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Journal

Substance Use and Misuse, 53(11)

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Publication Date

2018-09-19

DOI

10.1080/10826084.2018.1436566

Peer reviewed



Published in final edited form as:

Subst Use Misuse. 2018 September 19; 53(11): 1826–1833. doi:10.1080/10826084.2018.1436566.

Associations between Sociodemographic Characteristics and Sexual Risk Behaviors among Methamphetamine-using Men who Have Sex with Men

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Abstract

Background: Methamphetamine-using men who have sex with men (MSM) exhibit elevated rates of HIV and STI prevalence, indicating increased engagement in sexual risk behaviors.

Objectives: This analysis elucidates associations between participant sociodemographics (i.e., age, racial/ethnic identity, sexual identity, educational attainment, and HIV status) and sexual risk behaviors, particularly substance use before/during sex, and engagement in condomless anal intercourse (CAI) with casual, anonymous, and/or exchange male partners.

Methods: From March 2014 through January 2016, 286 methamphetamine-using MSM enrolled in a technology-based study to reduce methamphetamine use and HIV sexual risk behaviors. A robustly estimated generalized structural equation model employing the negative binomial family and log link function ($n = 282$) tested the simultaneous associations between participant sociodemographics and engagement in HIV sexual risk behaviors.

Results: Participants' racial/ethnic identity ($\chi^2_{(6)} = 43.5$; $p < 0.0001$), HIV status ($\chi^2_{(6)} = 22.0$; $p = 0.0012$), educational attainment level ($\chi^2_{(6)} = 13.8$; $p = 0.0322$), and years of age ($\chi^2_{(6)} = 32.4$; $p < 0.0001$) all influenced participants' engagement in substance use before/during sex and engagement in CAI. Methamphetamine ($\chi^2_{(2)} = 7.0$; $p = 0.0309$) and marijuana ($\chi^2_{(2)} = 9.7$; $p = 0.0079$) use before/during sex influenced participants' engagement in CAI with casual, anonymous, and exchange male partners.

Conclusion: Results indicate the importance of intervention efforts focused on younger racial/ethnic minority MSM with fewer years of educational attainment, and provides evidence of the specific subpopulations of MSM at greatest risk of detrimental effects of illicit substance use.

Keywords

men who have sex with men; HIV; substance use; sexual risks

Introduction

Epidemiological evidence from large urban centers in the United States have consistently revealed elevated HIV/STI infection rates among men who have sex with men (MSM), predominantly as a result of condomless sexual encounters with other men (CDC, 2013; Phillips et al., 2013; Wejnert et al., 2013; Friedman et al., 2014; CDC, 2015). Furthermore, prior studies have consistently shown high rates of substance use among MSM (Cochran, Ackerman, Mays, & Ross, 2004; Reback, Fletcher, Shoptaw, & Grella, 2013), which has been cited by the CDC as a driving factor in increased sexual risk behaviors and HIV/STI incidence among MSM (CDC, 2013b; CDC, 2014b; CDC, 2015b). Results are especially consistent for methamphetamine use and MSM (Vosburgh, Mansergh, Sullivan, & Purcell, 2012; Hoenigl et al., 2016), though there are also significant findings for alcohol (Vosburgh et al., 2012), cocaine (Colfax et al., 2005), and marijuana (Morgan et al., 2016) use. Even among substance-using MSM there are important sociodemographic differences regarding both the substances of use and sexual risk behaviors, differences which can inform interventions designed for this high-risk population.

