

ORIGINAL ARTICLE

Drug use, sexual risk behaviour and sexually transmitted infections among swingers: a cross-sectional study in The Netherlands

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ABSTRACT

Objectives Recreational drug use has been found to be associated with high-risk sexual behaviour and with sexually transmitted infections (STI). This study is the first to assess the prevalence of drug use among swingers (heterosexuals who, as a couple, practise mate swapping or group sex, and/or visit sex clubs for couples), and its association with high-risk sexual behaviour and STI.

Methods We recruited individuals who self-identified as swingers and visited our STI clinic (from 2009 to 2012, South Limburg, The Netherlands). Participants (n=289; median age 45 years; 49% female) filled in a self-administered questionnaire on their sexual and drug use behaviour while swinging, over the preceding 6 months. We assessed associations between sexual behaviour, drug use and STI diagnoses (*Chlamydia trachomatis* (CT), *Neisseria gonorrhoeae* (NG), syphilis, HIV and hepatitis B) using logistic regression analyses.

Results Overall, the prevalence of CT and/or NG was 13%. No other STIs were observed. Seventy-nine percent of swingers reported recreational drug use (including alcohol and use of erectile dysfunction drugs); 46% of them reported multiple drug use. Recreational drug use excluding alcohol and erectile dysfunction drugs (reported by 48%) was associated with high-risk behaviours in men and women. Drug use was independently associated with STI in female swingers, especially those who practice group sex.

Conclusions High rates of multiple drug use, as well as risky sexual behaviour and STIs among swingers, warrant paying more attention to this key population in prevention and care, as they are a risk group that is generally under-recognised and underserved in care.

BACKGROUND

Recreational drug use is associated with high-risk sexual behaviour or sexually transmitted infections (STI).^{1–5} Previous studies on the association between drug use and STI focused on women and on men who have sex with men (MSM), but no such data are available for swingers (heterosexuals who, as a couple, practise mate swapping or group sex, and/or visit sex clubs for couples). Swingers have recently been classified as an emerging high-risk group for STI.⁶ High-risk sexual behaviours, such as having multiple sex partners, group sex and a high rate of unprotected sex are common among swingers.^{6–8} By definition, swingers are also involved in concurrent sex, as they have overlapping partnerships over a fixed period of time.⁹

Participants in a pilot study among visitors to a single swingers club in Canada reported that

alcohol consumption was limited. Drug use was neither reported nor observed.¹⁰ However, respondents did report high numbers engaging in unprotected sex and rarely accessing STI health services.

An earlier pilot study in The Netherlands found a higher prevalence of drug use (70%) among a sample of 57 swinger couples.⁸ The prevalence of drug use was lower (55%) among swingers who visit sex clubs. The type of drugs used was not studied. The scarce data available about swingers indicates that drug use may not be uncommon, yet we lack knowledge about the prevalence, types, combinations and frequency of drug use among swingers.

Swingers are at high risk for STI and engage in risky sex with many (concurrent) partners, yet they are generally under-recognised in healthcare. They can play a key role in the transmission of infections, both within their own network and to other populations. We hypothesised that drug use by swingers during sex is associated with risky sex and STIs. This study assessed the prevalence of multiple types of drug use while swinging by female and male swingers who visited our STI clinic. We also studied the associations between drug use and STI risk behaviour and diagnosed STI. The results might inform more efficient STI control strategies and drug use intervention strategies for swingers.

METHODS

Study population

The study population included self-identified swingers visiting the STI clinic of the South Limburg Public Health Service for STI testing, representing 16% of our clinic population. Since 2007, our clinic has systematically registered whether a visitor is a swinger or not (ie, when they were part of a heterosexual couple, and as a couple, had sex with other couples and/or singles; or couples and singles who had sex with these heterosexual couples during the past year).⁶ From 2009 to 2012, we approached all visiting swingers (n=1023) for participation in this study. This paper presents data from the 289 participants (28% response rate) who filled in a self-administered questionnaire after giving written informed consent, and who had been active as a swinger during the preceding 6 months. Of the non-participants, 51% were female, their median age was 42 years (IQR: 37–47), and the *Chlamydia trachomatis* (CT)/*Neisseria gonorrhoeae* (NG) point-prevalence (at their first clinic consultation) was 10%. Between 2009 and



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2012, the proportion CT/NG positive in the total clinic population was 15%, with high percentages in other risk groups as well, including young people (<25 years: 17%), MSM (20%), male prostitutes: 38%, and female prostitute (11%).

