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Alcohol Use Severity and Sexual Risk Behavior Among Female Substance Users

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Abstract

Background—Substance use has been identified as one of the leading factors related to HIV transmission in the United States. The association of problematic drinking with sexual risk behavior puts individuals at greater risk for HIV transmission. This may be of particular concern for women given that approximately 66% of new HIV infections occurring through heterosexual transmission are female.

Objectives—To investigate alcohol use severity and sexual risk behavior among females who use heavy, illicit drugs.

Methods—Female substances users ($N = 251$; $M_{\text{age}} = 31.90$, $SD = 7.67$; 63.7% Black) self-reported past month alcohol use and lifetime sexual risk behaviors with both casual and steady sex partners.

Results—Problematic alcohol users were more likely to use non-injection drugs and less likely to use injection drugs than abstainers and more likely than moderate alcohol users to use alcohol before/during sex with a steady partner. White problematic alcohol users were less likely to use injection drugs before/during sex with a steady partner than abstainers. Black problematic alcohol users were more likely to use non-injection and alcohol than moderate alcohol users before/during sex with steady partners.

Conclusions—The current study extends the existing literature by taking a closer look at the role of alcohol use severity in sexual risk taking behavior of Black and White female substance users, a particularly vulnerable group for HIV transmission.

Keywords

alcohol use severity; HIV transmission; sexual risk behavior; substance use; women

Substance use has been identified as one of the leading factors related to HIV transmission in the United States. It is estimated that about 1 in 3 individuals living with HIV uses drugs or engages in binge drinking (National Survey on Drug Use and Health, 2010; NSDUH). In 2009, 9% of HIV incidence by transmission occurred through injection drug use (IDU) and 88% occurred through sexual contact. In particular, alcohol use puts individuals at greater risk for HIV transmission through subsequent sexual risk behavior, as alcohol use is known to reduce inhibitions and interfere with decision-making abilities. This may be of particular concern for women given that approximately 66% of new HIV infections that occurred through heterosexual transmission are female. Further, among Black women the rate of new infection is almost 20 times greater than White women and 5 times greater than Hispanic women (Centers for Disease Control, 2012; CDC). Research has documented the race disparity in HIV incidence, yet the underlying factors contributing to this disparity is not well understood, particularly among women. The tendency to engage in high-risk sexual behavior while under the influence of drugs and/or alcohol may help to explain some of the disparity in HIV cases. Although minority groups such as Blacks and Hispanics have higher rates of abstinence from alcohol than Whites, Blacks and Hispanics that do drink alcohol tend to have higher rates of problematic drinking than Whites (National Institute on Alcohol Abuse and Alcoholism, 2013; NIAAA). In an effort to improve the understanding of substance use and sexual risk behavior among women at risk for contracting HIV, the current study explores alcohol use severity and sexual risk behavior among a population of recent illicit drug users from Baltimore, Maryland.

Alcohol is an important factor to consider when examining risky sexual behaviors, particularly among high-risk populations of illicit drug users (Aicken et al., 2011; Fitterling et al., 1993; Seth et al., 2011). As studies have identified non-injection drug use (NIDU) in general as increasing the likelihood of sexual risk behavior, alcohol use, specifically, heavy drinking or binge drinking among non-injection drug users (NIDUs) may be of even greater concern. In fact, prevalence rates of alcohol use among substance users have been cited to be as high as 60% (Kuo et al., 2011) and 70% (Trenz et al., 2012) and binge drinking is associated with increased risky drug use, number of sex partners, and sexually transmitted infections (Sander et al., 2010). Further, among illicit drug users almost 50% of problematic alcohol users reported using alcohol before or during sex compared to almost 30% of moderate alcohol users. In addition, problematic alcohol users were found to be almost 5 times as likely to use alcohol before or during sex compared to moderate alcohol users (Scherer et al., 2013). Alcohol use before sex may translate into greater risk behavior and the potential for subsequent HIV infection. In fact, a strong dose-response relationship between alcohol consumption and subsequent HIV acquisition, independent from prior drug use and sexual activity has been documented among illicit drug users (Howe et al., 2011).

