

Sexual activities and condom use among heterosexual men and women engaged in mixed-gender group sex events in Melbourne, Australia

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ABSTRACT

Background. Few studies investigate group sex among heterosexuals. The aim of this study was to provide an exploration of characteristics and practices among heterosexual men and women who engage in group sex. **Method.** We conducted a cross-sectional survey between May 2019 and March 2020 among heterosexual men and women attending a sexual health clinic in Melbourne, Australia. Participants were asked whether they had participated in group sex (sex involving more than two participants) in the past 3 months, the size of the most recent event, sexual activities in which they engaged, and condom use. **Results.** Of 3277 heterosexuals surveyed (1509 women and 1768 men), the mean age was 29.9 years (s.d. 8.8) and more than half (56.0%, $n = 1834$) were born outside Australia. One in 20 participants (5.4%) had engaged in group sex in the past 3 months with the number of events ranging 1–10 times. Kissing was the most common activity in group sex, and women were significantly more likely to kiss a same-sex partner than men. Overall, of 165 participants who engaged in vaginal sex, 57 (34.5%) reported always using condoms and changing condoms between consecutive partners. Of the 100 men and women who had condomless vaginal sex, 79 (79.0%) received or performed fellatio after condomless vaginal sex. **Conclusion.** About two-thirds of heterosexuals who engaged in group sex neither used condoms nor changed condoms between partners in the most recent group sex event. Safe sex messages on changing condoms between partners and between sexual activities should be reinforced for sexually transmitted infections prevention.

Keywords: anal, condom, condomless, fellatio, group sex, heterosexual, kissing, rimming, sexually transmitted diseases, sexually transmitted infections, threesome, vaginal.

Introduction

Since the 2000s, the incidence of sexually transmitted infections (STIs) has been rising in many high-income countries, including Australia.^{1,2} In Australia, gay, bisexual and other men who have sex with men (MSM) have been disproportionately affected by gonorrhoea and syphilis.¹ Gonorrhoea and syphilis had not been common among heterosexual individuals in urban Australian cities until the mid-2010s. The cause of this rise is unclear and may be multifactorial.¹

Group sex is defined as a sex event that involves three or more people and has been considered a high-risk activity for the acquisition of HIV and other STIs, due to the high rates of condomless sex and having multiple concurrent partners.³ However, despite this relation, there have been very limited studies on group sex in the literature. Most studies investigating group sex focus on MSM, where the proportion of engaging in group sex within the past 3 months is estimated to be 27–35%.^{4,5} However, there have been very limited group sex studies among other at-risk populations, such as heterosexuals.^{4–6} A cross-sectional survey by Constantinou *et al.* (2021) reported that 5% of 698 heterosexual men and women in Melbourne had participated in at least one group sex

event within the past 3 months and found that heterosexuals who participated in group sex were over six times more likely to test positive for chlamydia, gonorrhoea or syphilis.⁶

Furthermore, previous studies investigating mixed-gender group sex events have not studied the number of people involved in each group sex event, the sexual activities involved in group sex events and the practice of changing condoms between partners during group sex in details.^{4,5} Most studies report condom use in group sex as a binary variable (yes/no) and it is unclear whether participants change condoms for each partner.^{4,7} To our knowledge, there has been only one study investigating whether MSM have changed condoms between partners during group sex⁴ and there are no quantitative studies among the heterosexual population. Past studies have highlighted the need for further research assessing condom use specifically for mixed-gender group sex events.⁸ Therefore, we aimed to provide a descriptive exploration into participation, sexual activities and condom use among heterosexual men and women when engaging in mixed-gender group sex.

Materials and methods

This was a cross-sectional study conducted at Melbourne Sexual Health Centre (MSHC). MSHC is a public sexual health clinic in Melbourne, Australia. All clients attending MSHC for the first time or had not been seen for 3 months were asked to complete a routine questionnaire using computer-assisted self-interviewing (CASI). This questionnaire collected information on demographic characteristics and sexual practices for routine clinical care and management. After completing CASI, eligible clients were invited to participate in a voluntary survey called the 'Kissing And Sexual Practice (KASP)' survey between 12 May 2019 and 13 March 2020.

