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CONDOMLESS GROUP SEX IS ASSOCIATED WITH HIV PRE-EXPOSURE PROPHYLAXIS KNOWLEDGE AND INTEREST UPTAKE: A CROSS-SECTIONAL STUDY OF GAY AND BISEXUAL MEN IN PARIS, FRANCE

Denton Callander,

Spatial Epidemiology Lab, Department of Population Health, New York University School of Medicine, New York, New York

Su Hyun Park,

Spatial Epidemiology Lab, Department of Population Health, New York University School of Medicine, New York, New York

Yazan A. Al-Ajlouni,

Spatial Epidemiology Lab, Department of Population Health, New York University School of Medicine, New York, New York

John A. Schneider,

Spatial Epidemiology Lab, Department of Population Health, New York University School of Medicine, New York, New York; Chicago Center for HIV Elimination, University of Chicago School of Medicine, Chicago, Illinois

Maria R. Khan, PhD,

Spatial Epidemiology Lab, Department of Population Health, New York University School of Medicine, New York, New York

Steven A. Safren, and

Department of Psychology, University of Miami, Miami, Florida

Dustin T. Duncan

Spatial Epidemiology Lab, Department of Population Health, New York University School of Medicine, New York, New York

Abstract

As a prevention strategy, HIV pre-exposure prophylaxis (PrEP) may benefit men who participate in group sex, but little is known about PrEP among this group internationally and virtually nothing is known of the European context. This study used an online survey of gay men living in Paris, France to assess associations between group sex and awareness of, use and interest in PrEP in its once-daily, episodic, injectable, and microbicidal forms. Men reporting recent (within 3 months) condomless group sex were much more likely to report once-daily PrEP use than men with no group sex experience (41.5% vs 7.7%, $p < .001$). Uptake was similarly low among men who had

group sex with condoms (8.0%) and those with less-recent experience (6.43%). Overall, willingness to use PrEP—including its non-daily forms—was high among men reporting group sex, suggesting opportunities for outreach and implementation.

Keywords

pre-exposure prophylaxis; condoms; MSM; collective sex; Europe

Wow, having group sex to me means different things: certainly, part of it is, um, an element of freedom in being able to understand my own body, relating to others, and being able to experience other people sharing their bodies with a group. (Sowell, Lindsey, & Spicer, 1998, p. 65)

In the late 1990s, Richard Sowell and his colleagues conducted one of the first studies of group sex among gay, bisexual, and other men who have sex with men (hereafter referred to as gay men), drawing upon interview data to construct it as a practice linked to sexual freedom but also HIV risk (Sowell et al., 1998). Since then, larger, quantitative studies of gay men have further illuminated connections between group sex, risk practices, and higher prevalences of HIV and other sexually transmissible infections (STIs; Friedman et al., 2008; Phillips, Grov, & Mustanski, 2015; Prestage, Grierson, Bradley, Hurley, & Hudson, 2009; Prestage et al., 2008; Rice et al., 2016; Solomon et al., 2011). Adding to this body of work, our recent analysis of group sex among gay men in Paris found that it was associated with condomless insertive and receptive anal sex as well as being diagnosed with an STI (Callander et al., 2019).

Although much earlier research has suggested some connection between group sex and infection risk, a recent review of group sex research—or “collective sex,” as sex among three or more people is sometimes known—concluded that while people more likely to take risks may be drawn to group sex, the practice itself does not pose inherent risks for HIV (Frank, 2019). This contention could explain why a cohort study of gay men in Amsterdam found that men were actually more likely to use condoms during group sex than they were in their dyadic sexual encounters (van den Boom et al., 2016). Previously, researchers have employed theories of sexual adventurism and compulsivity to explain men’s participation in practices like group sex, also drawing connections between these characteristics and high-risk practices, like drug use and condomless sex (Grov, Parsons, & Bimbi, 2010; Kippax et al., 1998).

