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Women in community corrections in New York City: HIV infection and risks

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Abstract

Although the incidence of HIV among women on probation, parole and alternatives to incarceration programs is significant to public health, drivers of this concentrated epidemic among women under community corrections remain understudied. This study examined prevalence of HIV and sexually transmitted infections and the associations between substance use, socio-demographic factors and the prevalence of biologically-confirmed HIV and other sexually transmitted infections among a sample of 337 substance-using women recruited from community correction sites in New York City. Prevalence of HIV was 13% and sexually transmitted infections was 26% (*Chlamydia*, *trachomatis* and *Neisseria gonorrhoea*). After adjusting for covariates, HIV-positive women were 1.42 times more likely to use crack/ cocaine than HIV-negative women (95% CI = 1.05–1.92). HIV-positive women were 25% less likely than HIV-negative women to report any unprotected vaginal and anal sex with their main partner (95% CI = 0.57–0.99). They were 70% less likely than HIV-negative women to report unprotected vaginal sex with a non-paying casual partner (95% CI = 0.1–0.9) and 22% less likely to report unprotected vaginal sex across all partners (95% CI = 0.61–0.99). Community corrections settings may be optimal venues to launch HIV/sexually transmitted infections prevention that have potential to reach and engage an ever-growing number of substance-using women.

Keywords

Human immunodeficiency virus; sexually transmitted infections; community supervision; women's health

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Introduction

Criminal justice involvement and drug use are critical intersecting risk factors for HIV infection, especially for women mandated to community corrections, which include probation, parole, drug treatment courts and other alternative-to-incarceration programs. Community corrections represent the largest segment of the criminal justice system with approximately 1 in 51 persons over the age of 18, or 4,751,400 adults under some form of community supervision in the United States in 2013.¹ Approximately one-quarter of the people under the mandate of community corrections are female, the majority of whom have committed drug-related offenses or have histories of substance abuse.² Women involved in the criminal justice system, including community corrections, are also more likely than men to be in the criminal justice system because of drug-related offenses and are also more likely than men to use hard drugs such as crack/cocaine and heroin and use them more often than men.^{3,4}

Once involved in the criminal justice system, the likelihood of having HIV or AIDS among women is 15 times greater than the likelihood of having HIV or AIDS among women in the community and twice as likely as men involved in the criminal justice system.^{5,6} As of 2010, approximately 146 per 10,000 prisoners in custody in the United States' federal and state prison systems was HIV-positive or had a diagnosis of AIDS with an HIV prevalence among women (1.9%) that exceeded the HIV prevalence among men (1.5%).²

Research on women in community corrections has also found high rates of STIs, unprotected sex with multiple risky partners, sex trading for money or drugs, low levels of condom use with main or outside partners, and low levels of HIV knowledge.^{7,8} Despite emerging evidence of a highly concentrated HIV epidemic among women mandated to community corrections in the US, there remains a gap in HIV surveillance data and epidemiological research on HIV risk factors among this population.

The highly concentrated HIV prevalence among women under community supervision reflects racial disparities in the epidemic.⁵ Low-income, black women including those in the criminal justice system occupy a disproportionate share of the overall burden of HIV infection in the United States.^{6,7} Moreover, they are more likely to be incarcerated than any other racial/ ethnic group of American women.⁶ In 2010, the proportion of new HIV infections among black heterosexual women was nearly twice as high as black heterosexual men and four times greater than white heterosexual women.⁸ In New York City in 2013, 60% of new HIV diagnoses among women were black females compared to 15.9% of white females.⁹

A significant majority of drug-involved women will eventually return to their communities by virtue of probation and encounter significant risk factors for HIV infection. For example, a study by Belenko et al.¹⁰ found that HIV prevalence rates among women under community supervision have been estimated to be as high as 17%. Women re-entering the community upon release from prison encounter many social and health problems that create barriers to re-establishing their position in the community.¹¹ Common barriers to successful re-entry for women in community corrections are high rates of unemployment, homelessness,

poverty, lack of health insurance, food insecurity, exclusion from public housing, and from some social programs.¹² It is estimated that merely 4 out of 10 incarcerated women are employed at the time of arrest compared to 6 out of 10 incarcerated men.¹³ This is further compounded by the lapse in employment during incarceration or detention in jail and barriers to employment posed by discriminatory hiring practices upon release. In addition to encountering health and social problems, the transition from jail or prison to community settings poses an increased risk for HIV infection, disengagement from HIV treatment, and reincarceration for drug-involved women.^{10,13–18}

