Self-identified sexual orientations and high-risk sexual behaviours among Chinese youth

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ABSTRACT

Purpose High-risk sexual behaviour is a factor affecting the health of sexual minority students, yet few related studies have been completed among Chinese students. This article explores the distribution of sexual minority groups and its association with high-risk sexual behaviours and symptoms of sexually transmitted infections(STIs) among Chinese college students.

Methods An internet-based questionnaire was applied, and a sample of 17 966 surveys from 130 Chinese colleges was collected. Based on their self-reports, participants were classified into the following groups: homosexual male or female, heterosexual, bisexual, and sexual orientation unknown. High-risk sexual behaviours were defined as having sexual intercourse before the age of 18 years, having one's sexual debut with a non-regular partner, having had more than four sexual partners before investigation, and having mostly had sexual intercourse without using condoms. Logistic regression models were constructed to analyse the associations.

Results The proportions of the homosexual males and females, and the bisexual groups were 1.62%, 0.88% and 5.07%, respectively. Homosexual males were more likely to have their sexual debut with a non-regular partner (OR 4.79, 95% CI 3.38 to 6.78), having more than four sexual partners (OR 5.81, 95% CI 4.06 to 8.32), having their sexual debut before the age of 18 years (OR 1.92, 95% CI 1.34 to 2.76), and not using condoms for most episodes of sexual intercourse (OR 1.47, 95% CI 1.00 to 2.17). Similar associations also existed among homosexual females. A positive association between sexual orientation and having symptoms of STIs (OR 1.49, 95% CI 1.02 to 2.18) was found among homosexual males.

Conclusions Sexual minority groups among Chinese college students had a greater risk of engaging in high-risk sexual behaviours and having STI symptoms. Future studies and interventions should focus on this population.

Key messages

- Compared with heterosexual college students, homosexual and bisexual individuals are more likely to demonstrate high-risk sexual behaviours and exhibit STI symptoms in China.
- Sexual activity among Chinese college students are now more commonly observed than was the case previously.

INTRODUCTION

China has experienced some relative liberation from traditional heterosexual sociocultural norms in the last 40 years. Same-sex sexual orientations and behaviours are increasingly detected among young college students. Many studies have focused on attitude, knowledge and social aspects of the so-called sexual minority groups (ie, homosexual men, homosexual women, bisexual population, and transgender population) in the general Chinese population, yet recent studies on college students' sexual behaviours and sexual health, especially among the sexual minority groups, remain limited.

Although the sexual minority groups in China are experiencing less pressure and discrimination, sexually transmitted infections (STIs) still cast a particular shadow on their physical health. In comparison to heterosexual populations, the sexual minority groups in China are more likely to exhibit STI symptoms. In China, men who have sex with men (MSM) were reported to have a higher syphilis prevalence of 14.6% compared to female sex workers (12.5%) and drug users (6.8%).[1] It was reported in 2011 that 17.4% Chinese HIV/AIDS patients became infected as a result of unprotected man-to-man sexual intercourse.[2] Among women who have sex with women

(WSW), the prevalence of STIs ranged from 26.8% to 34.7%, which is higher than that in the heterosexual population.[3]

The prevalence of STIs is closely related to the sexual behaviours that pose high risks of transmission. Similar to the results of studies on STI prevalence, studies on the sexual minority groups in China reported a high prevalence of high-risk sexual behaviours among them.[4] Guo *et al* analysed data from 4982 young adults aged between 15 and 24 years who were sexually active, and found that the overall prevalence of any HIV-related sexual risk behaviours (ie, sexual activities that increase the risk of HIV infection through potential contact with the semen, blood or vaginal secretions of a person infected with HIV') among non-heterosexual youth (90.53%) was significantly higher than that of heterosexual youth (79.21%).[5] Similar trends were also reported in the USA and Thailand.[6 7]

Based on our review of previous studies, we defined the following behaviours as being high-risk sexual behaviours in this study: having sexual intercourse before the age of 18 years, having one's sexual debut with a non-regular partner, having had more than four sexual partners before investigation, and having mostly had sexual intercourse without using condoms. The selection of high-risk behaviours was based on related studies contextualised to Chinese society. Ma *et al* found that Chinese college students who had their sexual debut before graduating from high school (age 18 years) are more likely to have unprotected sex on this debut. The same study also classified having sex with a non-regular partner at sexual debut as a risk to sexual health.[8] In previous studies on Chinese college students' sexual behaviours, 'having multiple sexual partners' was also considered to be a sexual health risk and was defined as 'having more than one sexual partner in total'. Because of the growing liberation of sexuality, and college students' increasingly open attitudes towards sex, we relaxed the threshold to having four sexual partners in total.

