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Sexualised Drug Use among Sexual Minority Young Adults in the United States: The P18 Cohort Study

Annie Ristuccia^a, Caleb LoSchiavo^{a,b}, Perry N. Halkitis^{a,b,c,d,e,*}, and Farzana Kapadia^{a,f,g}

^aCenter for Health, Identity, Behavior and Prevention Studies, 665 Broadway #800, New York, NY 10012, USA

^bDepartment of Biostatistics and Social and Behavioral Sciences, School of Public Health, Rutgers University, 684 Hoes Lane West, Piscataway, NJ 08854 USA

^cGraduate School of Applied and Professional Psychology, Rutgers University, 152 Frelinghuysen Rd, Piscataway Township, NJ 08854

^dRobert Wood Johnson School of Medicine, Rutgers University, 675 Hoes Lane West, Piscataway Township, NJ 08854

^eSchool of Public Affairs and Administration, Rutgers University, 111 Washington Street, Newark, NJ 07102

^fDepartment of Epidemiology, College of Global Public Health, New York University, 715 Broadway, New York, NY 10003, USA

^gDepartment of Population Health, School of Medicine, New York University, 227 East 30th Street, New York, NY 10016, USA

Abstract

Background—Substance use and condomless sexual behaviours are both well studied in sexual minority men, but few researchers have used event-level data collection to examine sexualised drug use in sexual and gender minority young adults. The aim of this study is to describe the co-occurrence of sex under the influence of substances and condomless sexual behaviours, using nuanced event-level data, in a racially/ethnically and socioeconomically diverse sample in New York City.

Methods—Data from one wave of a cohort of sexual and gender minority young adults who were assigned male at birth ($n = 500$) were used to characterise co-occurrence of sex under the influence of drugs and condomless sexual behaviours (oral receptive, anal insertive, and anal receptive sex), in the last 30 days. Logistic regression models were constructed to assess associations between sex while high and condomless sexual behaviours, controlling for sociodemographic factors.

*Corresponding author: Perry N. Halkitis; perry.halkitis@rutgers.edu; School of Public Health, Rutgers University, 683 Hoes Lane West, Piscataway, NJ 08854; +1(732)-253-9700.

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Results—Preliminary analyses indicated significant associations between engaging in sex while high and condomless sexual behaviours. In unadjusted regression models, sexualised and non-sexualised drug use were both significantly associated with increased odds of condomless sexual behaviours. In adjusted models, sexualised drug use remained significantly associated with condomless anal insertive sex (AOR =3.57) and condomless anal receptive sex (AOR = 4.98). Having multiple sexual partners was also significantly associated with greater odds of condomless sexual activity in all three adjusted models.

Conclusion—Multivariable analyses indicated that engaging in sex while high on any drug was associated with increased condomless sexual behaviour, but that sexualised drug use was associated with particularly elevated condomless anal sex. These findings provide insight for understanding the co-occurrence of substance use and condomless sex, and suggest a need for HIV/STI risk reduction strategies that address the role of sexualised drug use.

Keywords

sexualised drug use; sex under the influence of drugs; condomless sexual behaviour; YMSM; sexual minority; young adults

Introduction

Sexual minority men (SMM) refers to those individuals whose sexual identities or behaviors differ from cultural norms, including gay, bisexual, or otherwise non-heterosexual identities, and heterosexual men who have sex with men. The extant literature indicates that young sexual minority men (YSMM) engage in higher rates of substance use compared to their heterosexual peers (Marshal, Friedman, Stall, & Thompson, 2009; Marshal et al., 2008). Studies have found an association between substance use and condomless sexual behaviours in this population, which is important because SMM are at an increased risk of contracting HIV and other sexually transmitted infections (STIs; Halkitis et al., 2011; Koblin et al., 2006; Mustanski, Newcomb, Bois, Garcia, & Grov, 2011; Parsons, Lelutiu-Weinberger, Botsko, & Golub, 2013; Valleroy et al., 2000). Gaining a better understanding of the relationship between sexual behaviour and substance use in YSMM may help to identify factors that may be associated with this increased HIV and STI risk.

The phenomenon of engaging in sexual encounters under the influence of drugs, sometimes referred to as “chemsex” or “party and play (PnP)” often involves encounters with multiple partners that can last for several hours or days (McCall, 2015; Race, 2015). Among SMM in New York City, drugs associated with these types of sexual activity are most commonly methamphetamine, MDMA (ecstasy), gamma-Hydroxybutyric acid (GHB), ketamine, and cocaine (Bolding, Hart, Sherr, & Elford, 2006; Colfax et al., 2001; Halkitis, Palamar, & Mukherjee, 2007; Lee, Galanter, Dermatis, & McDowell, 2004; Nanin & Parsons, 2006; Palamar et al., 2014; Ross, Mattison, & Franklin, 2003).

The European Men-who-have-sex-with-men Internet Survey (EMIS), which surveyed 174,209 men from 38 European countries, found that the prevalence of sexualised drug use in the last 4 weeks ranged from 0.4% in Sofia, Bulgaria to 16.3% in Brighton, UK (Schmidt et al., 2016). While prevalence of sexualised drug use varies by location, multiple studies

have found an association with HIV/STI risk behaviours, including a greater number of partners and longer duration of sexual encounters, as well as increased odds of having had more than six sex partners in the past three months, having more than 21 alcoholic drinks per week, sharing sex toys, fisting, having transactional sex, intentionally engaging in condomless anal sex (“bareback”), and injecting drugs (Bourne, Reid, Hickson, Torres-Rueda, & Weatherburn, 2015; Hegazi et al., 2017; Stuart, 2013). Despite the risks associated with sex under the influence of substances, men who engage in sexualised drug use are more likely to access post-exposure prophylaxis (PEP) and many adhere to personal rules about using condoms with partners of a serodiscordant or unknown HIV status (Hegazi et al, 2017; Bourne, Reid, Hickson, Torres-Rueda, & Weatherburn, 2014).