Gay-identified MSM are more likely to engage in substance use than non-gay identified MSM (Irwin & Morgenstern, 2005; Bowers, Branson, Fletcher, & Reback, 2011; Kann, 2011; Bowers, Branson, Fletcher, & Reback, 2012); however, findings are mixed for alcohol and marijuana use (Rosario, Scrimshaw, & Hunter, 2004; Midanik, Drabble, Trocki, & Sell, 2007; Wong, Kipke, & Weiss 2008; Kann, 2011). Gay-identified MSM have also been observed to be at higher risk for engaging in sexual risk behaviors (including substance use during sex) and/or HIV seroconversion than their non-gay-identified MSM counterparts (Kral et al., 2005; Flores, Mansergh, Marks, Guzman, & Colfax, 2009; Kann, 2011), and though overall HIV prevalence is higher among African American/Black MSM and their sexual networks, African American/Black MSM are less likely to identify as gay or engage in sexual risk behaviors than their non-African American/Black MSM counterparts (Millet, Flores, Peterson, & Bakeman, 2007; Millet et al., 2012; contra: Eaton, Kalichman, & Cherry, 2010). When examining further differences across racial/ethnic identities, Caucasian/White and Hispanic/Latino MSM have been observed to be more likely to use methamphetamine and/or alcohol than African American/Black MSM (Irwin & Morgenstern, 2005; Millet et al., 2007; Eaton et al., 2010), whereas African American/Black MSM (particularly HIV-positive African American/Black MSM) are more likely to report using powder/rock cocaine (Hatfield, Horvath, Jacoby, & Rosser, 2009; Millet et al., 2012; Koblin et al., 2013) and/or to engage in exchange sex (i.e., sex in exchange for money, drugs, or valued resources; Nerlander et al., 2017). Among HIV-positive MSM, substance use (especially stimulant use) before or during sex has long been observed to increase engagement in HIV transmission risk behaviors (e.g., condomless anal intercourse [CAI], exchange sex; Purcell, Moss, Remien, Woods, & Parsons, 2005; Shoptaw & Reback, 2007; Semple et al., 2009; Boone, Cook, & Wilson, 2013). Furthermore, MSM engaged in exchange sex have been shown to be more likely to inject drugs, to engage in CAI, and to be unaware of living with HIV (Nerlander et al., 2017). Rates of substance use and sexual risk behaviors also share complex relationships with age and sexual identity among MSM (Pappas & Halkitis, 2011; Hampton et al., 2013; Lelutiu-Weinberger et al., 2013); in most prior examinations, increased

educational attainment has served as a buffer against substance use and sexual risk among MSM (e.g., Colfax, & Shoptaw, 2004; Koblin et al., 2006; Hampton et al., 2013).

This study sought to determine the associations between participant sociodemographic characteristics, self-reported substance use immediately before/during sex, and self-reported engagement in CAI with casual, anonymous, and exchange male partners. Nuanced understanding of how sociodemographic factors are associated with patterns of substance use immediately prior to or during sex, and how such substance use is subsequently associated with engagement in CAI, may help interventionists target the specific subpopulations of MSM most likely to acquire or transmit HIV due to their sexual risk behaviors during substance use. Furthermore, better understanding of the empirical associations between sociodemographic differences, substance use during sex, and sexual risk behaviors is a necessary and critical step in the process of designing culturally competent interventions for methamphetamine-using MSM. This analysis of baseline data is from a technology-based randomized controlled trial to reduce their methamphetamine use and sexual risk behaviors among non-treatment seeking methamphetamine-using MSM.

Methods

Participants and Procedure

Participants (N=286) enrolled from March 2014 through January 2016 and were recruited from a community-wide effort in Los Angeles County that included street- and venue-based outreach, print media that targeted MSM, online social media site advertisement and geolocation-based dating apps, flyers and posters distribution, and participant referrals. Eligibility criteria were: self-identified MSM who have used methamphetamine (via all modes of administration) within the previous three months, between the ages of 18 and 65 years, CAI (insertive or receptive) with a non-primary male partner in the previous 6 months, not currently in treatment or seeking methamphetamine abuse treatment, has a personal cellular phone with an unlimited texting service plan and able to charge phone daily, able and willing to provide informed consent and comply with study requirements. Individuals were excluded if they did not meet all criteria, were unable to understand the Informed Consent Form (unable to pass a consent quiz), or were determined to have a more serious psychiatric condition that was beyond the safe enrollment of the study procedures (verified through the Structured Clinical Interview for DSM-5 Mini International Neuropsychiatric Interview; Sheehan, Janavs, Baker, Sheehan, Knapp, & Sheehan 2015). Following screening and informed consent, participants completed a baseline Audio Computer Assisted Self Interview (ACASI) assessment comprised of the Behavioral Risk Assessment-Lite and Behavioral Questionnaire – Amphetamine (below), which took approximately 30 minutes to administer. Participants were compensated with a \$25 gift card for completing all the admission procedures. Follow-up ACASI assessments were conducted at 3-, 6-, and 9-months post-enrollment. All study procedures were approved by Friends Research Institute's and the University of California, Los Angeles Institutional Review Boards.

