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Time Since First Acting on Same-Sex Attraction and Recreational Drug Use among Men Who Have Sex With Men (MSM): Is There an Effect of “Gay Age”?

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Abstract

Background—Men who have sex with men (MSM) have higher rates of substance use compared to men who have sex with women. Among MSM, drug use is linked to higher-risk sexual behavior and acquisition of HIV and other sexually transmitted infections.

Objectives—We hypothesize that time since first acting on one’s same sex attraction, or one’s “gay age”, could be predictive of drug using behavior.

Methods—We examined this question among 176 MSM, aged 18–35, presenting at a public sexual health clinic. Behavioral data were captured using interviewer- and self-administered surveys and clinical data were extracted from medical records. We used modified Poisson regression to examine associations between gay age and recent recreational drug use, and separately, between gay age and recent marijuana use.

Results—In total, 43% of participants reported recent marijuana use and 26% of participants reported recent use of other drugs. The associations between gay age and marijuana use and other drug use varied by HIV status. After adjustment for biological age, race, and education, a one-year

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Declaration of interest

The authors report no conflicts of interest.

increase in gay age was associated with significantly *increased* drug use among HIV-negative men (adjusted prevalence ratio (aPR): 1.08; 95% confidence interval (CI): 1.03–1.14), but we observed no association between gay age and drug use among HIV-positive men (aPR: 0.96, 95% CI: 0.86–1.07). Gay age was not associated with marijuana use in HIV-negative (aPR: 1.00, 95% CI: 0.95–1.04) or HIV-positive (aPR: 1.06, 95% CI: 0.98–1.14) men.

Conclusions—In summary, HIV-negative MSM who had experienced more time since first same-sex experience had significantly increased prevalence of recent drug use.

Keywords

Men who have sex with men (MSM); marijuana; recreational drug use; HIV

Background

Men who have sex with men (MSM) have higher rates of substance use and substance use disorders compared to men who have sex with women (Green & Feinstein, 2012; McCabe, Hughes, Bostwick, West, & Boyd, 2009; Woody, VanEtten-Lee, & McKirnan, 2001). Recreational drug use is prevalent among MSM: 25% report cocaine use, 24% report ecstasy (Ruf, Lovitt, & Imrie, 2006), and 15% report sildenafil use (Crosby & DiClemente, 2004). Many recreational drugs, including ecstasy, crystal methamphetamine, cocaine, ketamine, nitrous oxide (“whip-its”), and amyl or butyl nitrates (“poppers”) have been independently tied to risky sexual behavior in MSM (Celentano, Latimore, & Mehta, 2008; Cohen, Giles, & Nelson, 2004; Fisher et al., 2006). These substances are termed “party drugs” or “club drugs” and may increase the duration of sex or decrease inhibitions about engaging in riskier sexual behaviors (Cohen et al., 2004; Crosby & DiClemente, 2004), such as condomless sex (Carey, Mejia, & Bingham, 2009). Recreational drug use among MSM has also been associated with STI and HIV acquisition (Hirshfield, Remien, Walavalkar, & Chiasson, 2004).

However, substance use is not constant across the life course, and is likely to be associated with a number of developmental factors. For example, previous research has identified chronological age as an important predictor of substance use among MSM, with younger men being more likely to use illicit drugs (Colfax, Vittinghoff, & Husnik, 2004; Halkitis & Palamar, 2009; Stall, Paul, & Greenwood, 2001). In addition, age of sexual debut among MSM has also been linked to substance use, with earlier sexual debut associated with increased substance use, poorer mental health, and increased sexual risk behavior (Lyons et al., 2012; Outlaw, Phillips, & Hightow-Weidman, 2011).

However, we hypothesize that time since an individual’s initiation of same-sex sexual behavior, which we term “gay age,” may also be an important predictor of risk behavior among MSM. There is some theoretical support for this hypothesis. For example, increased affiliation with the gay community, which may vary by gay age, is associated with increased substance use among MSM (Green & Feinstein, 2012). Additionally, MSM face unique stressors, including discrimination, internalized homophobia, and expectations of rejection (Hatzenbuehler, Nolen-Hoeksema, & Erickson, 2008), and MSM reporting more stressors

have increased substance use (Marshall, Friedman, & Stall, 2008). These stressors may occur more frequently or become increasingly difficult to manage with increasing gay age.

