prevalence of HIV among prisoners. In the past ten years, the number of known PLWHA in Argentina's federal prisons has ranged from 364 to 747, with approximately ten deaths from AIDS each year (ONUDD, 2009). As of May 2008, there were approximately 260 people living with HIV and 93 people living with AIDS in federal prisons in Argentina, and approximately half were reported to have received antiretroviral therapy (ART; ONUDD, 2009).

Over the past decade, Argentina has greatly increased both *de jure* and *de facto* access to health care for PLWHA both in the general population and within its prisons. By providing universal free ART to PLWHA who meet international treatment guidelines, Argentina has dramatically improved access to ART for HIV-infected patients in the general population from <10 per cent in 2005 to 70 per cent in 2007, and access to ART has remained steady through 2010 (Joint United Nations Programme on HIV/AIDS (UNAIDS), 2008; World Health Organization (WHO), Joint United Nations Programme on HIV/AIDS (UNAIDS) and The United Nations Children's Fund (UNICEF), 2010). In addition, access to health care for PLWHA in prisons has greatly expanded owing to national legislation that mandates the right to psychosocial and medical services for incarcerated populations and includes provisions guaranteeing access to HIV treatment throughout the duration of incarceration (El Senado y Cámara de Diputados de la Nación Argentina, 1996; Arcuri, 2010). Voluntary, confidential HIV testing is provided for new prisoners, as well as for those who show clinical symptoms of AIDS or are diagnosed with HIV-associated medical co-morbidities (Arcuri, 2010). Those with HIV receive special diets, and pregnant inmates with HIV have universal access to ART to prevent vertical transmission (ONUDD, 2009).

In spite of these remarkable efforts, however, there remains room for improvement in the delivery of health care for PLWHA within prisons and communities in Argentina. Specifically, there is an unmet need for interventions focusing on the treatment of alcohol use disorders (AUDs) among prisoners living with HIV/AIDS in Argentina, owing to a dearth of research on the subject. This is an important line of investigation, given both the prevalence of alcohol use among the general population in Argentina, as well as the well-documented relationship in other countries between AUDs and adverse health outcomes (Azar *et al.*, 2010).

Alcohol consumption is widespread in Argentina. A survey of the general population found that greater than 80 per cent of respondents had consumed alcohol in the past year, greater than 50 per cent of respondents had consumed alcohol in the past month, 11.6 per cent of respondents met criteria for harmful drinking using the alcohol use disorders identification test (AUDIT), and 34.5 per cent of male respondents between the ages of 18 and 29 had had alcohol-related health problems in the past year (Munné, 2005).

Although alcohol is legal in Argentina as in most other countries worldwide, excess alcohol consumption can result in serious negative consequences for both individuals and for society. Multi-criteria decision analysis modeling has shown alcohol to be the most harmful drug of abuse worldwide when accounting for its consequences to both individual users and society at large, and it ranks as the fourth most-harmful substance to individual users behind heroin, crack cocaine, and methamphetamine (Nutt *et al.*, 2010). Further research has found alcohol to be causally linked to both acute and chronic disease outcomes affecting nearly all of the body's organ systems (Rehm *et al.*, 2010).

Along with health problems directly caused by alcohol consumption, AUDs are associated with numerous negative primary and secondary HIV prevention outcomes. AUDs are associated with decreased ART adherence in prospective and cross-sectional research among the general population of PLWHA (Mellins *et al.*, 2009; Hendershot *et al.*, 2009; Azar *et al.*, 2010) as well as among HIV-infected incarcerated populations (Springer *et al.*, 2011). AUDs are chronic relapsing conditions that are seldom sufficiently treated by forced abstinence provided in criminal justice settings. As such, individuals with AUDs have a high likelihood of relapse soon after release, and effective treatment is crucial to maintaining the benefits of ART afforded within the structured settings of prisons and optimizing longitudinal health outcomes upon release to the community (Springer *et al.*, 2011). In addition, AUDs have been shown to accelerate liver disease in PLWHA, owing to both the hepatotoxic effects of alcohol as well as the increased hepatotoxicity in conjunction with ART (Springer *et al.*, 2011). Furthermore, alcohol use also increases high-risk HIV transmission behaviors demonstrated by research in both the USA and throughout Latin America (Springer *et al.*, 2011; Ludford *et al.*, 2011).

