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Marijuana and illicit drugs: Correlates of condomless anal sex among adolescent and emerging adult sexual minority men

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Abstract

The association between “illicit drugs” (e.g., cocaine/crack, methamphetamine, gamma-hydroxybutyrate-GHB, ketamine, and ecstasy) and condomless anal sex (CAS) with casual partners is well established for sexual minority men (SMM). Recent evidence from adult SMM has indicated that marijuana is associated with the occurrence of CAS with casual partners above and beyond illicit drug use. The purpose of the current study was to evaluate associations between CAS and the use of marijuana and illicit drugs in a sample of young SMM (aged 15 to 24). Participants ($n = 578$) completed an online survey assessing demographics, current PrEP prescription, age, marijuana use, as well as drug use and sexual behavior in the past 90 days. A hurdle model simultaneously predicted the occurrence of CAS as well as the frequency of CAS among those reporting it. Illicit drug use was associated with both the occurrence ($OR = 2.26$; $p = .01$) and frequency of CAS ($RR = 1.63$; $p = .02$). In contrast, marijuana use was associated with the occurrence ($OR = 1.69$; $p = .01$), but not the frequency of CAS ($RR = 1.07$; $p = .74$). Findings mirror recent observations in large samples of adult SMM. While the effect size of marijuana is more modest than illicit drug use, marijuana does have significant and unique associations with the occurrence of CAS. HIV prevention services for young SMM may therefore benefit from assessing and addressing marijuana use in the context of HIV sexual behavior.

Keywords

Sexual minority men; Adolescents; Illicit Drugs; Marijuana; Condomless Anal Sex; Hurdle Model

1. Introduction

Accounting for 69% of new U.S. HIV diagnoses in 2018, sexual minority men (SMM), including gay, bisexual and other men who have sex with men, remain most vulnerable to contracting HIV (CDC, 2020a). Additionally, youth aged 13 to 24 years make up a significant proportion of HIV diagnoses (21%) among SMM (CDC, 2020b) and rates among this age group have increased while rates among all adults have remained the same or declined (Guilamo-Ramos et al., 2019). Condomless anal sex (CAS) is the greatest behavioral risk factor underlying HIV transmission among SMM (Patel et al., 2014; Sullivan et al., 2009) and extensive research has examined factors associated with sexual risk behavior.

Sexual minorities aged 18-25 are more likely to use marijuana (46.2% versus 31%) and illicit drugs (54% versus 36.1%) compared to their heterosexual counterparts (Medley et al., 2016; Starks, et al., 2020). A substantial body of evidence has documented the association between drug use and CAS (e.g., Lloyd et al., 2020; Petersson et al., 2016). Most of this research has looked at illicit drugs other than marijuana, including cocaine, methamphetamines, ketamine, gamma-hydroxybutyrate-GHB, and ecstasy (e.g., Boone et al., 2013; Daskalopoulou et al., 2014; Hoenigl et al., 2016; Kurka et al., 2015; Robbins et al., 2020; Theodore et al., 2014). Aggregate (Starks et al., 2020), day-level (Rendina et al., 2015; Starks et al., in press), and event level analyses (Card et al., 2017; Vosburgh et al., 2012) indicate that the use of these drugs is associated with increased odds and frequency of CAS with casual partners. Most recently, Starks et al. (2020) presented data examining whether aggregate associations between illicit drugs and CAS with casual partners generalizes across relationship status and sexual agreements among adult SMM. Results indicated that the associations between illicit drug use and CAS with casual partners did not differ significantly between single and non-monogamous SMM. The association diminished but remained significant among monogamous SMM.