While the mechanisms linking risk and group sex are not entirely clear, it remains that participation in group sex is a useful marker for gay men at higher risk of HIV and other STIs. This association means that gay men who engage in group sex may be an important target population for HIV pre-exposure prophylaxis (PrEP). Researchers have already started exploring levels of PrEP awareness and uptake among these men, including in a recent survey from Canada, which found that gay men who had participated in group sex were much more likely than others to be aware of PrEP (Lachowsky et al., 2016). Similarly, young gay men in the United States who had recently participated in group sex were more than three times as likely to report PrEP use than those who had not (Kuhns, Hotton,

Schneider, Garofalo, & Fujimoto, 2017). Further, Australian researchers recently identified PrEP as an important feature of group sex for some gay men, often combined with drugs like crystal methamphetamine to facilitate long, condomless, collective sex experiences (Hammoud et al., 2018).

National and international health agencies recommend the expansion of PrEP to people most at-risk for HIV. There is, therefore, an ongoing need to understand perceptions and uptake of PrEP among those who are defined as part of a priority population. Relative to men involved with group sex, some of this work has been undertaken in North America and Australia but virtually nothing is known about PrEP and group sex cultures in Europe. This paper outlines an analysis of PrEP uptake and perceptions among gay men in Paris, France. Using survey data, we sought to understand if and how participation in group sex intersects with Parisian men's knowledge and use of PrEP in its once-daily, episodic, injectable, and microbicidal forms.

METHODS

STUDY DESIGN

This study comprises a cross-sectional analysis of anonymous online survey data collected during October 2016 in Paris, France. Full details of this survey have been described previously (Mountcastle et al., 2018).

SETTING, RECRUITMENT, AND PARTICIPANTS

Participants were recruited using paid advertisements on a mobile sex and dating application popular with men who have sex with men. Advertisements were visible only to users located in the Paris Metropolitan Area, which directed men to an online survey portal. A raffle was held to incentivize participation with a prize of €65. Participation was limited to men aged 18 years and older and both cis- and transgender men were eligible to participate. Although the survey recruited information from men with HIV and those of unknown status, because of our focus on HIV prevention this analysis was restricted to participants who self-identified as HIV negative.

SURVEY TOOL

The survey tool included a total of 52 items, which participants were able to complete in English or French. Items collected demographic details, including age, sexual orientation, employment status, relationships status, and country of birth. Details were also collected on recent sexual activity, including sex work and other transactional sex, sexual partner genders and numbers, and condom use. Additional details were collected about participants' single most recent experience with group sex, including when it took place and the number of people involved. Participants were also asked to report the number of people with whom they had condomless anal sex during their most recent group sex experience.

The survey asked participants a series of questions about PrEP, including in its different forms: once-daily, episodic, injectable. For each form of PrEP, men were asked if they were aware of its existence (yes, no) and if they would be likely to use it in the future based on "at

least 90% efficacy” (very unlikely, unlikely, undecided, likely, very likely). Participants were asked the same questions about rectal and penile microbicides to prevent HIV. Men were also asked if they had or were currently taking once-daily PrEP, the only form of the drug available at the time of this study. For each form of PrEP, a definition was provided (for more information on this survey’s PrEP-related items, see: Mgbako et al., 2018).

STUDY VARIABLES

We organized participants self-reported group sex experience into one of four categories: (1) recent group sex with condomless anal sex, (2) recent group sex with condoms, (3) less-recent group sex, or (4) no previous group sex. Recent in this context was defined as taking place within 3 months of participation while less-recent was group sex that took place more than 3 months before participation. Regarding condom use, we created a dichotomous variable based on the number of incidents of condomless sex participants reported at their most recent group sex encounter (zero incidents, one or more incidents) and used this to further nuance the categories of group sex. Around PrEP, awareness and use were maintained as dichotomous variables, while willingness to use was collapsed into two categories (very unlikely/unlikely/undecided, likely/very likely).

Sociodemographic variables were organized in categories of age (18–24 years, 25–29, 30–39, 40–49, 50 years and older), country of birth (France, other) employment status (employed, unemployed, student, retired), sexual orientation (gay, bisexual, straight, other) and relationship status (single, relationship with a man, relationship with a woman).

STATISTICAL ANALYSIS

Descriptive analyses were used to characterize the study sample, while Chi-squared tests were used to assess bivariate relationships between experiences of group sex, awareness of and willingness to use different forms of PrEP. Multiple logistic regression analyses were used to further investigate associations between group sex and knowledge, use and willingness to use different kinds of PrEP. To account for potential demographic and behavioral associations, age, sexual orientation country of birth, employment status, and relationship status were included as covariates in these models. Adjusted odds ratios (aORs) and 95% CI confidence intervals (CIs) were estimated; statistical significance was set at $p < 0.05$ and Stata Version 14.2 was used for all analyses.