Assessments

Behavioral Risk Assessment-Lite (BRA-Lite): The BRA-Lite is a reduced version of the Behavioral Risk Assessment developed by the senior author; it assessed participant sociodemographic characteristics (e.g., sexual identity, race/ethnicity, educational attainment).

Behavioral Questionnaire – Amphetamine (BQA): The BQA gathers information on HIV-related drug and sexual risk behaviors. Developed by investigators at the University of California at San Francisco, Center for AIDS Prevention Studies (Chesney, Barrett, & Stall, 1998) and modified, in consultation with the developers, for behavioral studies with methamphetamine-using MSM (Twitchell, Huber, Reback, & Shoptaw, 2002). The BQA collects detailed data on discrete sexual behaviors with main, casual, anonymous, and exchange partners, as well as engagement in sexual risk while under the influence of alcohol/drugs. A main partner was defined as a person with whom the participant had a relationship where they felt committed to above anyone else and with whom they have had sex. It was also noted that commitment did not have to mean monogamy. A casual partner was defined as a person that the participant knew, with whom they had sex, but did not consider their main partners. An anonymous partner was defined as someone the participant had sex with, but who they did not know before the sexual encounter and might not know their name. An exchange partner was defined as someone the participant had sex with in exchange for something the participant needed such as money, drugs, shelter, or food. Only substances demonstrating significant use by participants during sexual encounters in the past 30 days (i.e., minimum one episode of sexual intercourse while under the influence during the timeframe; substances chosen were alcohol, powder cocaine, methamphetamine, and marijuana) were included for analysis. Substances not chosen due to lack of participant use were: crack cocaine, LSD or other hallucinogens, Special K, speedballs, primos, ecstasy, heroin, synthetic marijuana/spice, non-heroin opiates, amphetamines, and non-prescribed psychiatric medications.

Statistical Analyses

Descriptive statistics were calculated for all variables, with the specific metric based on the level of measurement used (e.g., count and percentages for nominal variables, mean/standard deviation or median/range for counted/continuous variables, as appropriate). Multivariable analyses employed generalized structural equation modeling (GSEM) given the counted, non-continuous nature of the outcome variables (e.g., number of episodes of substance use before/during sex; number of episodes of CAI); a primary benefit of simultaneous estimation of pathways via GSEM is that it allows for post-hoc tests of significance on multiple sets of associations. The GSEM tested a two-stage model: exogenous participant sociodemographic characteristics generated pathways which led to both self-reported substance use before/during sex, as well as self-reported engagement in CAI with casual, anonymous, and exchange male partners. Self-reported substance use before/during sex also generated pathways leading to self-reported engagement in CAI with casual, anonymous, and exchange male partners. Outcomes were analyzed using the negative binomial family and log link function, and results are reported in their exponentiated form (i.e., adjusted incidence rate ratios [IRRs]), which indicate the expected factor change in the rate of

occurrence of that outcome for every one unit increase in the predictor variable. All equations employ robust estimation of the variance-covariance matrix, implying limited risk of results being disproportionately influenced by outliers. Counted episodes of alcohol use before/during sex were right-censored to further blunt the potential impact of outliers in the data; participants' counts of episodes in the past 30 days were capped at five episodes per day (max = 150 episodes of risk). All analyses were carried out using Stata v13SE, all significance tests are two-tailed, and results are flagged as significant beginning at $\alpha = 0.05$ though are discussed as marginally significant beginning at $\alpha = 0.10$.