Women who use drugs in community corrections face many challenges accessing health services in the community due to lack of health insurance, high rates of relapse, and economic hardship.^{19,20} Although increases in correctional programming have resulted in a growth in the rates of HIV testing for incarcerated populations, HIV testing in community corrections remains low.^{19,21,22} Once HIV is diagnosed, studies have found low rates of linkage to HIV primary care for inmates released from stays in jails and prisons.^{21,23} For formerly incarcerated inmates with HIV, release from jail or prison is associated with significantly lower rates of virological suppression, and other poor immunological outcomes.^{24–29} Moreover, rates of uptake of antiretroviral therapy (ART) are much lower among individuals who are involved in the criminal justice system.¹⁶ For instance, a study of formerly incarcerated men and women in Texas found that only 5% received ART in time to prevent an interruption in care and only 30% received ART within 60 days following release.¹⁶ Significant gaps remain in research into linkage to care, rates of viral suppression, and uptake of ART for women who use drugs and are under the supervision of community corrections.

For vulnerable populations of former inmates who may not be connected to any type of primary care, there is a considerable gap in community-based services to address HIV, especially for services where screening and referral for substance use as well as HIV treatment is to take place. State guidelines once mandated testing in licensed substance abuse programs but eventually this service was relinquished to other funded service providers. This paper examines the prevalence of HIV and STIs among a sample of 337 women under community corrections in New York City. We examine associations between binge drinking, drug and sexual risk behaviors, and HIV status (positive versus negative) after adjusting for potential socio-demographic confounders among women in community supervision.

Methods

We used baseline interview data from a randomized controlled trial testing the efficacy of an HIV intervention named Project WORTH: Women on the Road to Health. Methods of recruitment and details of the intervention are reported elsewhere.³⁰

At baseline, we collected biological assays and used Audio Computer Assisted Self-Interview (ACASI) to collect the self-reported data. After the interview was completed, a Clinical Research Coordinator conducted individual pre-test counseling related to HIV,

gonorrhea, trichomoniasis, and Chlamydia. Participants received \$30 for completing the baseline ACASI interview and biological testing.

Measures

Socio-demographic variables

Self-reported information was collected about the participant's socio-demographic characteristics including gender, age, ethnicity, high school diploma or equivalent, marital status (single, married other [divorced, separated, or widowed]), current employment status, monthly income, and homelessness (having no place to sleep within the past 90 days).

History of criminal justice involvement

Measures of legal history included: (1) ever being arrested and/or incarcerated, (2) total number of times arrested and/ or incarcerated in the lifetime; (3) ever being placed under community supervision in community court, probation, parole, drug or mental health court or in an alternative to incarceration program, (4) if they were ever arrested, and (5) if the arrest was due to a drug crime.

Current and past drug use

The Risk Behavior Assessment (RBA) was designed by the National Institute on Drug Abuse and has high reliability and validity.^{31,32} The RBA was used to measure drug use within 90 days prior to the baseline interview, including whether a participant had recently used non-injection drugs (smoked heroin, used crack/ cocaine, smoked marijuana, took methamphetamines) or injected drugs. We assessed binge drinking by asking whether a participant consumed four or more alcoholic drinks in six-hour period during the prior three months.

Sexual behaviors

We collected data on sexual behaviors with the participant's main sexual partner and with other partners (paying and non-paying casual partners) in the prior 90 days including any unprotected vaginal and anal sex with the main partner, with paying partners, and non-paying casual partners.

