

EPIDEMIOLOGY/RISK FACTORS

Gender Differences in the Association Between Sexual Orientation and Risky Sexual Behavior Among College Students With Sexual Experience in Sichuan Province, Chinese



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ABSTRACT

Background: Limited information is available regarding risky sexual behavior among college students with different sexual orientations.

Aim: The aim of this study was to examine the gender differences in the association between sexual orientation and risky sexual behavior among Chinese college students with sexual experience.

Methods: With a self-assessment questionnaire, we conducted a cross-sectional survey among 73,800 students from 25 vocational colleges (3-year colleges) in the Sichuan province of China. Multivariate logistic regression models were used to examine the association between sexual orientation and risky sexual behavior among students with sexual experience.

Outcomes: The main outcome measures used regarding risky sexual behavior are the following: condom use in the last sexual intercourse, early sexual debut, and having multiple sexual partners.

Results: 12,711 students with sexual experience were included. Sexual minority students were more likely to have an early sexual debut (For male students, homosexual: OR = 1.88, $P < .001$; bisexual: OR = 1.96, $P < .001$; unsure: OR = 1.68, $P < .001$. For female students, homosexual: OR = 1.87, $P < .01$; bisexual: OR = 2.07, $P < .01$; unsure: OR = 1.53, $P < .05$), and less likely to use condoms in their last sexual intercourse (except for homosexual male students) (For male students, bisexual: OR = 0.65, $P < .01$; unsure: OR = 0.60, $P < .001$. For female students, homosexual: OR = 0.21, $P < .001$; bisexual: OR = 0.54, $P < .001$; unsure: OR = 0.68, $tP < .05$). There are gender differences in the association between sexual orientation and having multiple sexual partners. Male sexual minorities were more likely to have multiple sexual partners than heterosexual students (homosexual: OR = 2.06, $P < .001$; bisexual: OR = 1.66, $P < .001$; unsure: OR = 1.31, $P < .05$), while the same result was only observed in bisexual female students (OR = 1.46, $P < .01$).

Clinical Implications: Sexual health education professionals should consider the sexual orientation of students when providing counseling services or educational intervention, especially for male students and LGBT ones.

Strengths & Limitations: We examined gender differences in the association between sexual orientation and risky sexual behavior among college students with sexual experience. However, the ability for the cross-sectional survey to address causality is limited, and will be further tested in cohort studies.

Conclusion: Gender and sexual orientation affect the likelihood of risky sexual behavior among China's college students, and gender differences in the association between sexual orientation and risky sexual behavior should be noticed. **Li Y, Zhou D, Dai Y, et al. Gender Differences of the Association Between Sexual Orientation and Risky Sexual Behavior Among College Students With Sexual Experience in Sichuan Province, Chinese. Sex Med 2022;10:100547.**

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Key Words: Sexual Orientation; Risky Sexual Behavior; Sexual Minorities; Adolescents; College Students

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INTRODUCTION

According to the UNAIDS report (2013), globally there are nearly 5 million young people aged 10–24 living with HIV, and 900,000 adolescents aged 10–19 get infected each year.¹ In China, the incidence of HIV among those aged 15–24 increased disproportionately compared with other population groups.² From 2010 to 2019, a total of 23,307 HIV/AIDS cases were newly reported among young students, and the number of new cases increased from 794 in 2010 to 3,422 in 2019.² The main route for the transmission of HIV/AIDS among Chinese adolescents is sexual contact, risky sexual behavior in particular.² It was shown that frequent exposure to risky sexual behavior was associated with a higher risk of HIV/AIDS infection.³

Influenced by sociocultural factors, many adolescents keep an open mind about sex, which makes them prone to risky sexual behavior. A study among 1,749 adolescents aged 17–19 in Thailand showed that 62% of the males and 34% of the females were sexually experienced, while 48% and 69% of them reported no condom use, respectively.⁴ Besides, earlier age at sexual debut is noticed.⁵ Risky sexual behavior puts adolescents at a high risk of adverse outcomes including unplanned pregnancy and sexually transmitted infections.

Sexual orientation is a part of individual identity that includes “a person’s sexual and emotional attraction to another person and the behavior and/or social affiliation that may result from this attraction.”^{6,7} Sexual orientation is an important aspect of one’s sexual health. Growing evidence revealed the association between sexual orientation and risky sexual behavior among adolescents.^{8–10} It is reported that homosexual, bisexual, and unsure students are more likely to engage in risky sexual behavior compared with heterosexual students, such as earlier sexual debut,^{8,9} having more sexual partners,⁸ lower frequency of condom use,¹⁰ and having sex after drinking alcohol.⁵ Due to the propensity for risky sexual behavior, sexual minority students are at a high risk of sexually transmitted infections, including HIV/AIDS.

Although previous studies have researched the MSM population as well as bisexual minority stress and its links with risky sexual behavior, some limitations exist in these studies. First, due to the insufficient sample sizes, some study designs combined sexual minority groups together in the comparison with heterosexuals.^{11,12} Second, some studies targeted only sexual minority groups, without setting a heterosexual group for comparison.^{13,14} Third, sexual minorities of different genders may exhibit different types of risky sexual behavior,¹⁵ and it’s necessary to obtain the information on the gender differences in the relationship between sexual orientation and risky sexual behavior and their impact on the decision-making processes. Moreover, a better understanding of the factors that drive both male and female sexual minorities to engage in risky sexual behavior will allow health professionals to develop gender and sexual orientation specific sexual risk behavior interventions.