Men or women aged 18 years or above and who reported no same-sex activities in the past 12 months (hereafter 'heterosexuals') were invited to participate in the KASP survey after they completed the routine clinical questionnaire via CASI. In this analysis, we excluded individuals who were working as sex workers because their sexual practices might be different from individuals who were not sex workers. Informed consent was obtained from participants before the commencement of the KASP survey. The KASP survey included questions on the number of group sex events in the past 3 months, the number of men and women involved in the most recent group sex event, the number of different sexual activities they engaged in (i.e. tongue-kissing, oral sex, vaginal sex, and anal sex), and whether men changed condoms between partners ('never', 'sometimes', 'always' or 'did not know'). We defined group sex as participation in at least one sexual activity (tongue kissing, oral sex or vaginal/anal sex), with more than two other

participants in the past 3 months. For participants who answered the KASP survey more than once, only their first response was included in the final analysis. Our original aim was to recruit at least 200 heterosexual men and women who had participated in group sex; however, we ceased recruitment earlier due to the COVID-19 pandemic, as sexual practices might have changed due to restrictions imposed during COVID-19 lockdowns in Melbourne.⁹ This study was approved by the Alfred Hospital Ethics Committee (647/17).

All individuals were offered HIV and STI (i.e. syphilis, gonorrhoea and chlamydia) testing as part of their routine clinical consultation at our clinic. Clinical data on HIV and STI testing results were extracted and linked to their survey response. HIV/STI test positivity was defined as the number of individuals who tested positive divided by the number of individuals who were tested. First-pass urine or urethral swabs were collected for genital gonorrhoea or chlamydia testing. Blood was collected for HIV and syphilis serological testing. Anorectal or oropharyngeal swabs were collected in some individuals for extragenital gonorrhoea or chlamydia testing based on the individual's risk profile or clinical decision. Gonorrhoea and chlamydia were diagnosed by nucleic acid amplification test using the Aptima Combo 2 Assay (Hologic, California, USA). Oropharyngeal STI positivity was not included in our STI analysis, as heterosexual patients are not regularly screened for this.

Continuous variables were summarised using mean, standard deviation, median and interquartile range. Categorical variables were summarised using frequencies and proportions. We compared characteristics between participants who had had group sex and those who did not have group sex using a two-sample *t*-test for continuous variables and Fisher's exact test for categorical variables. Univariable and multivariable logistic regression was performed to examine the association between group sex participation and HIV/STI positivity. We included demographic characteristics (i.e. age, sex and country of birth) in the multivariable logistic regression. All statistical analyses were performed using Stata (version 17, College Station, Texas, USA.).

Results

There were 14 798 eligible heterosexual men ($N = 8454$) and women ($N = 6344$) invited to participate in the KASP survey between May 2019 and March 2020. Of these, 3277 individual respondents (22.1%) consented to participate in the study and were included in the final analysis. There were no significant differences between those who participated in the study and those who did not in relation to age, born outside Australia, injecting drug use in the past 3 months and the number of sexual partners in the past 3 months. However, a greater proportion of women

(23.8% [1509/6344]) consented to participate in compared to men (20.9% [1768/8454]) ($P < 0.001$).

The mean age of participants was 29.9 years (s.d. 8.8) and 56.0% ($n = 1834$) were born outside Australia. A small proportion (5.4%, $n = 177$) reported group sex in the past 3 months and the number of group sex events ranged from 1 to 10, with a median of 1 (IQR: 1–2) time.

A significantly greater proportion of men (8.0%, 141/1768) had engaged in group sex in the past 3 months compared to women (2.4%, 36/1509) ($P < 0.001$) (Table 1). Additionally, men who had engaged in group sex were significantly older compared to men who did not engage in group sex (34.3 years vs 29.7 years, $P = 0.001$). However, there was no difference in age among women who had group sex compared to women who did not have group sex ($P = 0.142$). There was no significant difference in country of birth ($P = 0.109$) between those who had group sex and those who did not.

Overall, test positivity for chlamydia was 6.1% (177/2891), gonorrhoea was 0.7% (20/2913), syphilis was 0.9% (17/1968) and HIV was 0.1% (1/1955). After adjusting for age, sex and country of birth, the adjusted odds of having chlamydia was 1.8 (95% CI: 1.0–3.2; $P = 0.040$) times higher among individuals who had engaged in group sex compared to those who did not engage in group sex. However, gonorrhoea, syphilis or HIV was not associated with group sex participation. Of 12 men diagnosed with chlamydia who participated in group sex, the most common site of chlamydia infection was urethral ($n = 11$) followed by anal ($n = 1$). The most common site of chlamydia

infection for the three women who tested positive and participated in group sex was also urethral ($n = 3$).