Biological Testing for HIV and STIs

Biological assays were used to detect HIV and STIs. We collected oral swabs from participants to test for the presence of HIV 1/2 antibodies using the OraQuick ADVANCE Rapid HIV Test. Women also provided a self-collected vaginal swab specimen. Specimens were delivered to the Emory University pathology laboratory and assayed for *Chlamydia*, *trachomatis* and *Neisseria gonorrhoea* using the Becton Dickinson Probe ET Amplified DNA Assay (Becton, Dickinson and Co, Sparks, Maryland) and for *Trichomonas vaginalis* using a non-commercial real-time polymerase chain reaction assay.

All participants diagnosed HIV-positive were referred to the study Clinical Research Coordinator for further counseling. The Clinical Research Coordinator referred the participant to the HIV Clinic for confirmatory Western Blot testing and initial evaluation and

counseling. The HIV Clinic team comprises physicians, social workers, and registered nurses. The Clinical Research Coordinator then followed up with the participant between 7 and 14 days post-referral for verification of their positive test result and specifics about their linkages to care. Participants with positive STI test results received risk-reduction counseling from the Clinical Research Coordinator. Participants were then referred on that same day to a physician for the appropriate FDA-approved STI medications and standard medications for treatment. They were also encouraged to inform their partners and ensure that their partners were treated simultaneously in an effort to reduce reinfection. Participants provided verification of treatment by returning a form completed by a medical provider.

Statistical methods

Descriptive statistics were performed for socio-demographic variables, STIs, criminal justice involvement, drug, and sexual behaviors. T-tests or Chi square tests were performed for bivariate tests of differences by HIV status. We performed modified Poisson regressions without and with covariate adjustments for age, ethnicity, education, marital status, and employment to test for significant associations between HIV status and drug and sexual behaviors. Unadjusted and adjusted risk rate ratios (RRR) and their associated 95% confidence intervals are reported.

Results

Socio-demographics

Table 1 presents socio-demographic variables and STI biological testing results by HIV status for 337 women. Participants' average age was 41.3 years (SD = 10.4). Two-thirds of the women self-reported their race and ethnicity as black or African American and 17% identified as Hispanic or Latina. Over half of the women (58%) had a high school diploma or equivalent. Two-thirds of the women were single and 15% were married. Only 9% of the participants were currently employed, 58% had a monthly income of less than \$400, and 10% had experienced homelessness in the prior 90 days.

HIV and STIs

Of the total sample, 45 (13%) participants were HIV-positive and the prevalence of any STI was 26%. Of the three STIs, for which women were tested, trichomonas had the highest prevalence at 23%. Breaking down by HIV status, HIV-positive women were older than HIV-negative women (44.8 vs. 40.8, $p < .05$). Blacks accounted for a disproportionate share of the overall HIV-positive cases when compared to Hispanics (82% vs. 63%, $p < .05$). HIV-positive women reported a lower percentage of low monthly income (40% vs. 61%, $p < .01$) than HIV-negative women. The prevalence of trichomoniasis among HIV-positive women was higher than the prevalence of trichomoniasis among HIV-negative women (36% vs. 21%, $p < .05$). Among these 45 HIV-positive women, 43 women said they had been tested for HIV prior to the baseline and two women had not been tested. There were two new HIV-positive cases at the baseline.

Table 2 summarizes women's histories of criminal justice involvement by HIV status. Almost all of the women (98%) had a history of arrest with an average of 11 lifetime arrests

(SD = 14.8). Over half of the women (53%) reported the main reason for arrest was possession or use of an illegal substance. The majority of women (90%) reported ever having been in jail and the average number of times in jail was 6.7 (SD = 11.4). Over two-fifths of participants reported ever spending time in prison. The average number of times in prison was 3.2 (SD = 6.4). Higher percentage of drug-related crime arrests were found among HIV-positive women than HIV-negative women (70% vs. 50%, $p < .05$).

Associations between drug use and HIV

Table 3 reports the prevalence of different drug use and binge drinking in the past 90 days by HIV status, and then examines associations between use of different drugs and binge drinking and HIV status. Over three-fifths of participants (62%) reported using any illicit drugs in the past 90 days. During the past 90 days, crack/cocaine was used by 39% of the women and 38% used marijuana. Less than one-third (29%) reported binge drinking in the past 90 days. After adjusting for age, ethnicity, education, marital status, and employment, HIV-positive women were 1.42 times more likely to use crack/cocaine in the past 90 days than HIV-negative women (RRR = 1.42, 95% CI = 1.05–1.92).

