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Differences in gay male couples use of drugs and alcohol with sex by relationship HIV status

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Abstract

Prior studies with men who have sex with men (MSM) have documented a strong association between substance use with sex and risk for acquisition of HIV. However, few studies have been conducted about gay male couples use of substances with sex, despite that between one- and two-thirds of MSM acquire HIV from their relationship partners. The present study sought to: 1) describe whether one or both partners in the male couple uses substances with sex – by substance type – within and/or outside of their relationship; and 2) assess whether differences exist in those who use substances with sex within and outside the relationship by the couples' HIV status. Dyadic data for this analysis was collected in the U.S. from a nation-wide cross-sectional Internet study about male couples' relationships and behaviors. Couple-level descriptive and comparative analyses were employed with 361 male couples. Except for alcohol, most couples did not use substances with sex. Of those who did, rates of who used with sex and substance type within the relationship varied; most couples only had one partner who used substances with sex outside the relationship. Significantly higher proportions of concordantly HIV-negative and positive couples had both partners who used substances with sex (all types) within their relationship over discordant couples. Most couples had one partner who used outside the relationship; only marijuana and erectile dysfunction medication use with sex significantly differed by couples' HIV status. Findings indicate the need to conduct additional research for prevention development.

Keywords

Substance use with sex; Male couples; HIV status

Introduction

Men who have sex with men (MSM) in the US remain severely affected by HIV. In 2010, MSM accounted for 63% of all new HIV infections, and 78% among newly infected men (CDC, 2013). Prior studies with MSM have identified unprotected anal intercourse (UAI) and the use of substances with sex as risky behaviors associated with risk for acquisition of HIV (Coates, 2008; Ostrow & Stall, 2008). Two recent literature reviews describe how assessment of substance use with or without sex among MSM has been inconsistently

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measured and studied in prior studies (Drumright, Patterson, & Strathdee, 2006; Vosburgh, Mansergh, Sullivan, & Purcell, 2012). Despite these inconsistencies, several key themes were noted. Vosburgh and colleagues (2012) indicated that event-level use of methamphetamine and binge alcohol use provided the strongest causal link for acquisition of HIV among MSM. In addition to methamphetamine use with sex, Drumright and colleagues reported evidence for a causal link of MSM's use of volatile nitrites with sex and increased risk for HIV acquisition (Drumright et al., 2006).

Studies have also documented the demographics of MSM who use illegal substances (e.g. methamphetamines) and prescription drugs (e.g. erectile dysfunction medications (EDM), Xanax, Oxycontin) with sex as being more likely to identify as gay and/or White with representation across all ages (Carey et al., 2009; Halkitis et al., 2008; Heath, Lanoye, & Maisto, 2012; Kelly & Parsons, 2010; Kelly & Parsons, 2013; Pantalone, Bimbi, Holder, Golub, & Parsons, 2010; Parsons, Lelutiu-Weinberger, Botsko, & Golub, 2013; Theide et al., 2003). HIV-positive MSM are also more likely to use party drugs (e.g., cocaine, ecstasy, ketamine, GHB, methamphetamine) and prescription drugs, including EDM and sleep aids, than HIV-negative MSM (Kelly & Parsons, 2010; Kelly & Parsons, 2013; Pantalone et al., 2010; Ostrow & Stall, 2008).

Although prior studies have identified a variety of common risk factors of MSM who use substances with sex, few studies with gay male couples have examined their use of substances with sex. One study described partnered MSM as being more likely to report using substances than those without a main partner; substance use was also associated with main partners having had UAI outside of their relationship (Mor, Davidovich, McFarland, Feldstein, & Chemtob, 2008). Parsons and Stark (2014) recently provided evidence that substance use was strongly interdependent between partners within the couple, and that substance use was predictive of partners having had UAI outside of their relationship when controlling for HIV-status, race, age and relationship length (Parsons & Starks, 2014). Other research has noted that MSM who reported being in a monogamous relationship were less likely to have used substances with sex compared to those who were either single or in some type of a non-monogamous relationship (Mor et al., 2008; Parsons & Starks, 2014; Parsons, Starks, DuBois, Grov, & Golub, 2013). These studies provide some insight about male couples' use of substances (with sex). However, additional research with male couples is needed to help prevent HIV given that substance use with sex is fairly common among MSM. Little is known about who uses substances with sex in the male couple (e.g., one or both partners), whether their usage will differ by the type of substance, as well as the HIV status of their relationship.