This study investigates gay age as a predictor of recent recreational drug use among MSM. We hypothesize that regardless of when a man first acts on his same-sex attraction, subsequent drug using behaviors follow a similar trajectory.

Methods

Design and participants

Between July 2012 and October 2013, we conducted a cross-sectional study of MSM in the sexual health clinic (SHC) of a Midwestern metropolitan health department. All men who presented to the SHC for STI or HIV testing were screened for eligibility; criteria included ability to speak and read English, being at least 18 years old, and reporting anal sex with a man in the last year. Eligible men provided informed consent to a questionnaire and access to their SHC electronic health record (EHR). Of the men screened ($n = 1866$), 84% ($n = 1568$) did not report anal sex with a man in the last year, with others excluded based on age ($n = 13$) and inability to speak English ($n = 10$). In total, 286 men met eligibility requirements and 235 enrolled in the study. We found that variability in gay age tapered off after age 35 in our sample, which may limit our ability to examine its effect. Further, because distribution of gay age differed by age in our sample, we were concerned about the confounding effect of age. Thus, in order to focus on an age group with sufficient variability in gay age and lessen confounding effects of age, we restricted the sample to men under age 35 ($n = 176$).

This study was approved by The Ohio State University Institutional Review Board. The survey was conducted using REDCap, a secure web application for collecting research data (Harris et al., 2009). Sensitive questions, including measures of sexual and substance use behaviors, were self-administered.

Measures

Gay age—Debut of SM status is complex (The GenIUSS Group, 2014) and its initiation might be defined in multiple ways, including awareness of same-sex attraction, coming out to others, or acting on their same-sex attraction. A substantial body of research continues to debate whether sexual minorities should be defined based on their attractions, behaviors, or identity (The GenIUSS Group, 2014). We defined gay age in this analysis as the number of years since participants first acted on their same-sex attraction using the item, “At what age did you first act on your attraction to men?” We calculated gay age by subtracting a participant’s age of first acting on their same-sex attraction from their biological age. For example, if a 25-year-old reported that he first acted on an attraction to another man at age 21, his gay age was 4 years.

Recreational drug use—Men were asked to indicate all drugs (marijuana, sildenafil, MDMA, methamphetamines, amyl/butyl nitrates, nitrous oxide, rohypnol, ketamine, GHB, heroin, cocaine, mephedrone, bath salts, prescription pain medicine, other) used within the past three months. Because of the high rate of marijuana in this population (Stall et al.,

2001), we coded two drug use variables. Marijuana use was coded 1 if men reported using marijuana in the past three months and 0 if men reported no marijuana use. Other drug use was a composite variable, with 1 representing any drug use other than marijuana and 0 if men reported no drug use other than marijuana in the past three months.

HIV status—We coded HIV status as the HIV status that men believed they had when they completed the survey. This was based on an *a priori* hypotheses that known HIV status, rather than biological status, would have a bigger effect on men's behaviors. Men were classified as HIV-positive if there was a prior positive HIV test in the EHR or the participant reported being HIV-positive. Men were classified as HIV-negative if they had history of negative HIV test(s) or no history of HIV testing.

Statistical analyses

We first calculated the prevalence of demographic characteristics and HIV among our sample. We calculated the prevalence of use of each drug and of composite drug use in the past three months, among the entire sample and separately by HIV status.