The association between marijuana use and CAS is not as well researched. This may partially be due to a common perception that marijuana is not as strongly associated with HIV sexual risk behaviors compared to stimulant drugs (Morgan et al., 2016). Among the general population, some studies have found no association (e.g., Mertz et al., 2000), while other studies have found marijuana use associated with decreased condom use and higher number of casual sex partners (Bellis et al., 2008; Brodbeck et al., 2006). For SMM, only a small number of studies have looked specifically at marijuana use with sexual risk behavior. Morgan et al. (2016) examined the difference between marijuana for general use and sex-drug use among black SMM. Their results found that when marijuana was used as a sex drug to make sex easier, better, or last longer, it was associated with engaging in CAS. Starks et al. (2020) investigated how relationship status contextualizes the impact of drug use on sexual risk and found that the association between marijuana use and CAS

with casual partners did not differ significantly between single and monogamous SMM. Marijuana was not associated with significant increase in the frequency of CAS among those reporting it. For adolescent and young adult SMM, Zhang et al. (2017) found an association between marijuana use and having multiple sex partners; however, condom use was not assessed, and HIV risk was inferred. Given the prevalence of marijuana use among younger SMM specifically, clarifying the extent of its association with sexual risk taking is crucial to a comprehensive understanding of HIV infection risk in this vulnerable population.

The existing literature is limited in two ways. First, most studies examining drug use and CAS are conducted with adults and less is known for older adolescents and younger emerging adult SMM. Second, the existing literature largely focuses on predicting either the occurrence or the amount of risk. Modeling both the occurrence and frequency of CAS may be essential to the study of associations with marijuana use.

1.2. Current Study

The purpose of the current study was to evaluate the association between drug use and CAS among younger SMM (aged 15-24). Building on recent advances in the literature, we anticipated that both marijuana and other illicit drugs would contribute significantly to the prediction of the occurrence of CAS; however, we anticipated only illicit drugs would be associated with the frequency of CAS among those reporting it.

2. Methods

2.1 Procedures and Participants

Data were drawn from a screening survey intended to determine eligibility for Young Men's Health Study (YMHP) study focusing on sexual health and substance use among young SMM in the catchment area of three adolescent HIV care and prevention clinics in Detroit, MI, Miami, FL, and Philadelphia, PA (Parsons et al., 2019). Potential participants were recruited from ads on social media and popular geosocial networking apps for gay, bi, trans, and queer people seeking out sexual partners. Potential participants were also recruited from clinic in-house and outreach HIV testing services, health fairs, clinic sponsored drop-in events, and other outreach activities. Interested participants who clicked the ad or approached in person were directed to the survey landing page in Qualtrics. Participants who wished to complete the survey indicated their consent electronically and advanced into the survey, which took approximately 5 minutes to complete. No compensation was provided. The sample was recruited between September 28, 2018 and May 14, 2020. All procedures were approved by the Institutional Review Board of Florida State University.

2.2 Measures

Demographics included age, zip code, race and ethnicity, PrEP uptake, and HIV status. Participants were asked to report race and ethnicity as first whether they identified as Latino or Hispanic and then race as check all that apply. Zip codes were used to determine region. HIV status and PrEP uptake were aggregated into dichotomous indicators (HIV-positive, HIV-negative/unknown, not on PrEP, and HIV-negative on PrEP).

Drug Use.—Participants indicated whether they had used each of 7 drugs in the past 90 days. Data on cocaine, crack, methamphetamine/“crystal”/“tina”, ketamine, GHB/GHL, MDMA/ecstasy/“molly”) were aggregated to create a single dichotomous indicators of illicit drug use. Marijuana use was summarized separately with a dichotomous indicator.

Condomless anal sex.—Respondents reported the number of times they engaged in condomless anal sex events (either insertive or receptive) in the last 90 days.

2.3 Analytic Plan

Mplus Version 8.2 with robust maximum likelihood estimation was used to create a hurdle model predicting CAS. Hurdle models contain a binary logit component modeling the likelihood of reporting at least one instance of CAS and a negative binomial component modeling frequency of CAS among those who report at least one instance (Hu et al., 2011). In the binary logit portion of the hurdle, Mplus calculates the likelihood of a zero response by default; to facilitate analyses, coefficients were recalculated to describe the likelihood of a nonzero response. Covariates included for both components were race and ethnicity (Black, Latino, Other, White), region (Northeast, Midwest, South), a variable describing HIV and PrEP uptake (HIV-positive, HIV-negative/unknown without PrEP, HIV-negative on PrEP), and a variable describing marijuana and illicit drug use. Results were confirmed using the hurdle function included in the *pscl* package in R.

