

Factors associated with group sex in heterosexual males and females attending a sexual health clinic in Melbourne, Australia: a cross-sectional survey

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ABSTRACT

Background. There have been limited studies of group sex among heterosexual individuals. This study aimed to explore the factors associated with group sex among heterosexual males and females to improve risk assessment guidelines and inform sexually transmitted infection (STI) screening requirements. **Methods.** A cross-sectional survey was conducted among heterosexual males and females aged ≥ 16 years attending the Melbourne Sexual Health Centre between March and April 2019. The survey asked about group sex participation, methods used to meet sexual partners, number of casual and/or regular partners, and injection drug use (IDU) in the previous 3 months. HIV and STI (chlamydia, gonorrhoea, syphilis) diagnoses were extracted. A multivariable logistic regression was conducted to identify the factors associated with group sex participation. **Results.** A total of 698 participants (325 males, 373 females) were included and 4.7% (33/698) had participated in group sex in the previous 3 months. The proportion who participated in group sex increased with age (2.1% in 16–24 years, 5.5% in 25–34 years, 7.8% in ≥ 35 years, $p_{\text{trend}} = 0.010$). Meeting partners at sex venues (e.g. brothels) was associated with the highest odds of participating in group sex (aOR = 5.74, 95% CI: 1.20–27.44), followed by dating apps (aOR = 2.99, 95% CI: 1.36–6.58), friends/family (aOR = 2.99, 95% CI: 1.34–6.69) and social venues (e.g. bar) (aOR = 2.73, 95% CI: 1.18–6.30). Group sex was strongly associated with STI positivity (aOR = 6.24, 95% CI: 2.41–16.13). There was no association between group sex and sex, casual and/or regular partners, HIV positivity or IDU. **Conclusion.** Heterosexual individuals participating in group sex had a six-fold risk of testing positive for STIs. Including group sex in a sexual history is useful to determine STI risk and inform testing practices. Safe sex messages on group sex that are delivered through multiple methods (e.g. at sex venues, social venues and dating apps simultaneously) would be beneficial.

Keywords: dating apps, group sex, heterosexuals, safe sex, screening, sex party, sex venues, sexual behaviour, sexual practices, sexual risk, sexually transmitted diseases, sexually transmitted infections, threesome.

Introduction

Since the early 2010s, there has been a rise in the rates of sexually transmitted infections (STIs) among heterosexual individuals, particularly gonorrhoea and syphilis.¹ Previous studies have found that individuals participating in group sex (sex involving three or more participants) are at a higher risk of HIV and STI acquisition; however, the majority of these studies have focused on gay, bisexual or other men who have sex with men,^{2–6} whereas very few have examined heterosexual individuals.^{7,8} Previous studies of sex among heterosexuals have focused on group sex among people who use non-injecting drugs, who are likely at a higher risk of STI transmission than those who do not use drugs.^{8–10} There have been limited epidemiological studies of group sex among the general population, with some studies focusing on attitudes towards threesomes and

'consensual non-monogamy' in the context of heterosexual couples.^{11,12} Of the limited studies that have included heterosexual individuals, to our knowledge, there have been no studies that have analysed a wide range of methods through which they are meeting sexual partners for group sex. With the developing technology of smart phones, new methods of meeting partners for group sex have continued to emerge throughout the 2010s and may further facilitate group sex in this population.¹³ Understanding the associations between group sex and the different methods used to meet group sex partners is an important factor to be aware of for future health promotion campaigns that may aim to target this population. Additionally, there is limited information on the associations between group sex and participant characteristics outside of drug use, including sparse data on the association between group sex and STI risk.

This study aimed to determine the proportion of heterosexual individuals who had group sex in the previous 3 months and the factors associated with group sex in the setting of a sexual health clinic in order to inform risk assessment and testing practices at clinical services.