Medical ethical approval was obtained in 2009 from the Medical Ethical Committee of Maastricht University Medical Centre+(NL23703.068.08).

Laboratory data

Our STI clinic offers free examinations and treatment for STIs to people in risk groups, including swingers. All swingers are tested for five major STIs according to standard policy. We test for CT and NG at three different anatomic locations: on first-void urine (men) and self-swab (oropharyngeal in women and men, vaginal in women, and anorectal in women and men). We do this using commercially available nucleic acid amplification tests (NAAT, SDA, Becton Dickinson ProbeTec ET system, Maryland, USA or PCR, Roche Cobas Amplicor, California, USA; positive NG tests were confirmed by an inhouse PCR). Serum from venous blood puncture is tested for *Treponema pallidum* (syphilis), HIV (anti-HIV (1/2), AxSYM; Abbott, Chicago, USA); reactive samples are confirmed by western blot (HIVblot 2.2, Genelabs Diagnostics, Sciencepark, Singapore) and tested for the hepatitis B virus (HbsAg and anti-HBc, AXSYM, Abbott, Chicago, USA), following regular procedures and according to manufacturers' guidelines. Patients comprise people with symptoms (7%), or attending after partner notification (7%), but include mostly people attending for routine check-up.

Questionnaire

We assessed swingers' attributes using an extensive self-administered questionnaire. Apart from demographic variables, the questionnaire comprised several known behavioural risk factors for STI. One is group sex (ie, sex with multiple persons at the same time). This definition of group sex is narrower than that used in other recent studies addressing group sex (eg,¹¹) because by definition all swingers practice group sex. Group sex was evaluated with or without using a condom. Other variables include sadomasochism (SM), number of partners in the past 6 months, use of sex toys and use of condoms. In the questionnaire, sex was defined as physical contact between hands, mouth, anus and genitals mutually, like oral, vaginal or anal sex.

In analyses, most of the variables were dichotomised: one category indicates reporting the risky behaviour and the other category indicates 'other' (including missing information). The variable 'education' was divided into 'low education' (respondents only completed elementary school and vocational education) and 'other' (respondents did not answer the question or reported a medium or high education level).

Further, all participants were asked: 'did you use drugs while swinging in the past six months?' All participants who said 'yes' were routed to questions on the types of recreational drugs (eg, methylenedioxymethamphetamine (MDMA), gamma hydroxybutyrate (GHB), laughing gas, cannabis, alkyl nitrites (poppers), (meth)amphetamines, cocaine, ketamine (LSD), lysergic acid diethylamide, psilocybin mushrooms). Separately from questions about recreational drugs, the questionnaire asked about the use of alcohol and erectile dysfunction drugs, or any combination of these substances with drugs, while swinging.

All swingers were tested for STIs. People who were diagnosed with an STI in the 12 months preceding the questionnaire date until 2 months after the questionnaire date were recorded separately as positive (at least one test was positive) or negative (all tests were negative) for the different STIs studied.

Statistical analyses

Power was sufficient (>0.80) to detect an OR of at least 4 in men or in women given a proportion of the outcome of 13% (STI), or 70% (drug use) and 50% exposure. When exposure was lower or higher than 50%, the power to detect associations was reduced.

We hypothesised that drug use during sex is associated with more risky sex and with STI in swingers (figure 1). Differences in sociodemographic characteristics, sexual behaviour, drug use and STI were compared between male and female participants using χ^2 tests.

Determinants for the outcomes 'recreational drug use' (without alcohol or erectile dysfunction drugs) and 'STI diagnoses' (CT and NG combined) were assessed using logistic regression analyses. Drug use was used as a dichotomous variable: drug use (excluding alcohol and erectile dysfunction drugs) and non-drug use. First, sociodemographics (eg, age, educational level) and sexual behaviour were assessed as determinants for the outcome 'recreational drug use'. Second, sociodemographics, sexual behaviour and the drug use variables were assessed as determinants for the outcome 'STI diagnoses'. Third, determinants were assessed for both outcomes in a multivariate model (using a stepwise forward procedure). Only variables with a p value <0.05 in univariate analyses were included in the multivariate models. Analyses were done separately for men and women.