3. Results

A total of 579 respondents provided completed responses. One participant was omitted for providing a zip code outside of the catchment area, resulting in an analytic sample of 578. Table 1 describes the sample. Mean age was 20.87 years ($SD = 2.18$). The sample was 44.1% Black, 24.4% Latino, 20.6% White, with 10.9% identifying as Other race or ethnicity. Most respondents were from the Northeast (35.3%) with the remaining sample almost evenly split between the Midwest (32.5%) and the South (32.2%). Those who reported HIV-negative/unknown not on PrEP dominated the sample (84.6%), followed by those HIV-negative on PrEP (12.8%). Most reported marijuana use (68.0%) while illicit drug use was reported by 15.2% of the sample. Most respondents reported engaging in at least one instance of CAS in the last 90 days (58.1%) with 3.30 ($SD = 6.08$) CAS events in the last 90 days.

Results of the hurdle model are presented in Table 2. The binary component results indicated that both marijuana and illicit drug use were significantly associated with odds of having CAS ($OR = 1.69$, 95% CI: 1.15, 2.48 and $OR = 2.26$, 95% CI: 1.26, 4.04 respectively). The use of marijuana was associated with a 69% increase in the odds of CAS while the use of illicit drugs was associated with an increase more than 126%.

With respect to demographic covariates and the occurrence of CAS and rotating the reference group, Latino respondents were significantly more likely to report CAS than those identifying as Black ($OR = 1.93$, 95% CI: 1.21, 3.09). Midwesterners were significantly less likely than respondents in the Northeast to report at least one instance of CAS ($OR = 0.45$, 95% CI: 0.29, 0.69). Rotating the reference group, southerners were significantly

more likely to report CAS ($OR = 1.74$, 95% CI: 1.10, 2.75) than those in the Midwest. The likelihood of reporting any CAS was significantly greater for HIV negative respondents with PrEP prescriptions compared to those without a PrEP prescription ($OR = 2.12$, 95% CI: 1.21, 3.72).

The negative binomial component results indicated that use of illicit drugs was significantly associated with higher CAS frequencies ($RR = 1.63$, 95% CI: 1.07, 2.48), but marijuana use was not significantly associated with frequency of CAS ($RR = 1.07$, 95% CI: 0.70, 1.64). With respect to demographic covariates, no significant differences were observed among region or racial and ethnic groups in CAS frequency. However, those with a PrEP prescription reported higher frequencies of CAS than HIV negative respondents without prescriptions ($RR = 1.72$, 95% CI: 1.10, 2.69).

4. Discussion

These findings from a sample of older adolescent and emerging adult SMM add to the small but growing body of literature that seeks to clarify the association between drug use and CAS by distinguishing between the use of marijuana and other drug use in models predicting both the occurrence and frequency of CAS. The use of marijuana was selectively associated with the occurrence – but not the frequency – of CAS. Meanwhile, the use of illicit drugs was associated with significant increases in both the occurrence and frequency of CAS, which supports previous work among adolescent SMM (Robbins et al., 2020). Results mirror observations from adult samples (Morgan et al., 2016), especially similar patterns of marijuana use being associated with the occurrence, but not the frequency of CAS (Starks et al., 2020).