The majority of research with MSM has examined substance use with sex from an individual-level perspective. Recent estimates indicate that between one- and two-thirds of MSM in the U.S. acquire HIV from their main partners while in a same-sex relationship (e.g., "male couples") (Goodreau, Carnegie, Vittinghoff, Lama, & Sanchez, 2012; Sullivan, Salazar, Buchbinder, & Sanchez, 2009). Given the strong association between substance use with sex and HIV risk among MSM, along with demonstrated evidence of MSM acquiring HIV from their main relationship partners, new research that assesses male couples' use of substances with sex within and/or outside of their relationship is needed to help advance

HIV and substance abuse prevention efforts for this population. The present study sought to: 1) describe whether one or both partners of the male couple uses substances with sex within their relationship, as well as outside the relationship (i.e., with a casual MSM partner) by substance type; and 2) then to assess whether differences exist in who uses substances with sex within and outside the relationship between the concordantly negative, concordantly positive and discordant male couples (i.e., by couples' HIV status). Dyadic data for this study was collected in the U.S. from a nation-wide cross-sectional Internet study about male couples' relationships and behaviors. To accomplish these aims, couple-level descriptive and comparative analyses were employed with 361 male couples. Findings from this study provide key data about male couples' use of substances with sex which could be used toward further research to help develop prevention interventions for substance-using male couples; few such programs currently exist (Santos, Das, & Colfax, 2011).

Methods

Protocol

The BLINDED Institutional Review Board approved the study protocol. Recruitment for this study sample was conducted through *Facebook* banner advertising; methods have been previously described [blinded refs]. In 2011, advertisements targeted partnered men who reported in their Facebook profile being ≥ 18 years of age, living in the US, interested in men, and being in a relationship, engaged, or married. Banner advertisements briefly described the purpose of the study and included a picture of a male couple. Of a total of 7,994 *Facebook* users who clicked on an advertisement, 4,056 (51%) answered eligibility questions; 722 (18%), representing both men of 361 MSM couples provided consent and completed the study questionnaire. Men were eligible to participate if they: were ≥18 years of age, lived in the U.S., were in a sexual relationship with another male and had engaged in oral and/or anal sex with this partner within the previous three months. A partner referral system was embedded in the cross-sectional, one-time Internet survey to enable data collection from both men in the couple. Post-hoc analyses of response consistency were used to verify couples' relationships. Due to budget constraints, every fifth couple who had both partners complete the survey (i.e., 5^{th}, 10^{th}, 15^{th}, etc.) were modestly compensated with two $20USD electronic gift cards (one for each partner).

Study sample

The study sample of 361 male couples primarily identified as gay (N=349, 97%), non-Hispanic (N=308, 85%), white (N=237, 66%), and living in a US urban environment (N=308, 85%). The majority of the couples were well educated (N=227, 63%; i.e., one or both partners having earned a Bachelor's degree or higher), employed (N=339, 94%; i.e., one or both partners were employed), lived together (N=271, 75%) and had been in their relationship, on average, for about 4.9 years (SD 5.5). Regarding HIV status, 76% couples were concordantly negative (N=275), 8% (N=28) were concordant positive and 16% (N=58) HIV-discordant. Unprotected anal sex was commonly practiced among couples (N=304, 84%), though less so for those in a HIV discordant relationship (N=40, 69% vs. 87% in concordant HIV-negative and 93% in concordant HIV-positive couples).

Measures

Outcome variables—Participants were asked if they had used any substances with sex, by partner type, during the three months prior to assessment via a categorical response table. Selecting from the following response categories of “Never used this drug”, “Less than half of the time”, “About half of the time” and “More than half of the time”, participants were asked to report which of the nine substances they had used with sex with their main partner: alcohol, cocaine, crystal methamphetamine, ecstasy, GHB, ketamine, marijuana, amyl nitrates (e.g., poppers), and Viagra or similar (EDM). Using this same format, participants also reported their use of substances during sex with casual MSM partners for the same prior three-month period.