Gay age (coded continuously) was the primary exposure; marijuana use and other recreational drug use in the prior three months were the primary outcomes. We used modified Poisson regression (Zou, 2004) to examine the association between gay age and marijuana use, and in a separate model, between gay age and other recreational drug use. Modified Poisson regression is recommended to estimate relative risk in studies where the outcome is common (Zou, 2004). We evaluated whether the associations of interest in each model varied significantly by HIV status by examining likelihood ratio tests and p-values for the product-interaction terms between gay age and HIV status (Selvin, 2004). Our *a priori* criterion for statistical significance and retention of interaction terms was $\alpha = 0.20$ (Selvin, 2004). Based on previous literature and Directed Acyclic Graph (DAG) analysis (Greenland, Pearl, & Robins, 1999), we included biological age (centered), binary race (white versus minority) and education (high school or less versus at least some college) in all adjusted multivariable models.

Sensitivity analyses

While we controlled for biological age in our primary analyses, as a sensitivity analysis we evaluated whether biological age was associated independently with recreational drug use. We calculated unadjusted prevalence ratios to measure the separate associations between biological age (continuous) and recent marijuana use and recent other drug use.

In addition, we completed a subgroup analysis to test whether our findings would differ if our sample was restricted to only men who self-identify as gay. We restricted our sample to men who identified themselves as “gay or homosexual” in our survey, and then calculated unadjusted prevalence ratios to measure the associations between gay age and drug use, among HIV-negative and HIV-positive men.

Results

Demographics and drug use

The median biological age of the sample was 24 years (interquartile range (IQR): 21–28). Fifty-one percent of men were white, 26% were black, 9% were Hispanic, and 15% reported another or multiple race/ethnicity. Most (67%) had completed at least some college. Three-quarters (75%) self-identified as gay and 14% were HIV-positive. Median gay age was 9 years (IQR: 4–13) (Table 1)

In total, 43% of men reported marijuana use and 26% reported use of other drugs (Table 1). The most common recreational drugs were amyl/butyl nitrates (14%) and cocaine (9%). Drug use patterns varied by HIV-status, with HIV-positive MSM having higher reported use of marijuana, methamphetamines, poppers, cocaine, prescription pain medicine, and Viagra, compared to HIV-negative MSM (Figure 1).

Unadjusted and adjusted associations

The association between gay age and other drug use (excluding marijuana) differed by HIV status ($p = .03$); thus models include an interaction term between gay age and HIV. Adjusted models also controlled for age, race, and education. Among HIV-negative men, the prevalence of recent drug use increased significantly with each one-year increase in gay age in both unadjusted (prevalence ratio (PR): 1.08, 95% confidence interval (CI): 1.03–1.13) and adjusted models (aPR: 1.08, 95% CI: 1.03, 1.14). However, we observed no significant association between gay age and recent drug use among HIV-positive men in either unadjusted (PR: 0.94, 95% CI: 0.86–1.03) or adjusted models (aPR: 0.96, 95% CI: 0.86–1.07) (Table 2).

The association between gay age and recent marijuana use also differed by HIV status ($p = .08$). However, gay age was not significantly associated with recent marijuana use among HIV-negative ((PR: 0.97, 95% CI: 0.94–1.01) (aPR: 1.00, 95% CI: 0.95, 1.04)) or HIV-positive men ((PR: 1.05, 95% CI: 0.97–1.13) (aPR: 1.06, 95% CI: 0.98–1.14)) in unadjusted or adjusted models (Table 2).

Sensitivity analyses

Biological age was not significantly associated with other drug use among HIV-negative (PR: 1.06, 95% CI: 0.99, 1.12) or HIV-positive men (PR: 0.97, 95% CI: 0.88, 1.06) in unadjusted models. Biological age was significantly associated with marijuana use among HIV-negative men (PR: 0.94, 95% CI: 0.89, 0.99), but not among HIV-positive men (PR: 1.08, 95% CI: 0.99, 1.18).

Results from analyses on the subsample of men who identify as gay did not differ meaningfully from the models that resulted from the full sample of MSM. Among only self-identified gay men, gay age was significantly associated with other drug use among HIV-negative men, but not HIV-positive men. Among the subsample, gay age was not associated with marijuana use among HIV-negative or HIV-positive men (data not shown).