Results

Most participants reported a gay sexual identity (67%), a non-Caucasian/White racial/ethnic identity (80%), were HIV-negative (59%), and had graduated high school/obtained a GED or higher (82%; $n = 282$). The median age was 42 years (range = 18–65). Approximately one-quarter of the participants (25.9%) reported methamphetamine injection use in the past 30 days.

Sexual risk behaviors, particularly substance use before/during sex and CAI with male partners were both common among this sample of methamphetamine-using MSM. Participants averaged more than one episode of sexual intercourse in the past 30 days with heavy alcohol use (defined as minimum 5 or more drinks at one time; Mean [M] = 2.48, Range [R] = 0 thru 150), as well as cocaine (M = 1.21, R = 0 thru 28), methamphetamine (M = 6.47, R = 0 thru 50), and/or marijuana (M = 3.99, R = 0 thru 143) use. Additionally, in the past 30 days, participants self-reported multiple episodes of CAI with casual (M = 4.93, R = 0 thru 115), anonymous (M = 3.41, R = 0 thru 54), and exchange (M = 1.82, R = 0 thru 142) male partners.

Table 3 shows results of robust negative binomial GSEM models of predictors of sex while using drug and CAI, including 95% confidence intervals. Gay-identified participants engaged in CAI with exchange male partners at over three times the rate of their non-gay-identified counterparts (IRR = 3.21; 95% CI = 1.25–8.24), but this was broadly unrelated with outcomes during the post hoc omnibus test of significance (i.e., all GSEM pathways related to gay identity = 0; $\chi^2_{(6)} = 9.34$, *ns*). Self-reporting a Caucasian/White racial/ethnic identity was associated with lower rates of engagement in heavy alcohol (IRR = 0.16; 95% CI = 0.08–0.32) and cocaine use (IRR = 0.22; 95% CI = 0.11–0.45) before/during sex, as well as engagement in CAI with exchange male partners (IRR = 0.23; 95% CI = 0.07–0.73), relative to reporting a non-Caucasian/White racial/ethnic identity. Racial/ethnic identity was broadly related to engagement in sexual risk behavior in the post hoc tests of simultaneous significance ($\chi^2_{(6)} = 43.48$, $p = 0.0001$). Testing positive for HIV at baseline was associated with lower rates of heavy alcohol (IRR = 0.30; 95% CI = 0.17–0.53) and cocaine (IRR = 0.49; 95% CI = 0.25–0.95) use before/during sex and was broadly related to engagement in sexual risk behavior outcomes ($\chi^2_{(6)} = 22.03$, $p = 0.0012$). Compared to MSM with higher educational attainment, having achieved less than a high school diploma/GED was marginally associated with greater heavy alcohol use before/during sex (IRR = 2.26; 95% CI = 0.98–5.21; $p = 0.057$), as well as higher rates of engagement in CAI with exchange male partners (IRR = 2.92; 95% CI = 0.84–10.13; $p = 0.091$), and was broadly associated with