Table 4 examines sexual-risk behaviors by HIV status and presents unadjusted and adjusted relative risk ratios showing associations between sexual-risk behaviors and HIV status. The majority of women (86%) reported having had a main male partner in the past 90 days. Almost half of the participants (48%) indicated that they had an outside partner and 25% traded sex in the past 90 days. About 70% of the participants had unprotected vaginal and/or anal sex with their main partner and 16% of the women reported having unprotected vaginal and/or anal sex with a paying partner. A quarter of the sample (25%) reported unprotected sex with a non-paying casual partner in the past 90 days. More than three-quarters (78%) of the women reported having unprotected sex with any partner in the past 90 days. After adjusting for socio-demographic characteristics, HIV-positive women were 25% less likely than HIV-negative women to report any unprotected vaginal and anal sex with their main partner (RRR = 0.75, 95% CI = 0.57–0.99), 70% less likely than HIV-negative women to report any unprotected vaginal sex with a non-paying casual partner (RRR = 0.3, 95% CI = 0.1–0.9) and 22% less likely than HIV-negative women to report any unprotected vaginal sex across all partners in the past 90 days (RRR = 0.78, 95% CI = 0.61–0.996).

The self-reported data show that 18 (5%) women knew or suspected their main partners were HIV-positive, 21 (6%) women knew or suspected any of paying partners were HIV-positive, and 18 (5%) women knew or suspected any of the non-paying partners were HIV-positive. Because we defined women's HIV status from the bio-testing data, to consider women's self-reports of their partner's HIV status (including suspicion of partner's HIV status) as a confounder in the regression model is not appropriate.

Discussion

This paper provides important findings on the associations between drug use, sexual behaviors, and HIV infection among drug-involved women in community corrections, a previously understudied segment of the criminal justice system.

We found high rates of HIV and STIs with over one in ten testing positive for HIV and one-quarter of the participants testing positive for gonorrhea, trichomoniasis, or chlamydia. The elevated rate of HIV found in this sample suggests the presence of a highly concentrated epidemic, consistent with prior studies of women in community corrections.^{10,19} These findings are substantially higher than community-based estimates and underscore the need for services for this population.^{8,33,34}

Nearly half of the female participants reported having had outside partners and a quarter engaged in sex trading. These findings support previous research in other criminal justice settings demonstrating high rates of multiple sex partners and sex trading among drug-using women with recent criminal justice system involvement.³⁵⁻⁴⁰ A particularly alarming finding is that 16% of the overall sample and 18% of women with HIV reported unprotected sex with paying partners in the past 90 days. Unprotected sex with paying partners is a major driver of the global HIV epidemic and our findings suggest that this may be an avenue through which HIV is transmitted from women in community corrections in New York City.

Studies have found higher rates of sexual risk behaviors, drug use, and other HIV risk factors among women in correctional settings.^{10,12,40} Aligned with extant literature, our findings suggest that higher rates of unprotected sex and drug use expose women in community corrections to HIV at greater rates compared to women in the general population.⁴¹⁻⁴³

Women with HIV were significantly less likely to report unprotected sex with both main partners and casual partners. Nonetheless, rates of unprotected sex remained exceedingly high for both HIV-positive and HIV-negative women, with over half of HIV-infected women and nearly three-quarters of HIV-negative women reporting any unprotected sex with their primary partners. Our study emphasizes the importance of targeted HIV prevention interventions and drug treatment to reduce transmission and acquisition of HIV infection between both HIV-positive and HIV-negative women in community corrections.