Previous research on sexualised drug use among SMM in New York City found that users tend to be in their early-to-mid 30s (Halkitis, Green, & Mourgues, 2005; Halkitis et al., 2007; Lee et al., 2004). There is limited research on these behaviours in young and emerging adult sexual minority men, particularly those who are members of a new generation for whom HIV and other health challenges may differ from those of previous generations (Halkitis et al., 2017). Moreover, recent research on drug use and sexual behaviour emphasises the importance of using event-level methodologies to provide a more accurate and nuanced understanding of how these behaviours co-occur; this can then provide a greater understanding of how sexual behaviour and drug use manifest among sexual minority youth (Vosburgh, Mansergh, Sullivan, & Purcell, 2012; Weinhardt & Carey, 2000).

While there is a wealth of literature on drug use and sexual behaviours in YSMM, to the best of our knowledge, few explore factors associated with the co-occurrence of having sex under the influence of substances using event-level data collection, particularly among adolescents and emerging adults. Similarly few studies exist on the relationship between substance use and sexual behaviours in gender minority populations (Herbst et al., 2008). The aims of this study are: (1) to describe the prevalence of substance use and sexual behaviours in a racially/ethnically and socioeconomically diverse sample of sexual and gender minority young adults in New York City; (2) to describe the co-occurrence of substance use and sexual behaviours in our population; (3) to examine the extent to which engaging in sex under the influence of drugs is associated with condomless sexual behaviours, and whether this relationship differs by sociodemographic characteristics.

Methods

Data for the present cross-sectional analysis are derived from the Project 18 (P18) cohort study, an ongoing prospective study examining syndemic development in a sample of young sexual minority men and gender minority adults in New York City (Halkitis et al., 2013; Halkitis et al., 2017). Briefly, recruitment was conducted between March 2014 and March 2016 using active (i.e., recruitment at pride events, bars and clubs, public parks) and passive approaches (i.e., online recruitment, etc.). In order to be eligible for this study, potential participants had to meet the following criteria at baseline: being between 22 – 23 years old; being assigned male at birth; self-reporting an HIV negative serostatus; and self-reporting sexual contact with a male partner during the prior six months.

A total of $n = 665$ participants met these eligibility criteria and were enrolled into the study at baseline. Data for this analysis were collected during the 12-month assessment, which occurred between June 2015 and March 2017. Of the $n = 665$ participants who were enrolled into the P18 cohort study, $n = 500$ completed the 12-month follow-up visit (75.2% of those enrolled). Chi-square tests were conducted to compare key sociodemographic characteristics and indicated no statistically significant differences between the baseline and 12-month samples. The 12-month assessment was selected because items on being high or intoxicated during a sexual encounter were first added at this time point.

At each study visit, participants completed an Audio Computer-Assisted Self-Interview (ACASI), as well as a Timeline Follow Back (TLFB) to provide information on recent substance use and sexual behaviours. The TLFB is a calendar-based, semi-structured interview used to ascertain information on event-level behavioural data during the 30-day period preceding assessment (Sobell & Sobell, 1992). First, participants are presented with a calendar of the past 30 days and asked to provide ‘anchordates’ or dates of important events that occurred during those past 30 days (i.e., holidays, birthdays, paydays, exams, vacations, etc.). These dates were noted on the calendar and serve as markers to assist in recalling the events of the previous 30 days as well as to recall days during which individuals engaged in sexual and substance use behaviours. Finally, an AlereDetermine™ rapid HIV-1/2 Ag/Ab combination test was conducted to confirm HIV serostatus. All P18 study activities were approved by the New York University Institutional Review Board.

Measures

Sociodemographic characteristics—Participants provided information on their race/ethnicity, foreign born status, gender identity, sexual orientation, total annual income, and education status. Race/ethnicity was categorised as Hispanic/Latino, Black non-Hispanic, White non-Hispanic, and other non-Hispanic (which included individuals identifying as Asian or Pacific Islander, American Indian or Native American, other, or mixed race). Foreign-born status is based on whether participants were born in the United States or outside of the United States. Gender identity was ascertained by asking participants whether they identified as male, female, trans female, genderqueer, or with no gender; responses were dichotomised as male versus not male due to the small sample size of those who identified as not male. Sexual orientation was measured using the Kinsey scale with responses ranging from not exclusively heterosexual [0] to exclusively homosexual [6] (Kinsey, Pomeroy, & Martin, 1948). Consistent with previous studies, these responses were dichotomised as exclusively homosexual versus not exclusively homosexual (Haslam, 1997). Participants also reported their total annual income and responses were categorised as less than \$5,000, \$5,000 to \$25,000, and more than \$25,000. Finally, educational achievement was categorised as high school or less, associate’s degree, and bachelor’s or graduate degree.