Although these studies illustrate the prevalence and severity of alcohol among high-risk populations, to date, there has been little or no research examining the degree to which

alcohol use among women, particularly Black women, is associated with elevated sexual risk behaviors leading to HIV transmission in this population. This is of particular importance as females may be at greater risk for HIV infection among this group of substance users compared to males. Research has suggested that male to female transmission of HIV is significantly more effective than female to male transmission, thus putting females at greater risk for infection. The estimated transmission rate in male partners of infected women ranges from 1% to 12%, while the estimated transmission rate of female partners of infected men is approximately 20% (Padian et al., 1991; Devincenzi et al., 1992). In other words, male to female HIV transmission is approximately two times more efficient than female to male transmission. This transmission rate is particularly concerning for substance abusing women by further increasing their chances of exposure to HIV.

A closer look at alcohol use among female substance users illustrates the magnitude of HIV transmission risk even further. For example, in an analysis of binge drinking and sexual risk behavior by gender it was shown that female binge drinkers were more than twice as likely to have multiple sex partners than women who abstained from alcohol use and that sex risk behavior among men was high, but did not differ by alcohol use severity (Hutton et al., 2008). Studies have also suggested that among Black women, even alcohol use at non-abuse levels is associated with sexual risk behaviors and sexually transmitted infections (Seth et al., 2011). Although this body of research is growing in size and scope, one avenue of explanation that has been under-explored in the literature are differences by race in alcohol use severity and sexual risk behavior among female substance users as a potential explanation of the disparity in HIV prevalence.

Taken together, these findings are cause for significant public health concern not only among illicit drug users in general, but among female substance users specifically. Further exploration is warranted to elucidate the association of alcohol use severity and sexual risk behavior among this high-risk group. Among women, IDU explains fewer HIV infections and there continues to be high rates of HIV infection and high-risk behavior among heterosexuals. Many have identified the need for research aimed at developing HIV sexual risk behavior reduction interventions for women who use drugs, yet little has been done to reduce the rate of infections among those who use alcohol. Considering the fact that Black females have the greatest proportion of new HIV/AIDS cases by sex (64%), with the majority of these cases occurring through heterosexual sex (87%) (Centers for Disease Control, 2012), findings from the current study would be a valuable contribution to this body of research. The purpose of the current study is to explore the association of alcohol use severity with sexual risk behavior by race among female substance users to further address this gap in the literature. Due to the association between substance use and risky sexual behaviors among populations at high risk for HIV, even a minimal understanding of the role of alcohol use severity will inform targeted interventions and prevention research among female substance users.

Method

Study Design

Data for this study were obtained from the baseline assessment of the NEURO-HIV Epidemiologic Study. This study was originally designed to examine neuropsychological and social-behavioral risk factors of HIV, hepatitis A, hepatitis B, and hepatitis C among both injection and non-injection drug users. This study was approved by the Institutional Review Board at the Johns Hopkins Bloomberg School of Public Health in 2001 and has received annual renewals. The design of this study is cross-sectional. In order to be eligible for participation in the parent study, participants had to be between the ages of 15 and 50 and had to report use of non-injection and/or injection drugs in the past 6 months. Recruitment strategies for participation included advertisements in local papers, street outreach, and referrals from local service agencies. Participants were remunerated \$45 for the baseline assessment.

Participants provided written informed consent and completed a face-to-face HIV-Risk Behavior Interview. In addition, participants completed a battery of neuropsychological tests that measured executive functioning and estimated general intelligence. Blood and urine samples were also collected at the baseline assessment. Blood was drawn by a phlebotomist and tested for HIV, hepatitis A, B, and C. Urine samples were tested for the presence of drugs including: opiates, cocaine, cannabinoids, methamphetamine, methadone, PCP, barbiturates, benzodiazepines, tricyclic antidepressants, MDMA, and oxycodone. Participants were also asked if they had ever been told by a health professional that they had a STI including: gonorrhea, syphilis, chlamydia, genital herpes, genital warts, or trichomoniasis. Participants were subsequently notified of their HIV status and were referred to drug treatment and social services for counseling with respect to their blood and urine analysis results.

Participants

The current study used data from the Neuro-HIV Epidemiologic study in Baltimore, Maryland. The current study used a subset of participants from the parent study that identified as: (1) female, (2) Black or White, and (3) reported past six-month use of non-injection and/or injection drugs. The study sample included 251 participants that met the inclusion criteria. Table 1 shows a complete summary of participant characteristics including demographics, sexual history, sexually transmitted infections, and substance use.