Regardless of partner and substance type used with sex, most participants chose the response category “Never used this drug” with sex for both partner types. This yielded small yet varied response sample sizes for each reported type of substance used with sex for both types of partners (main and casual). For purposes of this analysis, the three remaining response categories, “Less than half of the time”, “About half of the time”, “More than half of the time” – which all describe some level of substance use with sex – were recoded to create a dichotomous dummy variable for each type of substance used with sex per partner type (i.e., within the relationship for main partner, and outside the relationship for casual MSM partner(s)). These new dichotomous dummy variables permit direct comparison between men who reported using a particular substance with sex (e.g., marijuana) with the main partner/casual MSM partner to those who reported never using this particular substance with sex with the main partner/casual MSM partner.

Independent variables—A variety of demographic and relationship characteristics were assessed, as well as, sexual and testing behaviors related to HIV prevention. With the exception of age, demographics of race, ethnicity, sexual orientation, highest education level achieved, employment status, and health insurance were measured categorically. Men also self-reported their HIV status, their primary partner’s HIV status, and their engagement in UAI, including with any casual MSM partners in the prior three months. Relationship characteristics included relationship and cohabitation length. A variety of other behavioral and relationship characteristics were assessed and have previously been reported in detail, including aspects of male couples’ sexual agreements, use of risk-reduction strategies, attitudes toward newer HIV testing options, HIV and STI testing behaviors, and disclosure of their sexuality and male-to-male sex with primary care providers [blinded refs].

Data analysis

Dyadic data from 361 male couples (722 individuals) were analyzed using Stata Version 12 (StataCorp, College Station, TX). A number of independent variables were recoded for analytic purposes to describe the sample’s characteristics and behaviors categorically at the couple-level. Specifically, dummy couple-level independent variables were created by comparing one partner’s response to the other partners’ response to determine whether that characteristic applied to only one partner, both partners, or neither partner of the couple (e.g., education, race).

Descriptive statistics including rates and percentages were calculated to describe characteristics of the sample. Comparative statistics (e.g., Pearson's Chi-square) were employed at the couple-level to describe and compare whether male couples' use of substances with sex had significantly differed ($P < 0.05$) by whether none, one or both partners had used substances with sex (e.g., within the relationship, and outside the relationship, respectively) and by type of substance used with sex (Aim 1). Additional comparative statistics were then employed to assess whether male couples' use of a particular type of substance with sex had significantly ($P < 0.05$) differed by the couples' HIV status within the relationship, as well as outside the relationship (Aim 2).

Results

With the exception of alcohol, the vast majority of couples reported not using drugs with sex within their relationship (Table 1). Among the couples with one or both partners who did use substances with sex, proportions of usage varied by drug type with ranges from 13% for party drugs to 33% for marijuana. Moreover, no consistent patterns were noted across the different types of substances used with sex between couples with only one partner who used and couples with both partners who had used with sex in their relationship.

Most couples also reported not using drugs with sex outside of the relationship, with the exception of alcohol. Of the couples who did use, a higher proportion had only one partner who used a substance with sex outside of the relationship compared to those with both partners who used. Except for alcohol (60%) and party drugs (11%), about one-third of couples had either one or both partners who used substances with sex outside the relationship.

Table 2 provides data on differences in male couples use of substances within and outside of the relationship by the couples' HIV status. Statistical differences by couples' HIV status were identified for all substance types used with sex within the relationship (alcohol, $\chi^2(4) = 17.53$, $P < 0.01$; marijuana, $\chi^2(4) = 86.02$, $P < 0.001$; amyl nitrates, $\chi^2(4) = 59.68$, $P < 0.001$; EDM, $\chi^2(4) = 44.06$, $P < 0.001$; party drugs, $\chi^2(4) = 61.98$, $P < 0.001$). Notably, most couples reported not using any substances with sex within their relationship. Among those with one or both partners who did use a substance with sex within their relationship, higher proportions of discordant and concordantly HIV-positive couples reported using compared to concordantly HIV-negative male couples; this trend was true for each substance type used with sex. For all types of substances, concordantly HIV-positive male couples had the highest proportion of those who used with sex in their relationship (i.e., one and both partners) whereas concordantly HIV-negative couples had the lowest rates of usage.

