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Walking the line: Stimulant use during sex and HIV risk behavior among Black urban MSM

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Abstract

Background—Although the association of stimulant use to sexual risk taking and HIV transmission has been well documented among white gay men, stimulant use during sex continues to be under-explored among Black men who have sex with men (MSM).

Methods—Black MSM ($n = 197$) recruited via modified respondent-driven sampling between January and July 2008 completed an interviewer-administered quantitative assessment and optional HIV counseling and testing. Bivariate logistic regression procedures were employed to examine the association of demographics, sexual risk, and other psychosocial factors with stimulant use (at least monthly during sex in the past 12 months). Variable elimination using the backward selection process was used to fit two separate final multivariable logistic regression models examining stimulant use as the outcome and HIV sexual risk in the past 12 months by gender as the primary predictor: (1) Model 1: HIV sexual risk behavior with a casual male sex partner as a primary, forced predictor; (2) Model 2: HIV sexual risk behavior with a female sex partner as primary, forced predictor.

Results—One-third (34%) of Black MSM reported using stimulants monthly or more frequently during sex in the past 12 months. The following factors were independently associated with stimulant use during sex: (1) Model 1: unprotected anal sex with a casual male sex partner in the past 12 months (AOR = 2.61; 95% CI = 1.06–6.42; $p = 0.01$), older age (AOR = 1.09; 95% CI =

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Contributors

Drs. Mimiaga and Mayer and Mr. Cranston, Mrs. Isenberg, and Mrs. Driscoll designed the study and wrote the protocol. Authors Bland and Fontaine managed the literature searches and summaries of previous related work. Authors Reisner, Mimiaga and Skeer undertook the statistical analysis, and author Mimiaga wrote the first draft of the manuscript. All authors contributed to and have approved the final manuscript.

Conflict of interest

No conflict of interest to declare.

1.05–1.15; $p < 0.001$), erectile dysfunction (ED) medication use monthly or more during sex in the past 12 months (AOR = 7.81; 95% CI = 1.46–41.68; $p = 0.02$), problematic alcohol use (AOR = 3.31; 95% CI = 1.312–8.38; $p = 0.005$), and higher HIV treatment optimism (AOR = 0.86; 95% CI = 0.76–0.97; $p = 0.01$). (2) Model 2: unprotected vaginal or anal sex with a female partner in the past 12 months (AOR = 3.54; 95% CI = 1.66–7.56; $p = 0.001$), older age (AOR = 1.10; 95% CI = 1.05–1.14; $p < 0.001$), ED use monthly or more during sex in the past 12 months (AOR = 3.70; 95% CI = 1.13–12.13; $p = 0.03$), clinically significant depressive symptoms (CES-D) at the time of study enrollment (AOR = 3.11; 95% CI = 1.45–6.66; $p = 0.004$), and supportive condom use norms (AOR = 0.69; 95% CI = 0.49–0.97; $p = 0.03$).

Conclusion—Frequent stimulant use is an important factor in HIV and STD sexual risk among Black MSM, particularly for older men and those with co-occurring psychosocial morbidities. HIV and STD prevention interventions in this population may benefit from addressing the precipitants of stimulant use and sexual risk taking.

Keywords

Stimulant use; Black; MSM; HIV; Sexual risk behavior

1. Introduction

The Centers for Disease Control and Prevention (CDC) estimates that 1.1 million people are living with HIV in the US (Centers for Disease Control and Prevention, 2009). African Americans/Blacks, who represent approximately 13% of the total US population, continue to be disproportionately affected by HIV, diagnosed with 45% of new HIV infections in the U.S. in 2006 and 51% in 2007 (Hall et al., 2008). Men who have sex with men (MSM) continue to comprise the majority of all men living with HIV (72%) as well as new HIV infections (53%) in the US (Centers for Disease Control and Prevention, 2009), with Black MSM having the highest HIV prevalence (Centers for Disease Control and Prevention, 2008).