Measures

Demographics—Study demographics included self-report of age, education, race, sexual history, and substance use. Participants were recruited from a socio-demographic region of the United States where the median household income is \$41,385 and 24.5% of persons live below the poverty level (U.S. Census Data, 2013).

HIV-Risk Behavior Interview—The HIV-Risk Behavior Interview is detailed behavioral assessment of drug use and sexual practices. This assessment was adapted from a similar interview used in the REACH (Strathdee & Sherman, 2003) and ALIVE (Vlahov et al.,

1991) studies. Questions addressed demographic, educational, medical, and neurodevelopment variables along with a detailed assessment of lifetime and recent drug use and sexual practices including a history of sexually transmitted infections (STIs). Measures of alcohol use severity, casual and steady sex, and alcohol use before or during sex were obtained from this assessment.

Alcohol Use Severity—The NIAAA defines excess or problematic alcohol use as an average of 7 standard drinks for women per week. In the United States a standard drink equates to 12 fluid ounces of beer, 8 to 9 fluid ounces of malt liquor, 5 fluid ounces of wine, and 1.5 fluid ounces of 80-proof spirits or hard liquor. Past 30-day alcohol consumption was assessed in the current study, as this is the standard used by Substance Abuse and Mental Health Services Administration (SAMHSA) to classify drinking severity categories. Similar to Scherer et al. (2013) self-report of past month alcohol use was used to create levels of alcohol consumption severity (abstinent, moderate, problematic). Those women who did not report alcohol consumption in the last 30 days were labeled “abstinent” and those who reported 1 to 30 drinks in the past month were labeled “moderate.” Women who consumed greater than 30 drinks in the past month were categorized as “problematic.” In the current study sample participants were categorized as follows: abstinent, 35.5% ($n = 89$) moderate, and 21.9% ($n = 55$) problematic.

Casual and Steady Sex—Participants were asked one question assessing both casual and steady sex behavior: “Have you ever had a casual partner?” and “Have you ever had a steady partner?” A casual partner is defined as having sex with someone whom the participant knew for less than three months (including one night stands). A steady sex partner is defined as a relationship greater than 3 months. A dichotomous variable was created for, ever (coded 1) or never (coded 0) having a casual or steady sex partner.

Substance Use Before or During Sex—Participants were asked three questions each for lifetime substance use before or during casual sex: “When you had sex with a casual partner, what percent of the time did you use alcohol before/during sex?”; “When you had sex with a casual partner, what percent of the time did you use non-injection drugs before/during sex?”; and “When you had sex with a casual partner, what percent of the time did you use injection drugs before/during sex?” These same set of questions were asked substituting “steady partner” for “casual partner.” Each of these variables were coded as ever (coded 1) or never (coded 0) having used a substance before or during sex.

Data Analysis

To meet study aims, descriptive statistics were used to calculate frequencies, means, and percentages for each variable of interest. Groups by race (Black and White) were created to conduct ANOVAs and chi-square statistics (χ^2) for demographic variables, sexual risk behavior, prevalence of STIs and HIV, severity of alcohol use, recent substance use, and substance use before/during sex. Multivariate logistic regression analyses were first conducted on the study sample overall while controlling for age and race. Separate binary logistic regression analyses were used to assess the influence of alcohol use severity on substance use before or during sex with casual and steady partners. Groups were then

stratified by race and binary logistic regression analyses were conducted for each predictor variable while controlling for age. Age was retained in the logistic analyses as a control mechanism for duration of substance use (Scherer, Trenz, Harrell, Mauro, & Latimer, 2013; Trenz, Penniman, Scherer, Zur, Rose, & Latimer, 2012; Whitehead, Hearn, Marsiske, Trenz, & Latimer, 2014). Descriptive data analysis and regression analyses were performed using PASW Statistics 18 (SPSS, 2009).