Among 141 men who had engaged in group sex, the total number of people involved in their most recent group sex event ranged from 3 to 40 people, with a median of four people (including the man surveyed as part of this study). The number of individuals in a group sex event is in Table 2.

For those who had engaged in group sex, the most common activity was kissing. Most (96.6%, $n = 171$) reported kissing in their most recent group sex event, and the total number of people they kissed ranged from 0 to 39, with a median of 4 (IQR 2–4) (Table 3). For men, there was no significant difference in whether they were more likely to kiss a male or female partner. However, women were significantly more likely to kiss a woman than kiss a man in the most recent group sex (94.4% [34/36] vs 25.0% [9/36], $P < 0.001$). Furthermore, a greater amount of women kissed a same-sex partner compared to men (94.4% [34/36] vs 90.8% [128/141]) although this was not statistically significant ($P = 0.739$).

Fellatio was the second most common activity in the most recent group sex event. For men, 91.5% ($n = 129$) reported receiving fellatio from women. For women, 88.9% ($n = 32$) reported performing fellatio on men, both with a median number of two activities per session.

Vaginal sex was reported by 93.2% (165/177) of participants (94.3% [133/141] men, 88.9% [32/36] women) in their most recent group sex event and anal sex was reported by 3.4% (6/177) of participants (2.8% [4/141] men, 0.6% [2/36] women).

Of 133 men who had vaginal sex, 54 (40.6%) always used condoms, 42 (31.6%) men sometimes used condoms and 37 (27.8%) never used condoms in the most recent group sex event. Of 54 men who always used condoms, 48 (88.9%) always changed condoms between women, one (1.9%) reported changing condoms with some women, and five (9.3%) used the same condoms with all women (Fig. 1). Therefore, of 133 men who had vaginal sex, 48 (36.1%) reported always using condoms and changing them between consecutive partners. Of 133 men who had vaginal sex, 102 received fellatio after vaginal sex. The proportion who engaged in fellatio after vaginal sex was significantly higher among men who engaged in condomless vaginal sex compared to those who used condoms during vaginal sex (83.5% [66/79] vs 66.7% [36/54], $P = 0.036$).

Of four men who engaged in anal sex, two always used condoms (50.0%), one sometimes used condoms and one never did (25.0%). The two men who always used condoms also always changed condoms between partners. The two men who did not always use condoms for anal sex received fellatio after anal sex.

Of 32 women who had vaginal sex, 11 (34.4%) always used condoms, 7 (21.9%) women sometimes used condoms and 14 (43.8%) never used condoms. Of 11 women who used condoms with all men, nine (81.8%) reported their male

Table 1. Demographic characteristics between those who had group sex compared to those who did not.

Demographic characteristics	Engaged in group sex (N = 177)	No group sex (N = 3100)	P-value ^A
Age (years), mean (s.d.)	33.3 (9.8)	29.7 (8.7)	<0.001
Sex, n (%)			<0.001
Male	141 (79.7%)	1627 (52.4%)	
Female	36 (20.3%)	1473 (47.5%)	
Country of birth, n (%)			0.370
Australia	66 (37.3%)	1027 (33.1%)	
Overseas	90 (50.8%)	1744 (56.3%)	
Unknown	21 (11.9%)	329 (10.6%)	
Injecting drug use in the past 3 months, n (%)			0.779
Yes	1 (0.6%)	17 (0.5%)	
No	146 (82.5%)	2618 (84.5%)	
Unknown	30 (16.9%)	465 (15.0%)	

^AP-value for age was calculated from a two-sample t-test. P-values for sex and country of birth were calculated using chi-squared test.

Table 2. The number of people involved in group sex among 177 participants.