Among MSM the use of cocaine/crack and methamphetamines has been linked to unprotected anal sex (UAS), exchange of money or drugs for sex, abuse of alcohol, drug use with casual and steady partners, being younger in age, use of poppers and Viagra, and drug use before or during sex (Molitor et al., 1998; Morin et al., 2005; Ober et al., 2009; Purcell et al., 2001; Sullivan et al., 1998; Wilton, 2008). Yet drug use in general, and stimulant use specifically, are not well documented among entirely Black MSM samples in the US.

Studies suggest that an increasing number of Black MSM are engaging in amphetamine-type stimulant use (Crosby and Grofe, 2001; Halkitis and Jerome, 2008; Koblin et al., 2007; Miller et al., 2005; Peck et al., 2005; Reback, 1997; Semple et al., 2002; Shoptaw et al., 2005; Wilton et al., 2005; Wohl et al., 2002), with between 2% and 49% of Black MSM across studies reporting recent stimulant use and concurrent risky sexual behavior (Crosby and Grofe, 2001; Gunter et al., 2004; Halkitis and Jerome, 2008; Koblin et al., 2007; Ober et al., 2009; Purcell et al., 2001; Semple et al., 2002; Shoptaw et al., 2005; Wilton et al., 2005). A recent meta-analysis of HIV risk behaviors of Black and White MSM found that Black MSM were significantly more likely to report using cocaine and crack than White MSM (Millett et al., 2007). Although Black MSM have been shown to use crystal methamphetamine less frequently than their white counterparts (Millett et al., 2007), research suggests that rates of methamphetamine use may be on the rise among this population and associated with HIV transmission risk behaviors (Harawa et al., 2008).

Because the overwhelming majority of research on substance use in MSM focused on large samples of white gay men, with limited representation of Black MSM (e.g., Koblin et al.,

2007), inferences about Black MSM behavior in these samples are questionable. The purpose of the current analysis was to examine the frequency of stimulant use (i.e., cocaine, crack, and methamphetamine) during sexual behavior with male and female partners among an exclusively Black MSM sample, and to identify which subgroups of Black MSM were most likely to use stimulants during sex. These data may enhance the current understanding of the pathways leading to stimulant use among at-risk, urban Black MSM.

2. Methods

2.1. Design and setting

Black MSM ($N = 197$) were recruited via modified respondent-driven sampling between January and July 2008. Following an informed consent process with trained study staff, participants completed: (1) a quantitative assessment with a trained interviewer, and (2) optional pre- and post-test HIV counseling and testing. The study was a collaboration between Fenway Health (FH), a freestanding health care and research facility specializing in HIV/AIDS care and lesbian, gay, bisexual, and transgender health in the greater Boston area (Mayer et al., 2007; www.thefenwayinstitute.org); the Multicultural AIDS Coalition (MAC); Justice Resource Institute (JRI); and was funded by the Massachusetts Department of Public Health (MDPH). The study was approved by the FH and JRI Institutional Review Boards and all study activities took place at MAC and JRI, the two participating study sites in Boston, Massachusetts.

2.2. Sample

2.2.1. Eligibility criteria—Prior to study enrollment, each potential participant was screened for study eligibility on the telephone or in-person by trained study staff. Eligible participants were individuals who: (1) identified as Black, (2) identified as male, (3) were 18 years of age or older, (4) self-reported living in Massachusetts, and (5) self-reported oral or anal sex with a man in the preceding 12 months.

2.2.2. Recruitment—A modified respondent-driven sampling (RDS) method (Heckathorn, 1997, 2002), used successfully with prior studies of MSM in New England (Mimiaga et al., 2007, 2009a, 2009c), was used, with study procedures having been described elsewhere (Mimiaga et al., 2009b). A dual incentive system was used: participants were compensated \$25 for the survey, \$25 for the optional HIV testing, and \$10 for each eligible peer they successfully recruited into the study (up to five peers).

2.3. Quantitative assessment and measures

Participants completed an interviewer-administered quantitative assessment that lasted approximately one hour.