Results

Summary Statistics

Study participants had a mean age of 31.90 ($SD = 7.67$). Sixty-four percent of participants were African American, 53% had completed high school or equivalent, and the majority were single (68.7%). Twenty-two (8.8%) study participants tested positive for HIV and 42% self-reported having a sexually transmitted infection. The average age of first sexual encounter was just under 15 years old ($M = 14.98$, $SD = 2.93$). The majority of participants reported heterosexual sex at their last sex encounter (93.1%), nearly all (99.6%) reported ever having a steady sex partner, with the average number of male steady sex partners at 3.88 ($SD = 2.91$). Over half (54.4%) of participants reported ever having a casual partner with 4.35 ($SD = 12.2$) male casual partners on average. Just over one-third (36.2%) of participants reported having ever engaging in sex trade.

Greater than half (59%) of study participants reported ever having injected any drug in their lifetime. Past six-month substance use included: cigarettes (89.6%), alcohol (68.1%), crack cocaine (50.6%), inject any drug (46.2%), nasal heroin (45.2%), smoke marijuana (44.6%), and inject heroin (41.4%). A complete list of past six-month substance use can be found in Table 1.

Demographic Characteristics Stratified by Race

Frequency distributions for each of the demographic and study variables were determined for the entire sample and were stratified by race (Table 2). Of female substance users in the sample, 63.7% were Black and 36.3% were White. Race groups did not differ significantly on age, high school education, receipt of public assistance, homelessness, positive urinalysis for cocaine, or HIV-positive status. Black females had a significantly greater proportion of being single ($\chi^2 = 18.94$, $p < .001$) and self-reporting ever having a STI ($\chi^2 = 13.30$, $p < .001$). White females were significantly more likely to report having ever injected any drug ($\chi^2 = 33.99$, $p < .001$) and to have a positive urinalysis for opioids ($\chi^2 = 15.36$, $p < .001$).

Sexual Risk Behavior Stratified by Race

Groups also did not differ significantly by race on any sexual risk behaviors (Table 2) or substance use before or during sex with a casual partner. For steady relationships, White females had a significantly greater proportion of injection drug use before or during sex ($\chi^2 = 25.88$, $p < .001$) than Black females. Finally, groups did not differ significantly by race on any of the three alcohol use categories.

Overall Predictors of Casual and Steady Sexual Risk Behaviors

The adjusted logistic models for all female substance use before or during sex with a casual and steady partner can be found in Table 3. There were no significant associations for severity of alcohol use and casual sexual risk behaviors. After adjusting for age and race, problematic alcohol users were more likely to use non-injection drugs ($AOR = 2.28$, 95% CI: 1.11, 4.69) and less likely to use injection drugs ($AOR = 0.37$, 95% CI: 0.17, 0.83) than abstainers during or before sex with a steady partner. Problematic alcohol users were 4.58 (95% CI: 1.75, 11.99) times more likely than moderate alcohol users to use alcohol before or during sex with steady partners.

Predictors of Casual and Steady Sexual Risk Behaviors Stratified by Race

Among White females, problematic alcohol users were significantly less likely to use injection drugs ($AOR = 0.22$, 95% CI: 0.06, 0.78) before or during sex with a steady partner than those who abstained from alcohol use. There were no significant associations between categories of alcohol use and casual sexual risk behaviors with any of the substance use variables before or during sex.

Among Black females, problematic alcohol users were 3.03 (95% CI: 1.22, 7.52) times more likely to use non-injection drugs before or during sex with a steady partner than abstainers. Problematic alcohol users were 7.83 (95% CI: 2.14, 28.70) times more likely to use alcohol before or during steady sex than moderate alcohol users. Similar to White females, there were no significant associations between alcohol use categories and casual sexual risk behaviors with any of the substance use variables before or during sex.

Discussion

Similar to Scherer et al. (2013), the current study found that overall problematic alcohol users were almost five times more likely than moderate alcohol users to use alcohol before or during sex with steady partners. Among Black females this association increased to almost eight fold and provides further evidence of the vulnerability of this population. Furthermore, problematic users were over twice as likely than abstainers to use NIDU before or during sex with steady partners. These findings partially replicate findings by Scherer et al. (2013) among this illicit drug using population overall and further extends this work among female substance users by including steady sex partners in addition to casual partners.

Additionally, Scherer et al. (2013) found that among a sample of illicit drug users, problematic alcohol users were almost six times more likely than abstainers to engage in IDU before or during sex, while the current study found that among women problematic users were less than half as likely than abstainers to engage in IDU before/during sex. This difference is likely the result of the population being examined. That is, where Scherer et al. (2013) examined the population in its entirety, the current study focused on specific subgroups within this population – specifically, females. This provides additional support that interventions tailored to the general population of illicit drug users may be insufficient in meeting the needs of this particular subgroup and, as such, further research is required

examining the precise concerns facing female substance users rather than lumping all substance users together.