In contrast to the high prevalence of high-risk sexual behaviours, social support mechanisms for this population are significantly insufficient.[9]Effective interventions that can improve sexual and reproductive health for Chinese sexual minority college students are still limited. Conversely, social stigma still weaken the already poor supports such as social acceptance, sexual and reproductive health (SRH) knowledge advocacy, and STI prevention interventions.[9] In such circumstances, it is important to understand the current status of sexual minority groups among college students, in order to promote effective prevention interventions and strengthen positive social supports for these individuals' health. To fill this gap, the present study examined the correlation between being in a sexual minority group and high-risk sexual behaviours, and explored the STI-related health outcomes among Chinese college students.

METHODS

Participants

The study employed an internet-based questionnaire and was conducted from January to August 2015. To maintain a balanced geographical distribution within the study sample, 130 colleges were selected from Eastern, Central and Western regions in China. A total of 17 966 college students were recruited and 90% of them came from the 130 chosen colleges. The sample was limited to undergraduate students aged between 18 and 25 years. Multiple stages of sampling approaches were used in collecting and processing the data to maintain reliability and validity. An electronic version of the questionnaire was delivered to the focal points of each school, who posted a link to the questionnaire on social networks on the schools' internal communication platforms. Each participant who completed the questionnaire received a monetary compensation of a random amount (from 1 to 200 renminbi (RMB)). In the end, five of the participants received the maximum reimbursement of 200 RMB. To avoid repetitive answering from the same person, each IP address was restricted to having only one opportunity to respond to the online questionnaire. The survey was conducted in Chinese, and translated by SRH health professionals. Participants' informed consent was obtained via electronic surveys, and participants were free to withdraw at any time during the study.

Exposures and covariates

Participants were classified into groups of homosexual male, homosexual female, heterosexual, bisexual, and sexual orientation unknown based on their self-reported answer to the question 'What is your sexual orientation?'. A series of sociodemographic, socioeconomic and behavioural covariates were included in the regression model as covariates. Self-reported biological sex was dichotomised into female and male. Age was coded as a continuous variable. Family type was divided into 'nuclear/extended families' (defined as respondents living with both biological/adoptive parents, and with/without grandparent(s)) and 'other' categories. Monthly expenditure was categorised into three levels including <1000 RMB, 1000 to 2000 RMB, and >2000 RMB. The participants' parental level of education was categorised from illiteracy to master's degree and above. Alcohol consumption and tobacco use were treated as categorical variables.

Outcomes

In this study, high-risk sexual behaviours were defined as sexual behaviours that have higher association with STIs, including having sexual intercourse before the age of 18 years, having one's sexual intercourse debut with a non-regular partner, having had more than four sexual partners before the investigation, and having mostly had sexual intercourse without using condoms. Since Chinese students are more conservative towards

sex as has been shown by previous studies, we defined 'high-risk sexual behaviours' with reference to previous studies so as retain consistency in the features of the study population.[10–12] Questions were designed to measure participants' sexual behaviours from specific aspects. Questions such as 'What was your age at sexual intercourse debut?', 'Who was your sexual partner at sexual intercourse debut?' and 'How many sexual partners have you ever had till now?' were asked to elucidate information on sexual intercourse debut and sexual partners, respectively. It is necessary to note that age at sexual intercourse debut and total number of previous sexual partners were coded as continuous variables. One's first sex partner was dichotomised into 'regular' (defined as one's exclusive long-term partner in the questionnaire) and 'non-regular'. 'What is your most frequently used contraceptive for sexual intercourse?' was asked in order to explore participants' self-protection during sexual intercourse. Participants who did not use choose condom as the most frequently used contraceptive method for sexual intercourse were regarded as exhibiting high-risk sexual behaviours. STI-related venereal signs and symptoms were asked about to determine participants' sexual health status. The question 'Have you ever had the following symptoms before?' was followed by a series of venereal symptoms including abnormal urethral secretions, pain on urination, vaginal/urethral inflammation, genital ulcers, genital itching, genital rash, and others. A positive answer to any of the aforementioned symptoms resulted in a score of 1 for the 'venereal symptoms-related score'. The scoring measures the likelihood of potential STIs. Participants were assigned as 'having venereal symptoms' when the total score was ≥1.