In order to address this knowledge gap regarding AUDs among HIV-infected prisoners in Argentina, this study characterizes their prevalence among 100 HIV-infected prisoners. Because prisons are structured settings that can effectively screen and treat chronic conditions, this study examines factors associated with receipt of ART within the prison setting compared to a lack of receipt in the period immediately before incarceration where such structure may not have existed.

Methods

Data were collected from July 2010 to January 2011 through an anonymous, cross-sectional study conducted at federal prisons near Buenos Aires, Argentina. A comprehensive study questionnaire was designed to assess the following parameters using standardized metrics: drug abuse severity using the DAST-10 (Bedregal *et al.*, 2006), AUDs using the AUDIT (de Torres *et al.*, 2009; Saunders *et al.*, 1993), social support using the multidimensional scale of

perceived social support (Canty-Mitchell and Zimet, 2000; Zimet *et al.*, 1990), and HIV-related stigma experienced by subjects using the Berger HIV Stigma scale (Berger *et al.*, 2001; Franke *et al.*, 2010). In addition, subjects were screened for major depressive disorder using the nine-item patient health questionnaire (PHQ-9) (Kroenke *et al.*, 2001).

In addition to the standardized metrics above, the subjects were asked a series of questions written specifically for this survey to assess the following: background demographics, criminal justice history, barriers to re-entry upon release, substance abuse history, medical co-morbidities, access to medical services, HIV-related risk behaviors in the period prior to incarceration, and access to HIV-related medical and social services both prior to and during the current period of incarceration.

This questionnaire was created in English and then translated into Spanish, using previously validated Spanish-language versions of the study metrics when available. The remainder of the study form was translated and back translated (Brislin, 1970) by bilingual research assistants in the USA and further modified for the local context by research staff at the Fundación Huésped in Buenos Aires.

After receiving ethical approval from both the Yale University School of Medicine Human Investigations Committee in New Haven, CT, USA and the Committee of Bioethics at the Fundación Huésped in Buenos Aires, Argentina, subjects were sequentially selected for participation in the study. The study was conducted at the federal prison complex in Florencio Varela, Buenos Aires, Argentina in all five on-site units. All inmates with documented HIV-positive status and sufficient mental capacity to provide informed consent were eligible for participation in the study. HIV-positive status was determined using lists maintained in the medical office of the incarceration facility. Prison medical staff aware of a prisoner's HIV status asked if they were interested in participation. Interested inmates were then approached by research staff who explained the informed consent and enrollment procedures. Subjects were provided with both a written and oral explanation of the research study and were informed that there were no incentives or disincentives for their participation. In addition, subjects were informed that their individual response forms would be coded anonymously without any identifying information and that their answers would not be shared with the staff at the prison. After providing oral consent, subjects were interviewed individually in private offices by trained research assistants. All interviews were conducted in Spanish without the use of a translator, with the exception of one subject who had spent his childhood in North America and preferred to complete the interview in English.

In total, all 82 individuals on the HIV registry at the Florencio Varela prison during the months of July and August 2010 were considered for participation in the study. Two individuals were excluded due to misidentification of their HIV status on the official registry, 14 chose not to participate in the study, and five others were not able to participate as they were not on location at the prison facility at the time the interviews were conducted. A total of 61 individuals were enrolled in the study at the Florencio Varela prison, one of whom subsequently chose not to complete the interview. Subsequently, forty more individuals from units within the federal prisons in La Plata, Berisso, and Ensenada were

enrolled in the study from October to December 2010 for a total of 100 participants (Figure 1).