2.3.1. Demographics, sexual behavior, substance use, STD history, and HIV status—Demographic characteristics (i.e., age, housing status, health insurance), sexual behavior/sexual partner history (most recent sexual encounter and past 12 months), gender of sexual partners (male or female), and questions about substance use during sex (cocaine, crack, crystal methamphetamine, marijuana, poppers, ecstasy, GHB, downers and painkillers, and erectile dysfunction (ED) medications such as Viagra, Cialis, Levitra) were adapted from the Centers for Disease Control and Prevention's National HIV Behavioral Surveillance Study, MSM cycle (Sanchez et al., 2006). Participants were asked about their lifetime and recent (within the past year) STD history (syphilis, gonorrhea, Chlamydia, herpes), as well as current HIV status. HIV status was confirmed via rapid HIV antibody testing at study enrollment for those who agreed to be tested, and positive results were confirmed by Western blot.

2.3.2. Alcohol use—The CAGE questionnaire, a 4-item validated clinical screening instrument for problematic alcohol use (Cronbach's $\alpha = 0.69$; Ewing, 1984; Knowlton et al., 1994; Mayfield et al., 1974), was used to assess probable alcohol dependence. A score of three or more indicated likely alcohol dependence (Buchsbbaum et al., 1991).

2.3.3. Depression—Clinically significant depressive symptoms were assessed with the Center for Epidemiologic Studies Depression Scale (CES-D), a 20-item validated screening measure of clinically significant distress as a marker for clinical depression (coefficient $\alpha = 0.90$; Cronbach's $\alpha = 0.89$; Radloff, 1977; United States Department of Health and Human Services, 2004). A score of 16 or greater indicated clinically significant depressive symptoms.

2.3.4. HIV treatment optimism—The HIV Optimism/Skepticism scale was used to assess participant attitudes towards current HIV treatments, with lower scores indicating greater optimism due to the way we scaled this measure (Cronbach's $\alpha = 0.79$; Van de Ven et al., 2000).

2.3.5. Condom use norms—To assess condom use norms, participants were asked two validated questions, taken from previous research on this topic (Catania et al., 1994) and which have been used in prior studies of MSM (Mimiaga et al., 2009c; Reisner et al., 2009): (1) "Most of my friends think that condoms are just too much of a hassle to use"; and (2) "Most of my friends think you should always use a condom when having sex with a new person". Responses were scored on a 4 point Likert scale from "strongly agree" to "strongly disagree"; item two was reverse scored and scores were summed to produce a mean scale score.

2.3.6. Self-perceived HIV and STD risk—Participants were asked the following "Based on your sexual experiences in the last year, if you were to rate your risk of getting or transmitting [HIV] or [STDs] on a scale of 1–10, with 1 being not risky at all to 10 being extremely risky, how would you rate yourself?" Higher scores indicated greater self-perceived risk for HIV or STDs.

2.3.7. History of incarceration, substance abuse treatment, history of sex work—Participants were asked to self-report whether they had ever spent time in jail or prison, whether they had ever been in treatment for substance abuse at any time in their life, and whether they had ever exchanged sex for money or other goods.

2.4. HIV testing

Each participant was offered an anonymous rapid HIV antibody test (fingerstick). Overall, 91% of the sample ($N = 180$) opted to have a rapid HIV test during their study visit (those who did not test already knew their HIV positive status). Only one participant was newly diagnosed with HIV in the study as a result of HIV testing procedures. The FDA approved OraQuick® ADVANCE™ HIV-1/2 Antibody Test was used for HIV testing. Rapid reactive HIV test study participants (preliminary positive) were offered Western blot confirmatory testing by blood draw. Each participant received standard-of-care, pre- and post-test HIV counseling. Clients were referred to appropriate medical and psychosocial support services, including referrals for depression, at the discretion of the interviewer.

2.5. Data analysis

SAS® version 9.1.3 (SAS Institute Inc., 2003) statistical software was used to perform analyses, where statistical significance was determined at the $p < 0.05$ level.

