SHORT REPORT

Club drug users had higher odds of reporting a bacterial STI compared with non-club drug users: results from a cross-sectional analysis of gay and bisexual men on HIV pre-exposure prophylaxis

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ABSTRACT

Objectives Pre-exposure prophylaxis (PrEP) can reduce HIV transmission risk for many gay, bisexual and other men who have sex with men. However, bacterial STI (BSTI) associated with decreasing condom use among HIV PrEP users is a growing concern. Determining the characteristics of current PrEP users at highest BSTI risk fills a critical gap in the literature.

Methods Gay and bisexual men (GBM) in New York City on HIV PrEP for 6 or more months (n=65) were asked about chlamydia, gonorrhoea and syphilis diagnoses in the past 6 months. By design, half (51%) of the sample were club drug users. We examined the associations of length of time on PrEP, type of PrEP care provider, PrEP adherence, number of sexual partners, number of condomless anal sex acts and club drug use on self-reported BSTI using multivariable, binary logistic regressions, adjusting for age, race/ethnicity, education and income.

Results Twenty-six per cent of GBM on HIV PrEP reported a diagnosis of BSTI in the past 6 months. Men who reported club drug use (adjusted OR (AOR)=6.60, p<0.05) and more frequent condomless anal sex in the past 30 days (AOR=1.13, p<0.05) had higher odds of reporting a BSTI. No other variables were significantly associated with self-reported BSTI in the multivariable models.

Conclusions Club drug users could be at a unique BSTI risk, perhaps because of higher risk sexual networks. Findings should be considered preliminary, but suggest the importance of ongoing BSTI screening and risk-reduction counselling for GBM on HIV PrEP.

INTRODUCTION

HIV pre-exposure prophylaxis (PrEP)—a once-daily oral pill of tenofovir disoproxil fumarate/emtricitabine—greatly reduces HIV risk for many gay, bisexual and other men who have sex with men (MSM).[1 2] However, bacterial STIs (BSTIs) associated with decreasing condom use among HIV PrEP users is a growing concern. In a meta-analysis of literature published during August 2017, BSTIs were significantly higher among PrEP users pooled across eight studies reporting BSTI prevalence, with most studies in the overarching meta-analysis of 17 open-label and observational studies reporting evidence of an increase in condomless sex after PrEP uptake.[3] These findings are supported by newer evidence indicating young MSM who used PrEP engaged in more receptive condomless anal sex (CAS) compared with those not taking PrEP,[4] and although PrEP can protect against HIV it cannot protect against BSTIs.

It is plausible that subgroups of PrEP users could be at a higher BSTI risk, especially MSM who combine club drug use (ie, ketamine, MDMA (3,4-methylenedioxymethamphetamine)/ecstasy, GHB (γ-hydroxybutyricacid), cocaine or methamphetamine) and PrEP. Club drugs can be used by MSM to stimulate sex, particularly when used in combinations (ie, 'chemsex'), and are especially relevant to 'party-n-play' scenes often including group sex and condomless sex.[5 6] Therefore, PrEP users engaging in club drug use could be at a higher BSTI risk because of network prevalence resulting from partner concurrency and condomless sex compared with their non-drug using counterparts.[7] With limited prior research on BSTI acquisition among PrEP users, we sought to determine the characteristics of self-identified gay and bisexual men (GBM) who had higher odds of self-reporting a BSTI diagnosis while on daily oral PrEP for HIV prevention.

METHODS

Data used for this analysis were taken from *PrEP & Me*, a study of 104 GBM who were active HIV PrEP users at the time of enrolment (see online supplementary appendix A for more details). GBM were recruited via targeted sampling[8] in New York City from November 2015 to November 2016. Passive recruitment strategies included posting advertisements on social media and geosocial sexual networking apps, and active recruitment was conducted by the research staff within gay-concentrated neighbourhoods and settings. To join the study, participants had to call our office, whereby they were screened for eligibility and scheduled for an appointment (if eligible). To be eligible for the study, participants had to (1) be 18 years or older, (2) be cisgender male, (3) identify as gay/bisexual, (4) have been taking HIV PrEP for at least 30 days, but not via a research study that provided the PrEP medication, (5) reside in the New York City area, and (6) have access to the internet. By design of the parent study, half of the enrolled participants

self-reported club drug use (ketamine, MDMA/ecstasy, GHB, cocaine or methamphetamine) in the past 30 days. The study was marketed as an opportunity for participants to describe their experiences on PrEP, and we did not mention club drug use in our advertising for the study. For the purposes of this analysis, we excluded 39 GBM who were on PrEP for less than 6 months.