RESULTS

Of the 289 participants, 49% were women and 51% were men. The participants' median age was 45 years with an IQR of 38–50 years (with a minimum of 21 years and a maximum of 65 years). On average, the male participants were slightly older than the females: the median age of men was 47 years (IQR: 39–52) and the median age of women was 42 years (IQR: 35–48). The majority of the participants had been swinging for more than 3 years; they swung at swinger clubs and/or swung at home parties. Half the participants had been actively swinging six times or more over the preceding 6 months (table 1).

STI-related risk behaviour

One-fourth of the male participants had had sex with male swing partners in the last 6 months (MSM). Over half the participants from both sexes had had group sex in the past 6 months and half of them did not use condoms during group sex. Nine percent reported SM play and 41% reported use of sex toys. Half the respondents reported having six or more sex partners

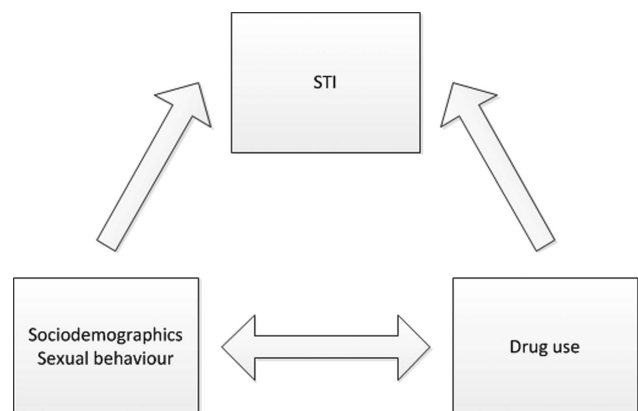


Figure 1 Association of drug use with sexual risk behaviour and STI.

over the preceding 6 months, and had not used a condom during vaginal sex. We found no differences in sexual risk behaviour between men and women (table 1).

STI prevalence

Twenty-five participants tested positive for CT; the prevalence was 9%. CT prevalence was higher in women than in men. NG was diagnosed in 5% of the participants, leading to an overall prevalence of CT and/or NG of 13%, with higher positivity in women than in men. Of all 25 CT/NG-positive patients, 21 were diagnosed with urogenital CT, 15 with anorectal CT, 2 with oropharyngeal CT, 3 with urogenital NG, 1 with anorectal NG and 13 with oropharyngeal NG. Over a third of the participants reported having had a previous STI (table 1).

Drug use

Nearly half of both male and female swingers reported using recreational drugs (other than alcohol or erectile dysfunction drugs) in the past 6 months while swinging. The top five drugs used were: MDMA, GHB, laughing gas, cannabis and alkyl nitrites (poppers). Nearly half the respondents reported using alcohol, and 61% of men and 8% of women reported recreational use of erectile dysfunction drugs. Multiple drug use was reported by up to 46% of all participants and was slightly higher among men. The combination of GHB and MDMA was most common (table 2).

Sexual risk behaviour associated with drug use

Overall, recreational drug use (excluding alcohol and erectile dysfunction drugs) was associated with several determinants for both men and women: swinging at home, group sex, use of toys

and use of erectile dysfunction drugs were univariately associated with using recreational drugs. Additionally, low education levels, swinging for three or more years, and SM play, were univariately associated for women; for men, swinging six times or more, having sex with men, and having six or more partners, were univariately associated. Use of alcohol was inversely associated with recreational drug use for men (table 3).

In the multivariate models, swinging at home and use of toys were independent determinants for drug use in both sexes. For women, low education levels and SM play appeared to be independently associated. For men, the number of partners and no alcohol use were independent determinants for using drugs (data not shown).

Sexual risk and drug use associated with STI

In women, group sex without using a condom, use of recreational drugs, use of multiple drugs and use of erectile dysfunction drugs were univariately associated with STI diagnosis. A history of STI was univariately associated with STI for both men and women (table 3).

In the multivariate model, overall use of recreational drugs remained the only determinant associated with STI in women. Even after forcing group sex into the model, drug use remained the only independent determinant associated with STI although the risk estimate decreased (adj OR=2.70, CI 1.00 to 7.26, $p<0.05$). It is notable that this association between drug use and STI was only present for women who participated in group sex (OR=5.89, CI 1.55 to 22.46) and not for women who did not participate in group sex (OR=0.74, CI 0.13 to 4.37) (the interaction between group sex and drug use was borderline significant: $p=0.067$).