Individual survey responses were then coded and analyzed using *SPSS v.19.0* (SPSS Inc., Chicago, IL). Summary statistics of demographics, prevalence of substance abuse, and high-risk HIV behavior were assessed through variable count functions. In addition, a bivariate regression was performed using receipt of ART upon incarceration but not in the 30 days pre-incarceration as the dependent variable. This group was compared to the remaining subjects, who were either on ART pre-incarceration or who had never initiated on ART in either setting because they did not meet the ART treatment guidelines used within the prison. AUDs, drug abuse severity, HIV-related stigma, age, duration of present incarceration, previous diagnosis of tuberculosis, and mental illness were used as independent variables. Statistical significance was defined as two-tailed $p < 0.05$. AUDs were assessed with the AUDIT, and scores were stratified for bivariate analysis into two categories (low risk or sensible drinking (score < 8 for men or < 4 for women) vs hazardous drinking or alcohol dependence (score of ≥ 8 for men or ≥ 4 for women) (Miller *et al.*, 1992). Drug abuse severity was assessed with the DAST-10 and stratified for bivariate analysis into two categories (no-moderate reported problem (score < 6) vs substantial or severe problem (score of ≥ 6)). Major depressive disorder was screened for using the PHQ-9 and defined as a score of ≥ 9 . Subjects were also asked specifically if they had received prior treatment for mental illness. Social support and HIV-related stigma were assessed using the Berger HIV Stigma scale and the Zimet social support scale, respectively, and the resultant scores were used as continuous variables in the bivariate analysis. Logistic regression modeling was used with all variables that met threshold of < 0.2 at the bivariate level in a multivariate model examining the correlates associated with the dependent variable.

Results

The characteristics of the sample are detailed in Table I. Consistent with the demographics of the general prison population, the study participants were predominantly male. Of note, the study did include one transgender participant. In general, study subjects were serving multi-year sentences for non drug-related crimes. All subjects had some degree of formal schooling, although half had not completed secondary education.

Many of the subjects also had significant medical and psychological co-morbidities. There was a significant prevalence of hepatitis B and C among the study participants, and nearly one-third had been diagnosed with tuberculosis. While alcohol and drug use disorders were highly prevalent, pre-incarceration opioid and injection drug use (IDU) were rare among study participants.

In general, participants reported widespread access to HIV-related medical services in prison. Nearly half of the subjects were diagnosed with HIV in prison, either previously or during the present incarceration, and one-quarter of the study participants had initiated ART during the current incarceration. In addition, nearly all participants felt confident they could continue to receive HIV-related medical care upon release. In spite of this, approximately one-third (35 per cent) of participants did not receive ART in the month prior to their

incarceration despite meeting criteria for ART used within the prison setting and receiving ART during the current incarceration. Of note, three subjects who received ART in the 30 days prior to incarceration reported that it was not continued in prison.

Bivariate correlations with appropriate ART in the 30 days before incarceration are detailed in Table II. In the final model, only the presence of AUDs (adjusted odds ratio (AOR) = 0.20, 95 per cent CI 0.06–0.74, $p = 0.016$) and duration of present incarceration (AOR = 0.98, 95 per cent CI 0.97–0.99, $p = 0.047$) were significantly associated with receiving ART after incarceration, but not in the 30 days before. Lower social support, however, approached statistical significance in the final model (AOR = 0.95, 95 per cent CI 0.91–1.00, $p = 0.054$).

Discussion

Consistent with prior research in prisons in the USA (Springer *et al.*, 2004; Beckwith, 2010) this study demonstrates the important role of criminal justice settings in the diagnosis and treatment of HIV (Altice *et al.*, 2001; Flanigan and Beckwith, 2011). Though Argentina is a middle-income country, HIV treatment outcomes appear similar to those in high-income settings, likely due to its standardized treatment guidelines that are used in both correctional and community settings. Compared to other middle-income countries, these findings are markedly better than reported elsewhere (Choi *et al.*, 2010; Azbel *et al.*, 2013; Fu *et al.*, 2012) and could potentially serve as a model for prison health care reform in other middle-income countries. Three of the subjects, however, reported that they had received ART in the 30 days prior to incarceration but had not received it in prison. The reason for ART discontinuation was not explored further. Since interruption of ART is associated with increased risk of HIV-related adverse events (Emery *et al.*, 2008), it is important that the prison system in Argentina work to ensure that all inmates who received ART prior to incarceration continue to receive treatment while in prison.