Methods

Study setting and population

A cross-sectional study was conducted at the Melbourne Sexual Health Centre (MSHC), located in Melbourne, Australia, between March and April 2019. MSHC is a public sexual health clinic located in metropolitan Melbourne that provided over 50 000 consultations throughout 2019. Routine care at the MSHC involves asking all new clients and those who have not attended in the previous 3 months to complete a questionnaire using computer-assisted self-interview (CASI), which includes questions regarding their demographic characteristics (e.g. age), sexual practices (e.g. number of casual and/or regular sexual partners) and injection drug use (IDU) in the previous 3 months.

Between March and April 2019, clients aged ≥ 16 years were shown an invitation (electronically after completion of CASI) to participate in an additional voluntary survey called 'Annual surveys of Sexual Activities and Practices' (ASAP) via CASI. Participants consented to participate in the ASAP survey by selecting 'yes' on the consent page via CASI, or selecting 'no' if they did not want to participate. Four different sets of questions were included in the ASAP survey, one set for each of the following groups based on their sexual practices: (a) men who have sex with men (MSM); (b) men who have sex with women only; (c) women who are not sex workers; and (d) female sex workers (FSW). Depending on the self-reported sexual activities they disclosed on CASI, clients were shown one of the ASAP surveys. In this study, we analysed data from the heterosexual population (defined as having only opposite-sex partners in the previous 12 months, as described

previously¹⁴) because data on group sex in MSM and FSW had been reported and published elsewhere.^{4,15} Men were shown survey (b) for 'heterosexual men' if they reported having sex with an opposite-sex partner and did not have any same-sex partners in the previous 12 months. Women were shown survey (c) if they reported no current sex work on CASI and women who have sex only with women were removed from analysis (due to low overall numbers, there was no separate survey for women who have sex only with women). The ASAP survey collected additional questions that were not asked in the routine clinical questionnaire on CASI, including group sex participation (phrased 'In the last 3 months, how many times have you had group sex with at least two other persons?') and the methods used to meet sexual partners (not specifically group sex partners), including the internet, dating apps (e.g. Tinder), social venues (e.g. bar), sex venues (e.g. brothel), friends/family or other.

Data on HIV and STI (chlamydia, gonorrhoea and syphilis) diagnoses on the day participants completed the survey were also extracted from the clinical database. HIV and syphilis diagnoses were based on serology. Gonorrhoea and chlamydia diagnoses were based on high-vaginal swab or first void urine by a nucleic acid amplification test using an Aptima Combo 2 assay (Hologic Panther system; Hologic San Diego, CA, USA).

This study was approved by the Alfred Hospital Ethics Committee, Melbourne, Australia (Project Number 571/17).

Statistical analysis

Age was categorised into three groups from 16–24, 25–34 to ≥ 35 years, as per previous studies.¹⁶ The frequency and proportion of participants participating in group sex in the previous 3 months were calculated. The 95% confidence intervals (CI) of the proportion of participants were calculated using the binomial exact method. A chi-squared test was performed to compare the proportion of group sex participation between males and females. A chi-squared trend test was performed to examine if there was an increasing or decreasing trend in group sex across the three age groups. Univariable logistic regressions were performed to examine the factors (i.e. age, sex, casual and/or regular partners, methods used to meet partners, STIs) associated with group sex. Variables that had a $P < 0.1$ in the univariable analysis were considered as potential confounders and were included in the multivariable logistic regression. Crude and adjusted odds ratios (aOR), and the corresponding 95% CI, were reported. All analyses were performed using Stata (Version 14; College Station, TX, USA).