2.5.1. Primary outcome—The primary outcome was a dichotomous measure of stimulant use (cocaine, crack, and/or crystal methamphetamine) at least monthly during sex in the prior 12 months. Participants were asked, “In the past 12 months, have you been high or buzzed on [substance name] during sex?” Participants who indicated using cocaine, crack, and/or crystal methamphetamine during sex at least once monthly or more frequently in the past 12 months were considered to be regular stimulant users; those who answered no use/less than monthly use were considered to not be regular stimulant users.

2.5.2. Independent variables of interest—Two dichotomous independent variables were assessed to examine the association of HIV sexual risk behavior to stimulant use during sex: (1) unprotected anal sex with a casual male sex partner in the past 12 months; (2) unprotected vaginal or anal sex with a female partner in the past 12 months.

2.5.3. Bivariate and multivariable logistic regression analyses—For all measures (demographics, sexual risk, psychosocial factors), bivariate logistic regression models were constructed to identify the variables that were statistically significantly associated with the outcome of interest. To further examine which subgroups of Black MSM predicted stimulant use during sex we assessed HIV sexual risk behavior in two separate final multivariable logistic regression models: (1) Model 1: unprotected anal sex with a casual male sex partner in the past 12 months as the primary, forced predictor; (2) Model 2: unprotected vaginal or anal sex with a female partner in the past 12 months as the primary, forced predictor. To fit the most parsimonious final multivariable models, the backward elimination procedure was used, which included bivariate associations that were significantly associated with our outcome at the $p < 0.05$ alpha level (Lomax, 2007).

For significant bivariate predictors that were multicollinear (intercorrelation among the independent variables above 0.80), the variables thought to be theoretically most important in the analysis were chosen and retained in the final multivariable model, whereas the others were dropped (Afifi et al., 2004). Due to multicollinearity the following variables were excluded from the final models: unstable housing, gay self-identification, marijuana and popper use during sex, incarceration, substance abuse treatment history, and lifetime history of exchanging sex for money. In addition, additional variables capturing risk behavior during their most recent sexual encounter with a casual male sex partner were excluded.

3. Results

One-third (34%) of the sample reported stimulant use at least monthly during sex in the prior 12 months. Characteristics of the study sample by stimulant users ($N = 66$) and non-stimulant users ($N = 131$) are presented in Table 1. Frequency of stimulant use (i.e., number of stimulant users reporting cocaine, crack, and/or crystal methamphetamine use at least monthly during sex in the past 12 months) is provided in Fig. 1.

3.1. Bivariate associations of demographic, behavioral, and psychosocial factors to stimulant use at least monthly during sex in the past 12 months (Table 2)

In bivariate analyses, the following factors were significantly associated ($p < 0.05$) with increased odds for stimulant use at least monthly during sex in the past 12 months: (1) *Demographics*: older age (continuous measure), being publicly insured, and unstable housing in the 12 months prior to study enrollment; (2) *HIV sexual risk and substance use in the past 12 months*: unprotected anal sex with a casual male partner, unprotected vaginal or anal sex with a female partner, perceiving that they were at greater risk for HIV and STDs, and popper use and ED use at least monthly during sex; (3) *HIV sexual risk and substance use during most recent sexual encounter*: serodiscordant unprotected anal sex with a casual

male partner during their most recent sexual encounter, using alcohol and drugs concurrently during their most recent sexual encounter with a casual male partner, and having met sexual partner at a bar or dance club; (4) *Presenting psychosocial issues*: problematic alcohol use, clinically significant depressive symptoms, higher levels of HIV treatment optimism (i.e., lower scores), and less supportive condom use norms; (5) *Lifetime psychosocial history*: incarceration, substance abuse treatment, and having exchanged sex for money.

Factors significantly associated with decreased odds of stimulant use: self-identifying as gay (as compared to self-identifying as heterosexual/bisexual) and use of marijuana during sex monthly or more.