ETHICS

The conduct of this study was approved by the institutional review board of New York University’s School of Medicine.

RESULTS

In total, 5,206 individuals visited the study webpage, 935 started the survey, 580 completed it, 444 self-identified as HIV-negative and were, therefore, included in this analysis. Table 1 provides an overview of participant sociodemographic and behavioral characteristics. Participants in our sample ranged in age from 18 to 66 with a median of 34 years (interquartile range: 27–43). Overall, 287 (64.6%) of participants had some previous

experience of group sex in their lifetime: 41 participants (9.2% of the total sample) reported group sex within the previous 3 months and condomless anal sex at their most recent encounter, 87 (19.6%) reported recent group sex and condoms at their most recent encounter, and 159 (35.8%) reported a less-recent group sex experience that took place longer than 3 months prior. At their most recent encounter, including themselves men reported between 3 and 100 group sex participants with a median of 3 (interquartile range: 3–5). Among those reporting group sex, 57.0% said that their most recent encountered involved a total of three people.

Awareness of PrEP was high among this sample, with 87.2% of men reporting that they had heard of its once-daily application. At a bivariate level, awareness was even higher among men who reported group sex (92.7%) compared with those with no group sex experience (79.0%, $p = .002$) but similar among men involved with group sex regardless of recency or condom use. Overall, PrEP uptake was 10.4% among our sample, highest among men reporting recent condomless group sex (41.5%) compared with those with recent group sex where condoms were used (8.1%), those with less-recent group sex (6.3%) and men with no experience of group sex (7.6%, $p < .001$). Interestingly, although 41.5% of men reporting group sex indicated a willingness to use PrEP, only 12.5% had some experience with the medication. As depicted in Figure 1, willingness to use PrEP was consistently highest among men reporting recent experiences of condomless group sex.

The regression analyses findings are presented in Table 2. After controlling for sociodemographic characteristics, participants with any previous group sex experience were more likely than those who had not previously engaged in group sex to have heard of once-daily PrEP. Men who reported a recent experience of condomless group sex were more likely than other participants to indicate their willingness to use PrEP in its once daily, episodic and injectable forms and tended to be more aware of their existence in the first place. Men with recent condomless group sex also were much more likely than their peers to report use of once-daily PrEP. There were no group sex-related differences of men's awareness of or willingness to use microbicides. Interestingly, among men reporting group sex, engaging in larger encounters (3 vs. 4 people) was associated with greater interest in once-daily PrEP (aOR = 1.9, 95% CI [1.1, 3.3], $p = .018$) and in its previous use (aOR = 2.6, 95% CI [1.1, 6.3], $p = .03$).

DISCUSSION

HIV-negative gay men in Paris, France demonstrated a high-level awareness of PrEP, with awareness highest among men who had previously engaged in group sex. Men with recent experiences of condomless group sex were more likely than others to indicate a willingness to use PrEP and much more likely to report having used it previously. Gay men in Paris were less aware of other kinds of PrEP—notably its injectable and microbicial forms—but displayed some willingness to use them, with the greatest interest among men reporting recent condomless group sex.

In general, experiences of group sex alone were not associated with greater awareness of or interest in using PrEP, except among men who reported condomless anal sex during their

most recent encounter. Further, rates of PrEP use were similar among all participants except those who had recently experienced condomless group sex. These distinctions are important because they speak to an idea emerging in recent literature, which is that group sex is not a practice with inherent risk of HIV or STIs (Frank, 2019). In our sample, more than half of men reported using condoms during a recent group sex encounter and these men displayed no greater interest in PrEP than those not involved in group sex. It is, therefore, plausible that gay men are assessing their own risk for HIV—and subsequent interest in PrEP—based on condom use, not participation group sex.