Data analysis

Descriptive statistics, including demographic and socioeconomic characteristics, lifestyle risk factors, and sexual behaviours, were examined to show the baseline status of participants. To further explore the sexual behaviours of students with different self-reported sexual orientations, other descriptive statistics were processed to show the baseline status of sexual behaviours and venereal symptoms among all sexually active participants. Pearson Chi-square (χ^2) tests were conducted in order to examine the distribution of related factors in populations with different sexual orientations.

A series of logistic regression analyses were conducted to explore the association between high-risk sexual behaviours and different sexual orientations including homosexual male, homosexual female, heterosexual, bisexual, and sexual orientation unknown groups. In addition, logistic regression models were used to examine the relationship between venereal symptoms and sexual orientations. The heterosexual group was chosen as the reference group. A series of covariates including gender, age, monthly expenditure, hometown, family type, parental level of education, alcohol consumption, and smoking history were included in the regression models of the analyses. Covariates were chosen based on previous studies on the determinants of sexual behaviours among Chinese students.[11] All the analyses were done using SAS version 9.4 (SAS Institute, Cary, NC, USA).

RESULTS

Descriptive statistics of the participants by their sexual orientation are presented in table 1. Of all 17 966 participants in the study, 60.38% were female. The mean age of participants was 20.18 (SD 1.22) years. The proportions of heterosexual male, heterosexual female, homosexual male, homosexual female, bisexual, and sexual orientation unknown groups were 35.8%, 53.8%, 1.62%, 0.88%, 5.07% and 2,88%, respectively. Incidence of high-risk sexual behaviours and venereal symptoms among the participants with different sexual orientations is shown in table 2.

Tables 3 and 4 present the relative odds of high-risk sexual behaviours and having venereal symptoms among the sexual minority groups, classified by gender (male and female). When compared with heterosexual females, homosexual female (OR=3.22, 95% CI: 1.53 to 6.80), bisexual (OR=2.27, 95% CI: 1.39 to 3.71), and sexual orientation unknown participants (OR=4.97, 95% CI: 1.99 to 12.46) had greater likelihood of choosing a non-regular partner in sexual intercourse debut; homosexual and bisexual female were more likely to have had more than four partners before the study, with the odds ratios of 3.18 (95% CI: 1.51 to 6.69) and 2.90 (95% CI: 1.83 to 4.61) and tended to have sexual debut before age 18, with the odds ratios of 2.19 (95% CI: 1.13 to 4.24) and 2.22 (95% CI: 1.53 to 3.22). The similar associations were also observed among homosexual, bisexual and sexual orientation unknown male participants than heterosexual males. For condom use, sexual minority male (homosexual: OR=1.47, 95% CI: 1.00 to 2.17; bisexual: OR=1.76, 95% CI: 1.14 to 2.72; and sexual orientation unknown: OR=2.86, 95% CI: 1.08 to 7.58) had greater chance of not using condoms in most sexual intercourse. In addition, the odds ratios of having venereal symptoms among homosexual, bisexual and sexual orientation unknown male were 1.49 (95% CI: 1.02 to 2.18), 1.33 (95% CI: 0.85 to 2.08), and 3.18 (95% CI: 1.20 to 8.43). However, the association of having venereal symptoms and being homosexual female was insignificant.