The current study did not find any significant association between alcohol use severity categories and casual sex risk behaviors. This finding potentially indicates that women may be more aware of STI/HIV risk during casual encounters. Therefore, regardless of alcohol use, women may be less likely to engage in high-risk behaviors such as drug use before and during sex with casual partners. This is consistent with findings in the literature that individuals in steady partnerships are more likely to engage in risk behaviors than those in casual partnerships (Macaluso & Demand, 2000). Therefore, our finding that both Black and White women have increased risk behaviors during sexual encounters with steady partners is not only consistent with the literature but also indicative of a possible area of vulnerability for women.

Further, White women categorized as abstainers were more likely to use injection drugs before or during sex with a steady partner than problematic alcohol users. This finding indicates that there may be certain qualities about the steady partnerships of women in the current study sample that contribute to drug use before or during sex even without the influence of alcohol. For example, female IDUs and NIDUs in steady partnerships may be in relationships that support their drug use behaviors both socially (e.g., partners as primary drug network member) and financially (e.g., partner pays for drugs) (Miller and Neaigus, 2002; Montgomery et al., 2002; Neblett et al., 2011). Drug use before and during sex has been linked to high risk sexual behaviors associated with STI/HIV risk, especially if their partner is not monogamous (Riehm et al., 2006). In fact, research has indicated that young heterosexual couples may have a poor awareness of their partner's sexual concurrency in relationships outside of their own (Gorbach et al., 2005; Drumright et al., 2004). Therefore, women in steady partnerships may be more vulnerable to STI/HIV infection, especially when their steady partner is engaged in multiple relationships without disclosing.

Findings here indicate that alcohol use severity may have additional adverse consequences for Black women compared to White women in steady partnerships in particular. Specifically, it was found that problematic drinkers were more likely to use non-injection drugs and alcohol before or during sex with a steady partner. Undisclosed bisexuality is a noted problem in the African American community that has significant implications for STI/HIV infection rates. Research has indicated that among Black men who have sex with men and women (MSMW) only one-tenth to one-third disclose their sexual identity to female partners (Dodge et al., 2008; Martinez & Hosek, 2005; Montgomery et al., 2003). As a result, Black women may be facing increased risk in the context of steady partnerships due to discordant perceptions regarding monogamy, as well as their partner's undisclosed sexual concurrency and non-disclosure of bisexuality (Dodge et al., 2008; Riehm et al., 2006). Findings here indicate that HIV prevention interventions should also take into account women's risk in steady partnerships. It has become increasingly important to help women more effectively evaluate their levels of disease risk in steady partnerships as this may decrease risk-taking behaviors in this context.

Although the current study offers valuable contributions to the literature, limitations must be noted. Consistent with cross-sectional designs, conclusions regarding causality or temporal order of variables investigated here should be reserved for future longitudinal or experimental designs. Specifically, the use of lifetime sexual encounters with recent alcohol may have limited validity due to the difference in temporal measurement. In addition, findings presented here may be specific to populations of female substance users within urban settings such as Baltimore, Maryland. The categories of alcohol use severity were created using self-report data from the HIV-Risk Behavior Inventory, and not the more commonly used Alcohol Use Disorders Identification Test (AUDIT) measure. However, alcohol use severity categories in the current study were created using NIAAA guidelines. Significant findings from the current study should be interpreted with caution due to the possibility of chance findings when conducting multiple comparisons. Considering these limitations, this study has several strengths. First, the use of urinalysis to verify self-report of substance use adds to the validity of measured variables. Second, this study contributes to previous work by adding steady sex partners as a descriptive variable. Lastly, this study extends work among substance using females by exploring these variables by race.

The current study makes important contributions to our understanding of the role of alcohol use severity in sexual risk taking behavior for Black and White female substance users. Though these relationships have been supported in previous literature in the general population, the current research extends the existing literature by taking a closer look at substance using females who have typically been a particularly vulnerable group. Gaining greater understanding the role of alcohol use in sexual risk behavior and subsequent HIV transmission is the key to the development of effective interventions for this vulnerable population.