It is promising that nearly nine out of ten gay men surveyed in Paris were aware of PrEP in its once-daily form. This proportion is markedly higher than a national study conducted in France in 2017, which found that only 69% of gay men knew PrEP existed (Rosenthal et al., 2014). This difference is likely explained by the fact that our sample was based exclusively in Paris, the center for France's PrEP efficacy and implementation studies (Pebody, 2017). At the time of this survey, gay men in Paris could access PrEP only through off-label prescribing or a trial, so it is unsurprising that only one in ten men had used PrEP even though nearly 40% expressed interest. Our finding that uptake was so much higher among men involved with condomless group sex could reflect efforts of researchers to enroll men with the highest HIV risk, self-selection among this group to access PrEP through research and other channels, or some combination of both.

As France and other countries seek to implement PrEP as a safer sex option, more work is required to bridge the gap between awareness, interest, and uptake. While men involved with condomless group sex in Paris seem very interested in PrEP—including its episodic, injectable, and microbicidal forms—without access to the medication they remain at risk for HIV. Further, although largely unaware of other options, many men with less-recent, less-risky or no group sex practices seemed interested in non-daily forms of PrEP, suggesting that they may have a part to play in supporting safer sex among men with diverse sexual lives. More work is required to clarify how nondaily PrEP might work and to make that information more widely available.

As a cross-sectional study, we do not claim causation and it is highly likely that some men in Paris accessed PrEP because they were participating in condomless group sex, while for others their PrEP use facilitated these experiences. A longitudinal study exploring these relationships is warranted, including to see if PrEP uptake predicts participation in condomless group sex. This study also recruited men through a single mobile application, a sample that could be different from those who do not use other webservices for sex or dating or who do not meet partners online. Regardless, our analysis helps shed further light on the relationship between group sex and engagement with PrEP among men in Paris, which will help serve further implementation of this drug in France and other parts of the world.

Our findings are most relevant to Paris, a highly urbanized setting. Given that group sex tends to be far more common in urban settings (Frank, 2019) it is not clear how applicable this study is to knowledge of, interest in and use of PrEP in other parts of the country or continent. Further, while we focused on risk for HIV and its relationship to PrEP, following some of our previous research it is important to recognize that participation in group sex

seems to pose a risk for STIs that cannot be mitigated by condom use alone (Callander et al., 2019). Greater attention is needed to develop strategies for preventing and managing STIs among this population, which complement PrEP and address the multifaceted nature of STIs other than HIV.

CONCLUSIONS

Although researchers and theorists have debated if group sex settings can be harnessed for safer sex interventions (Flowers & Frankis, 2019; Meunier, Escoffier, & Siegel, 2019), it remains that men involved with group sex seem to have different sexual health risks and needs than their peers. PrEP may have some part to play in helping reduce infection risk among men involved with group sex, and so the possibility of harnessing group sex subcultures and networks to support implementation should be considered. The possibilities of such an approach are reinforced by our finding that at least some men in Paris are ready and willing to engage with it as a method of HIV prevention. As France and other countries continue to roll-out PrEP, attention must be paid to group sex as a marker of potential risk and an opportunity to identify those for whom it might have the greatest benefit. Such attention could include marketing to men who engage in this practice and the inclusion of group sex as a criterion for PrEP eligibility as part of clinical and self-assessments.

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REFERENCES

- Callander D, Park S, Schneider J, Khan M, Kreski N, Hambrick H, ... Duncan D (2019). The city of love: Group sex participation, condomless anal intercourse and HIV risk among men who have sex with men in Paris, France. *Sexual Health*. Advance online publication.
- Flowers P, & Frankis J (2019). Imagining interventions for collective sex environments. *Archives of Sexual Behavior*, 48, 35–39. 10.1007/s10508-018-1222-7 [PubMed: 29748786]
- Frank K (2019). Rethinking risk, culture, and intervention in collective sex environments. *Archives of Sexual Behavior*, 48, 3–30. 10.1007/s10508-018-1153-3 [PubMed: 29748787]
- Friedman SR, Bolyard M, Khan M, Maslow C, Sandoval M, Mateu-Gelabert P, ... Aral SO (2008). Group sex events and HIV/STI risk in an urban network. *Journal of Acquired Immune Deficiency Syndromes*, 49, 440–446. [PubMed: 19186355]
- Grov C, Parsons JT, & Bimbi DS (2010). Sexual compulsivity and sexual risk in gay and bisexual men. *Archives of Sexual Behavior*, 39, 940–949. [PubMed: 19308715]
- Hammoud MA, Vaccher S, Jin F, Bourne A, Haire B, Maher L, ... Prestage G (2018). The new MTV generation: Using methamphetamine, Truvada™, and Viagra™ to enhance sex and stay safe. *International Journal of Drug Policy*, 55, 197–204. [PubMed: 29526546]
- Kippax S, Campbell D, Van de Ven P, Crawford J, Prestage G, Knox S, ... Kinder P (1998). Cultures of sexual adventurism as markers of HIV seroconversion: A case control study in a cohort of Sydney gay men. *AIDS Care*, 10, 677–688. [PubMed: 9924523]
- Kuhns LM, Hottot AL, Schneider J, Garofalo R, & Fujimoto K (2017). Use of pre-exposure prophylaxis (PrEP) in young men who have sex with men is associated with race, sexual risk behavior and peer network size. *AIDS and Behavior*, 21, 1376–1382. [PubMed: 28238119]