Substance use—As part of the TLFB, participants were asked to report use of any of the following licit and illicit substances on each day of the 30-day period prior to assessment: alcohol not to intoxication, alcohol to intoxication (where participants were asked to select only one of these responses for a given day that they consumed alcohol), cocaine, crack, ecstasy, GHB, opiates (i.e., heroin, opium, morphine), ketamine, marijuana,

methamphetamine, inhalant nitrates (poppers), inhalants (other than poppers), hallucinogens, erectile enhancers (i.e., Cialis, Levitra, Viagra), and non-prescribed pharmaceuticals such as pain killers (i.e., Percocet, Oxy, Vicodin, Codeine), Rohypnol, stimulants (i.e., Adderall, Ritalin, Concerta), anxiolytics (i.e., Valium, Xanax, Klonopin), sleeping pills (i.e., Ambien, Lunesta), and cough medicine. Consistent with previous studies of sexualised drug use in the United States, we considered sexualised drugs to include methamphetamine, ecstasy, cocaine, ketamine, and GHB (Bolding et al., 2006; Bracchi et al., 2015; Halkitis et al., 2007). Erectile enhancers were excluded due to the low sample ($n = 1$) of participants reporting their use.

Sexual behaviour—Using the TLFB, participants reported the days on which they engaged in oral sex, vaginal sex, anal sex, whether or not a condom or other barrier (i.e., dental dam) was used and whether the activity was insertive, receptive, or both. Next, participants who reported use of alcohol to intoxication or of any other illicit substances on the same day that they reported engaging in sexual activity were asked if they were high or intoxicated on any substance during any sex acts reported on that day. Using these event-level data from the TLFB, we created three sex-drug use groups for our analyses: “no sex while high,” “sex while high on non-sexualised drugs,” and “sex while high on sexualised drugs.” Analyses presented here will examine associations between sex while high for the following sexual activities: condomless oral receptive sex, condomless anal insertive sex, and condomless anal receptive sex; vaginal sex was excluded from analyses due to a small sample of reported incidents. These variables were handled as both count and dichotomous variables in our analyses. Finally, for all sexual behaviour reported using the TLFB, participants were asked to identify whether each sex act occurred with the same partner or different partners. Participants were also asked to report demographic characteristics of their sexual partners (age, gender, race/ethnicity, and HIV serostatus) and partners were denoted with different letters in order to ascertain the total number of distinct sexual partners during the 30-day period. For these analyses, having multiple sexual partners was included as a continuous variable for participants who indicated being sexually active with more than one partner during this timeframe.

Analytic plan

Exploratory analyses were first conducted to examine overall distributions of substance use, sex while high and types of sexual activity in this sample of young sexual and gender minority adults. Next, we examined associations between sexual activity while high on specific types of drugs (any sex while high on sexualised drugs, and sex while high on non-sexualised drugs) by type of sexual activity—condomless oral receptive sex, condomless anal insertive sex, and condomless anal receptive sex. Associations between sexual activity while high and total acts of condomless sexual behaviours were evaluated using the non-parametric Kruskal-Wallis test. The three condomless sexual behaviours were then dichotomised to examine associations with sexual activity while high, having multiple sexual partners, and sociodemographic characteristics using Pearson's chi-square tests and one-way ANOVA, as appropriate. Three distinct two-step binary logistic regression models were then constructed for condomless oral receptive sex, condomless anal insertive sex, and condomless anal receptive sex. Variables were organised into two blocks; the first block

included sociodemographic characteristics found to be statistically significant in bivariate analyses. The second block included category of sex while high and having multiple sexual partners in the last 30 days.

Results

The mean age of the sample at the 12-month follow-up was 23.50 years old ($SD = 0.61$). With respect to race/ethnicity, 31.4% ($n = 157$) of participants identified as Hispanic/Latino, 27.6% ($n = 138$) identified as Black non-Hispanic, 25.4% ($n = 127$) identified as White non-Hispanic, and 15.6% ($n = 78$) identified as other non-Hispanic race/ethnicity (Table 1). The majority of participants were born in the United States (85.2%, $n = 425$), identified as male (91.9%, $n = 455$), and were HIV-negative (92.8%, $n = 461$) based on HIV-antibody testing as part of this study. Slightly less than half of the sample (46.0%, $n = 227$) identified as exclusively homosexual. In terms of individual, annual income, 21.0% ($n = 99$) of participants reported earning <\$5,000, 42.2% ($n = 199$) reported an income level between \$5,000 - \$25,000, and 36.9% ($n = 174$) reported an income level >\$25,000. Approximately half of the sample (48.2%, $n = 240$) completed a bachelor's or graduate degree, 12.9% ($n = 64$) had an associate's degree, and 39.0% ($n = 194$) had a high school diploma.

Substance Use

The most commonly used substances in the 30 days prior to assessment were as follows, in order of magnitude: alcohol to intoxication (84.4%, $n = 422$), alcohol not to intoxication (70.4%, $n = 352$), marijuana (53.4%, $n = 267$), and inhalant nitrates (16.2%, $n = 81$), which were all categorised as non-sexualised drugs for the purposes of this analysis (Table 2). A total of 62.2% ($n = 311$) reported use of only non-sexualised drugs, 19.6% ($n = 98$) participants reported use of sexualised drugs, and 18.2% ($n = 18.2$) reported no substance use in the last 30 days. Of the 19.6% ($n = 98$) participants who used sexualised drugs, polysubstance use with both sexualised and non-sexualised drugs was common. With respect to frequency of sexualised drug use in the last 30 days, 11.8% ($n = 59$) of participants reported cocaine use, 7.0% ($n = 35$) ecstasy use, 3.0% ($n = 15$) methamphetamine use, 3.0% ($n = 15$) ketamine use, and 2.2% ($n = 11$) reported GHB use. Among those who reported sexualised drug use during this timeframe, the mean days of use was highest for methamphetamine users ($M = 4.40$, $SD = 4.48$), followed by GHB users ($M = 3.00$, $SD = 3.32$), ketamine users ($M = 2.53$, $SD = 4.07$), cocaine users ($M = 2.08$, $SD = 1.92$), and ecstasy users ($M = 1.66$, $SD = 0.87$).