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Table 1

Characteristics of the study sample (N = 251)

	Frequency / Mean	% / SD
Age (range = 15–50 years)	31.90	7.67
Race/ethnicity		
African American	160	63.7
White	91	36.3
High school graduate or equivalent	134	53.4
Single (never married)	171	68.7
Homeless past 6 months	47	18.8
Received public assistance past 6 months	139	55.6
Sexual History		
Age of 1 st sex	14.98	2.93
Years sexually active	16.71	7.50
Heterosexual sex (last sex encounter)	230	93.1
Ever had a female partner	44	17.7
Ever had steady partner	248	99.6
Number of male steady partners	3.88	2.91
Ever had casual partner	135	54.4
Number of male casual partners	4.35	12.2
Ever trade sex	89	36.2
HIV-positive	22	8.8
Any STI	104	42.1
Ever inject any drug	148	59.0
Recent substance use ^a		
Cigarettes	225	89.6
Alcohol	171	68.1
Crack Cocaine	127	50.6
Inject any drug	116	46.2
Heroin – nasal	113	45.2
Marijuana – smoking	112	44.6
Heroin – injection	104	41.4
Heroin and cocaine together (“Speedball”) – injection	64	25.5
Cocaine – injection	65	25.9
Street methadone	50	19.9
“Downers” (barbiturates, tranquilizers, sedatives, etc.)	45	17.9
Cocaine - nasal	41	16.4
Heroin and cocaine together (“Speedball”) – nasal	25	10.0
Alcohol Use Category ^b		
Abstinent	107	42.6
Moderate	89	35.5
Problematic	55	21.9

Note.

^aPast six months;

^bPast month.

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Table 2

Association of baseline participant characteristics in 251 female substance users

	White Females <i>n</i> = 91	Black Females <i>n</i> = 160	<i>t</i> / χ^2	<i>p</i>
Demographics				
Age (<i>M</i> ± <i>SD</i>)	28.74 (7.43)	33.70 (7.22)	3.90	.049
High School Graduate /GED [<i>n</i> (%)]	43 (52.7)	91 (43.1)	1.79	.181
Single [<i>n</i> (%)]	49 (53.8)	122 (77.2)	18.94	.001
Public assistance ^a [<i>n</i> (%)]	45 (49.5)	94 (51.5)	1.82	.178
Homeless ^a [<i>n</i> (%)]	22 (24.2)	25 (15.7)	2.18	.140
Ever injected any drug [<i>n</i> (%)]	76 (83.5)	72 (45.0)	33.99	<i>p</i> < .001
Positive urinalysis for opioids	55 (68.8)	61 (40.7)	15.36	<i>p</i> < .001
Positive urinalysis for cocaine	34 (42.5)	70 (46.7)	.22	.641
HIV Positive [<i>n</i> (%)]	4 (4.4)	18 (50.9)	2.61	.111
Any STI [<i>n</i> (%)]	23 (26.1)	81 (50.9)	13.30	<i>p</i> < .001
Sex-Risk Behavior^a				
Ever steady	90 (100)	158 (99.4)	.00	1.00
Ever casual	48 (53.3)	87 (55.1)	.02	.896
Casual partners (<i>M</i> ± <i>SD</i>)	5.70 (14.85)	3.58 (10.35)	1.32	.039
Steady partners (<i>M</i> ± <i>SD</i>)	3.60 (2.97)	2.88 (4.04)	−1.14	.638
Consistent condom use with casual partner	13 (27.1)	32 (37.6)	1.09	.296
Consistent condom use with steady partner	7 (7.9)	6 (3.9)	1.03	.309
Trade sex	31 (34.8)	54 (34.4)	.00	1.00
Substance Use Before/During Casual Sex^a [<i>n</i> (%)]				
Alcohol	23 (47.9)	48 (55.8)	.49	.485
Non-injection drugs	23 (47.9)	41 (47.7)	.00	1.00
Injection drugs	16 (34.0)	14 (16.1)	4.67	.031
Any drug use	37 (78.7)	57 (66.3)	1.71	.191
Substance Use Before/During Steady Sex^a [<i>n</i> (%)]				
Alcohol	46 (51.1)	89 (57.8)	.77	.379
Non-injection drugs	49 (54.4)	99 (64.3)	1.91	.167
Injection drugs	50 (57.7)	37 (23.9)	25.88	<i>p</i> < .001
Any drug use	71 (81.6)	123 (79.9)	.03	.874
Alcohol Use Category^b				
Abstinent	46 (50.5)	61 (38.1)	3.17	.075
Moderate	31 (34.1)	58 (36.2)	.04	.833
Problematic	14 (15.4)	41 (25.6)	2.98	.084

Note.