Table 1 Characteristics, sexual (risk) behaviour and STI of 289 swingers by sex

	Men (n=147)		Women (142)		Missing data		Total (n=289)	
	%	n	%	n	%	n	%	n
Sociodemographic								
Age <45 years	40	59	58	82	0	0	49	141*
Low education	13	19	16	22	27	77	14	41
Swing duration 3 or more years	74	108	67	95	6	16	70	203
Venues								
Ever swung at swingers club	77	113	77	109			77	222
Ever swung at home party	81	119	85	120			83	239
Swing times in past 6 months, 6 or more	45	66	51	73	1	2	48	139
Risk behaviour in past 6 months								
Sex with male swing partners	27	39	88	125	9	25	57	164*
Sex with female swing partners	88	129	77	109			82	238
Group sex								
No group sex	45	66	44	63	5	15	45	129
Group sex with condom	27	40	28	40			28	80
Group sex without condom	28	41	28	39			28	80
SM								
Six or more partners while swinging	11	16	7	10	10	29	9	26
Use of sex toys	54	80	54	76	20	59	54	156
No condom use vaginal sex	42	61	40	57	14	41	41	118
STI diagnosis in past 12 months	57	84	56	80	22	63	57	164
STI ever (self-reported)								
CT	4	6	13	19	0	0	9	25*
NG	4	6	6	8			5	14
CT and/or NG	8	12	17	24			13	36*
STI ever (self-reported)	38	56	41	58	1	4	39	114

* $p<0.05$, ** $p<0.001$, indicates differences between men and women.
CT, *Chlamydia trachomatis*; NG, *Neisseria gonorrhoeae*.

Table 2 Recreational drug use, use of alcohol and use of erectile dysfunction drugs (past 6 months) while swinging of 289 swingers by sex

	Men (n=147)		Women (142)		Total (n=289)	
	%	n	%	n	%	n
Use of erectile dysfunction drugs	61	90	8	11	35	101**
Alcohol use	43	63	49	70	46	133
Drug use while swinging						
Drug use (excl alcohol and erectile dysfunction drugs)	49	72	48	68	48	140
Drug use (incl alcohol and erectile dysfunction drugs)	81	119	77	109	79	228
Top 5 drugs (other than alcohol and erectile dysfunction drugs)						
MDMA	43	63	41	58	42	121
GHB	40	58	37	52	38	110
Laughing gas	37	54	33	47	35	101
Cannabis	31	46	27	38	29	84
Alkyl nitrites (poppers)	17	25	15	21	16	46
Combination of drugs while swinging						
Combination (excl alcohol and erectile dysfunction drugs)	33	49	32	46	33	95
Combination (incl alcohol and erectile dysfunction drugs)	52	77	49	56	46	133*
Top 3 combinations						
GHB and MDMA	33	49	32	46	33	95
MDMA and erectile dysfunction drugs	31	46	4	5	18	51**
Alcohol and erectile dysfunction drugs	25	27	2	3	14	40**

*p<0.05, **p<0.001, indicates differences between men and women.

DISCUSSION

To our knowledge, this is the first study to assess the prevalence of drug use among female and male swingers, and the association between drug use and STI risk. Results revealed high proportions of reported recreational drug use. Drugs were frequently used in combination during sex. Swingers are a high-risk group for STI due to their high rates of unprotected sex with multiple and concurrent partners. Together with the observed associations between drug use, risky sex and STI in female swingers, this warrants more attention for this high-risk group. Sexual behaviour that facilitates a rapid spread of STI, such as a high number of sexual partners, unprotected sex and group sex, was highly prevalent among swingers. Further, a substantial prevalence of STI was observed (13% CT/NG-positive). These findings confirm that swingers are an important target population for STI control strategies, although they are still under-recognised and underserved in care.⁶ Swingers, at least those attending our clinic, are a generally older aged group. We confirm previous UK observations suggesting older STI clinic attendees, such as swingers, are a notable STI clinic population.^{6 12} The prevalence of drug use observed among swingers in this study is very high and comparable with what is observed in MSM.¹ Drugs were frequently used in combination: especially the combination of GHB and MDMA. Also, the combination of drugs like MDMA and erectile dysfunction drugs was frequently observed in men. It is known that some recreational drugs (eg, MDMA or GHB) may hamper the potential to ejaculate or maintain an erection. Since swingers are involved in lengthy sexual acts with multiple partners, male swingers use erectile dysfunction drugs to maintain an erection while using other drugs. It is notable that 8% of the women reported recreational use of erectile dysfunction drugs, for which the effects are unknown. We also found an association between drug use and swinging at home parties. It has previously been shown that drug use in clubs is relatively low,¹⁰ and that swingers who use drugs tend to frequently visit websites instead of clubs.⁸