DISCUSSION

After collecting data from 130 colleges in China, this study presented a detailed description of the distribution of sexual minority groups and identified associations between self-identified minority sexual orientations and high-risk sexual behaviours among Chinese

Table 1 Basic characteristic of participants by sexual orientation (N=17 966)

Variable	Total (N=17 966)	Heterosexual		Homosexual		Bisexual (N=911)	Unknown (N=518)
		Male (N=6428)	Female (N=9660)	Male (N=291)	Female (N=158)		
Gender (female)	60.4 (59.7 to 61.1)	0	100.0	0	100.0	69.6 (66.6 to 72.6)	76.5 (72.8 to 80.1)
Age (years)							
18–19	30.6 (29.9 to 31.3)	26.2 (25.1 to 27.3)	32.7 (31.8 to 33.6)	23.4 (18.5 to 28.2)	26.0 (19.1 to 32.8)	36.6 (33.4 to 39.7)	40.9 (36.7 to 45.2)
20–21	56.2 (55.5 to 56.9)	57.5 (56.3 to 58.7)	56.1 (55.1 to 57.1)	56.4 (50.7 to 62.1)	58.2 (50.5 to 65.9)	52.6 (49.3 to 55.8)	49.0 (44.7 to 53.3)
≥22	13.2 (12.7 to 13.7)	16.4 (15.5 to 17.3)	11.2 (10.6 to 11.8)	20.3 (15.7 to 24.9)	15.8 (10.1 to 21.5)	10.9 (8.8 to 12.9)	10.0 (7.5 to 12.6)
Mean (SD)	20.18 (1.22)	20.34 (1.27)	20.09 (1.17)	20.47 (1.29)	20.32 (1.38)	20.02 (1.23)	19.94 (1.21)
Monthly living costs (RMB)							
<1000	49.4 (48.7 to 50.2)	45.5 (44.3 to 46.7)	54.1 (53.1 to 55.1)	29.2 (24.0 to 34.4)	47.5 (39.7 to 55.3)	34.6 (31.5 to 37.7)	49.8 (45.5 to 54.1)
1000–2000	43.1 (42.4 to 43.8)	47.0 (45.8 to 48.2)	39.7 (38.7 to 40.7)	53.3 (47.5 to 59.0)	41.1 (33.5 to 48.8)	50.4 (47.1 to 53.6)	40.5 (36.3 to 4.8)
>2000	7.5 (7.1 to 7.9)	7.6 (7.0 to 8.2)	6.3 (5.8 to 6.8)	17.5 (13.2 to 21.9)	11.4 (6.4 to 16.3)	15.0 (12.7 to 17.4)	9.7 (7.1 to 12.2)
Hometown							
Urban	39.7 (38.9 to 40.4)	40.0 (38.8 to 41.2)	37.2 (36.3 to 38.2)	54.3 (48.6 to 60.0)	52.5 (44.7 to 60.3)	54.6 (51.3 to 57.8)	44.2 (39.9 to 48.5)
Suburban	31.1 (30.5 to 31.8)	29.8 (28.7 to 30.9)	32.3 (31.4 to 33.2)	31.6 (26.3 to 37.0)	21.5 (15.1 to 28.0)	28.7 (25.7 to 31.6)	34.0 (29.9 to 38.1)
Rural	29.2 (28.5 to 29.9)	30.3 (29.2 to 31.4)	30.6 (29.7 to 31.5)	14.1 (10.1 to 18.1)	26.0 (19.1 to 32.8)	16.8 (14.4 to 19.2)	21.8 (18.3 to 25.4)
Family type							
Nuclear/extended family	89.5 (89.1 to 89.9)	90.0 (89.3 to 90.7)	90.1 (89.5 to 90.7)	83.9 (79.6 to 88.1)	84.8 (79.2 to 90.4)	84.4 (82.1 to 86.8)	85.9 (82.9 to 88.9)
Other family	10.5 (10.1 to 10.9)	10.0 (9.3 to 10.7)	9.9 (9.3 to 10.5)	16.2 (11.9 to 20.4)	15.2 (9.6 to 20.8)	15.6 (13.2 to 17.9)	14.1 (11.1 to 17.1)
Parents' education level							
Primary school and below	10.3 (9.9 to 10.8)	10.5 (9.8 to 11.2)	9.3 (8.7 to 9.9)	9.3 (5.9 to 12.6)	11.4 (6.4 to 16.3)	7.5 (5.8 to 9.2)	13.5 (10.6 to 16.5)
Middle school	32.7 (32.0 to 33.3)	31.5 (30.4 to 32.6)	35.5 (34.5 to 36.5)	21.0 (16.3 to 25.6)	26.6 (19.7 to 33.5)	20.4 (17.8 to 23.0)	24.7 (21.0 to 28.4)
High school	31.8 (31.1 to 32.5)	31.7 (30.6 to 32.8)	32.2 (31.3 to 33.1)	30.2 (25.0 to 35.5)	28.5 (21.4 to 35.5)	30.4 (27.4 to 33.4)	31.3 (27.3 to 35.3)
Vocational school and above	25.2 (24.6 to 25.8)	26.3 (25.2 to 27.4)	22.0 (21.2 to 22.8)	39.5 (33.9 to 45.1)	33.5 (26.2 to 40.9)	41.7 (38.5 to 44.9)	30.5 (26.5 to 34.5)
Alcohol use							
Non-drinker	29.8 (29.2 to 30.5)	12.4 (11.6 to 13.2)	41.8 (40.8 to 42.8)	19.2 (14.7 to 23.8)	33.5 (26.2 to 40.9)	24.2 (21.4 to 26.9)	37.5 (33.3 to 41.6)
Occasional drinker	51.6 (50.8 to 52.3)	51.0 (49.8 to 52.2)	51.9 (50.9 to 52.9)	49.5 (43.7 to 55.2)	49.4 (41.6 to 57.2)	52.9 (49.7 to 56.2)	51.4 (47.0 to 55.7)
Infrequent drinker	16.3 (15.8 to 16.9)	31.9 (30.8 to 33.0)	5.8 (5.3 to 6.3)	27.8 (22.7 to 33.0)	13.9 (8.5 to 19.3)	18.2 (15.7 to 20.7)	9.7 (7.1 to 12.2)
Frequent drinker	2.3 (2.1 to 2.5)	4.6 (4.1 to 5.1)	0.5 (0.4 to 0.6)	3.4 (1.3 to 5.5)	3.2 (0.4 to 5.9)	4.7 (3.3 to 6.1)	1.5 (0.5 to 2.6)
Smoking							
Never	91.2 (90.8 to 91.6)	79.9 (78.9 to 80.9)	98.7 (98.5 to 98.9)	88.7 (85.0 to 92.3)	88.0 (82.9 to 93.0)	89.5 (87.5 to 91.5)	96.9 (95.4 to 98.4)