3.2. Backward elimination procedure resulting in final multivariable models predicting stimulant use at least monthly during sex in the past 12 months (Table 3)

3.2.1. Model 1: Casual male sexual partners—The backward elimination procedure was used to fit a multivariable logistic regression model that forced HIV sexual risk with male sex partners in the past 12 months as the primary predictor in this model. The following variables were fit in the final model and independently associated with an increased odds of stimulant use at least monthly during sex in the past year: unprotected anal sex with a casual male sex partner in the past 12 months, older age, ED use monthly or more during sex in the past 12 months, and problematic alcohol use. Higher HIV treatment optimism was associated with a decreased odds of monthly stimulant use during sex.

3.2.2. Model 2: Female sexual partners—To examine HIV risk with female sex partners as the primary forced predictor, the backward elimination process was employed. The following variables were fit in the final model and independently associated with an increased odds of stimulant use at least monthly during sex in the past year: unprotected vaginal or anal sex with a female partner, older age, ED use monthly or more during sex in the past 12 months, and clinically significant depressive symptoms at the time of study enrollment. Supportive condom use norms was associated with a decreased odds of at least monthly stimulant use during sex.

4. Discussion

Nationwide, Black MSM are disproportionately affected by the HIV/AIDS epidemic, with 25% of new infections occurring within this relatively small group (Hall et al., 2008). One in three Black MSM in the current study reported using crack, cocaine and/or crystal methamphetamine at least monthly during sex in the prior 12 months. Consistent with prior research (Halkitis and Jerome, 2008; Harawa et al., 2008; Purcell et al., 2001), the current study found that Black MSM reported using cocaine (21%) and crack (14%) in greater frequency than crystal methamphetamine (7%). Stimulant dependence has been shown to be highly associated with HIV infection (Peck et al., 2005), largely due to drug-associated sexual risk behaviors (Shoptaw et al., 2005). Participants in this sample who reported unprotected anal sex with a casual male partner in the past 12 months were more likely to be stimulant users, as were those who reported unprotected vaginal or anal sex with a female partner in the past 12 months, suggesting that regular use of stimulants during sex remains an important risk factor for infection and/or transmission of HIV and other STDs among Black urban men. In addition, these data suggest that stimulant use may be especially important to consider among older Black MSM (Ober et al., 2009; Wohl et al., 2008) and those of lower socioeconomic status (e.g., Harawa et al., 2008; Ober et al., 2009; Myers et al., 2003; Shoptaw et al., 2008)—since in bivariate models 83% of stimulant users in this study were publicly insured and 23% reported unstable housing.

Monthly use of ED medications was significantly associated with stimulant use at least monthly during sex, as was problematic alcohol use in a multivariable model including sexual risk with male partners. In the multivariable model including sexual risk with female partners, however, monthly use of ED medications and depression were significantly associated with stimulant use. The finding that different psychosocial variables were independently associated with stimulant use during sex when male or female partner sexual risk variables were included in final models may have implications for treatment and HIV prevention services. For example, it is possible that internalized homophobia, a variable not captured in the current study, may confound observed effects and account for differential co-morbidities observed in stimulant use among Black MSM reporting sexual risk behavior with male and female partners. While both models suggest co-morbidities among urban Black MSM regular stimulant users, in that stimulant use during sex is happening in the context of co-occurring drug use or problematic alcohol abuse, and drug use or depression, interventions focused on treating/reducing stimulant abuse or dependence among Black MSM should be cognizant of differences that may exist in stimulant use co-morbidities for subgroups of Black men (i.e., Black MSM who partner with men only versus Black MSM who partner with both men and women).

Contrary to prior research (Harawa et al., 2004; Ober et al., 2009), in the current study HIV serostatus did not predict stimulant use and no significant differences in stimulant use were observed in the percentage of HIV-infected participants or the percentage of individuals with a recent or lifetime history of STDs. However, a non-statistically significant higher proportion of men who used crystal methamphetamine at least monthly during sex were HIV positive (23% vs. 17%) and had a lifetime STD history (38% vs. 28%) compared to men not reporting crystal methamphetamine use. A similar trend was observed for crack versus non-crack users during sex (29% vs. 16% HIV positive, 32% vs. 28% lifetime STD history). Cocaine users compared to non-cocaine users had the same pattern with respect to elevated STD history (36% vs. 27%) but not for HIV serostatus (14% vs. 19%). These descriptive differences suggest that future studies with larger samples of Black MSM may benefit from examining differences in HIV and STDs by types of stimulants used during sex. It is possible that differences in existing social network dynamics of stimulant users differ by stimulant type used and/or patterns of stimulant use. Findings from the current study suggest that HIV prevention interventions for stimulant users should be equally developed around the prevention needs of both HIV-infected and HIV-uninfected men.