Sexual Behaviours

Overall, 74.2% ($n = 371$) of participants reported engaging in condomless oral receptive sex during the 30 days preceding study visit, 29.8% ($n = 149$) reported engaging in condomless anal insertive sex and 29.4% ($n = 147$) reported engaging in condomless anal receptive sex (Table 2). Participants reported $M = 4.86$ ($SD = 4.93$) acts of condomless oral receptive sex, $M = 3.81$ ($SD = 4.15$) acts of condomless anal insertive sex, and $M = 3.94$ ($SD = 4.09$) acts of condomless anal receptive sex. Half of the sample reported having more than one sexual partner in the last 30 days, with a mean of $n = 4.20$ sexual partners ($SD = 3.18$). Less than half of participants (45.0%, $n = 224$) reported engaging in sexual activity while under the

influence of any drug at least once in the last 30 days ($M = 1.45$, $SD = 2.79$). Of the overall sample, 9.6% ($n = 48$) reported engaging in sex while high on sexualised drugs ($M = 2.29$, $SD = 2.24$), and 35.4% ($n = 177$) reported sex while high on non-sexualised drugs ($M = 1.23$, $SD = 2.48$).

Associations between Substance Use and Sexual Behaviours

Kruskal-Wallis tests revealed statistically significant differences in the frequency of sexual acts between the three categories of sex while high for condomless oral receptive sex ($\chi^2(2) = 77.49$; $p < 0.001$), condomless anal insertive sex ($\chi^2(2) = 37.67$; $p < 0.001$), and condomless anal receptive sex ($\chi^2(2) = 41.49$; $p < 0.001$). Mean rank scores for condomless oral receptive sex were highest for participants who had sex while high on sexualised drugs (356.13), compared to sex while high on non-sexualised drugs (297.42) and no sex while under the influence of any drugs (201.87). For condomless anal insertive and receptive sex, mean rank scores were similarly highest for participants who had sex while high on sexualised drugs (insertive: 314.68; receptive: 339.93), followed by sex while high on non-sexualised drugs (insertive: 275.50; receptive: 262.59), and those who did not have any sex while high (insertive: 223.21; receptive: 227.11).

The associations between substance use and condomless sex were also supported using dichotomised versions of the sex variables for all three sexual behaviours, condomless oral receptive sex ($\chi^2(2) = 51.86$, $p < 0.001$), condomless anal insertive sex ($\chi^2(2) = 34.96$, $p < 0.001$), and condomless anal receptive sex ($\chi^2(2) = 35.77$, $p < 0.001$), with more individuals who reported sexualised drug use engaging in each of the condomless sexual behaviours compared to those who were high on non-sexualised drugs or those who did not report any sex while high in the last 30 days (Table 1). Sex while high on either sexualised drugs or non-sexualised drugs was also significantly associated with having multiple sexual partners in the last 30 days ($F = 47.85$, $p < 0.001$), with a mean of 5.50 partners ($SD = 4.87$) for participants who reported having sex while high on sexualised drugs, compared to $M = 2.91$ partners ($SD = 2.23$) for those who had sex while high on non-sexualised drugs, and $M = 1.65$ partners ($SD = 2.29$) for those who reported no sex while under the influence of drugs.

Associations between Substance Use, Sexual Behaviours, and Sociodemographic Characteristics

Bivariable analyses indicated that there were no significant sociodemographic differences between the three categories of sex while high. However, there were statistically significant associations between sociodemographic characteristics and condomless sexual behaviours (Table 3). Condomless oral receptive sex in the last 30 days was associated with race/ethnicity ($\chi^2(3) = 25.33$; $p < 0.001$), foreign born status ($\chi^2(1) = 5.47$; $p = 0.019$), sexual orientation ($\chi^2(1) = 6.65$; $p = 0.010$), HIV status ($\chi^2(1) = 7.09$; $p = 0.008$), total annual income ($\chi^2(2) = 8.15$; $p = 0.017$), and education status ($\chi^2(2) = 12.35$; $p = 0.002$). Race/ethnicity was significantly associated with condomless anal receptive sex in the last 30 days ($\chi^2(3) = 9.09$; $p = 0.028$), with a greater proportion of individuals identifying as Hispanic/Latino and White non-Hispanic reporting condomless anal sex than those identifying as Black or other non-Hispanic. No sociodemographic characteristics were significantly associated with condomless anal insertive sex.