Continued

Table 1 Continued

Variable	Total (N=17 966)	Heterosexual		Homosexual		Bisexual (N=911)	Unknown (N=518)
		Male (N=6428)	Female (N=9660)	Male (N=291)	Female (N=158)		
1–10 cigarettes/day	7.1 (6.7 to 7.4)	16.2 (15.3 to 17.1)	1.1 (0.9 to 1.3)	8.9 (5.7 to 12.2)	10.1 (5.4 to 14.8)	7.2 (5.6 to 8.9)	2.3 (1.0 to 3.6)
>10 cigarettes/day	1.8 (1.6 to 2.0)	4.0 (3.5 to 4.5)	0.2 (0.1 to 0.3)	2.4 (0.6 to 4.2)	1.9 (0.0 to 4.0)	3.3 (2.1 to 4.4)	0.8 (0.0 to 1.5)
Sexual intercourse (Yes)	20.3 (19.7 to 20.8)	26.7 (25.6 to 27.8)	14.4 (13.7 to 15.1)	57.0 (51.4 to 62.7)	28.5 (21.4 to 35.5)	30.1 (27.1 to 33.1)	8.1 (5.8 to 10.5)

Values in the table are percentages (%) and 95% confidence intervals (95% CIs) unless otherwise specified.
RMB, renminbi; SD, standard deviation.

college students. The sexual minority groups (defined in this article as homosexual male, homosexual female, bisexual population, sexual orientation unknown population) had a greater likelihood of engaging in high-risk sexual behaviours. In addition, a strong association between identifying with minority sexual orientations and having venereal symptoms of STIs was found among male participants.