Treatment of stimulant use remains suboptimal. The mainstay of treatment for stimulant abuse is behavioral modification, using interventions such as cognitive behavioral therapy (CBT) (Carroll, 1996, 2002; Rawson et al., 2004, 2006) and contingency management (Higgins et al., 1993, 2000, 2004; Shoptaw et al., 2006, 2008). To date, few studies have shown that CBT has been effectively used for the treatment of stimulant abuse (Shoptaw et al., 2005, 2008; Roll et al., 2006; Vocci and Montoya, 2009). Moreover, although contingency management has been shown to decrease stimulant use and increase clinic attendance and medication adherence (Higgins et al., 2004; Lussier et al., 2006), individuals receiving contingency management have been shown to have a greater percentage of negative toxicology screens while on treatment compared with standard-of-care and CBT (Petry et al., 2005; Rawson et al., 2006; Shoptaw et al., 2005; Vocci and Montoya, 2009). Furthermore, data from stimulant-abusing West coast MSM who enter substance abuse behavioral treatment suggests that although reductions in both substance use and HIV-related sexual risk behaviors accrue almost immediately upon treatment entry, these effects are difficult to sustain over time (Malow et al., 1994; Shoptaw et al., 2005; Stall et al., 1999). Investing in and refining new behavioral treatment approaches to stimulant abuse/dependence represents an important strategy to intervene on both stimulant use and HIV sexual risk among MSM in general, and Black MSM in particular.

These data suggest that effective treatments for stimulant abuse and HIV sexual risk are needed in outpatient Black MSM-serving clinics and tertiary care centers. The cessation of substance use is the principal concern of hospital or inpatient drug treatment programs (Jaffe et al., 2007). However, many individuals in drug treatment experience co-occurring problems that are not addressed in a hospital or inpatient setting, such as HIV sexual risk behaviors with male and female sexual partners, that may complicate not only their recovery process but also have broad public health significance with respect to rates of infectious disease (Stall and Purcell, 2000). Moreover, at specialized settings or clinics such as MSM-serving clinics and tertiary care centers that have substantial MSM clientele, lack of effective treatment for stimulant abuse, and difficulties implementing traditional HIV prevention modalities among stimulant-using MSM remain significant barriers to addressing concomitant stimulant use and HIV sexual risk behavior among this population. Effective treatment for stimulant use delivered to HIV seronegative or seropositive Black MSM in a specialized setting may represent an important component of a comprehensive HIV/STD control strategy for this at-risk, marginalized population (Shoptaw et al., 2005).

A few study limitations bear mention. First, the survey was interviewer administered, and hence responses could have been biased towards social desirability, which may be especially pertinent since participants self-reported on sexual risk and drug use behaviors. However, this would likely bias estimates such that these behaviors are an underreporting of the true effects. Second, in contrast to traditional RDS, this study did not weight the final sample according to the population being studied. Resource limitations determined the sample size ($N = 197$), which did not allow for recruitment chains to continue and hence interrupted the ability to establish equilibrium using RDS methods. As such, it was not appropriate to weight the final sample according to the population being studied; thus, these data may not be completely representative of the Black MSM population in Massachusetts. Third, income, the conventional marker of socioeconomic position, was not collected as part of this study. Thus, public health insurance was used as a proxy for lower income. The use of a proxy variable introduces the possibility that other dimensions of health insurance status may be contributing to effect sizes (for example, access to care) and are duly noted. Fourth, aggregating the “type of stimulant” (including crack, cocaine and crystal methamphetamine) use into a single construct limited our ability to draw comparisons across these drugs, but was necessary due to our relatively small sample size. Given recent research suggesting that Black MSM who use methamphetamine are more likely to use cocaine, but Black MSM who use cocaine are less likely to report using methamphetamine (Halkitis and Jerome, 2008), it may be that patterns of stimulant use differ among Black MSM and have varied levels of associated risk. Additional research, including prospective studies, is needed with larger samples to examine differential patterns of crack, cocaine, and methamphetamine use among Black MSM. Lastly, while current study findings are relevant to stimulant-using Black MSM in Massachusetts they may also apply to Black MSM subgroups in other geographic locations with similar demographic, behavioral and psychosocial configurations.