As nearly half of the study participants were diagnosed with HIV within prisons settings, this research suggests that enhanced routine HIV testing in Argentine prisons has succeeded in detecting a significant number of previously undiagnosed HIV cases and demonstrates a need for increased HIV testing of the adult population outside of the prison setting. Given the near-universal access to ART both within and outside of the prison system in Argentina, increased HIV testing would likely result in significant numbers of previously undiagnosed individuals with HIV receiving necessary HIV care, as occurred with this study population (de Voux, 2012). Widespread voluntary testing of the adult population would likely decrease rates of HIV transmission, as providing this previously undiagnosed population of PLWHA with access to ART would decrease viral loads and subsequently infectivity (Granich *et al.*, 2009). Furthermore, while nearly all participants in the study felt confident that they could continue to receive HIV care upon release, further research is needed to determine the degree to which recently released HIV-infected inmates are actually able to access HIV-related services and adhere to ART upon release. Other studies elsewhere have suggested otherwise (Springer *et al.*, 2004; Baillargeon *et al.*, 2009).

This study is also the first to illustrate the widespread prevalence of AUDs among HIV-infected prisoners in Argentina and provide evidence showing the significant relationship between AUDs and secondary prevention of HIV in this population. The prevalence of AUDs among this sample is over five times that of the general Argentine population (Munné, 2005). Furthermore, AUDs correlated significantly with decreased ART use prior to incarceration in multivariate logistic regression. The data from this sample suggest a need in Argentina for improved access to treatment for AUDs not only in the community before incarceration, but also during incarceration and in the transitional period post-release. Research from other countries suggests that there are insufficient substance abuse treatment programs in prisons despite a clear, overwhelming need (Chandler *et al.*, 2009; Hendershot *et al.*, 2009; Meyer *et al.*, 2011).

The high prevalence of AUDs among the HIV-infected Argentine prison population could potentially be addressed through increased routine screening for AUDs upon incarceration using previously validated instruments (Cremonte and Cherpitel, 2008), as well as through the development of culturally appropriate AUD treatment programs within prisons. Since AUDs are chronic relapsing conditions seldom sufficiently treated by the forced abstinence philosophy prevailing in criminal justice settings, effective treatment is crucial to maintaining the benefits of ART afforded within the structured settings of prisons and optimizing longitudinal health outcomes upon release to the community (Springer *et al.*, 2011). Pharmacologic therapy with naltrexone is the AUD treatment modality best supported by current evidence (Altice *et al.*, 2010), and studies examining the efficacy and safety of extended-release naltrexone are currently underway among HIV-infected men in Peru and among HIV-infected prisoners with AUDs transitioning to the community in the USA. Results from these studies could potentially serve as the basis for a similar program development in Argentina and elsewhere (Springer and Altice, www.clinicaltrials.gov, NCT01077310; Duerr, Lama, and Altice, www.clinicaltrials.gov, NCT01377168). Such an intervention would likely have both primary and secondary preventative effects, given the strong association between AUDs and high-risk sexual behavior throughout Latin America (Ludford *et al.*, 2011). Further research is also needed to characterize the connection between AUDs and insufficient treatment with ART within the community for PLWHA who are incarcerated in Argentine prisons.

The patterns of drug abuse among the study population are different than those found among incarcerated populations in other middle-income countries (Dolan *et al.*, 2007; Azbel *et al.*, 2013) but are consistent with nationwide patterns of drug abuse within Argentina (Caiaffa *et al.*, 2011). Specifically, this study found an overwhelming predominance of cocaine abuse among the study population, as well as a significant degree of benzodiazepine abuse. In contrast with previously reported studies of prisoners in other middle-income countries, however, hardly any of the subjects in this investigation reported using opioids. In addition, while IDU was initially the primary route of HIV transmission in Argentina at the outset of the HIV epidemic (Rodriguez *et al.*, 2002), almost none of the subjects in this study had injected drugs in the month prior to the current incarceration. The high prevalence of remote drug injection and the long history of incarceration among this population likely explain the high prevalence of viral hepatitis in spite of little recent IDU. This finding is consistent with