Table 2 Risky sexual behaviours and venereal symptoms among individuals who have had sexual intercourse (N=3639)

Variable	Total (N=3639)	Heterosexual		Homosexual		Bisexual (N=274)	Unknown (N=42)
		Male (N=1717)	Female (N=1395)	Male (N=166)	Female (N=45)		
First sexual partner (non-couple)	14.1 (13.0 to 15.2)	14.2 (12.5 to 15.9)	7.2 (5.8 to 8.6)	42.8 (35.3 to 50.3)	24.4 (11.9 to 36.9)	25.6 (20.4 to 30.8)	38.1 (23.4 to 52.8)
Total number of previous sexual partners							
1	59.5 (57.9 to 61.1)	60.2 (57.9 to 62.5)	66.7 (64.2 to 69.2)	28.3 (21.4 to 35.2)	37.8 (23.6 to 52.0)	43.8 (37.9 to 49.7)	42.9 (27.9 to 57.9)
2–3	29.9 (28.4 to 31.4)	29.6 (27.4 to 31.8)	28.9 (26.5 to 31.1)	31.3 (24.2 to 38.4)	37.8 (23.6 to 52.0)	32.5 (27.0 to 38.0)	40.5 (25.7 to 55.3)
≥4	10.6 (9.6 to 11.6)	10.2 (8.8 to 11.6)	4.4 (3.3 to 5.5)	40.4 (32.9 to 47.9)	24.4 (11.9 to 36.9)	23.7 (18.7 to 28.7)	16.7 (5.4 to 28.0)
Mean (SD)	1.89 (1.34)	1.89 (1.32)	1.61 (1.05)	3.14 (1.71)	2.51 (1.62)	2.49 (1.64)	2.40 (1.48)
Age at first sexual intercourse (years)							
<14	4.5 (3.8 to 5.2)	4.1 (3.2 to 5.0)	2.2 (1.4 to 3.0)	9.0 (4.6 to 13.4)	15.6 (5.0 to 26.2)	12.0 (8.2 to 15.8)	16.7 (5.4 to 28.0)
15–17	19.4 (18.1 to 20.7)	18.2 (16.4 to 20.0)	17.9 (15.9 to 19.9)	25.3 (18.7 to 31.9)	24.4 (11.9 to 36.9)	28.8 (23.4 to 34.2)	26.2 (12.9 to 39.5)
18–19	44.0 (42.4 to 45.6)	43.2 (40.9 to 45.5)	46.0 (43.4 to 48.6)	45.2 (37.6 to 52.8)	46.7 (32.1 to 61.3)	39.4 (33.6 to 45.2)	35.7 (21.2 to 50.2)
≥20	32.2 (30.7 to 33.7)	34.6 (32.3 to 36.9)	34.0 (31.5 to 36.5)	20.5 (14.4 to 26.6)	13.3 (3.4 to 23.2)	19.7 (15.0 to 24.4)	21.4 (9.0 to 33.8)
Mean (SD)	18.40 (2.44)	18.51 (2.40)	18.71 (1.96)	17.57 (2.75)	17.02 (3.10)	17.16 (3.39)	16.57 (4.45)
Condom use							
No condom use for most episodes of sexual intercourse	16.8 (15.6 to 18.0)	17.0 (15.2 to 18.8)	12.5 (10.8 to 14.2)	23.5 (17.0 to 30.0)	60.0 (45.7 to 74.3)	23.4 (18.4 to 28.4)	35.7 (21.2 to 50.2)
No condom use for last epidose of sexual intercourse	37.5 (35.9 to 39.1)	36.7 (34.4 to 39.0)	35.8 (33.3 to 38.3)	41.6 (34.1 to 49.1)	77.8 (65.7 to 89.9)	40.2 (34.4 to 46.0)	47.6 (32.5 to 62.7)
Have venereal symptoms	32.0 (30.5 to 33.5)	20.1 (18.2 to 22.0)	46.9 (44.3 to 49.5)	25.9 (19.2 to 32.6)	37.8 (23.6 to 52.0)	32.9 (27.3 to 38.5)	40.5 (25.7 to 55.3)

Values in the table are percentages (%) and 95% confidence intervals (95% CIs) unless otherwise specified.