- Lachowsky NJ, Lin SY, Hull MW, Cui Z, Sereda P, Jollimore J, ... Moore DM (2016). Pre-exposure prophylaxis awareness among gay and other men who have sex with men in Vancouver, British Columbia, Canada. *AIDS and Behavior*, 20, 1408–1422. [PubMed: 26884310]
- Meunier É, Escoffier J, & Siegel K (2019). Rethinking risks and interventions beyond HIV: The importance of contextualizing collective sex. *Archives of Sexual Behavior*, 48, 51–56. 10.1007/s10508-018-1214-7 [PubMed: 29663163]
- Mgbako O, Park SH, Mayer KH, Schneider JA, Goedel WC, Hambrick HR, & Duncan DT (2018). Transactional sex and preferences for pre-exposure prophylaxis (PrEP) administration modalities among men who have sex with men (MSM). *Journal of Sex Research*. Advance online publication.
- Mountcastle HD, Park SH, Al-Ajlouni YA, Goedel WC, Cook S, Lupien S, ... Duncan DT (2018). Stress levels are associated with poor sleep health among sexual minority men in Paris, France. *Sleep Health*, 4, 436–441. [PubMed: 30241658]
- Pebody R (2017). France's next PrEP study aims to assess the wider impact of PrEP on the HIV epidemic. *AIDS Map*. Retrieved October 2018, from <http://www.aidsmap.com/Frances-next-PrEP-study-aims-to-assess-the-wider-impact-of-PrEP-on-the-HIV-epidemic/page/3161163/>
- Phillips G, Grov C, & Mustanski B (2015). Engagement in group sex among geosocial networking mobile application-using men who have sex with men. *Sexual Health*, 12, 495–500. [PubMed: 26255156]
- Prestage G, Grierson J, Bradley J, Hurley M, & Hudson J (2009). The role of drugs during group sex among gay men in Australia. *Sexual Health*, 6, 310–317. [PubMed: 19917200]
- Prestage GP, Hudson J, Down I, Bradley J, Corrigan N, Hurley M, ... McInnes D (2008). Gay men who engage in group sex are at increased risk of HIV infection and onward transmission. *AIDS and Behavior*, 13, 724–730. [PubMed: 18818998]
- Rice CE, Lynch CD, Norris AH, Davis JA, Fields KS, Ervin M, & Turner AN (2016). Group sex and prevalent sexually transmitted infections among men who have sex with men. *Archives of Sexual Behavior*, 45, 1411–1419. [PubMed: 26392187]
- Rosenthal E, Piroth L, Cua E, Joulie A, Ravaux I, Chauveau M, ... Weiss L (2014). Preexposure prophylaxis (PrEP) of HIV infection in France: A nationwide cross-sectional study (PREVIC study). *AIDS Care*, 26, 176–185. [PubMed: 23756091]
- Solomon TM, Halkitis PN, Moeller RM, Siconolfi DE, Kiang MV, & Barton SC (2011). Sex parties among young gay, bisexual, and other men who have sex with men in New York City: Attendance and behavior. *Journal of Urban Health*, 88, 1063–1075. [PubMed: 21698548]
- Sowell RL, Lindsey C, & Spicer T (1998). Group sex in gay men: its meaning and HIV prevention implications. *Journal of the Association of Nurses in AIDS Care*, 9, 59–71.
- van den Boom W, Davidovich U, Heuker J, Lambers F, Prins M, Sandfort T, & Stolte IG (2016). Is group sex a higher-risk setting for HIV and other STIs compared to dyadic sex among MSM? *Sexually Transmitted Diseases*, 43, 99–104. [PubMed: 26766526]

FIGURE 1.