sexual risk behavior outcomes ($\chi^2_{(6)} = 13.78, p = 0.0322$). Each year of age was associated with significant differences in the rates of cocaine (IRR = 1.03; 95% CI = 1.00–1.05) and methamphetamine (IRR = 0.99; 95% CI = 0.98–1.00) use before/during sex, as well as rates of engagement in CAI with casual (IRR = 0.98; 95% CI = 0.95–1.00), anonymous (IRR = 0.97; 95% CI = 0.95–1.00), and exchange (IRR = 1.07; 95% CI = 1.02–1.12) male partners, and was broadly associated with sexual risk behavior outcomes ($\chi^2_{(6)} = 32.41, p < 0.0001$). Greater alcohol use before/during sex was associated with higher rates of engagement in CAI with exchange male partners (IRR = 1.06; 95% CI = 1.00–1.13), and was marginally associated with CAI outcomes across partner types ($\chi^2_{(2)} = 4.86, p = 0.0882$). Greater reported cocaine use before/during sex was associated with higher rates of engagement in CAI with anonymous (IRR = 1.08; 95% CI = 1.01–1.14) and exchange (IRR = 1.22; 95% CI = 1.00–1.49) male partners, though confidence intervals in each case were near the critical value, and cocaine use before/during sex was thus statistically unrelated to CAI across partner types ($\chi^2_{(2)} = 2.51, p = 0.2855$). Greater reported methamphetamine use before/during sex was associated with higher rates of engagement in CAI with casual (IRR = 1.06; 95% CI = 1.03–1.10), anonymous (IRR = 1.06; 95% CI = 1.02–1.10), and exchange (IRR = 1.16; 95% CI = 1.08–1.25) male partners, and was significantly associated with engagement in CAI across partner types ($\chi^2_{(2)} = 6.96, p = 0.0309$). Greater reported marijuana use before/during sex was associated with lower rates of engagement in CAI with exchange male partners (IRR = 0.92; 95% CI = 0.85–0.99), was marginally associated with lower rates of engagement in CAI with casual male partners (IRR = 1.03; 95% CI = 1.00–1.06; $p = 0.063$), and in the omnibus test of significance was broadly associated with CAI ($\chi^2_{(2)} = 9.68, p = 0.0079$).

Discussion

Findings from this predominantly gay-identified, racial minority sample of methamphetamine-using MSM indicated high rates of engagement in sexual risk behaviors, specifically engagement in sex while intoxicated and CAI with casual, anonymous, and exchange male partners. The HIV prevalence rate (41%) was significantly higher than epidemiological estimates derived from the local community; however, this high prevalence rate was commensurate with previous samples of MSM who were chronic users of methamphetamine, operationalized as used methamphetamine at least once a month for six months (Reback, 1997; Shoptaw & Reback 2006). In aggregate, the participants averaged more than one episode of sex while intoxicated in the past 30 days on each of four discrete substances: alcohol, cocaine, methamphetamine, and marijuana. In the case of methamphetamine (the primary substance of choice among the sample and an eligibility criterion), participants averaged a sexual episode while using methamphetamine every 4–5 days. Evidence has consistently demonstrated that substance use, particularly methamphetamine and/or alcohol use, before/during sex increases the likelihood of engaging in sexual risk behaviors among MSM (Vosburgh et al., 2012).

Multivariable analysis revealed nuanced associations between sociodemographic characteristics and engagement in sexual risk behaviors. Broadly, participant race/ethnicity, HIV-status, educational attainment, and age were all significantly associated with sexual risk behaviors. Specifically, Caucasian/White racial identity was associated with lower reports of

alcohol or cocaine use before/during sex and CAI with exchange male partners, HIV-positive serostatus with lower rates of alcohol and cocaine use before/during sex, and older age with lower methamphetamine use and CAI with casual and anonymous male partners but with higher rates of both cocaine use and CAI with exchange male partners. Similar trends in associations were observed for having less than high school diploma/GED and alcohol use before/during sex, and CAI with exchange partners. Evidence from this study dovetails cleanly with prior evidence that sexual health interventions may look to focus efforts and resources on younger, racial/ethnic minority MSM, and that interventions should include educational and job training programs designed to increase this population's potential to earn a steady income and form strong social support and social network ties within their community. Heavy substance use and/or engagement in sex work appears to be deterrent factors in the ability to maintain sexual health among this population.

Though endorsing a gay identity was not broadly associated with all sexual risk behaviors examined in this sample, the gay-identified participants demonstrated significantly higher rates of engagement in CAI with exchange male partners than their non-gay-identified counterparts. This was likely due to greater rates of engagement in same-sex sex work among gay-identified MSM overall (Nerlander et al., 2017), rather than to a particular association between a gay identity and engagement in sex work. Whereas non-gay-identified MSM engage in sex with men (including casual and anonymous partners), other than the "gay for pay" occurrence among more economically disadvantaged non-gay-identified MSM, they may be empirically less likely to engage in sex work with other men than their gay-identified counterparts.