Table 3 Relative odds of having risky sex behaviours and venereal symptoms in the female population

Parameter	Homosexual female		Bisexual		Unknown	
	OR	95% CI	OR	95% CI	OR	95% CI
First sexual partner was non-couple	3.22	1.53 to 6.80	2.27	1.39 to 3.71	4.97	1.99 to 12.46
No condom use for most episodes of sexual intercourse	11.45	5.96 to 21.96	1.92	1.24 to 3.00	3.45	1.43 to 8.28
Had first intercourse when aged <18 years	2.19	1.13 to 4.24	2.22	1.53 to 3.22	2.08	0.87 to 4.97
Had more than four sexual partners	3.18	1.51 to 6.69	2.90	1.83 to 4.61	0.58	0.08 to 4.47
Had venereal symptoms	0.71	0.38 to 1.32	0.80	0.56 to 1.13	0.69	0.30 to 1.60

Values in the table are odds ratios (ORs) and 95% confidence intervals (95% CIs). 'Heterosexual female' was chosen as the reference group. Data were adjusted for age, monthly life cost, home town, family type, parents' education level, alcohol use, and smoking history.

Prior to this study, few articles focused on sexual minority groups among college students in China, partly due to the sensitivity of the topic and the tradition of overlooking sexual minority groups.[9] The present study was based on a large national survey of sexual and reproductive health status in 130 Chinese colleges, which recruited nearly 18 000 students. Its sample size was larger than any of the previous studies conducted in China. Due to the sensitivity of sexual issues, an internet-based approach was judged to be more suitable for collecting reliable data and for guaranteeing anonymity and protecting privacy. Also, by comparing the sexual behaviours among students with different sexual orientations, this study identified sexual minority college students in China as a group that is more vulnerable to high-risk sexual behaviours, and therefore was able to argue the need for supports for this group of individuals.

This study has some potential limitations. Although an internet-based approach could provide better protection of the participants' privacy, this method may result in problems with selective non-response and reliability of the data obtained.[13] In order to exclude extreme values, for example, number of sexual partners, age of sexual debut, researchers conducted a thorough logic check and regrouped continuous variables. Regarding questionnaire design, we presented condoms as being the only way of preventing STIs during sexual intercourse, ignoring the fact that homosexual females might have other options such as gloves, dental dams, and so on. The consequence is that the homosexual female participants in the study may have chosen the option 'not using condoms' and thus be considered to have high-risk sexual behaviours, whereas they in fact they used other protection. Also, due to the lack of data concerning school information (participants universities), we didn't account for the clustering of universities in the data analysis, which could lead to an underestimation of standard errors in the results. We asked about 'contraceptive use' without distinguishing between condom use for protection against STIs and for contraception, which would lead to a misclassification for homosexual students.

The present study identified an overall increasingly open attitude towards sexuality among college students in China. In our study, 20.25% of college students reported being sexually active. A previous study that focused on the sexual knowledge and behaviours of college students in Hunan Province of China reported the same rate of 14% in 2005.[14] The sexual minority groups were found to be more likely to engage in sexual activities than the heterosexual group in our study. This finding is consistent with previous results.[15]

Early sexual debut could be a risk factor for STIs including HIV/AIDS among sexual minority groups.[16] Our study identified a positive association between identifying with a minority sexual orientation and having an earlier sexual debut. A series of factors may facilitate early sexual debut in sexual minority groups. Previous studies of other societies attempted

Table 4 Relative odds of having risky sex behaviours and venereal symptoms in the male population

Parameter	Homosexual male		Bisexual		Unknown	
	OR	95% CI	OR	95% CI	OR	95% CI
First sexual partner was non-couple	4.79	3.38 to 6.78	3.52	2.35 to 5.26	6.37	2.47 to 16.42
No condom use for most episodes of sexual intercourse	1.47	1.00 to 2.17	1.76	1.14 to 2.72	2.86	1.08 to 7.58
Had first intercourse when aged <18 years	1.92	1.34 to 2.76	2.02	1.34 to 3.02	3.29	1.24 to 8.68
Had more than four sexual partners	5.81	4.06 to 8.32	3.62	2.38 to 5.50	4.62	1.69 to 12.67
Had venereal symptoms	1.49	1.02 to 2.18	1.33	0.85 to 2.08	3.18	1.20 to 8.43