Measures

GBM in this study were asked their age, race/ethnicity, education, income, length of time on PrEP and from whom they received their PrEP-related care (ie, primary care provider or specialist clinic/provider). We also assessed if participants had missed any PrEP doses in the past 90 days (yes/no). Club drug use and sexual behaviour were assessed using a structured 30-day timeline follow-back interview (see online supplementary appendix A). Men were coded as club drug users if they reported using ketamine, MDMA/ecstasy, GHB, cocaine or methamphetamine at least once in the past 30 days. Sexual behaviour variables included the number of sexual partners and number of CAS acts (including both insertive and receptive CAS) in the past 30 days. Finally, GBM were asked about recent diagnoses of chlamydia, gonorrhoea and syphilis in the past 6 months, which we coded into a dichotomous outcome variable of any BSTI while on HIV PrEP (yes/no).

Statistical analyses

We conducted bivariate analyses on recent BSTI diagnosis using χ^2 comparisons, Fisher's exact tests and logistic regressions. We next assessed recent BSTI diagnosis using multivariable, binary logistic regressions each for length of time on PrEP, PrEP-related care provider, missed PrEP doses, number of male sexual partners, number of CAS acts and club drug use, adjusting for age, race/ethnicity, education and income.

RESULTS

Sixty-five GBM who had been taking HIV PrEP for more than 6 months were included in this cross-sectional analysis (see online supplementary appendix A for more details); 59% had been on PrEP for 1 year or longer (see table 1). Men ranged in

Table 1 Demographics, PrEP use characteristics, sexual behaviour and club drug use and their associations with reporting BSTI while on PrEP (n=65)

			Bivariate: recent BSTI diagnosis† (ref: no)			Adjusted: recent BSTI diagnosis† (ref: no)	
Categorical variables	**n**	**%**	**n**	**%**	**FE‡/χ^2**	**AOR§**	**95% CI**
Race/Ethnicity					FE=1.0		
Black	5	7.7	1	20.0			
Latino	21	32.3	6	28.6			
White	31	47.7	8	25.8			
Other/Multiracial	8	12.3	2	25.0			
Education					χ^2 = 5.5*		
Lower than bachelor's degree	18	24.7	1	5.6			
Bachelor's degree or higher	47	72.3	16	34.0			
Income					χ^2 = 1.3		
Less than $20 000 per year	14	21.5	2	14.3			
$20 or more per year	51	78.5	15	29.4			
Length of time on PrEP					χ^2 = 0.3		
6–12 months	27	41.5	8	29.6		–	–
More than 1 year	38	58.5	9	23.7		0.50	0.14 to 1.74
Receives PrEP-related care from PCP¶					χ^2 = 1.0		
No	24	36.9	8	33.3		–	–
Yes	41	63.1	9	22.0		0.46	0.12 to 1.69
Missed any PrEP doses (past 90 days)					χ^2 = 0.1		
No	25	38.5	6	24.0		–	–
Yes	40	61.5	11	27.5		1.02	0.29 to 3.60
Engages in club drug use††					χ^2 = 9.2**		
No	32	49.2	3	9.4		–	–
Yes	33	50.8	14	42.4		6.60*	1.34 to 32.56
Continuous variables	**M**	**SD**	**OR**	**SE**		**AOR§**	**95% CI**
Age (M,SD, OR,SE)	31.9	8.5	0.98	0.04	–		
Number of sexual partners (past 30 days)	5.1	4.4	1.10	0.07	–	1.09	0.96 to 1.24
Number of condomless anal sex acts (past 30 days)	5.1	5.4	1.11	0.06	–	1.13	1.01 to 1.27

*p<0.05, **p<0.01.
†Self-reported chlamydia, gonorrhoea and/or syphilis diagnosis while on PrEP (past 6 months). A total of 17 men reported BSTI while 48 men did not report a BSTI diagnosis in the past 6 months while on PrEP.
‡Fisher's exact where applicable.
§Adjusted for age, race/ethnicity, education and income.
¶PCP, primary care provider (as compared with receiving PrEP-related care from a specialist clinic or provider).
††Self-reported use of ketamine, MDMA (3,4-methylenedioxymethamphetamine)/ecstasy, GHB (γ-hydroxybutyricacid), cocaine and/or methamphetamine in the past 30 days.
AOR, adjusted OR; BSTI, bacterial STI; FE, Fisher's exact; M, mean; PrEP, pre-exposure prophylaxis; ref, reference.