Logistic Regression Modelling

In separate unadjusted logistic regression models, individuals who reported having sex while high on sexualised drugs had significantly greater odds of reporting condomless oral receptive sex, condomless anal insertive sex, and condomless anal receptive sex compared to those who did not have sex while under the influence of any drugs in the last 30 days (Table 4). Individuals who had sex while high on non-sexualised drugs also had significantly greater odds of condomless oral receptive sex, condomless anal insertive sex, and condomless anal receptive sex compared to those who did not report any sex while high. Additionally, when unadjusted models were constructed with the reference group being sex while high on sexualised drugs, individuals who reported no sex while high on any drug had significantly decreased odds of engaging in condomless oral receptive sex, condomless anal insertive sex, and condomless anal receptive sex. Individuals who reported having sex while high on non-sexualised drugs had significantly lower odds of condomless anal receptive sex when compared to those who had sex while high on sexualised drugs.

Finally, three multivariable logistic regression models were constructed to examine the relationship between engaging in sexual activity while high and condomless sexual behaviours, controlling for sociodemographic characteristics (Table 5). In adjusted models, having sex while high on sexualised drugs was significantly associated with increased odds of condomless anal insertive sex (AOR = 3.57, 95% CI: 1.68, 7.56) and condomless anal receptive sex (AOR = 4.98, 95% CI: 2.35, 10.57) compared to participants who did not have sex while high on any substance. Similarly, engaging in sex while high on non-sexualised drugs was significantly associated with greater odds of condomless sex in all three models (condomless oral receptive sex: AOR = 4.05, 95% CI: 2.10, 7.81; condomless anal insertive sex: AOR = 2.71, 95% CI: 1.69, 4.34; condomless anal receptive sex: AOR = 2.13, 95% CI: 1.33, 3.41) compared to those who reported no sex while high. Having multiple sexual partners was also significantly associated with greater odds of condomless oral receptive sex (AOR = 1.80, 95% CI: 1.44, 2.26), condomless anal insertive sex (AOR = 1.14, 95% CI: 1.05, 1.19), and condomless anal receptive sex (AOR = 1.10, 95% CI: 1.02, 1.19). Race/ethnicity and sexual orientation were significantly associated with condomless oral receptive sex, with lower odds for participants identifying as Black non-Hispanic compared to those identifying as White non-Hispanic, and lower odds among participants identifying as not exclusively homosexual. There were no sociodemographic characteristics that were statistically significant in adjusted regression models for condomless anal insertive or receptive sex.

Discussion

The findings of this study indicate that engaging in sexual activity under the influence of drugs was evident in this sample of young sexual and gender minority adults. Approximately 10% of participants reported sex while high on sexualised drugs, indicating that this phenomenon is evident although not highly prevalent in this sample, compared to the 35.4% who reported condomless sex while using non-sexualised drugs, such as alcohol or marijuana. The most commonly used substances in the last 30 days were alcohol to intoxication, marijuana, poppers, cocaine, and ecstasy. This is noteworthy, as it adheres to

previous findings which demonstrate that sexualised drug use emerges as sexual minority men age and are not necessarily evident during adolescence or emerging adulthood. Our findings are consistent with previous research suggesting that YSM use these substances (e.g. alcohol, marijuana, poppers) more frequently than other illicit drugs, particularly compared to methamphetamine use, which tends to increase among SMM between the ages of 30 and 40 (Halkitis et al., 2005; Halkitis et al., 2007; Hegazi et al., 2017; Lee et al., 2004; Newcomb et al., 2014; Starks, Millar, Lassiter, & Parsons, 2017; Thiede et al., 2003).

The results of multivariable modelling indicated that engaging in sex while under the influence of any drugs was significantly associated with greater odds of condomless oral receptive sex, condomless anal insertive sex, and condomless anal receptive sex compared to individuals who did not have sex under the influence of any substances. Furthermore, there were greater odds of condomless sex while high on sexualised drugs than engaging in sex while high on non-sexualised drugs, which is consistent with previous research indicating that sexualised drugs may provide a disinhibiting effect (Palamar, Kiang, Storholm, & Halkitis, 2014; Weatherburn, Hickson, Reid, Torres-Rueda, & Bourne, 2017). These findings point to the role of sex under the influence of any substances in exacerbating condomless sex, and in turn the potential transmission of HIV and other STIs in this population. Still, we must note that condomless sex is not synonymous with HIV risk in the era of biomedical advances like pre-exposure prophylaxis (PrEP) and treatment as prevention (TasP), and further studies are needed to explore these prevention methods in the context of sexualised drug use (Attia, Egger, Muller, Zwahlen, & Low, 2009; Cohen et al., 2011; Grant et al., 2014; Rodger et al., 2016; Okwundu, Uthman, & Okoromah, 2012).

We also note that while relationships exist between drug use and condomless sex, the direction or drivers of these associations are unclear. Paradigms such as the Cognitive Escape Model (McKirnan, Ostrow & Hope, 1996) would suggest that substances are used as a form of escapism and thus engender sexual risk. However, it is unclear whether the desire for a certain type of sex instead acts a driver for the use of drugs, particularly those associated with chemsex or party-and-play. It has been argued that this may be the more likely pattern for SMM who are confronted with the expectations of a gay community that demands conformity to masculine ideals and physical perfection (Brennan, Craig, & Thompson, 2012; Halkitis, 2009, 2013; Hamilton & Mahalik, 2009; Kimmel & Mahalik, 2005; Sanchez, Greenberg, Liu, & Vilain, 2009). As further evidence shows, SMM are more likely to partake in extreme sex while under the influence of methamphetamine (Halkitis, Shrem, & Martin, 2005). As has been previously noted, the use of methamphetamine does not always precede seroconversion and in fact may be initiated after seroconversion to manage feelings associated with being HIV-positive (Halkitis et al., 2014; Halkitis, Levy & Solomon, 2016).