Results

Characteristics of the study population

Between March and April 2019, a total of 2961 heterosexual clients (1506 males and 1455 females) attended the

MSHC and were invited to participate in the ASAP survey. There were 728 (24.6%) clients who consented and completed the survey. A slightly higher proportion of female clients participated than male clients (26.3% of females [$n = 383$] vs 22.9% of males [$n = 345$]; $P = 0.031$). There were no significant differences in mean age of clients who consented compared to those who did not consent (28.6 years for those consenting vs 29.1 years for those who declined; $P = 0.163$). The proportion of individuals who were born in Australia was slightly higher in those who consented compared to those who did not consent (35.6% vs 32.1%; $P = 0.049$). In this analysis, we excluded 30 participants: 19 reported no sexual partners in the previous 3 months and 11 participants had incomplete data for methods of meeting partners. The remaining 698 participants (325 males and 373 females) were included in the final analysis.

Of the 698 participants, the median age was 26 years (IQR 23 to 31) and 244 (35.0%) were born in Australia. There were 33 (4.7%) participants who had group sex in the previous 3 months, and the proportion of having group sex was higher in males (21/325, 6.5%) than in females (12/373, 3.2%) ($P = 0.044$). After adjusting for sex, age, casual partners, methods of meeting and STI positivity, the adjusted odds of participating in group sex did not vary between males and females (aOR = 1.70; 95% CI: 0.76–3.84; $P = 0.198$). Overall, group sex became more common with increasing age in both males and females (2.1% in 16–24 years, 5.5% in 25–34 years, 7.8% in ≥ 35 years, $p_{\text{trend}} = 0.010$). Compared with individuals aged 16–24 years, the adjusted odds of participating in group sex for individuals aged 25–34 years was 4.36 (95% CI: 1.45–13.10) and for ≥ 35 years, it was 7.67 (95% CI: 2.06–28.50).

The majority of participants who participated in group sex reported using more than one method to meet sexual partners (66.7%, 22/33), compared to those who did not participate in group sex (31.4%, 209/665) ($P < 0.001$). Meeting partners at sex venues (e.g. brothel) had the highest odds of having group sex (aOR = 5.74, 95% CI: 1.20–27.44), followed by dating apps (aOR = 2.99, 95% CI: 1.36–6.58), friends/family (aOR = 2.99, 95% CI: 1.34–6.69) and social venues (e.g. bar) (aOR = 2.73, 95% CI: 1.18–6.30), but not the internet (Table 1). Having regular partners or casual partners were not associated with participating in group sex (Table 1). Only five participants injected drugs in the previous 3 months, none of which had participated in group sex (Table 1).

Two participants tested positive for HIV and both of these participants had not participated in group sex in the previous 3 months (Table 1). A much higher proportion of participants who participated in group sex (27.3%, 9/33) tested positive for an STI compared to participants who did not participate in group sex (6.5%, 43/665). After adjusting for potential confounders in the multivariable analysis, participants who participated in group sex had a six-fold (aOR 6.24, $P < 0.001$) higher odds of testing positive for an STI (i.e. chlamydia, gonorrhoea, syphilis).

Discussion

Group sex participation in the previous 3 months was reported by 5% of the heterosexual clients attending a large sexual health clinic in Melbourne, Australia. Factors associated with group sex included increasing age, and group sex was associated with having a six-fold risk of testing positive for any STIs (i.e. chlamydia, gonorrhoea, syphilis). After adjusting for sex, age, casual partners, methods of meeting and STI positivity, a number of different methods used to meet sexual partners were associated with group sex participation, including sex venues (e.g. brothel, massage parlor), dating apps, friends/family and social venues (e.g. bar, club, party). We found no association between group sex and sex, country of birth, type of partners, and IDU.

To our knowledge, there have been no studies examining the association between age and group sex in heterosexual males and females. However, previous studies in MSM have also reported an association between group sex and increasing age,⁴ and a North American study conducted in 2020 involving both heterosexual and non-heterosexual individuals found that older adults were more likely to have participated in mixed-gender threesomes than younger adults.¹² It has been hypothesised that this may be due to older adults, who are more commonly in long-term relationship compared to younger adults, utilising new sexual experiences including group sex to reignite sexual arousal and novelty in their routine sexual relationships.^{12,17} However, consensual non-monogamy among people in relationships has not been found to be associated with an increase in STIs.¹⁸ The association between group sex and increasing age is important for healthcare professionals to be aware of, as a 2018 Australian study¹⁹ found that general practitioners (GPs) do not routinely discuss sexual health with older patients, and a study performed in the UK in 2012²⁰ found that GPs do not address sexual health proactively with older patients and that sexual health questions are not seen as 'legitimate' topics of discussion in older age groups.