Regular stimulant use remains an important factor in HIV and STD sexual risk among Black MSM, particularly for older men. It is imperative to keep in mind that stimulant use among Black MSM is likely co-occurring in the context of other factors, including polysubstance use, problematic alcohol abuse, or depression. Understanding the factors that influence stimulant use and sexual risk taking in this population may have implications for HIV and STD prevention interventions.

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Fig. 1. Proportion of participants reporting cocaine, crack, and/or crystal methamphetamine use at least monthly during sex in the past 12 months ($N = 197$).

Characteristics of Black MSM who report stimulant use at least monthly during sex in the past 12 months ($N = 66$) and those who do not ($N = 131$).

Table 1

	Stimulant users, $N = 66$		Non-stimulant users, $N = 131$		Total sample, $N = 197$	
<i>Mean (SD)</i>	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Age	44.8 (7.6)		37.6 (11.7)		38.7 (11.3)	
HIV treatment optimism	33.2 (3.7)		34.6 (3.7)		34.2 (3.8)	
Condom norms	4.9 (1.2)		5.5 (1.2)		5.3 (1.2)	
Self-perceived HIV risk	4.6 (2.5)		3.4 (2.2)		3.8 (2.4)	
Self-perceived STD risk	4.6 (2.9)		3.5 (2.4)		3.9 (2.6)	
<i>Health insurance</i>						
Publicly insured	55	83	88	67	143	73
Not publicly insured	11	17	43	33	54	27
<i>Education and housing</i>						
High school diploma/GED or less	28	42	59	45	87	44
Unstable housing	15	23	9	7	24	12
<i>Sexual identity</i>						
Gay-identified	23	35	64	49	87	44
Bisexual or heterosexual	41	62	62	47	103	52
<i>HIV and STDs</i>						
HIV-infected	12	18	23	18	35	18
STD ever	21	32	36	27	57	29
STD in past 12 months	4	6	8	6	12	6
<i>Sexual risk during sex in past 12 months</i>						
UAS with casual male sex partner	32	48	34	26	66	34
UAS with female sex partner	30	45	29	22	59	30
<i>Substance use monthly or more during sex</i>						
Cocaine	42	64	0	0	42	21
Crack	28	42	0	0	28	14
Crystal meth	13	20	0	0	13	7
Marijuana	35	53	41	31	76	39

	Stimulant users, N = 66		Non-stimulant users, N = 131		Total sample, N = 197
Poppers	20	30	6	5	26
EDs (Viagra, Cialis, Levitra)	12	18	5	4	17
Club drugs	5	8	1	1	6
Downers/painkillers	4	6	0	0	4
<i>Sexual risk during most recent encounter with a casual male sex partner</i>					
Serodiscordant unprotected anal sex	15	23	10	8	25
Concurrent use of alcohol and drugs during last sex	56	85	66	50	122
Met at bar or dance club	30	45	40	31	70
Met at public cruising area	9	14	30	23	39
Met through friends	17	26	29	22	46
Met through social gathering	7	11	9	7	16
Met through Internet	9	14	30	23	39
<i>Presenting psychosocial issues at study enrollment</i>					
Problematic alcohol use (CAGE)	28	42	30	23	58
Clinically significant depressive symptoms (CES-D)	30	45	35	27	65
<i>Psychosocial lifetime history</i>					
Incarceration	47	71	54	41	101
Substance abuse treatment	44	67	40	31	84
Exchanged sex for money or other goods	14	21	8	6	22

Table 2

Bivariate associations examining demographic, behavioral, and psychosocial associations to stimulant use at least monthly during sex in the past 12 months ($N = 197$).