There are some key limitations that must be noted. Due to the low prevalence of sex while high on sexualised drugs in this sample, participants reporting any sex while high on cocaine, ecstasy, methamphetamine, ketamine, and GHB were collapsed into one category, which did not permit multivariable analyses to identify differences in associations between individual drugs and condomless sexual behaviours. Also, data were not collected regarding motivations influencing sexualised drug use, which may help to contextualise factors that

impact why participants used certain drugs during sex and decision-making around condom use. Additionally, this cross-sectional analysis cannot indicate the extent to which sex while high predicts condomless sexual behaviour, although these findings may provide a preliminary basis for future studies to assess longitudinal trends of substance use during sex in this cohort. Despite these limitations, the use of robust measures and event-level data to assess the co-occurrence of recent sexualised drug use and condomless sexual activity provide ample support for the conclusions that we draw. Another notable strength of this study is the use of the TLFB, which is a previously validated measure that was used to reduce recall bias in reporting all substance use and sexual behaviours for each day over the previous 30 days. Finally, the findings of this analysis are representative of a racially/ethnically and socioeconomically diverse sample of young sexual minority men and gender minority adults living in the New York City metropolitan area.

Since the onset of the AIDS epidemic in the United States, much attention has been focused on the relations between substance use and sexual risk taking in sexual minority men (Halkitis et al., 2011). This work has demonstrated the high level of association between non-injection drug use and condomless sexual behaviour in the population of sexual minority young adults, which has been linked to the ongoing prevalence of HIV within the population. These findings building on some three decades of work that has shown similar patterns in previous generations of gay and bisexual men. And while such findings are ample and robust, few interventions have truly focused on managing the synergistic interplay between substance use and sexual risk behaviour (Halkitis, Wolitski, & Millet, 2013).

Despite our attention to the role of sexualised drugs such as methamphetamine, in relation to HIV, few have sought to understand the extrinsic drivers of substance use for sexual minority men (Halkitis, Levy, Moreira, & Ferrusi, 2014). Thus the question is not what drugs do sexual minority men use, but why the use of drugs occurs at such high rates. Moreover, we must acknowledge that various aspects of gay culture often model and idealise sexualised drug use, creating a challenge for efforts to curtail these public health concerns. Disentangling the role that social conditions (both within the gay community and within society at large) play in driving drug use will be key in tackling this ongoing health challenge. To do so, we must adopt a holistic framework for the care of sexual minority men—one that focuses on the multiple drivers of health states and one that recognises that health conditions such as substance use and HIV do not occur in isolation, but rather fuel and exacerbate each other (Halkitis, Wolitski & Millett, 2013).

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Table 1

Bivariable associations between sociodemographic characteristics and category of sex while high in the last 30 days (n = 500).

	n(%)	No sex while high (n = 275)	Sex while high, non-sexualised drugs (n = 177)	Sex while high, sexualised drugs (n = 48)	p value
Race/ethnicity					0.443
Hispanic/Latino	157 (31.4)	82 (29.8)	59 (33.3)	16 (33.3)	
Black Non-Hispanic	138 (27.6)	83 (30.2)	47 (26.6)	8 (16.7)	
White Non-Hispanic	127 (25.4)	65 (23.6)	48 (27.1)	14 (29.9)	
Other Non-Hispanic	78 (15.6)	45 (16.4)	23 (13.0)	10 (20.8)	
Country of origin					0.112
Born in the United States	425 (85.2)	241 (88.0)	143 (80.8)	41 (85.4)	
Not born in the United States	74 (14.8)	33 (12.0)	34 (19.2)	7 (14.6)	
Gender					0.209
Male	455 (91.9)	251 (93.0)	163 (92.1)	41 (85.4)	
Not male	40 (8.1)	19 (7.0)	14 (7.9)	7 (14.6)	
Sexual orientation					0.057
Exclusively homosexual	227 (46.0)	137 (50.9)	70 (39.8)	20 (41.7)	
Not exclusively homosexual	266 (54.0)	132 (49.1)	106 (60.2)	28 (58.3)	
HIV status					0.385
Negative	461 (92.8)	250 (91.6)	168 (94.9)	43 (91.5)	
Positive	36 (7.2)	23 (8.4)	9 (5.1)	4 (8.5)	
Total annual income					0.090
Less than \$5,000	99 (21.0)	63 (24.8)	27 (15.7)	9 (19.6)	
Between \$5,000 and \$25,000	199 (42.2)	110 (43.3)	71 (41.3)	18 (39.1)	
More than \$25,000	174 (36.9)	81 (31.9)	74 (43.0)	19 (41.3)	
Education status					0.496
High school or less	194 (39.0)	109 (39.9)	62 (35.0)	23 (47.9)	
Associate's degree	64 (12.9)	37 (13.6)	22 (12.4)	5 (10.4)	
Bachelor's or graduate degree	240 (48.2)	127 (46.5)	93 (52.5)	20 (41.7)	
Condomless oral receptive sex					< 0.001
Yes	371 (74.2)	169 (61.5)	159 (89.8)	43 (89.6)	
No	129 (25.8)	106 (38.5)	18 (10.2)	5 (10.4)	

	<i>n</i> (%)	No sex while high (<i>n</i> = 275)	Sex while high, non-sexualised drugs (<i>n</i> = 177)	Sex while high, sexualised drugs (<i>n</i> = 48)	<i>p</i> value
Condomless anal insertive sex					
Yes	149 (29.8)	53 (19.3)	71 (40.1)	25 (52.1)	< 0.001
No	351 (70.2)	222 (80.7)	106 (59.9)	23 (47.9)	
Condomless anal receptive sex					
Yes	147 (29.4)	56 (20.4)	62 (35.0)	29 (60.4)	< 0.001
No	353 (70.6)	219 (79.6)	115 (65.0)	19 (39.6)	
Multiple sexual partners ^a	250 (50.0)	1.65 (2.29)	2.91 (2.23)	5.50 (4.87)	< 0.001

Note.