As of 2020, the Australian STI Management Guidelines (<http://www.sti.guidelines.org.au>) advise annual screening for chlamydia in heterosexuals and more thorough STI screening in individuals considered at higher risk according to their risk assessment guidelines. Current guidelines do not detail 'group sex' as a specific question to be included in the routine risk assessment and sexual history taking for heterosexuals and it has been found that Australian GPs infrequently perform testing to include or exclude specific STIs (e.g. chlamydia, gonorrhoea, syphilis, HIV) in patients presenting with sexual health issues (e.g. vaginal discharge, testicular symptoms).²¹ The association between group sex and STIs found in this study highlights the importance of health practitioners making an active effort to routinely question patients about their participation in group sex in sexual healthcare settings, regardless of their demographic

Table 1. Factors associated with group sex among 698 heterosexual males and females.

	Number participated in group sex ^A (n)/total number (N), (%)	OR (95% CI)	P-value	aOR (95% CI) ^B	P-value
Sex					
Female	12/373 (3.2)	1 (ref)		1 (ref)	
Male	21/325 (6.5)	2.08 (1.01–4.29)	0.048	1.70 (0.76–3.84)	0.198
Age (years)					
16–24	5/240 (2.1)	1 (ref)		1 (ref)	
25–34	19/343 (5.5)	2.76 (1.01–7.49)	0.047	4.36 (1.45–13.10)	0.009
≥35	9/115 (7.8)	3.99 (1.31–12.19)	0.015	7.67 (2.06–28.50)	0.002
Country of birth					
Australia	16/244 (6.6)	1 (ref)		–	–
Overseas	17/440 (3.9)	0.57 (0.28–1.15)	0.119	–	–
Unknown	0/14 (0)	–	–	–	–
Methods used to meet sexual partner(s) in the previous 3 months					
Internet					
No	29/640 (4.5)	1 (ref)		–	–
Yes	4/58 (6.9)	1.56 (0.53–4.60)	0.420	–	–
Dating app ^C					
No	17/486 (3.5)	1 (ref)		1 (ref)	
Yes	16/212 (7.5)	2.25 (1.12–4.55)	0.024	2.99 (1.36–6.58)	0.006
Social venues ^D					
No	14/425 (3.3)	1 (ref)		1 (ref)	
Yes	19/273 (7.0)	2.20 (1.08–4.46)	0.029	2.73 (1.18–6.30)	0.018
Sex venues ^E					
No	30/674 (4.5)	1 (ref)		1 (ref)	
Yes	3/24 (12.5)	3.07 (0.87–10.85)	0.082	5.74 (1.20–27.44)	0.029
Friends/Family ^F					
No	14/398 (3.5)	1 (ref)		1 (ref)	
Yes	19/300 (6.3)	1.85 (0.91–3.76)	0.087	2.99 (1.34–6.69)	0.008
Other					
No	30/589 (5.1)	1 (ref)		–	–
Yes	3/109 (2.8)	0.53 (0.16–1.76)	0.298	–	–
Had regular partner(s) in the previous 3 months					
No	15/383 (3.9)	1 (ref)		–	–
Yes	17/293 (5.8)	1.51 (0.74–3.08)	0.256	–	–
Unknown	1/22 (4.5)	1.17 (0.15–9.27)	0.883	–	–
Had casual partner(s) in the previous 3 months					
No	1/97 (1.0)	1 (ref)		1 (ref)	
Yes	31/537 (5.8)	5.88 (0.79–43.60)	0.083	2.65 (0.33–21.06)	0.358
Unknown	1/64 (1.6)	1.52 (0.09–24.81)	0.767	1.30 (0.08–22.46)	0.855
Injection drug use in the previous 3 months					
No	33/685 (4.8)	–	–	–	–
Yes	0/5 (0)	–	–	–	–
Unknown	0/8 (0)	–	–	–	–

(Continued on next page)

Table 1. (Continued).