Multivariable models also demonstrated associations between substance use before/during sex and CAI with male sexual partners, including methamphetamine as expected; however, the associations between marijuana use during sex and higher CAI with casual partners but lower CAI with exchange partners was a unique finding that requires further study. Results presented here suggest that risk reduction interventions working with stimulant-using MSM may focus on reducing stimulant use as a primary goal, with the understanding that the specific stimulant of use (e.g., cocaine vs. methamphetamine) will likely vary by age and racial/ethnic identity. Heavy alcohol use or binge drinking may also be targeted, and intervention staff should be aware of potential behavioral links between alcohol use before/during sex and engagement in high-risk sex work.

Data from this study was derived from methamphetamine-using, predominantly gay-identified and racial/ethnic minority MSM engaged in sexual risk behaviors, including high rates of substance use before/during sex and/or engagement in CAI with non-primary (i.e., casual, anonymous, and exchange) male partners in the past 30 days. Granular insights into the associations between sociodemographic characteristics, substance use before/during sex, and engagement in CAI with non-primary partners may increase the ability of researchers and social service providers planning to work with high-risk MSM to design targeted and effective interventions. For example, results here would suggest different intervention strategies might be appropriate for communities of predominantly older, gay-identified, non-Caucasian/White, low HIV prevalence MSM than would be applied to younger, predominantly non-gay-identified, Caucasian/White, educated MSM with high rates of HIV

prevalence. Whereas the former group might be expected to engage in high rates of exchange sex and sex under the influence of alcohol and/or cocaine, the latter group would be more prone to engage in sex on methamphetamine and to engage in CAI with casual and/or anonymous male partners.

Limitations and Conclusions

This study and the findings were limited by the non-random nature of the sampling frame used (i.e., participants voluntarily enrolled in an intervention to reduce methamphetamine use and sexual risk behaviors, introducing potential self-selection biases), and results are thus potentially not generalizable beyond the context of the study. These findings were also limited by the location of the study, an urban West Coast city; thus, findings could differ even among methamphetamine-using MSM from other geographical areas or from rural locations. Additionally, all results reported here were gathered at a single point-in-time, and though the causal logic of the GSEMs employed were consistent, all results must be understood as merely associational and not evidence of causality.

In spite of these limitations, this study illustrates important associations between sociodemographic subgroups of MSM, their substance use behaviors immediately before/during sex, and the sexual risk behaviors they engaged in across partner types. Though the generalizability of these findings may be limited beyond urban samples of methamphetamine-using MSM, this risk group is of particularly high relevance for HIV prevention efforts in the U.S. As such, granular information can be critically useful for researchers and social service providers hoping to best target and tailor their interventions to the needs of specific populations of MSM, particularly younger and racial/ethnic minority methamphetamine-using MSM.

Acknowledgments

Funding for this study was provided by the National Institute on Drug Abuse, grant #R01DA035092. Drs. Reback and Swendeman acknowledge additional support from the National Institute of Mental Health (P30 MH58107). The authors would like to thank Mitch Metzner, Ph.D., for his work as project director during the implementation of the study.

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Table 1:

Baseline Participant Characteristics (N = 286)

	n (%) or Md [Range]
Sexual Identity	
<i>Gay-Identified</i>	192 (67.1%)
<i>Not Gay-Identified</i>	94 (32.9%)
Racial Identity	
<i>Caucasian/White MSM</i>	56 (19.6%)
<i>MSM of Color</i>	230 (80.4%)
HIV Status (biomarker confirmed)	
<i>HIV Positive</i>	118 (41.3%)
<i>HIV Negative</i>	168 (58.7%)
Educational Attainment ^a	
<i>Less than HS Graduate/GED</i>	50 (17.7%)
<i>HS Graduate/GED</i>	232 (82.3%)
Age	
<i>Years</i>	42 [18–65]
Methamphetamine Injection Use	
<i>Past 30 Days</i>	74 (25.9%)