	Unadj. OR	95% CI	p-value
<i>Demographics</i>			
Older age	1.09	1.05–1.13	<0.001
Public health insurance	2.44	1.16–5.14	0.02
Unstable housing in past 12 months	3.85	1.59–9.09	0.003
Gay self-identification	0.54	0.29–0.99	0.049
<i>Sexual risk behavior in the past 12 months</i>			
Unprotected anal sex with a casual male sex partner	3.18	1.52–6.64	0.002
Unprotected vaginal or anal sex with a female sex partner	2.93	1.55–5.54	<0.001
<i>Substance use monthly or more during sex</i>			
Marijuana	0.47	0.22–0.99	0.049
Poppers	3.84	1.42–10.38	0.008
ED medications	5.60	1.88–16.67	0.002
<i>Sexual risk during most recent sexual encounter with a casual male sex partner</i>			
Serodiscordant unprotected anal sex	3.00	1.26–7.15	0.01
Concurrent use of alcohol and drugs during sex	4.05	1.82–9.04	<0.001
Met last casual sex partner at a bar or dance club	1.90	1.02–3.49	0.04
<i>Presenting psychosocial issues at study enrollment</i>			
Problematic alcohol use	2.48	1.31–4.69	0.005
Clinically significant depressive symptoms	2.29	1.23–4.25	0.009
Higher levels of HIV treatment optimism (e.g., lower scores)	0.90	0.82–0.98	0.01
Less supportive condom use norms	0.62	0.47–0.82	<0.001
<i>Psychosocial lifetime history</i>			
Incarceration	3.53	1.87–6.67	<0.001
Substance abuse treatment	4.55	2.42–8.57	<0.001
Exchanged sex for money	4.19	1.66–10.59	0.003
<i>Self-perception of HIV and STD risk</i>			
HIV risk	1.23	1.08–1.39	0.002
STD risk	1.18	1.05–1.32	0.005

Table 3

Final multivariable models examining independent predictors of stimulant use at least monthly during sex in the past 12 months ($N = 197$): (1) Model 1: unprotected anal sex with a casual male sex partner in the past 12 months as the primary, forced predictor and (2) Model 2: unprotected vaginal or anal sex with a female sex partner in the past 12 months as the primary, forced predictor.

	(1) Model 1			(2) Model 2		
	Adj. OR ^a	95% CI	p-value	Adj. OR ^a	95% CI	p-value
<i>Demographics</i>						
Older age	1.09	1.05–1.15	<0.001	1.10	1.05–1.14	<0.001
<i>Sexual risk behavior in the past 12 months</i>						
Unprotected anal sex with a casual male sex partner	2.61	1.06–6.42	0.01	–	–	–
Unprotected vaginal or anal sex with a female sex partner	–	–	–	3.54	1.66–7.56	0.001
<i>Substance use monthly or more during sex</i>						
ED medications	7.81	1.46–41.68	0.02	3.70	1.13–12.13	0.03
<i>Presenting psychosocial issues at study enrollment</i>						
Problematic alcohol use	3.31	1.31–8.38	0.005	–	–	–
Clinically significant depressive symptoms	–	–	–	3.11	1.45–6.66	0.004
Higher levels of HIV treatment optimism (e.g., lower scores)	0.86	0.76–0.97	0.01	–	–	–
Less supportive condom use norms	–	–	–	0.69	0.49–0.97	0.03

^a Backward elimination was used to fit the most parsimonious final multivariable models. The following variables were included in the elimination process for each model: age, health insurance status, depression, drinking problem, HIV treatment optimism, condom use norms, ED use. Model 1 also included unprotected anal sex with a casual male sex partner as a forced predictor. Model 2 included unprotected sex with a female partner as a forced predictor. Each model fit the variables represented above.