	Number participated in group sex ^A (n)/total number (N), (%)	OR (95% CI)	P-value	aOR (95% CI) ^B	P-value
HIV status					
Negative	33/696 (4.7)	–	–	–	–
Positive	0/2 (0)	–	–	–	–
Any STIs ^C					
Negative	24/646 (3.7)	I (ref)		I (ref)	
Positive	9/52 (17.3)	5.42 (2.37–12.39)	<0.001	6.24 (2.41–16.13)	<0.001

^AGroup sex was defined by sex 'involving at least two other persons'.

^BAdjusted for sex, age, method of meeting partner, casual partners, and previous STI.

^CMobile dating applications (e.g. *Tinder*).

^DBar, pub, night club, dance, party, disco or gym.

^EBrothel, massage parlor, sauna, beat, other sex venue.

^FIntroduced by friends or family.

^GChlamydia, gonorrhoea, syphilis.

–, not applicable.

characteristics or relationship status, and to use this in their clinical judgement when determining if a patient requires more thorough STI screening (e.g. screening for chlamydia, gonorrhoea and syphilis if a patient answers 'yes' to participating in group sex in the previous 3 months). A study conducted in North Carolina in 2017⁷ likewise found that participating in group sex carried a six-fold risk of STI (chlamydia, gonorrhoea, trichomoniasis) acquisition among African-American heterosexual men; however, there was no association with sexual risk practice (e.g. condomless sex). This could be explained by the findings in a New York study that analysed relevant literature on group sex events among non-gay drug users and concluded that STI 'third party transmission' (i.e. transmission of an STI between two individuals who did not have sex with each other) is possible even when condoms are consistently used due to condoms not being removed or cleaned when changing partners during group sex or due to transfer of mucosal secretions via fingers and/or mouth.⁹ As such, public health campaigns that educate individuals participating in group sex about their increased STI risk and how to practice safer sex in such environments (e.g. using a new condom when changing partners) are fundamental to improving the sexual health of this population. Our study analysed the association between group sex and the acquisition of chlamydia, gonorrhoea and syphilis in unison. Due to the small sample size, we were unable to investigate each STI separately. Analysing the association of group sex with each STI independently and whether group sex is also associated with an increased risk of additional STIs or infections (e.g. trichomoniasis, hepatitis) may help guide future STI management guidelines. Additionally, it is possible that the covariates chosen could mediate the association between group sex and STI positivity. Future research such as path analysis is warranted to further understand the magnitude and significance of our findings.

A previous study in the US published in 2015 examined associations with group sex among people who take club drugs (non-injecting drugs such as cocaine, ecstasy, and methamphetamine) and found that those who participated in group sex were more likely to have a history of sexual abuse, experiences of mental distress, recent IDU, and paying for sex in the previous year.¹⁰ In this study, the proportion of group sex participation was high for both men ($n = 128$; 46.3%) and women ($n = 75$; 33.7%).¹⁰ Similarly, a 2011 review of group sex in the US among non-gay drug users found that group sex was common among people who used non-injecting drugs (34% for those aged <25 years) and was associated with STI and HIV positivity.⁹ We did not ask about non-injecting drug use in our study, thus it is difficult to compare our group sex participation rate with studies conducted among people who take non-injecting drugs. Further research is warranted to examine group sex in Australia among people who use non-injecting drugs, as this may be an understudied population at increased risk of STIs and HIV.