^aEducational Attainment n = 282

Table 2:

Episodes of Substance Use Before/During Sex and Condomless Anal Intercourse in the Past 30 Days at Baseline (N = 286)

	Mean	SD	Range
Episodes of Sex while Using...			
Alcohol (<i>min. 5 drinks</i>)	2.48	9.73	0–150
Cocaine	1.21	3.22	0–28
Methamphetamine	6.47	7.30	0–50
Marijuana	3.99	10.67	0–143
Episodes of CAI ^a with...			
Casual Male Partners	4.93	11.48	0–115
Anonymous Male Partners	3.41	8.47	0–54
Exchange Male Partners	1.82	10.17	0–142

^aCAI: Condomless Anal Intercourse

Table 3:

Robust Negative Binomial Regressions of Sex While Under the Influence of Drugs/Alcohol and Condomless Anal Intercourse in the Past 30 Days on Participant Sociodemographic Characteristics (n = 282)

	Sex on Alcohol	Sex on Cocaine	Sex on Meth	Sex on Marijuana	CAI ^a with Casual Male Partners	CAI ^a with Anonymous Male Partners	CAI ^a with Exchange Partners	Omnibus Tests of Sig.
	IRR (95% CI)	IRR (95% CI)	IRR (95% CI)	IRR (95% CI)	IRR (95% CI)	IRR (95% CI)	IRR (95% CI)	
Gay Identity	1.47 (0.86–2.50)	0.88 (0.51–1.53)	0.91 (0.68–1.21)	1.15 (0.65–2.03)	1.06 (0.60–1.87)	1.48 (0.80–2.73)	3.21 (1.25–8.24) *	$\chi^2_{(6)} = 9.34$
Caucasian/White	0.16 (0.08–0.32) ***	0.22 (0.11–0.45) ***	1.26 (0.93–1.72)	0.94 (0.50–1.76)	0.73 (0.39–1.35)	0.60 (0.31–1.16)	0.23 (0.07–0.73) **	$\chi^2_{(6)} = 43.48$ ***
HIV Positive	0.30 (0.17–0.53) ***	0.49 (0.25–0.95) *	0.97 (0.73–1.28)	0.62 (0.35–1.10)	1.61 (0.88–2.96)	1.16 (0.65–2.09)	1.90 (0.54–6.62)	$\chi^2_{(6)} = 22.03$ ***
Less than HS Education	2.26 (0.98–5.21) [†]	1.40 (0.77–2.57)	0.81 (0.55–1.20)	1.64 (0.73–3.73)	0.69 (0.36–1.35)	0.94 (0.50–1.78)	2.92 (0.84–10.13) [†]	$\chi^2_{(6)} = 13.78$ *
Age (years)	0.99 (0.96–1.01)	1.03 (1.00–1.05) *	0.99 (0.98–1.00) *	0.99 (0.96–1.01)	0.98 (0.95–1.00) *	0.97 (0.95–1.00) *	1.07 (1.02–1.12) **	$\chi^2_{(6)} = 32.41$ ***
Sex on Alcohol	-	-	-	-	0.99 (0.96–1.03)	1.02 (0.95–1.09)	1.06 (1.00–1.13) *	$\chi^2_{(2)} = 4.86$ [†]
Sex on Cocaine	-	-	-	-	1.05 (0.96–1.16)	1.08 (1.01–1.14) *	1.22 (1.00–1.49) *	$\chi^2_{(2)} = 2.51$
Sex on Meth	-	-	-	-	1.06 (1.03–1.10) ***	1.06 (1.02–1.10) **	1.16 (1.08–1.25) ***	$\chi^2_{(2)} = 6.96$ *
Sex on Marijuana	-	-	-	-	1.03 (1.00–1.06) [†]	1.02 (0.98–1.05)	0.92 (0.85–0.99) *	$\chi^2_{(2)} = 9.68$ **

^aCAI: Condomless Anal Intercourse

[†]p 0.10;

* p 0.05;

** p 0.01;

*** p 0.001