Discussion

Among MSM presenting to an urban SHC, we found an association between gay age and recent recreational drug use among HIV-negative, but not among HIV-positive MSM. Gay age was not associated with recent marijuana use. The measures of association between gay age and drug use remained nearly constant in unadjusted and adjusted analyses. These findings suggest that gay age may be an important indicator of risk among MSM and warrants further study as a risk factor for drug use.

Our sensitivity analyses confirm the robustness of our findings and provide further support for our hypothesis of gay age as a predictor of drug use independent of biological age. Specifically, sensitivity analyses indicated that biological age and gay age have different relationships with drug use among MSM. While gay age was associated with other drug use among HIV-negative MSM, biological age was associated with marijuana use among HIV-negative MSM. Neither biological age or gay age were associated with any drug use among HIV-positive MSM.

Two hypotheses may explain our findings of increased recreational drug use with higher gay age among HIV-negative MSM. First, previous research concludes that stronger affiliation with gay culture and degree of “outness” may be related to increased substance use (Green & Feinstein, 2012). Specifically, higher levels of gay community participation, more frequent attendance at gay bars or sex clubs, higher numbers of sexual partners (Carpiano, Kelly, Easterbrook, & Parsons, 2011; Halkitis & Palamar, 2009; Kipke, Weiss, & Ramirez, 2007; Klitzman, Greenberg, & Pollack, 2002), and larger proportions of a social network having knowledge of one’s sexual minority status (Klitzman et al., 2002) have each been associated with increased recreational drug use. After same-sex sexual debut, MSM may become increasingly affiliated with gay culture with the passage of time and that increased drug use is a part of this culture. Second, the sexual minority stress hypothesis states that MSM face a unique set of stressors due to their minority status (Meyer, 2003), including “internalized heterosexism” (internalization of negative societal attitudes about sexual minority identity, attraction, and behavior). Heterosexism has been associated with increased drug use (Brubaker, Garrett, & Dew, 2009), perceived stigma (expectations of rejection and discrimination) (Meyer, 2003), and actual prejudicial events (ranging from violence to ostracism by families and peer groups (Meyer, 2003)), which may also result in increased substance use (Brubaker et al., 2009; Marshal et al., 2008). It is possible that as gay age increases, MSM become increasingly “out” and increasingly prone to minority stress, which is associated with increased drug use. However, testing the minority stress as a mediator of the association between gay age and drug use was outside the scope of this study.

As others have reported (Pantalone, Bimbi, Holder, Golub, & Parsons, 2010), we found that HIV-positive MSM had higher prevalence of drug use than HIV-negative MSM, although the reasons for this relationship are not well understood. HIV-positive men may have higher anxiety or depression compared to HIV-negative men, which may lead to increased substance use as a coping strategy (Green & Feinstein, 2012). In this analysis, we found that the association between gay age and drug use was not present among HIV-positive MSM. It is possible that while HIV-positive MSM use drugs at a higher rate, their use is more closely

correlated with other factors, like the stress associated with an HIV diagnosis, and not as strongly related to gay age.

This analysis had several limitations. We relied on self-reported data, which may be affected by recall or social-desirability bias (NIMH, 2008; Zenilman, Weisman, & Rompalo, 1995). Also, men were recruited from a SHC and had to report recent anal sex with a man to be included, which limits the representative nature of the sample. Further, this analysis was restricted to men between the ages of 18 and 35. Future studies should assess whether gay age remains a predictor of drug using behavior across the lifespan among HIV-negative men. This study is cross-sectional, limiting our ability to assess directionality. In addition, the operational definition of gay age in this analysis was limited to measures of behavior. Future work should assess more complex possible operational definitions of gay age that account for identity and attraction. Our assessment of drug use may have allowed for some misclassification. Several drugs that were assessed are available only through prescription in the United States (e.g., sildenafil, amyl/butyl nitrates, and prescription pain medicine), and we did not specify that we were only interested in nonprescription use. However, prescriptions for inhaled nitrates are uncommon, and prescriptions for sildenafil are less common in this age group. Further, while we adjusted for several key demographic factors in these analyses, it is possible that there are other unmeasured variables confounding our reported findings. Finally, our analyses were limited by the small number of HIV-positive men in our sample. Future research should further investigate the role of HIV-status as a modifier of the association between gay age and drug use.