There were multiple methods of meeting that were associated with group sex, most of which could be utilised by sexual health promotion campaigns. A study conducted in Melbourne in 2019 found that almost half (49%) of female sex workers participated in group sex,¹⁵ aligning with the results found in a report published in Queensland, Australia, on the proportion of sex workers that provide services to couples.²² Although the Melbourne survey¹⁵ did not specify if group sex was with paying clients or non-paying sexual partners, it indicates that group sex is a service provided by female sex workers in Melbourne. Our findings support this notion, as meeting partners at sex venues (e.g. brothels) had the highest association with group sex. The development and continual progression of dating apps throughout the 2010s, such as *3fun* and *Feeld*, which are specifically designed for individuals wanting to participate

in 'threesomes', have provided new and easy platforms for individuals to explore their interest in group sex. It is unclear why individuals who meet partners through friends/family are more likely to participate in group sex. Further research is required to explore this association. Social venues (e.g. bar, club, party) are environments that facilitate meeting new sexual partners and are common locations that binge drinking and recreational drug use occurs. A 2018 study⁸ that analysed group sex among heterosexuals attending a nightclub in Miami, Florida, found that 41% of participants reported group sex and that an even greater frequency of group sex was associated with recreational drug use at venues. 'Swingers clubs' are social venues that singles or couples in non-monogamous relationships can meet individuals to participate in sexual activities with, providing a convenient method through which couples can participate in group sex. The majority of participants who participated in group sex used more than one method to meet their sexual partners, indicating that sexual health promotion campaigns that utilise multiple methods to reach this population, such as an advertisement that is simultaneously delivered through sex venues, social venues and on dating apps, may be most effective.

There were some limitations to this study. First, this study was conducted at a sexual health clinic where clients' sexual practices may not be representative of the general population. Second, the survey was only shown to participants who self-reported sex with opposite-sex partners in the previous 12 months and did not report any sexual contact with same-sex partners. As such, individuals that personally identify as heterosexual but participated in group sex with an individual of the same sex would have been excluded from the study, potentially misrepresenting the proportion and demographic characteristics of heterosexuals who participate in group sex. Further research is warranted among self-identified heterosexuals to determine the characteristics of group sex participation, including the proportion who engage in group sex with individuals of the same sex. Third, the response rate (25%) in this survey was low. However, there was no significant difference in demographic characteristics between participants and non-participants. Although 5% of participants reported group sex, there were only 33 individuals, and this small sample size may have limited the statistical power in the analysis, particularly where outcomes were uncommon (e.g. HIV infection). Further research that involves a larger population size and sources participants from outside the healthcare setting is required to determine the demographic characteristics and health risks associated with group sex in the wider community. Fourth, interpretation of our pre-defined methods of meeting and what classified as a 'casual' versus 'regular' partner was up to the participants' personal interpretation, which may have varied from participant to participant (e.g. the categorisation of 'friends with benefits').²³ Fifth, the small sample size of three individuals

who met partners at sex venues that participated in group sex produced a large confidence interval (95% CI: 1.20–27.44), limiting the statistical power of this association. Finally, some other factors such as alcohol and recreational, non-injecting drug use,⁸ marital status, and ethnicity might also be associated with group sex participation, but these data were not collected or adjusted for in this study.

Conclusion

Our analyses found that 5% of heterosexuals reported group sex in the previous 3 months in a sexual health clinic in Melbourne, Australia. Group sex became more common with increasing age, and individuals who participated in group sex were over six times more likely to test positive for chlamydia, gonorrhoea or syphilis. Heterosexuals who met sexual partners at sex venues had the highest odds of having group sex, followed by dating apps, friends/family and social venues. Our results highlight the importance of including group sex as a routine question in the sexual healthcare setting and indicates that utilising the methods of meeting that are associated with group sex (e.g. advertisements at brothels, social venues and on dating apps) could be an effective way to reach this population.

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Data availability. All relevant data are included in this manuscript.

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