patterns found among the Argentine population outside of prison, namely that the prevalence of IDU and the sharing of injection equipment have decreased since the 1990s (Cohen, 2006; Rossi, 2006), leading to a sharp decrease in the percentage of new HIV infections secondary to IDU in Argentina (Mendes Diz *et al.*, 2008; Programa Nacional de Lucha contra el Retrovirus del Humano, 2008). These findings suggest that future efforts should focus on sexual transmission. To that end, Argentine law stipulates access to condoms for all inmates regardless of whether or not they receive conjugal visits (Programa Nacional de Lucha contra el Retrovirus del Humano, 2008). If universally available, such programs may prevent intra-prison HIV transmission. While few prison facilities have initiated such programs themselves, several prisons have allowed for nongovernmental organizations to provide government-issued condoms to inmates.

In addition to the presence of AUDs, increased duration of incarceration was significantly associated with receiving ART during the present incarceration but not in the 30 days beforehand. Though this particular study was unable to elucidate the reasons behind this association, one explanation is the improved access to ART in the community in Argentina over the past decade, which would have increased the likelihood that individuals who were incarcerated more recently would have received ART prior to incarceration. Another possible explanation is that the study subjects were at increased likelihood of meeting criteria for initiation of ART after a prolonged period of incarceration. Further research is needed to explore the mechanism underlying this association.

This study did have a number of limitations. Ideally, we would have defined eligibility for ART use based on CD4 lymphocyte counts, but the lack of available clinical data made this impossible, thus requiring us to construct the dependent variable based on the expectation that anyone who was eligible for and could tolerate ART would receive it in prison. In addition, the relatively small sample size could have potentially decreased the power to detect a larger number of significant associations, as well as the applicability of the study results to all HIV-infected prisoners. Moreover, while social support was found to be associated with the primary outcome of accessing ART during incarceration but not beforehand, the relatively small sample size may have been insufficient to truly disentangle this association. Prior research has, however, demonstrated stronger correlations between social support and adherence to ART (Gordillo *et al.*, 1999; Ammassari *et al.*, 2002; Gonzalez, 2004; Simoni *et al.*, 2006), but its association on accessing ART remains undocumented. These findings here suggest a need for further research on the relationship between social support and access to and receipt of ART in community settings among a larger sample size in Argentina.

In addition, the data could not be stratified by gender owing to the small number of female subjects, which reflect the lower rates of incarceration of women. While women have traditionally had decreased access to ART, it was not possible to perform such analyses with the present data. Furthermore, the cross-sectional nature of the study precludes the inference of causality between AUDs and receiving ART upon incarceration but not in the pre-incarceration period. This can be addressed through further research using a prospective, longitudinal design. In order to maintain the anonymity of the subjects, the survey relied on subjective reports regarding access to HIV medication and was not verified with objective

medical records that could have demonstrated the medical outcomes of ART initiation in prison, namely changes in CD4 counts and viral loads. This could be addressed in the future through a retrospective analysis of anonymized prison records in Argentina. Despite these limitations, this study does provide a unique insight into the substance abuse patterns and access to HIV medication among Argentine prisoners and provides a basis for future interventions.

Conclusion

The findings from this study indicate that HIV-infected Argentinian prisoners not only have a high prevalence of AUDs but much greater access to ART than their counterparts in prisons located in other middle-income countries (Azbel *et al.*, 2013; Choi *et al.*, 2010; Wolfe *et al.*, 2010), and that prisons in Argentina play an important role in the delivery of HIV-related medical care. Despite the availability of ART both within and outside of prison in Argentina, however, this study finds that AUDs are a widespread problem associated with decreased use of these medications outside of prison among currently incarcerated HIV-infected inmates. As AUDs are medically-treatable conditions, it would thus be useful to design future interventions in Argentine prisons that provide addiction treatment services to include alcohol counseling and potentially medication-assisted therapies in order to improve primary and secondary HIV prevention.