Furthermore, illicit drug use was more common among HIV-positive women than women without HIV. The robust association between crack/cocaine use in the past 90 days and HIV infection converges with other studies conducted in secure forensic settings, namely jails and prisons.^{35,36} Women who were arrested for drug crimes were more likely to test positive for HIV, which supports accumulating evidence that incarceration and criminalization of drug use is a notable driver of the HIV epidemic among women.¹²

Women in our sample were older, predominantly black, and had a very high rate of unemployment. This profile compares with existing epidemiological data pointing to severe racial disparities in HIV prevalence rates among women in urban communities and in other correctional settings.^{7,10} Additionally, unemployment was persistent in our sample. Less than 10% of the entire sample and only one woman with HIV reported current employment. The low employment rates may suggest that there are structural risks such as economic insecurity that may increase vulnerability to HIV infection for drug-involved women in community corrections. Conversely, fewer women with HIV reported incomes of less than

\$400 a month. This may be due to differences in participation in cash assistance programs, earnings, or other unmeasured factors.

Our study has a few limitations that are worth noting. First, we did not control for confounders at the partner-level such as relationship conflict, the partners' sexual and drug risk behaviors, or the serostatus of the partner. Second, we did not recruit a sample that was representative of all women under community corrections. Third, the study sample drawn entirely from a population of women who used drugs while under community corrections is a relative homogenous population. Comparing risk profiles in a sample that includes drug-involved and non-drug-involved women may detect important differences in predictors of HIV infection. Fourth, it is possible that the \$30 incentive may have affected self-reported data and motivated lower income participants to enroll in the study. Also we did not collect biological assays to detect the presence of the Hepatitis B (HBV) or C (HCV) viruses. Studies point to rates of co-infection between HCV and HIV among persons involved in the criminal justice system that are higher than the general population.^{44,45}

Nevertheless, this study puts forth several sound implications for public health policy and practice. Our multivariable findings suggest that drug-involved women in community corrections carry a very high risk for contracting and transmitting HIV and other STIs. The design and implementation of programs to reduce HIV risk and prevent infection among drug-involved women under community corrections must be a priority for public health and criminal justice practitioners. These interventions and initiatives should embrace strategies to address intersecting drug and sexual risk factors that are commonly experienced by women on probation. Moreover, our findings support drug treatment as HIV prevention. The expansion of drug treatment programs that address the causes of addiction could attenuate the transmission of HIV among women under community supervision. Findings from this study support situating HIV prevention (including testing and diagnosis) for women on probation within substance abuse programs. An important component of the design of HIV prevention programs for this population involves close coordination between community-based HIV treatment programs and community corrections.

There is a need for a collaborative approach that includes public health practitioners, social service providers, and community correction officers that jointly addresses drug use and HIV risk. Third, our finding that women with HIV are less likely to engage in unprotected sex than HIV-negative women offers a critical opportunity for HIV prevention. The HIV-negative women in our sample are at a heightened risk for future HIV infection by virtue of very high rates of drug use and unprotected sex. It is worth noting that rates of unprotected sex remained alarmingly high in both groups. Although HIV-positive women engaged in unprotected sex significantly less frequently than HIV-negative women, over half of HIV-positive women reported unprotected sex across all partners. Finally, high rates of unemployment suggest that structural interventions provided to women on probation are vital components in a multi-sectorial approach to HIV prevention. Accumulating evidence suggests that providing social service interventions such as employment and food security assistance to ameliorate problems that are disproportionately experienced by women on probation reduces risk for future HIV infection.^{45,46}

Our findings support health policies that increase funding to expand HIV prevention and substance abuse treatment programs for women who are involved in community corrections. Presently, the funding streams for HIV prevention programs for women in community correctional settings are distressingly inadequate to meet the demand for services. Approximately 40% of state prisoners report receiving any substance abuse treatment prior to incarceration.⁴⁷ Out of the approximately 700,000 persons that are released annually from jails, approximately half will be eligible to enroll in health insurance under the Affordable Care Act (ACA) upon release from prison.⁴⁸ The findings from this study support a greater effort to ensure women who are on probation become enrolled in health insurance and to expand HIV prevention and substance abuse treatment programs for this population. The mandatory essential health provisions of the ACA require health insurance coverage of substance abuse treatment.^{48–50} Increased funding to cover substance abuse treatment, under the mandates of the ACA, could facilitate the uptake of HIV prevention services to women in community corrections in the United States.