Proportion of participants (with 95% confidence intervals) reporting awareness of, willing to use, and previous use (previous or current use was asked only for once-daily PrEP) of once-daily, episodic, injectable, and microbicide (rectal and/or penile) HIV PrEP among HIV-negative gay, bisexual, and other men who have sex with men in Paris, France ($n = 444$), by experiences of group sex ("recent" defined as any group sex within the 3 months prior to participation; condom use relative to each participant's most recent group sex).

TABLE 1.

Sociodemographic and Behavioral Characteristics of HIV-Negative Gay, Bisexual, and Other Men Who Have Sex With Men in Paris, France ($n = 444$)

	<i>n</i>	%
Median age in years (interquartile range)	34 (27–43)	
Country of birth		
France	352	80.2
Other	87	19.8
Employment status		
Employed	304	69.6
Unemployed	64	14.7
Student	65	14.9
Retired	4	0.9
Sexual orientation		
Gay	376	85.5
Bisexual	56	12.7
Other	8	1.8
Relationship status		
Single	298	68.2
With a man	129	29.5
With a woman	10	2.3
Group sex experience		
Recent, ^a condomless ^b	41	9.2
Recent, ^a condoms ^b	87	19.6
Less-recent ^a	159	35.8
No previous group sex	157	35.4
Median people (no.) during group sex (interquartile range)^b	3 (3–7)	

Note.

^a“Recent” defined as any group sex within the 3 months prior to participation;

^bRelative to each participant’s most recent group sex experience.

TABLE 2.

Multiple Logistic Regression Outcomes (aORs and 95% CIs) Between Experiences of Group Sex and the Awareness of, Willingness to Use, and Use of Once-Daily, Episodic, Injectable, and Microbicide HIV PrEP Among HIV-Negative Gay, Bisexual, and Other Men Who Have Sex With Men ($n = 444$)

PrEP method		Group sex aOR [95% CI] ^a			
		None	Less-recent ^b	Recent, ^b condoms ^c	Recent, ^b condomless ^c
		($n = 157$)	($n = 159$)	($n = 87$)	($n = 41$)
Once daily	Aware of		3.5 [1.7, 7.4] **	6.3 [2.1, 19.2] **	3.5 [1.0, 12.7] *
	Willing to use		1.4 [0.8, 2.2]	1.4 [0.8, 2.5]	4.6 [2.1, 10.3] **
	Have used		0.9 [0.3, 2.2]	1.2 [0.4, 3.4]	13.4 [4.9, 36.4] **
Episodic	Aware of		1.2 [0.8, 1.9]	1.9 [1.1, 3.3] *	2.2 [1.0, 4.8] *
	Willing to use	Reference group	1.0 [0.6, 1.5]	0.9 (0.5, 1.6)	2.6 [1.2, 5.7] *
Injectable	Aware of		0.9 [0.3, 2.8]	1.7 [0.6, 5.1]	6.2 [2.1, 18.7] **
	Willing to use		1.5 [0.9, 2.4]	1.6 [0.9, 2.9]	2.9 [1.4, 6.2] **
Microbicide ^d	Aware of		0.8 [0.3, 1.8]	1.1 [0.4, 3.0]	1.9 [0.6, 5.6]
	Willing to use		1.1 [0.7, 1.8]	0.9 [0.5, 1.6]	1.6 [0.7, 3.4]

Note. aOR: adjusted odds ratio; 95% CI: 95% confidence interval.

^a Adjusted for age, sexual orientation, country of birth, employment, and relationship status;

^b "Recent" defined as any group sex within the 3 months prior to participation;

^c Condom use relative to each participant's most recent group sex experience;

^d Rectal and/or penile microbicide.

* $p < .05$.

** $p < .01$.