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Figure 1.
Participant disposition

Table I

Study participant characteristics

Background demographics	n = 100
Mean age, years	37.6
Gender	
Male	93
Female	6
Transgender	1
Did not complete secondary education	45
Criminal justice history	n = 99
Mean duration of present incarceration (months)	38
Mean time remaining until release (months)	22
Mean number of adult incarcerations	3
Mean total lifetime spent incarcerated (years)	10.5
Medical comorbidities	n = 96 (%)
Tuberculosis	30 (31%)
Received treatment during current incarceration	12 (12.5%)
Hepatitis	
Hepatitis B (n = 93)	20 (22%)
Hepatitis C (n = 93)	37 (40%)
Hypertension (n = 93)	23 (25%)
Co-morbid drug use and mental illness	
Ever diagnosed with mental illness (n = 93)	6 (7%)
Major depressive disorder (PHQ-9 > 9) (n = 95)	41 (43%)
AUDs (n = 92)	
Hazardous drinking (AUDIT: men 8–14; women 4–12)	21 (23%)
Alcohol dependence (AUDIT: men 15; women 13)	36 (39%)
Hazardous drinking or alcohol dependence	57 (62%)
Other drug use in 30 days prior to incarceration (n = 100)	
Cocaine	46 (46%)
Crack/paco	17 (17%)
Opioids	2 (2%)
Benzodiazepines	19 (19%)
HIV transmission behavior	n = 93
IDU	
Lifetime	42 (45%)
In 30 days before present incarceration	2 (2%)
Mean number of unprotected sex partners in 30 days before present incarceration (n = 92)	2
Partner known to be HIV-infected	1
Partner not infected with HIV or serostatus unknown	1
Mean number of unprotected sexual encounters in 30 days before present incarceration (n = 62)	22
Partner known to be HIV-infected	9

<i>Background demographics</i>	n = 100
Partner not infected with HIV or serostatus unknown	11
<i>HIV care and treatment</i>	
Mean time since HIV diagnosis, years (<i>n</i> = 100)	11
First diagnosed with HIV in prison (<i>n</i> = 100)	45
Diagnosed during current incarceration	15
Ever saw HIV doctor or nurse (<i>n</i> = 99)	91
Felt they could easily see HIV doctor after release (<i>n</i> = 98)	95
Received ART upon incarceration but not in the 30 days pre-incarceration (<i>n</i> = 75)	26 (34.7%)

Table II

Correlates of receiving ART during present incarceration, but not receiving it in the 30 days before incarceration

Covariate	UOR	Bivariate 95% CI	p-value	AOR	Multivariate 95% CI	p-value
Alcohol use disorders						
None	Referent					
Hazardous or dependent drinking ^a	0.21	0.06–0.71	0.012	0.20	0.06–0.74	0.016
Increasing duration of present incarceration	0.98	0.97–0.99	0.018	0.98	0.97–0.99	0.047
Social support ^b	0.97	0.93–1.01	0.145	0.95	0.91–1.00	0.054
Number of years since HIV diagnosis	1.00	0.99–1.01	0.776			
Major depressive disorder (PHQ-9 >9) ^c	0.75	0.28–2.01	0.565			
Moderate to severe substance abuse severity ^d	0.73	0.27–1.98	0.536			
Age, years	1.04	0.97–1.11	0.291			
HIV-related stigma ^e	0.99	0.98–1.01	0.577			
	AIC – 132.00, BIC – 277.51					

Notes:

^a Alcohol use assessed with AUDIT scale and stratified as low risk (men <8, women <4); hazardous drinking or alcohol dependence (men > 8, women > 4);

^b social support assessed with Zimet social support scale;

^c mental illness assessed with PHQ-9 Scale;

^d drug use assessed with DAST-10 scale and stratified by “no” (0), “low” (1–2), “moderate” (3–5), “substantial” (6–8), and “severe” (9–10) problem;

^e HIV stigma assessed with Berger HIV Stigma Scale; UOR – Unadjusted Odds Ratio, AOR – adjusted odds ratio; AIC – Akaike information criterion; BIC – Bayesian information criterion