	Range	Median (IQR)	Mean (s.d.)	Mean proportion (s.d.) of men or women in the group sex event
Men and women (N = 177)				
Total number of men and women in a group sex event (including surveyed participant)	3–40	4 (3–5)	6.0 (7.0)	–
Total number of men in a group sex event (including surveyed participant)	0–20	2 (1–2)	2.9 (3.5)	47.0% (14.2)
Total number of women in a group sex event (including surveyed participant)	0–20	2 (2–3)	3.1 (3.6)	51.4% (14.0)
Men (N = 141)				
Total number of men and women in a group sex event (including surveyed participant)	3–40	4 (4–6)	6.6 (7.3)	–
Total number of men in a group sex event (including surveyed participant)	1–20	2 (2–3)	3.4 (3.7)	48.9% (11.8)
Total number of women in a group sex event (including surveyed participant)	1–20	2 (2–3)	3.2 (3.8)	51.1% (12.8)
Women (N = 36)				
Total number of men and women in a group sex event (including surveyed participant)	3–28	3 (3–3)	3.8 (4.3)	–
Total number of men in a group sex event (including surveyed participant)	1–8	1 (1–1)	1.1 (1.2)	32.2% (9.1)
Total number of women in a group sex event (including surveyed participant)	1–20	2 (2–2)	2.5 (3.1)	67.8% (9.1)

IQR, interquartile range.

Table 3. Engagement in different sexual activities in the most recent group sex event among 177 participants who had had group sex in the past 3 months.

	Participants who engaged in the activity, n (%)	Number of partners engaged in the activity		
		Range	Median (IQR)	Mean (s.d.)
Kissing anyone	171 (96.6%)	0–39	4 (2–4)	4.8 (5.5)
Kissing opposite-sex partner	144 (81.4%)	0–20	2 (1–2)	2.7 (3.6)
Kissing same-sex partner	162 (92.6%)	0–20	2 (1–2)	2.3 (2.5)
Engaging in fellatio	161 (91.5%)	0–25	2 (1–2)	2.2 (2.4)
Men received ^A	129 (91.5%)	0–16	2 (1–2)	2.2 (1.8)
Women performed	32 (88.9%)	0–8	2 (1–2)	2.2 (4.0)
Engaging in cunnilingus	146 (82.5%)	0–23	2 (1–2)	2.0 (3.2)
Men performed	114 (80.9%)	0–9	2 (1–2)	1.6 (1.3)
Women received ^B	32 (88.9%)	0–15	2 (2–4)	3.8 (6.5)
Vaginal sex	165 (93.2%)	0–10	2 (1–2)	2.1 (2.2)
Anal sex	6 (3.4%)	0–2	0 (0–0)	0.39 (0.22)

Stratified data among men and women is provided in the supplementary materials.

^AMen received fellatio includes from women only.^BWomen cunnilingus includes both receiving from men and women.

IQR, interquartile range.

partners changed condoms between all women, one (9.1%) reported their male partners used the same condoms with all women, and one (9.1%) did not know (Fig. 2). Therefore, of 32 women who had vaginal sex, nine (28.1%)

reported using condoms and changing them between consecutive partners. Of 32 women who had vaginal sex, 21 (65.6%) performed fellatio after vaginal sex. The proportion who engaged in fellatio after vaginal sex was

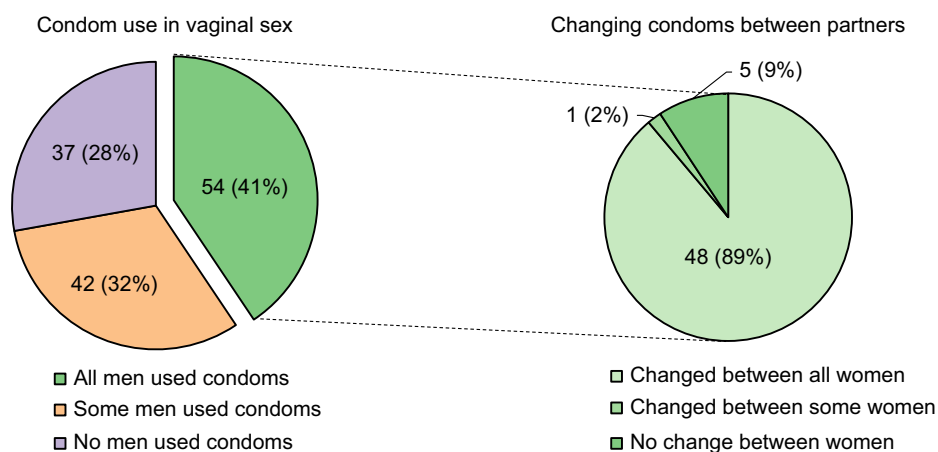


Fig. 1. Condom use among the 133 surveyed men who engaged in vaginal sex in their most recent group sex event.