Fewer statistical differences by couples' HIV status were identified for the different types of substances used with sex outside the relationship. Among those who had one or both partners who reported using a substance with sex, rates of marijuana ($\chi^2(4) = 13.48$, $P < 0.01$) and EDM ($\chi^2(4) = 12.74$, $P < 0.05$) use with sex outside the relationship significantly differed among the concordantly negative, concordantly positive and discordant male couples. Irrespective of couples' HIV-status, a higher proportion of couples had only one partner who reported using marijuana and/or EDM with sex outside the relationship

compared to those with both partners reported using. Furthermore, HIV-discordant couples had the highest rates of marijuana and/or EDM use with sex outside the relationship compared to the concordantly HIV-negative and HIV-positive male couples.

Discussion

A growing interest in developing prevention strategies for male couples has emerged over the past few years. A number of studies have examined gay male couples' relationship dynamics, testing patterns and behaviors related to HIV risk, and willingness to use newer modes of prevention (Campbell et al., 2014; Darbes, Chakravarty, Neilands, Beougher, & Hoff, 2014; Hoff, Chakravarty, Beougher, Neilands, & Darbes, 2012; Mitchell, 2014a; Mitchell, 2014b; Mitchell, Harvey, Champeau, & Seal, 2012; Mitchell & Petroll, 2012; Sullivan et al., 2014). Although much research has been conducted about MSM's use of substances with sex, this has not been the case for gay male couples. The present study is one of a few which provides new insights about gay male couples use of substances with sex within their relationship, and outside their relationship with casual MSM partners.

Findings from this analysis showcase that a variety of substances were used with sex among the couples, and those who used – either within the relationship and/or outside the relationship – varied according to the substance type. Among the substance-using male couples, similar proportions were noted for those with one or both partners who used EDM (11% vs. 9%) and party drugs (7% vs. 6%) with sex within the relationship. Further, a higher proportion of couples had both partners who used marijuana, amyl nitrates and alcohol with sex within the relationship compared to those who only have one partner who used. Differences of whether one or both partners used a specific type of substance with sex within their relationship may be attributed to individual, and couple-level preferences, as well as their access to the substance. For some couples, alcohol, marijuana, and amyl nitrates (poppers) may be easier to access than party drugs and EDM.

A consistent pattern of who used substances with sex outside the relationship was noted for this sample of couples. Among the couples who had one or both partners using substances with sex outside the relationship, a higher proportion of the couples had only one partner who used compared to those with both partners who used; this was true for each type of substance. This pattern may reflect the nuances of how sex with and without the use of substances may occur outside the couples' relationship. For instance, some couples who have an open relationship may include partners independently using substances with sex with casual MSM partners, and/or together as a couple for a threesome or group play. Other research has noted that gay male couples' form a variety of sexual and romantic relationships that range from monogamy to monogamish (couple only plays together with others) to completely sexually open (can have sex with others independently) (LaSala, 2004a; LaSala, 2004b; Parsons, Starks, Gamarel, & Grov, 2012; Mitchell, 2014a; Mitchell, Harvey, Champeau, Moskowitz, & Seal, 2012). Although this pattern may represent how partnered men who have sex outside their relationship may prefer to use substances with sex with casual MSM partners when their main partner is not present, it does not indicate the reasons and motivating factors as to why some partnered men use substances with sex outside their relationship. One possibility may pertain to their preference to have a different

type of sexual experience (e.g., being high while having sex – party n' play (PNP)) with casual sex partners than with their main partner (Ostrow & Stall, 2008). Another possibility includes the environment in which men meet and/or engage in sex with their casual partners. These environments (e.g., sex clubs, bathhouses, casual partners' residence) may encourage the use of substances before and/or while having sex as the substances could be easily accessible. Additional research is warranted to further explore these possibilities and the particular contexts which substance use occurs with sex outside of gay male couples' relationships.