age between 21 and 61 years old (M_{age}=32 years). Nearly half (48%) were white, most (72%) had a bachelor's degree or higher education, and most (79%) had annual income of $20 000 or more. Sixty-three per cent received their PrEP-related care from a primary care provider, and 62% reported not missing a PrEP dose in the past 90 days. On average, men reported 5.1 sexual partners (SD=4.4) and 5.1 CAS acts (SD=5.4) in the past 30 days, and half (51%) of the sample reported recent engagement in club drug use (per study design). The average club drug use was reported on 4.9 days (SD=4.5) among those reporting using at least once in the past 30 days, and 82% of club drug users reported using on more than 1 day. Overall, a quarter (26%, n=17) reported a BSTI diagnosis in the prior 6 months; nearly half (42%) of club drug users had a BSTI compared with 9% of non-club drug users. Although we aggregated the three BSTIs for data analysis, the most commonly reported BSTI was gonorrhoea (n=13), followed by chlamydia (n=10) and syphilis (n=3).

Men with higher education and club drug users were more likely to report a recent BSTI in bivariate analyses. GBM who reported a higher number of CAS acts were also significantly more likely to report a BSTI diagnosis; however, the number of sexual partners and other variables analysed were not significantly associated with BSTI (see table 1). After adjusting for age, race/ethnicity, education and income, club drug users had higher odds of reporting a BSTI compared with non-users. Men who had more CAS also had higher odds of reporting a recent BSTI diagnosis. No significant differences in self-reported BSTI diagnosis were observed by length of time on PrEP, type of PrEP-related care provider, PrEP adherence or number of sexual partners (see table 1) (see online supplementary appendix A for supplemental analyses).

DISCUSSION

In this study, GBM who engaged in club drug use and those who reported a greater number of recent CAS acts were more likely to self-report a BSTI diagnosis while on HIV PrEP. Of particular note, 42% of club drug users reported a BSTI in the past 6 months. Based on this study and previous research among PrEP users that identified comparable rates of BSTIs,[2] regular BSTI testing and risk-reduction counselling for PrEP users are warranted. PrEP users who report club drug use and CAS are particularly important for ongoing BSTI testing and counselling. Club drug use is one mechanism to increase sexual arousal and motivations for sex,[6] which could be uniquely enhanced with diminished concern about HIV with PrEP use.[4] However, because club drug use is not an activity that causes transmission of BSTIs in and of itself, we posit club drug users on PrEP could be members of higher risk sexual networks.[9 10] This hypothesis is supported by findings indicating higher engagement in group sex activities among GBM and other MSM who combine drug and PrEP use compared with those who only use PrEP.[7] As such, healthcare providers providing PrEP and follow-up maintenance care should initiate ongoing BSTI risk-reduction counselling with their patients, particularly if they report club drug use and/or CAS engagement.

Limitations

Our findings should be understood in light of their limitations. First, this study is based on retrospective recall data with differing recall periods, and we are unable to determine temporality of events or causality. Second, we rely on self-reported BSTI diagnosis data, which could under-report the number of BSTIs because of asymptomatic or unrecognised infections that went undiagnosed. Third, this was a small sample size of PrEP users in New York City. It is likely that a larger sample size might have identified additional significant differences. Additional research is needed with larger samples of GBM on PrEP—including club drug users on PrEP—with comparative samples of men not on PrEP to determine heightened or comparable BSTI risk associated with PrEP and/or club drug use.

CONCLUSION

Our findings highlight the importance of ongoing BSTI screening and risk-reduction counselling for GBM on HIV PrEP. Club drug users could be at unique BSTI risk, perhaps because of higher risk sexual networks. However, our data provide no means of establishing a causal link between club drug use and BSTI acquisition, rather only a correlation. GBM engaging in CAS more often are also important for frequent testing and ongoing BSTI risk-reduction counselling.

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Contributors SAJ was responsible for manuscript conceptualisation, data analysis, data interpretation, literature search and manuscript writing. JTP and HJR were coinvestigators of the parent study and were responsible for oversight of measures development, participant recruitment, data management and day-to-day operations. CG is the principal investigator (PI) of the parent study, and his role included conceptualising the study design and oversight of all scientific decisions. JTP, HJR and CG provided feedback on data analysis and interpretation, manuscript revisions, and mentorship to SAJ during the writing of this paper. All authors provided intellectual content to the manuscript and approved the final manuscript. As the study's PI, CG carries the responsibilities of a corresponding author.

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