Conclusion

This study revealed very high rates of sexual and drug risk behaviors among HIV-negative women in community corrections that increase their vulnerability to future HIV infection. Until the present study, little was known about risk factors for HIV and STIs among this sub-population of women and our findings highlight the need for additional research. Study findings suggests that community correction sites may be an advantageous setting to launch large-scale interventions due to the opportunity to regularly access an at-risk population over an extended period of time because drug-involved women are required to report to community corrections officers on a regular basis.

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Table 1Socio-demographic and bio-testing results by HIV status.^a

	Total (N = 337)	HIV status	
		HIV-negative ^b (n = 292)	HIV-positive (n = 45)
Age (mean and SD)	41.3 (10.4)	40.8 (10.5) *	44.8 (8.5) *
Black/African American	221 (66%)	184 (63%) *	37 (82%) *
Hispanic/Latino	57 (17%)	52 (18%)	5 (11%)
High School or equivalent	195 (58%)	167 (57%)	28 (62%)
Single	226 (67%)	198 (68%)	28 (62%)
Married	52 (15%)	42 (14%)	10 (22%)
Employed	31 (9%)	30 (10%)	1 (2%)
Monthly income<\$400	196 (58%)	178 (61%) **	18 (40%) **
Homeless (past 90 days)	33 (10%)	28 (10%)	5 (11%)
Any STI	89 (26%)	73 (25%)	16 (36%)
Gonorrhea	4 (1%)	4 (1%)	0 (0%)
Trichomoniasis	77 (23%)	61 (21%) *	16 (36%) *
Chlamydia	10 (3%)	10 (3%)	0 (0%)

*
 $p < 0.05$.**
 $p < 0.01$.^aSignificance tests were performed by Chi square test.^bTwo women who refused to get bio-testing were included.

Table 2History of criminal justice involvement by HIV status.^a

	Total (N = 337)	HIV-negative ^b (n = 292)	HIV-positive (n = 45)
Ever been ARRESTED	331 (98%)	287 (98%)	44 (98%)
Number of times arrested (n = 331; mean and SD)	11.0 (14.8)	10.5 (14.2)	14.0 (18.4)
Arrested due to drug crime (n = 331)	175 (53%)	144 (50%)*	31 (70%)*
Ever in JAIL	302 (90%)	260 (89%)	42 (93%)
Number of times in jail (n = 302; mean and SD)	6.7 (11.4)	6.9 (11.8)	6.7 (8.4)
Ever in PRISON	138 (41%)	120 (41%)	18 (40%)
Number of times in prison (n = 138; mean and SD)	3.2 (6.4)	3.4 (6.8)	2.4 (1.7)
Ever in COMMUNITY COURT	151 (45%)	125 (43%)	26 (58%)
Ever on PROBATION	208 (62%)	181 (62%)	27 (60%)
Ever on PAROLE	103 (31%)	89 (30%)	14 (31%)
Ever in drug or mental health court	105 (31%)	89 (30%)	16 (36%)
Ever in ATI	68 (20%)	58 (20%)	10 (22%)

* $p < 0.05$.** $p < 0.01$.^aSignificance tests were performed by Chi square test.^bTwo women who refused to get bio-testing were included.

Table 3

Substance abuse by HIV status.

In the past 90 days	# (%) ^d				Relative risk ratio of HIV-positive and 95% confidence intervals ^b	
	Total	HIV-negative ^c	HIV-positive		Unadjusted	Adjusted ^d
Illicit drugs	210 (62%)	177 (61%)	33 (73%)		1.21 [0.99, 1.48]	1.20 [0.98, 1.48]
Heroin	32 (10%)	29 (10%)	3 (7%)		0.67 [0.21, 2.12]	0.67 [0.22, 2.06]
Crack/cocaine	130 (39%)	104 (36%)^{**}	26 (58%)^{**}		1.62^{**} [1.21, 2.18]	1.42[*] [1.05, 1.92]
Marijuana	127 (38%)	109 (37%)	18 (40%)		1.07 [0.73, 1.58]	1.15 [0.78, 1.68] (0.479)
Crystal meth	10 (3%)	8 (3%)	2 (4%)		1.62 [0.35, 7.41]	1.57 [0.28, 8.67] (0.607)
Injected drugs	23 (7%)	23 (8%)	0 (0%)		—	—
Binge drinking	97 (29%)	90 (31%)[*]	7 (16%)[*]		0.50 [0.25, 1.02]	0.52 [0.26, 1.04]

* $p < 0.05$.