While observed effect sizes suggested the degree of risk associated with marijuana use was not as high as other illicit drugs, modest increases in the likelihood of CAS were observed among younger SMM who used marijuana. This is compelling for two reasons. First, adolescent and emerging adult SMM may have different drug use patterns than their adult counterparts and further consideration is imperative to understanding their impact on HIV transmission sexual behaviors. Second, increased state legalization for medical and recreation marijuana use may increase availability (Levy, 2013), making it a more accessible drug for sexual enhancement compared to other illicit drugs. Any level of risk could have a substantial impact on population HIV risk in adolescent and emerging adult SMM. HIV prevention interventions would benefit from the inclusion of marijuana in discussions about sexual health.

Limitations of this research include the following. These data are cross-sectional, and we are unable to infer causal inference or event-level co-occurrence from these associations. These findings are based on a convenience sample and not representative of the US adolescent and emerging adult SMM in general. Finally, our CAS measurement did not distinguish between different partner types. We are not able to discern if reported CAS occurred with casual partners versus main partners.

Notwithstanding these limitations, this work contributes to the growing literature regarding illicit drugs, marijuana, and sexual risk behaviors among adolescent and emerging adult SMM. Future considerations of these drug use patterns and CAS with casual partners among a national sample of SMM would further this research in a meaningful way.

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Highlights:

- Knowledge of drug use and sexual behaviors among young sexual minority men is limited.
- Marijuana was associated with the occurrence of condomless anal sex.
- Illicit drugs were associated with occurrence and frequency of condomless anal sex.

Table 1.

Demographics and other characteristics of sample.

	Total (n=578)
	<i>n</i> (%)
Race/Ethnicity	
Black	255 (44.1)
Latino	141 (24.4)
White	119 (20.6)
Other	63 (10.9)
Region	
Northeast	204 (35.3)
Midwest	188 (32.5)
South	186 (32.2)
HIV status and PrEP uptake	
HIV-positive	15 (2.6)
HIV-negative/unknown, not on PrEP	489 (84.6)
HIV-negative on PrEP	74 (12.8)
Marijuana	393 (68.0)
Illicit drug use	91 (15.7)
CAS occurrence	336 (58.1)
	<i>M</i> (<i>SD</i>)
Age	20.87 (2.18)
CAS frequency	3.30 (6.08)

Note: PrEP = pre-exposure prophylaxis; CAS = condomless anal sex; Illicit drug use included: cocaine, crack, GHB = gamma-hydroxybutyrate, ecstasy, ketamine, methamphetamine

Table 2.

Hurdle model predicting odds and frequency of condomless anal sex (n= 578).

	Any CAS (Binomial)		Frequency of CAS (Count)	
	Odds Ratio	95% CI	Rate Ratio	95% CI
Intercept	0.50	(0.09, 3.67)	0.57	(0.08, 2.98)
Age	1.04	(0.96, 1.14)	1.08*	(1.00, 1.17)
Race/Ethnicity (ref = White)				
Black	0.61*	(0.37, 1.00)	0.85	(0.54, 1.34)
Latino	1.17	(0.65, 2.12)	0.74	(0.47, 1.16)
Other	0.81	(0.41, 1.58)	0.81	(0.42, 1.55)
Region (ref = Northeast)				
Midwest	0.45***	(0.29, 0.69)	1.01	(0.64, 1.58)
South	0.79	(0.49, 1.25)	1.09	(0.72, 1.64)
HIV status and PrEP uptake(ref = HIV-negative/unknown, not on PrEP)				
HIV-positive	0.66	(0.22, 1.94)	1.68	(0.42, 6.69)
HIV-negative on PrEP	2.12***	(1.21, 3.72)	1.72*	(1.10, 2.69)
Marijuana	1.69***	(1.15, 2.48)	1.07	(0.70, 1.64)
Illicit drug use	2.26***	(1.26, 4.04)	1.63*	(1.07, 2.48)

* *p* 0.05;

** *p* 0.01;

*** *p* 0.001

Note: PrEP = pre-exposure prophylaxis; CAS = condomless anal sex; Illicit drug use included: cocaine, crack, GHB = gamma-hydroxybutyrate, ecstasy, ketamine, methamphetamine