^a Lifetime;

^bPast month.

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Logistic regression analysis for all female substance use before/during sex with casual and steady sex partners

Table 3

	Alcohol Use Before/During Sex			NIDU Before/During Sex			IDU Before/During Sex		
	AOR	95% CI		AOR	95% CI		AOR	95% CI	
<i>Predictors of Casual Sex Risk Behavior</i>									
Abstainers × Moderate Users	---	---		0.82	[0.37, 1.78]		0.49	[0.19, 1.28]	
Abstainers × Problematic Users	---	---		1.77	[0.67, 4.73]		0.63	[0.19, 2.06]	
Moderate × Problematic Users	1.67	[0.59, 4.75]		1.68	[0.63, 4.45]		1.56	[0.38, 6.35]	
<i>Predictors of Steady Sex Risk Behavior</i>									
Abstainers × Moderate Users	---	---		1.76 [†]	[0.97, 3.20]		0.54 [†]	[0.28, 1.02]	
Abstainers × Problematic Users	---	---		2.28 [*]	[1.11, 4.69]		0.37 [*]	[0.17, 0.83]	
Moderate × Problematic Users	4.58 ^{**}	[1.75, 11.99]		1.34	[0.63, 2.85]		0.66	[0.29, 1.51]	

Note. Logistic analyses are adjusted for age and race.

[†] $p < .10$;

^{*} $p < .05$;

^{**} $p < .01$;

^{***} $p < .001$.

Logistic regression analysis for female substance use before/during sex with casual and steady partners stratified by race

Table 4

White Females	Alcohol Use Before/During Sex		NIDU Before/During Sex		IDU Before/During Sex	
	AOR	95% CI	AOR	95% CI	AOR	95% CI
<i>Predictors of Casual Sex Risk Behavior</i>						
Abstainers × Moderate Users	---	---	0.61	[0.17, 2.28]	0.80	[0.21, 3.08]
Abstainers × Problematic Users	---	---	2.73	[0.24, 30.59]	1.94	[0.23, 16.43]
Moderate × Problematic Users	1.17	[0.19, 11.51]	5.95	[0.49, 73.05]	3.84	[0.32, 46.58]
<i>Predictors of Steady Sex Risk Behavior</i>						
Abstainers × Moderate Users	---	---	0.79	[0.21, 2.88]	0.67	[0.81, 2.54]
Abstainers × Problematic Users	---	---	1.39	[0.41, 4.67]	.22*	[0.06, 0.78]
Moderate × Problematic Users			0.79	[0.21, 2.88]	0.67	[0.18, 2.54]
Black Females	Alcohol Before/During Sex		NIDU Before/During Sex		IDU Before/During Sex	
	AOR	95% CI	AOR	95% CI	AOR	95% CI
<i>Predictors of Casual Sex Risk Behavior</i>						
Abstainers × Moderate Users	---	---	1.04	[0.37, 2.88]	0.30	[0.07, 1.29]
Abstainers × Problematic Users	---	---	1.66	[0.55, 4.97]	0.41	[0.10, 1.76]
Moderate × Problematic Users	1.97	[0.60, 6.52]	1.30	[0.43, 3.91]	1.10	[0.19, 6.39]
<i>Predictors of Steady Sex Risk Behavior</i>						
Abstainers × Moderate Users	---	---	1.73	[0.80, 3.72]	0.59	[0.34, 1.84]
Abstainers × Problematic Users	---	---	3.03*	[1.22, 7.52]	0.55	[0.20, 1.48]
Moderate × Problematic Users	7.83***	[2.14, 28.70]	1.85	[0.71, 4.82]	0.68	[0.24, 1.93]

Note. Logistic analyses are adjusted for age.

[†] $p < .10$;

* $p < .05$;

** $p < .01$;

*** $p < .001$.