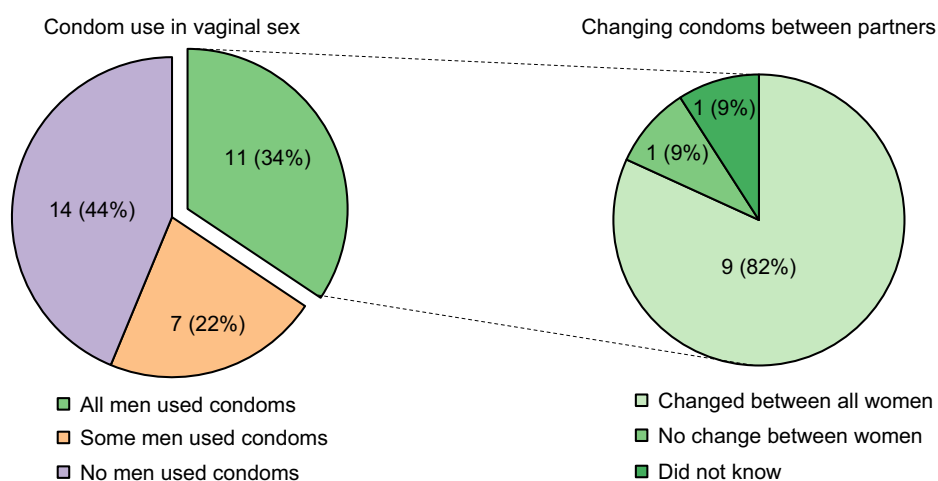


Fig. 2. Condom use among the 32 women who engaged in vaginal sex in their most recent group sex event.

similar among women who used condoms during vaginal sex (72.7% [8/11]) compared to those engaged in condomless vaginal sex (61.9% [13/21]) ($P = 0.703$).

Two women reported condomless anal sex and one reported performing fellatio after condomless anal sex.

Discussion

In our study of 3277 heterosexual men and women attending a sexual health clinic in Melbourne, Australia, we found that one in 20 (5%) had engaged in mixed-gender group sex in the past 3 months. Overall, we found that the median number of people involved in mixed-gender group sex was four participants (including the surveyed participant), with two men and two women being the most common combination. Kissing was the most common activity in group sex, and

most had fellatio, cunnilingus and vaginal sex. Women were more likely to kiss women rather than men in the most recent group sex. One in 30 participants reported having anal sex in their most recent group sex event. Our study further finds that participants were 1.8 times more likely to test positive for chlamydia if they participated in group sex, and the proportion who used condoms during group sex and changed them between each partner for both men and women was less than half (40.6% for men and 34.4% for women). There was also a high proportion of participants who engaged in fellatio after condomless vaginal (79.0%) and anal sex (75.0%).

Studies suggest that 34–50% of heterosexual men and women in Melbourne reported consistent condom use with casual partners in the past 12 months.^{10–13} Our study found that 41% of men and 34% of women used condoms with every partner during their most recent group sex event.

However, we found that 36% of men and 28% of women reported always using condoms and changing condoms between consecutive partners, which is similar to the findings from a qualitative study of 28 men and women who had experience in mixed-gender threesomes.¹⁴ The qualitative study found that half (14/28) used condoms for penetrative sex during threesomes and no participants used condoms for oral sex during threesomes. Additionally, the authors also found that 18% (5/28) changed condoms when switching between partners during threesomes. Using the same condom between partners can increase the risk of STI transmission between individuals who might not have any sexual contacts.¹⁵ Alternative contraceptive methods may therefore lead to lower rates of condom use among heterosexuals if their intention is to only avoid pregnancy rather than avoid STIs.^{11,14,16} As the proportion of heterosexuals who always used condoms and changed them between partners during group sex was relatively low (36% in men and 28% in women), safe sex practices should be reinforced among individuals especially in group sex to minimise STI acquisition risk. Past studies have shown oral and anal sex are common in heterosexuals,¹³ but there has been no data on changing condoms between oral, vaginal and anal sex during mixed-gender group sex events; therefore, further studies are required to explore patterns of condom use in the heterosexual population.