With respect to HIV-status, prior research has reported that HIV-positive MSM were more likely to report using substances with sex compared to HIV-negative MSM (Kelly & Parsons, 2010; Kelly & Parsons, 2013; Pantalone et al., 2010; Ostrow & Stall, 2008). For this sample, concordantly positive gay male couples also reported significantly higher rates of using each type of substance with sex within the relationship, and marijuana and EDM use with sex outside the relationship, compared to concordantly negative and discordant gay male couples. Moreover, no consistent patterns were noted about the type of substance used with sex within the relationship by the couples' HIV status and whether one or both partners had used substances with sex within the relationship. This was not the case for substance use with sex that had occurred outside the relationship. Regardless of the couples' HIV status, a higher proportion of couples had only one partner who used substances with sex outside the relationship versus those who had both partners who used. Again, this pattern may be a reflection of the types of open relationships that gay male couples form and/or the comfort level that some partnered men may have about only using substances with sex outside of the relationship. Future research which examines partnered men's and gay male couples motivations for using substances with sex – or – not using substances with sex, particularly with casual MSM partners, would be beneficial for prevention as well as for how this usage impacts the couples' relationship and sexual behaviors overall.

The Theory of Interdependence (TI) provides a theoretical framework to understand and measure how partners of the couple interact, and influence their outcomes and behaviors within the context of a relationship. The TI suggests that behaviors among couples are interdependent because each relationship partner has a certain amount of control and influence on the outcome in the behavioral interaction that they have together (Kelley & Thibaut, 1978). This outcome depends on each member's option, value and assessment of the particular behavior and whether that behavior (e.g., substance use with sex, no substance use with sex) is important to their relationship (Rusbult & Van Lange, 2003). By using the TI, researchers could apply the Actor-Partner Interdependence Model (APIM) to quantitatively assess how partners interact, and influence their outcomes and behaviors in their relationship (Kenny, Kashy, & Cook, 2006). Taken into context of the findings from the present study, the TI could be used to guide future research for determining how much influence one partner has on the other regarding their use of substances with sex within and/or outside the relationship, and whether male couples establish any guidelines about their usage of substances with sex. Similarly, the TI could be applied to examine how much influence one partner has on the other regarding their non-use of substances with sex within and/or outside the couples' relationship. Some male couples may place a greater value in having sex without the use substances within their relationship, and only allow the use of

substances with sex to occur with casual MSM partners. Alternatively, couples may place a greater value in using substances with sex within their relationship, and not using substances with sex outside the relationship. Thus, the application of TI would be a useful theoretical framework to help guide future research to better understand the context and influencing factors of using or not using substances with sex among gay male couples.

This study does have limitations. The use of a cross-sectional study design with dyadic data from a convenience online sample precludes us from making casual inferences and generalizing our findings to all male couples living in the US, as well as those who do and do not have access to the Internet and/or use Facebook. Although identifying information was not collected, participation, social desirability, and recall biases may have influenced the men to inaccurately report information about their HIV status, engagement of UAI, and use of substances with sex. In addition, participants may have completed the survey with their main partners, despite the request for them to complete it independently and separately, and therefore potentially causing some bias. Couples' motivations for using substances, whether both partners within the couple were aware of each other's use of substances with sex within and/or outside of their relationship, and their possible use of nonmedical controlled medications such as prescription anti-anxiety, opioid, stimulant, and sleeping medications was not assessed in this survey. Future research that examines male couples' use of substances with sex should specifically address these limitations by conducting a mixed methods study with event-level measures with a more diverse sample regarding race and education who may be more inclined to use substances with sex. Despite these limitations, this study obtained dyadic data from a large sample of Internet-using male couples who reported their use of substances with sex within and outside of their relationship.

Findings from the present study provide new, yet important data about who uses, and the types of substances used with sex, within and outside of gay male couples' relatiosnhips. Further research is needed to determine how substance use with sex affects gay male couples' relationships, including but not limited to their relationship satisfaction, trust, communication patterns and other dynamics that have been identified in prior studies as being important to study for HIV prevention. Moreover, substance use with sex may also affect gay male couples' engagement in HIV prevention strategies, such as HIV/STI testing and adoption of pre-exposure prophylaxis among the HIV-negative partners and access and adherence to antiretroviral treatment(s) for the men and couples living with HIV. In summary, results of this study highlight the need to conduct further research to reveal how best to help prevent new HIV infections and substance abuse among gay male couples.