^aDescriptive statistics reported as mean (standard deviation).

Table 2Descriptive statistics for all substance use and sexual behaviours in the last 30 days ($n = 500$).

	<i>n</i> (%) reporting any use	<i>M</i> (<i>SD</i>) days of use	<i>Min</i> , <i>Max</i> days of use
Sexualised drugs			
Cocaine	59 (11.8)	2.08 (1.92)	1, 10
Ecstasy	35 (7.0)	1.66 (0.87)	1, 4
Methamphetamine	15 (3.0)	4.40 (4.48)	1, 13
Ketamine	15 (3.0)	2.53 (4.07)	1, 17
GHB	11 (2.2)	3.00 (3.32)	1, 9
Non-sexualised drugs			
Alcohol	352 (70.4)	5.21 (4.73)	1, 30
Alcohol to intoxication	422 (84.4)	4.51 (3.98)	1, 30
Marijuana	267 (53.4)	14.78 (11.86)	1, 30
Poppers	81 (16.2)	3.17 (3.25)	1, 17
Pain killers	20 (4.0)	1.40 (0.82)	1, 4
Hallucinogens	17 (3.4)	1.71 (1.10)	1, 4
Stimulants	11 (2.2)	3.27 (3.50)	1, 13
Anxiolytics	10 (2.0)	2.00 (1.49)	1, 5
Cough Medicine	3 (0.6)	10.33 (16.17)	1, 29
Crack	2 (0.4)	4.50 (4.95)	1, 8
Opiates	2 (0.4)	4.50 (4.95)	1, 8
Inhalants	1 (0.2)	-	-
Viagra	1 (0.2)	-	-
Cialis	0 (0.0)	-	-
Levitra	0 (0.0)	-	-
Sleeping pills	0 (0.0)	-	-
Rohypnol	0 (0.0)	-	-
	<i>n</i> (%) reporting any engagement in behaviour	<i>M</i> (<i>SD</i>) sex acts	<i>Min</i> , <i>Max</i> sex acts
Sexual behaviour			
Condomless oral receptive sex	371 (74.2)	4.86 (4.93)	1, 32
Condomless anal insertive sex	149 (29.8)	3.81 (4.15)	1, 27
Condomless anal receptive sex	147 (29.4)	3.94 (4.09)	1, 24
Multiple partners	250 (50.0)	4.20 (3.18)	2, 23
No sex while high	275 (55.0)	-	-
Sex while high, any drug	225 (45.0)	1.45 (2.79)	1, 27
Sex while high, sexualised drugs	48 (9.6)	2.29 (2.24)	1, 14
Sex while high, non-sexualised drugs	177 (35.4)	1.23 (2.48)	1, 26

Table 3

Bivariable associations between sociodemographic characteristics and dichotomised condomless sexual behaviours in the last 30 days ($n = 500$).

	Yes ($n = 149$)	No ($n = 149$)	Yes ($n = 149$)	No ($n = 351$)	Yes ($n = 147$)	No ($n = 353$)	p value
Race/ethnicity							0.028
Hispanic/Latino	121 (32.6)	36 (27.9)	58 (38.9)	99 (28.2)	54 (36.7)	103 (29.2)	0.133
Black Non-Hispanic	81 (21.8)	57 (44.2)	36 (24.2)	102 (29.1)	27 (18.4)	111 (31.4)	
White Non-Hispanic	104 (28.0)	23 (17.8)	34 (22.8)	93 (26.5)	41 (27.9)	86 (24.4)	
Other Non-Hispanic	65 (17.5)	13 (10.1)	21 (14.1)	57 (16.2)	25 (17.0)	53 (15.0)	
Country of origin							0.543
Born in the United States	307 (83.0)	118 (91.5)	125 (84.5)	300 (85.5)	123 (83.7)	302 (85.8)	
Not born in the United States	63 (17.0)	11 (8.5)	23 (15.5)	51 (14.5)	24 (16.3)	50 (14.2)	
Gender							0.942
Male	335 (91.3)	120 (93.8)	139 (93.3)	316 (91.3)	134 (91.8)	321 (92.0)	
Not male	32 (8.7)	8 (6.3)	10 (6.7)	30 (8.7)	12 (8.2)	28 (8.0)	
Sexual orientation							0.082
Exclusively homosexual	181 (49.5)	46 (36.2)	60 (40.3)	167 (48.5)	76 (52.1)	151 (43.5)	
Not exclusively homosexual	185 (50.5)	81 (63.8)	89 (59.7)	177 (51.5)	70 (47.9)	196 (56.5)	
HIV status							0.827
Negative	349 (94.6)	112 (87.5)	136 (91.3)	325 (93.4)	136 (93.2)	325 (92.6)	
Positive	20 (5.4)	16 (12.5)	13 (8.7)	23 (6.6)	10 (6.8)	26 (7.4)	
Total annual income							0.736
Less than 5K	66 (18.7)	33 (27.7)	32 (22.4)	67 (20.4)	27 (19.3)	72 (21.7)	
Between 5K and 25K	145 (41.1)	54 (45.4)	54 (37.8)	145 (44.1)	58 (41.4)	141 (42.5)	
More than 25K	142 (40.2)	32 (26.9)	57 (39.9)	117 (35.6)	55 (39.3)	119 (35.8)	
Education status							0.399
High school or less	131 (35.5)	63 (48.8)	66 (44.3)	128 (36.7)	53 (36.3)	141 (40.1)	
Associate's degree	43 (11.7)	21 (16.3)	18 (12.1)	46 (13.2)	16 (11.0)	48 (13.6)	
Bachelor's or graduate degree	195 (52.8)	45 (34.9)	65 (43.6)	175 (50.1)	77 (52.7)	163 (46.3)	