We observed a notable association between recreational drug use and high-risk sexual behaviour. Relationships between drug

use and STI are complex, but several other studies have observed associations between drug use and STI among other groups.^{2 13-15} Sexual risk taking has frequently been linked to use of alcohol and other substances by injecting drug users, MSM, patients seen in an STI clinic, youth, heterosexual users, drug offenders and young adults who routinely engage in nightlife.^{1-3 16} Drug use is associated with specific sexual behaviours: a higher number of sexual partners, concurrent partners, unprotected sex and lack of condom use, indiscriminate choice of sexual partner.^{1 2 17 18}

This study only found an association between drug use and STI for female swingers. The absence of an association for males may be explained by a lack of statistical power to detect an association. On the other hand, it also corresponds with Heiligenberg *et al*,¹ who found that sex-related drug use was associated with STI in women and MSM, but not in heterosexual men. It is difficult to specify direct effects of drug use on STI transmission. However, people who use more drugs are more likely to engage in risky sexual behaviours and have multiple or concurrent partners, which leads, in turn, to increased rates of STIs.²

According to Friedman, group sex events (all swinger events according to our definition) can involve much use of different drugs and create an atmosphere that can lead to engaging in sex with more partners and in more dangerous ways than they had originally intended.¹¹ Such sexual networks and social contexts can be a powerful source of influence on a number of risk behaviours including drug use,^{2 19} and include many factors that facilitate STI transmission.¹⁰

In addition to sexual risk behaviour, these drug effects could lead to an increased number of sexual acts, increased duration of sexual activity and increased tissue damage, blood-blood contact and blood-semen-vaginal fluid contact.¹ Drug use leads to altered mental states or loss of muscle control (eg, GHB),²⁰ decreased sensation of pain (eg, alkyl nitrites),²¹ intense sexual desires, and loss of inhibitions (eg, cocaine).²² Drugs like (meth) amphetamines dry the mucosa and reduce the sensitivity of the rectal and genital areas. This can facilitate longer and rougher

Table 3 Univariate determinants for recreational drug use and diagnose with STI among 289 swingers