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Table 1

Gay male couples' use of substances with sex within and outside the relationship, by substance type

Substance use with sex within relationship (main partner)	**Neither partner**	**Only by one partner**	**By both partners**
Sample size: 361 dyads	% (N)	% (N)	% (N)
Alcohol	16.3 (59)	24.1 (87)	59.6 (215)
Marijuana	67.0 (242)	14.1 (51)	18.8 (68)
Amyl nitrates	83.1 (300)	5.8 (21)	11.1 (40)
EDM	79.5 (287)	11.4 (41)	9.1 (33)
Party drugs [a]	87.5 (316)	6.7 (24)	5.8 (21)
Substance use with sex outside relationship (outside partner(s))[b]	**Neither partner**	**Only by one partner**	**By both partners**
Sample size: 113 dyads	% (N)	% (N)	% (N)
Alcohol	40.7 (46)	35.4 (40)	23.9 (27)
Marijuana	69.0 (78)	22.1 (25)	8.9 (10)
Amyl nitrates	66.4 (75)	20.3 (23)	13.3 (15)
EDM	68.1 (77)	26.6 (30)	5.3 (6)
Party drugs [a]	89.4 (101)	6.2 (7)	4.4 (5)

Notes.

[a] Represents ecstasy, ketamine, GHB, cocaine and crystal methamphetamine

[b] Only includes couples with one or both partners who self-reported having had sex with a casual MSM partner outside of the relationship.

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Table 2

Differences in who used substances with sex within and outside the relationship, by male couples' HIV serostatus

	Concordantly negative			**Concordantly positive**			**Discordant**		
Substance use with sex within relationship	**Neither partner**	**Only by one partner**	**By both partners**	**Neither partner**	**Only by one partner**	**By both partners**	**Neither partner**	**Only by one partner**	**By both partners**
Sample size		**N=275 dyads**			**N=28 dyads**			**N=58 dyads**	
	% (N)	**% (N)**	**% (N)**	**% (N)**	**% (N)**	**% (N)**	**% (N)**	**% (N)**	**% (N)**
Alcohol **	91.3 (251)	2.9 (8)	5.8 (16)	64.3 (18)	25.0 (7)	10.7 (3)	81.0 (47)	15.5 (9)	3.5 (2)
Marijuana ***	69.8 (192)	14.5 (40)	15.6 (43)	35.7 (10)	0 (0)	64.3 (18)	69.0 (40)	19.0 (11)	12.0 (7)
Amyl nitrates ***	86.9 (239)	4.4 (12)	8.7 (24)	46.4 (13)	17.9 (5)	35.7 (10)	82.8 (48)	6.9 (4)	10.3 (6)
EDM ***	84.0 (231)	9.1 (25)	6.9 (19)	53.6 (15)	17.9 (5)	28.6 (8)	70.7 (41)	19.0 (11)	10.3 (6)
Party drugs[a] ***	91.3 (251)	2.9 (8)	5.8 (16)	64.3 (18)	25.0 (7)	10.7 (3)	81.0 (47)	15.5 (9)	3.5 (2)
Substance use with sex outside relationship[b]	Neither partner	Only by one partner	By both partners	Neither partner	Only by one partner	By both partners	Neither partner	Only by one partner	By both partners
Sample size		N=83 dyads			N=12 dyads			N=18 dyads	
	% (N)	**% (N)**	**% (N)**	**% (N)**	**% (N)**	**% (N)**	**% (N)**	**% (N)**	**% (N)**
Alcohol	41.0 (34)	32.5 (27)	26.5 (22)	25.0 (3)	50.0 (6)	25.0 (3)	50.0 (9)	38.9 (7)	11.1 (2)
Marijuana **	70.0 (58)	20.5 (17)	9.5 (8)	41.7 (5)	41.7 (5)	16.6 (2)	83.3 (15)	16.7 (3)	0 (0)
Amyl nitrates	67.5 (56)	18.1 (15)	14.4 (12)	50.0 (6)	41.7 (5)	8.3 (1)	72.2 (13)	16.7 (3)	11.1 (2)
EDM *	73.5 (61)	22.9 (19)	3.6 (3)	50.0 (6)	33.4 (4)	16.6 (2)	55.6 (10)	38.9 (7)	5.5 (1)
Party drugs [a]	89.2 (74)	6.0 (5)	4.8 (4)	91.7 (11)	0 (0)	8.3 (1)	88.9 (16)	11.1 (2)	0 (0)

Notes.

[a]Represents ecstasy, ketamine, GHB, cocaine and crystal methamphetamine

[b]Only includes couples with one or both partners who self-reported having had sex with a casual MSM partner outside of the relationship.

*P < .05,

** P < .01,
*** P < .001