** $p < 0.01$.

^a Significance tests were performed by Chi square test.

^b Relative risk ratios were obtained by modified Poisson regressions.

^c Two women who refused to get bio-testing were included.

^d Adjusted covariates are age, ethnicity, education, marital status and employment.

Table 4

Sexual behaviors by HIV status.

In the past 90 days	# (%) ^d			Relative risk ratio of HIV positive and 95% confidence intervals ^b	
	Total	HIV-negative ^c	HIV-positive	Unadjusted	Adjusted ^d
Had main male partner	291 (86%)	253 (87%)	38 (84%)	0.97 [0.85, 1.11]	0.99 [0.86, 1.15]
Had an outside partner	162 (48%)	142 (49%)	20 (44%)	0.91 [0.65, 1.29]	0.95 [0.67, 1.36]
Sex trading	85 (25%)	72 (25%)	13 (29%)	1.17 [0.71, 1.93]	1.13 [0.68, 1.88]
Any unprotected sex (vaginal and anal) with main partner	235 (70%)	211** (72%)	24*** (53%)	0.74* [0.56, 0.98]	0.75* [0.57, 0.99]
<i>Any unprotected vaginal sex with main partner</i>	230 (68%)	206* (71%)	24* (53%)	<i>0.76 [0.57, 1.00]</i>	<i>0.76 [0.58, 1.01]</i>
<i>Any unprotected anal sex with main partner</i>	67 (20%)	61 (21%)	6 (13%)	<i>0.64 [0.29, 1.39]</i>	<i>0.72 [0.33, 1.57]</i>
Any unprotected sex (vaginal and anal) with paying partner	53 (16%)	45 (15%)	8 (18%)	1.15 [0.58, 2.29]	1.21 [0.59, 2.50]
<i>Any unprotected vaginal sex with paying partner</i>	48 (14%)	41 (14%)	7 (16%)	<i>1.11 [0.53, 2.32]</i>	<i>1.16 [0.53, 2.55]</i>
<i>Any unprotected anal sex with paying partner</i>	16 (5%)	13 (4%)	3 (7%)	<i>1.50 [0.44, 5.06]</i>	<i>2.13 [0.54, 8.35]</i>
Any unprotected sex (vaginal and anal) with non-paying casual partner	85 (25%)	80* (27%)	5* (11%)	0.41* [0.17, 0.95]	0.46 [0.20, 1.06]
<i>Any unprotected vaginal sex with non-paying casual partner</i>	76 (23%)	73*** (25%)	3*** (7%)	0.27* [0.09, 0.81]	0.30* [0.10, 0.90]
<i>Any unprotected anal sex with non-paying casual partner</i>	23 (7%)	20 (7%)	3 (7%)	<i>0.97 [0.30, 3.15]</i>	<i>1.24 [0.41, 3.77]</i>
Any unprotected sex (vaginal and anal) across all partners	263 (78%)	235*** (80%)	28*** (62%)	0.77* [0.61, 0.98]	0.79 [0.63, 1.01]
<i>Any unprotected vaginal sex across all partners</i>	257 (76%)	230*** (79%)	27*** (60%)	0.76*** [0.60, 0.97]	0.78*** [0.61, 0.996]
<i>Any unprotected anal sex across all partners</i>	80 (24%)	72 (25%)	8 (18%)	<i>0.72 [0.37, 1.40]</i>	<i>0.84 [0.44, 1.63]</i>

* $p < 0.05$.

** $p < 0.01$.

^a Significant tests were performed by Chi square test.

^b Relative risk ratios were obtained by modified Poisson regressions.

^c Two women who refused to get bio-testing were included.

^d Adjusted covariates are age, ethnicity, education, marital status, and employment.