In summary, recreational drug use was highly prevalent in this MSM sample. Each one-year increase in gay age—each one-year increase in time since a man first acted on his attraction to men—was associated with increased prevalence of recent drug use among HIV-negative MSM. The identification of gay age as a predictor of recent drug use among HIV-negative MSM could be leveraged for prevention programs as an easily-measurable time point to target for substance use interventions by clinicians and educators. For example, similar to the ways in which prevention programs have been targeted and delivered to specific age groups (Klein et al., 2001), we anticipate that gay age might be used as an additional marker for tailored messaging.

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Figure 1.

Prevalence of recent^a drug use^b by HIV status (N = 176). (a) Recent drug use is based on self-report of use in past three months. (b) Drugs endorsed by 1% or less of entire sample are not reflected in figure. These include nitrous, rohypnol, ketamine, and bath salts.

Table 1

Demographic characteristics and drug use prevalence of MSM (N = 176).

	n	%
Age		
18–24	100	57%
25–29	41	23%
30–35	35	20%
Race/ethnicity		
White	89	51%
Minority ^a	87	49%
Education		
High School Diploma or less	58	33%
At least some college	118	67%
Sexual orientation ^b		
Gay	132	75%
Other	43	24%
Known HIV status		
Positive	25	14%
Negative	151	86%
Marijuana		
Recent use ^c	76	43%
No recent use	100	57%
Amyl/butyl nitrates		
Recent use	24	14%
No recent use	152	87%
Cocaine		
Recent use	16	10%
No recent use	160	91%
Prescription pain medicine		
Recent use	7	4%
No recent use	169	96%
Methamphetamines		
Recent use	6	3%
No recent use	170	97%
Sildenafil		
Recent use	5	3%
No recent use	171	97%
GHB		
Recent use	6	3%
No recent use	170	97%
Heroin		
Recent use	3	2%

	n	%
No recent use	173	98%
MDMA		
Recent use	6	3%
No recent use	170	97%
Mephedrone		
Recent use	3	2%
No recent use	173	98%
Nitrous		
Recent use	1	<1%
No recent use	175	99%
Rohypnol		
Recent use	0	0%
No recent use	176	100%
Ketamine		
Recent use	0	0%
No recent use	176	100%
Bath salts		
Recent use	1	<1%
No recent use	175	99%
Other drugs		
Recent use	5	3%
No recent use	171	97%
Composite drug (excluding marijuana)		
Recent use	46	26%
No recent use	130	74%

^aMinority category includes Black, Hispanic, Asian, Pacific Islander, Native American, Native Hawaiian, Other Races, and any Combination of Races.

^bFrequencies may not sum to 176 due to missing responses.

^cRecent drug use is based on self-report of use in past 3 months.

Table 2

Modified Poisson regression predicting recent^a use of marijuana and other drug use (N = 176).

	Other ^b drug use		Marijuana	
	HIV-negative	HIV-positive	HIV-negative	HIV-positive
	PR (95% CI)	PR (95% CI)	PR (95% CI)	PR (95% CI)
Model 1: unadjusted				
Gay age (continuous)	1.08 (1.03, 1.13)	0.94 (0.86, 1.03)	0.97 (0.94, 1.01)	1.05 (0.97, 1.13)
Model 2: adjusted ^c				
Gay age (continuous)	1.08 (1.03, 1.14)	0.96 (0.86, 1.07)	1.00 (0.95, 1.04)	1.06 (0.98, 1.14)

^aRecent drug use is based on self-report of use in past three months.

^bOther drugs include amyl/butyl nitrates, bath salts, cocaine, GHB, heroin, ketamine, MDMA, mephedrone, methamphetamines, nitrous oxide, prescription pain medicine, rohypnol, sildenafil, others.

^cAdjusted for biological age (centered), race, and education.