	Drug use						STI					
	OR univariate men	95% CI	p Value	OR univariate women	95% CI	p Value	OR univariate men	95% CI	p Value	OR univariate women	95% CI	p Value
Age <45 years	0.90	(0.47 to 1.75)	0.762	1.54	(0.79 to 3.02)	0.205	1.55	(0.48 to 5.05)	0.470	0.56	(0.23 to 1.36)	0.199
Lower education	1.94	(0.72 to 5.25)	0.191	4.60	(1.596 to 13.29)	0.005	1.39	(0.28 to 6.88)	0.688	1.11	(0.34 to 3.63)	0.862
Swinging more than 3 years	1.79	(0.85 to 3.78)	0.128	2.69	(1.29 to 5.61)	0.008	0.70	(0.20 to 2.47)	0.579	0.64	(0.26 to 1.57)	0.330
Ever swunged at swinger club	1.29	(0.60 to 2.79)	0.518	1.33	(0.61 to 2.92)	0.474	0.38	(0.11 to 1.30)	0.123	0.89	(0.32 to 2.47)	0.823
Ever swunged at home parties	4.57	(1.73 to 12.07)	0.002	5.14	(1.64 to 16.10)	0.005	0.43	(0.12 to 1.55)	0.199	1.34	(0.36 to 4.96)	0.658
Swinging more than 6 times [^]	2.10	(1.09 to 4.07)	0.028	1.01	(0.52 to 1.94)	0.989	1.25	(0.38 to 4.07)	0.711	1.40	(0.58 to 3.40)	0.458
Sex with a male swing partner [^]	2.70	(1.25 to 6.81)	0.011	N.a.			1.43	(0.41 to 5.04)	0.579	N.a.		
Having group sex without condom* [^]	4.31	(1.87 to 9.91)	0.001	3.42	(1.47 to 7.98)	0.004	2.15	(0.54 to 8.54)	0.275	3.73	(1.25 to 11.13)	0.018
SM [^]	2.52	(0.83 to 7.67)	0.102	11.14	(1.37 to 90.42)	0.024	1.73	(0.34 to 8.70)	0.507	1.25	(0.25 to 6.29)	0.787
Six partners or more [^]	2.39	(1.23 to 4.66)	0.010	1.20	(0.62 to 2.32)	0.589	0.39	(0.11 to 1.35)	0.137	1.27	(0.52 to 3.07)	0.605
Use of sex toys [^]	6.15	(2.96 to 12.75)	<0.001	6.35	(3.01 to 13.43)	<0.001	1.01	(0.30 to 3.34)	0.990	1.99	(0.82 to 4.82)	0.128
STI ever	1.35	(0.69 to 2.62)	0.383	1.64	(0.84 to 3.22)	0.150	10.50	(2.14 to 51.53)	0.004	7.38	(2.16 to 25.16)	0.001
No condom use vaginal sex	1.27	(0.66 to 2.44)	0.475	0.82	(0.42 to 1.60)	0.567	0.42	(0.11 to 1.61)	0.204	0.91	(0.37 to 2.21)	0.829
Alcohol use [^]	0.37	(0.19 to 0.72)	0.004	0.67	(0.35 to 1.30)	0.238	0.95	(0.29 to 3.14)	0.931	1.27	(0.52 to 3.05)	0.601
Erectile dysfunction drugs [^]	30.31	(10.79 to 85.10)	<0.001	5.49	(1.14 to 26.41)	0.034	1.29	(0.37 to 4.51)	0.687	4.91	(1.36 to 17.71)	0.015
Drug use while swinging [^]	N.a.						0.73	(0.22 to 2.40)	0.598	3.19	(1.23 to 8.27)	0.017
Combination of drugs while swinging [^]	N.a.						1.30	(0.39 to 4.30)	0.667	2.63	(1.07 to 6.44)	0.034

*Compared with no group sex.

Group sex with condom use was not significant [^]in past 6 months.

SM, sadomasochism.

sexual episodes and contribute to an increased likelihood of bruising and lacerations in the region and of increasing opportunities for transmission of infectious disease.^{5 16 23}

Drug-using populations are a target for interventions that address the practice of safer sex along with secondary prevention of drug use.³ By dealing with all these items properly, more tailored prevention and enhanced STI screening are likely to produce gains for both individuals and the population (reduced STI burden).⁶

This research has several limitations. The response rate is quite low and although there seem to be no large differences between participating and non-participating swingers in age and gender, this makes it difficult to know if these findings can be extrapolated to other studies. We also acknowledge the relatively small number of swingers in this study, which limits our statistical power and ability to detect associations. For example, the power to detect associations in males and females separately was low (<80%) to detect an OR of less than 4. Nevertheless, this is the largest study of swingers of which we are aware. Sexual behaviour data for this study was based on self-report, which introduces recall and social desirability bias. Further, this study data was only collected from swingers who visited an STI clinic. It is unknown whether results are generalisable to swingers outside the STI clinic and/or in other countries. It should be noted that the STI prevalence was a cumulative measure over 1 year, and may thus be somewhat higher than a single-point prevalence measure. Nevertheless, previous data showed high point-prevalences as well (10%).⁶ Though we used STI data about diagnoses over the 12 months preceding the questionnaire date, the questionnaire only asked about risk behaviour in the preceding 6 months. It is possible that we missed associations because of this discrepancy, but it is not likely that behaviour in the preceding 6 months differed from behaviour in the preceding 12 months.

CONCLUSION

In view of high rates of sexual risk behaviour and drug use in swingers, and given their association with STI in female swingers, swingers can play a key role in the transmission of infections. Because swingers have a complicated sexual network, they require more tailored STI control and drug use interventions that include network factors.

Key messages

- ▶ Swingers are a generally older group that shows high rates of STI, sexual risk behaviour and drug use.
- ▶ The effects of drug use on STI among female swingers are part of a context that incorporates different elements, including social network factors.
- ▶ Swingers are an important target population for STI control strategies.
- ▶ More tailored interventions for swingers are needed; these should include social network factors like group sex.

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Competing interests None.

Patient consent Obtained.

Ethics approval Medical Ethical Committee of Maastricht University Medical Center.

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