Values in the table are odds ratios (ORs) and 95% confidence intervals (95% CIs). 'Heterosexual male' was chosen as the reference group. Data were adjusted for age, monthly life cost, home town, family type, parents' education level, alcohol use, and smoking history.

to explain the associations between early sexual initiation and other behavioural and contextual factors. A strong association between adverse childhood experiences and early age of sexual debut was observed in both sexual minority youth and heterosexual populations.[17] Sexual minorities tend to be disproportionately exposed to adverse childhood experiences such as physical/psychological abuse, sexual abuse, and parental incarceration.[18] Sexual minorities may initiate sexual activities in early adolescence in an attempt to obtain more personal connexions.[10] Further exploratory studies on the reasons for sexual minority groups' earlier sexual debut need to be conducted in the contexts of contemporary China.

Our study shows that compared to self-reported heterosexual college students, the self-reported sexual minority individuals were significantly more likely to have their sexual debut with non-regular partners and were reported to have more sexual partners. Such an association is aligned with previous studies in other populations.[19] Same-sex marriage remains illegal in China.[20] Meanwhile, discrimination towards sexual minority groups aggravates stigma and stress, and hampers relationships in sexual minority couples.[21] These sociocultural barriers make it more difficult for bisexual Chinese couples to maintain stable long-term relationships.[22]

Our study also shows that regarding protection against risks in sexual behaviours, sexual minority groups had a greater likelihood of not using condoms. This might be because sexual minorities are more likely to encounter sexual activities without consent. Research in North American settings showed that for MSM, unprotected sex such as condom-less anal sex is one of the major risk factors for sexual health.[23] Although our study does not recognise the protective measures used by WSW in the questionnaire, other studies have reported infrequent use of protective measures such as condoms among WSW.[24] Previous studies have also indicated that compared with the heterosexual population, sexual minority groups had a greater chance of encountering intimate partner violence, in which forced and unprotected sex were likely to occur.[25] Sexual minority individuals' frustrations in negotiating safer sex might also be attributed to a variety of other reasons including a decreased control over sex, fear of violence, and unequal power dynamics (ie, financially and socially) within the relationship.[26] Further qualitative study on sexual minorities among Chinese college students is needed to ascertain their particular reasons for not using condoms.

Our study implies a higher prevalence of STIs among sexual minority groups. We identified a positive association between venereal symptoms in homosexual and bisexual male students. Since venereal symptoms may indicate potential STI contraction, the presented associations suggest a possible higher STI prevalence in male sexual minority students. Previous studies ascribe this association among MSM to low levels of access to anonymous, gay-friendly, low-cost STI screening services aimed at MSM, and homosexual individuals with bisexual behaviours were more vulnerable to STIs and HIV because of the more frequent exchange of body fluids and increased number of sexual partners in China.[27 28]

Policy implications

To reduce the prevalence of STIs among sexual minority students, contextualised interventions aimed at encouraging behavioural change should be considered. First, theories of behavioural change such as the Health Belief Model (HBM) or Information, Motivation, Behavioural skills (IMB) model could be applied in the prevention of high-risk sexual behaviours.[29] At the implementation of behavioural change models, knowledge of high-risk sexual behaviours and STIs should be strengthened and emphasised. Another key to effective intervention is approaching the students from a holistic point of view, and developing family-, community- and school-based programmes. Family checkups and family resource centre might improve the quality of family relationships, and in turn may result in less high-risk sexual behaviours in children's early adulthood. School-based interventions such as peer education could help promote knowledge and offer a positive environment for sexual minority groups.

CONCLUSIONS

Since Chinese young adults nowadays adopt more open attitudes to sex, sexual behaviours among college students are now more commonly observed. Compared to heterosexual college students, homosexual, bisexual, and individuals with unknown sexual orientation (sexual minority groups) are more likely to demonstrate high-risk sexual behaviours and STI-related venereal symptoms. To tackle the emerging public health problem of high-risk sexual behaviours and STIs among sexual minority groups of college students, designing educational programmes and advocating social awareness are possible options.

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