Almost all participants kissed in their most recent group sex event. Emerging evidence suggests some STIs, especially gonorrhoea, could be transmitted via tongue-kissing alone.^{17–20} Individuals with oropharyngeal gonorrhoea usually do not have symptoms and therefore they may not be aware of acquiring and transmitting the infection. Furthermore, we also found that more women kiss same-sex partners compared to men, although this was not statistically significant. This finding is similar to that of Phillips and colleagues' findings in 2021, who surveyed 709 heterosexual men and women in Melbourne and found that heterosexual women were significantly more likely to report same-sex tongue-kissing compared to men beyond group sex events.^{13,21} This may reflect the stigmatisation or cultural taboo of same-sex kissing among heterosexual men due to the increased sexual connotations associated with kissing.^{13,22} A study by Bettinsoli and colleagues in 2019 across 23 countries worldwide (including Australia) found that stronger negative attitudes towards non-heterosexual individuals are held by men compared to women in each country studied.²³ However, given the growing acceptance of same-sex activity in Australia and in other settings, past studies have shown that heterosexual men are now more open to same-sex sexual or semi-sexual contact.^{24–26}

A substantial proportion of participants in our study engaged in fellatio after condomless vaginal and anal sex, which carries a significant risk of genital-to-oropharyngeal STI transmission due to contamination from different mucosal sites.²⁷ While we did not investigate condom use

during fellatio, a past study at the same clinic found that 86.1% of heterosexuals do not use condoms for fellatio.¹³ Past studies have found that oropharyngeal STIs are common among those with genital infections in heterosexuals.^{28,29} With this dynamic of transmission and sexual activities between anatomical sites, it is possible that infections can be transmitted across different anatomic sites. While we did not investigate whether men and women changed condoms between vaginal and anal sex, nor did we investigate whether anal sex preceded vaginal sex, safe sex messages on changing condoms between different sexual activities with the same partner should be reinforced.²⁷

There are several limitations in our study. First, this study was conducted at a single urban sexual health clinic, with a low response rate (22.1%) and, as our clients are more likely to be health-seeking and therefore possibly more conscious about safe sex practices, our results may not be generalisable to the general Australian heterosexual population. Second, social desirability bias might have occurred when self-reporting condom use or other activities, including group sex and such data may be inaccurate. We asked participants whether the male partner changed condoms between partners, thus inaccurate reporting on condom use by female participants may have occurred. We also did not ask whether men changed condoms between vaginal and/or anal sex, or if men had performed fellatio on another man. Third, we only asked about condom use for vaginal and anal sex but did not ask about condom use for fellatio or dental dam use for cunnilingus. While condom use during fellatio is reportedly lower than condom use during vaginal and anal sex, it is unknown if a greater proportion of participants used condoms for fellatio or dental dam for cunnilingus if they did not use condoms for anal or vaginal sex.³⁰ Further studies may be warranted to investigate condom and/or dental dam use during oral, vaginal and anal sex, and investigate the role that condom use has in the prevention of oropharyngeal STIs. Fourth, other sexual activities, such as rimming may be associated with STI acquisition but we did not collect this information.³¹ Fifth, we did not collect data on the relationship status of the individuals who participated in group sex. Past research has found that heterosexuals would prefer having group sex with their romantic partners rather than strangers.^{32,33} Participants may be less likely to use condoms with their romantic partner compared to casual partners as they may be more likely to be aware of their partner's STI status.^{34,35} Further studies will be required to access condom use with different types of partners during group sex. Sixth, we did not collect data on the sexual orientations of the individuals who were in the group sex event. It is possible some men who were in the group sex event were gay, bisexual and other MSM, which may result in sexual mixing between different risk populations.³⁶

Our study found that one in 20 (5.4%) heterosexual men and women had engaged in group sex in the past 3 months.

Less than half of these participants reported that they use condoms during vaginal and anal sex in their most recent group sex event, and more than one in 10 men did not change condoms between every female partner. Further studies may be warranted to investigate the attitudes of group sex members on condom use. With the increasing incidence of STIs in recent years, our study shows that current safe sex messages highlighting the use of condoms during sex and changing condoms between partners should be further reinforced for HIV and STI prevention, especially in group sex events.³⁷

Supplementary material

Supplementary material is available [online](#).

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Data availability. The data that support this study are available in the article and accompanying online supplementary material.

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