Table 4Unadjusted binary logistic regression models for condomless sexual behaviours in the last 30 days ($n = 500$).

	COR model OR (95% CI)	CAI model OR (95% CI)	CAR model OR (95% CI)
No sex while high	1.00	1.00	1.00
Sex while high, non-sexualised drugs	5.49 (3.18 – 9.46) ***	2.79 (1.83 – 4.27) ***	2.10 (1.37 – 3.21) ***
Sex while high, sexualised drugs	4.45 (1.83 – 10.82) ***	4.34 (2.30 – 8.20) ***	5.65 (2.97 – 10.72) ***
Sex while high, sexualised drugs	1.00	1.00	1.00
Sex while high, non-sexualised drugs	1.23 (0.46 – 3.30)	0.64 (0.34 – 1.21)	0.37 (0.19 – 0.71) **
No sex while high	0.23 (0.09 – 0.55) ***	0.23 (0.12 – 0.44) ***	0.18 (0.09 – 0.34) ***

Notes.

**
p < 0.01;***
p < 0.001. COR, condomless oral receptive sex; CAI, condomless anal insertive sex; CAR, condomless anal receptive sex; CI, confidence interval; OR, unadjusted odds ratio.

Table 5Adjusted binary logistic regression models for condomless sexual behaviours in the last 30 days ($n = 500$).

	COR model AOR (95% CI)	CAI model AOR (95% CI)	CAR model AOR (95% CI)
Category of sex while high			
No sex while high	1.00	1.00	1.00
Non-sexualised drugs	4.05 (2.10 – 7.81) ***	2.71 (1.69 – 4.34) ***	2.13 (1.33 – 3.41) **
Sexualised drugs	3.45 (1.64 – 7.29)	3.57 (1.68 – 7.56) ***	4.98 (2.35 – 10.57) ***
Multiple sexual partners	1.80 (1.44 – 2.26) ***	1.14 (1.05 – 1.19) ***	1.10 (1.02 – 1.19) **
Race/ethnicity			
White non-Hispanic	1.00	1.00	1.00
Hispanic/Latino	0.98 (0.46 – 2.07)	1.48 (0.81 – 2.69)	1.19 (0.67 – 2.13)
Black non-Hispanic	0.38 (0.18 – 0.81) *	1.05 (0.55 – 2.02)	0.60 (0.31 – 1.15)
Other non-Hispanic	1.18 (0.46 – 3.03)	1.15 (0.55 – 2.38)	1.15 (0.58 – 2.31)
Country of origin			
Born in the United States	1.00	1.00	1.00
Not born in the United States	1.89 (0.81 – 4.45)	1.06 (0.57 – 1.96)	0.88 (0.48 – 1.61)
Gender			
Male	1.00	1.00	1.00
Not male	1.72 (0.58 – 5.10)	0.57 (0.25 – 1.33)	0.92 (0.42 – 2.02)
Sexual orientation			
Exclusively homosexual	1.00	1.00	1.00
Not exclusively homosexual	0.47 (0.27 – 0.80) **	0.72 (0.46 – 1.12)	1.55 (0.99 – 2.41)
HIV status			
Negative	1.00	1.00	1.00
Positive	0.43 (0.16 – 1.12)	1.77 (0.79 – 3.98)	1.09 (0.46 – 2.62)
Total annual income			
Less than \$5,000	1.00	1.00	1.00
Between \$5,000 and \$25,000	1.31 (0.69 – 2.49)	0.71 (0.40 – 1.26)	1.01 (0.56 – 1.81)
More than \$25,000	1.73 (0.84 – 3.54)	1.01 (0.55 – 1.86)	0.93 (0.50 – 1.73)
Education status			
High school or less	1.00	1.00	1.00
Associate's degree	0.78 (0.36 – 1.66)	0.82 (0.41 – 1.66)	0.86 (0.41 – 1.78)
Bachelor's or graduate degree	1.38 (0.76 – 2.52)	0.81 (0.48 – 1.35)	1.18 (0.70 – 1.99)

Notes.

* $p < 0.05$;** $p < 0.01$;*** $p < 0.001$. COS-R, condomless oral receptive sex; CAS-I, condomless anal insertive sex; CAS-R, condomless anal receptive sex; CI, confidence interval; AOR, unadjusted odds ratio.