Sichuan province has the largest number of newly infected HIV/AIDS cases among youth aged 15–24 in China.² Therefore, we conducted a cross-sectional survey to examine the influence of both gender and sexual orientation on the risky sexual behavior of college students in Sichuan, China.

METHODS

Participants

In late 2019, a school-based cross-sectional survey was conducted with a self-assessment questionnaire in Sichuan province. With a population of 83 million, Sichuan province in Southwest China is home to 74 vocational colleges, of which 25 vocational colleges were selected by random sampling. The QR code was sent to the trained teachers from each of the sampled colleges, and they distributed the code to students of the 25 vocational colleges via their Wechat groups so that students could access the online self-assessment questionnaire by scanning the QR code. The students were informed of the purpose of the survey and the freedom of participation. Participants, limited to unmarried students aged 18–24, were required to fill in the questionnaire independently on their mobile phones within 20 minutes, and their IP addresses were recorded to avoid repeated submission.

A total of 73,800 students have participated in the survey. For the current analyses, we excluded (i) those aged under 18 or over 24 years old; (ii) those who had been married; (iii) those with missing information on any outcome, exposure, or adjusted covariates; (iv) those who had no sexual experience. Ultimately, a total of 12,711 students remained in the analyses.

Measures

Sociodemographic Characteristics. Sociodemographic characteristics included gender (male or female), grade (first-year, second-year, or third-year), hometown (divided into 3 categories: urban, suburban, or rural according to the registered residence address), nationality (Han or minority), parents’ educational attainment (primary school and below, middle school, high school, or vocational college and above), family structure (two-parent biological family, stepfamily, single-parent family, or other types), kids number (only child or more), monthly expenditure (<500 CNY, 500–999 CNY, 1,000–1,999 CNY, or ≥2,000 CNY), and relationship status (never, ever, or current).

Sexual Orientation. Sexual orientation identity was determined according to their response to this question: “Which of the following sexual orientations best describes you?” Response options included “heterosexual,” “homosexual,” “bisexual,” and “unsure,”¹⁶ and people with homosexual, bisexual, and unsure orientation were defined as sexual minorities.¹⁷

Risky Sexual Behavior. Risky sexual behavior is defined as sexual activities that could put adolescents at risk for early sexual initiation, sexually transmitted infections, and unplanned pregnancy, and include pre-coital behavior, initiating sexual intercourse, having multiple sexual partners, and unprotected sex.¹⁸ The indicators used to evaluate sexual behavior in our study include condom use, the age at sexual debut, and the number of sexual partners in total. Condom use in the last sexual intercourse is surveyed according to global reports.¹⁸ Early sexual debut is defined as a sexual debut occurring before the age of 17,^{19,20} and having multiple sexual partners is defined as having had sex with more than one person during the three months before the survey.^{21,22}

Psychosexual Health. Psychosexual health was evaluated using Adolescent Psychosexual Health Questionnaire.²³ The questionnaire consists of 46 items and each item adopts Likert 5-point scores, ranging from low to high, namely “completely disagree,” “relatively disagree,” “uncertain,” “relatively agree,” and “completely agree.” Of the 46 total items, 21 are scored positively (1–5 points) and 17 are scored reversely (5–1 points). For positive scoring (eg, I agree with my gender role), higher scores indicate a higher level of mental health, while for negative scoring (eg, when there's a sexual impulse, I can't control it), higher scores represent lower mental health. In this study, the internal reliability of the questionnaire (Cronbach's $\alpha = 0.88$) is higher than previously reported (Cronbach's $\alpha = 0.81$).²⁴

Knowledge of AIDS Prevention. Knowledge of AIDS Prevention was measured through a questionnaire with eight items developed by the National Center for AIDS/STD Control and Prevention, China CDC.^{25,26} For each item, the correct answer was scored 1, with the wrong answer scored as 0. The total score of the AIDS-related knowledge was 8, with a higher score indicating a higher level of AIDS-related knowledge.

Statistical Analysis

IBM Statistical Package and Services Solutions (SPSS) software version 25 (IBM Corp, Armonk, New York) was used for data analysis. The distributional properties of the variables were presented with descriptive statistics. The associations between different sociodemographic characteristics and risky sexual behavior were examined with the Pearson Chi-Square test. Scores of psychosexual health and knowledge of AIDS prevention were not normally distributed, so their associations with risky sexual behavior were tested with Mann–Whitney *U*-test. The association between sexual orientation and risky sexual behavior was examined with a multivariate logistic regression model, and the results of the latter were presented as

adjusted odds ratios (aOR) with 95% confidence intervals (CI). “ $P < 0.05$ ” is defined as “statistically significant.”

RESULTS

Sociodemographic Characteristics

12,711 students (male: 36.0%; female: 64.0%) were included in this study, and first-year, second-year, and third-year students accounted for 46.8%, 39.6%, and 13.6%, respectively. In addition, 25.0%, 31.3%, and 43.7% of them came from urban ($n = 3,172$), suburban ($n = 3,978$) and rural ($n = 5,561$) areas, respectively. Participants from two-parent biological families, step-families, or single-parent families accounted for 81.5%, 8.1%, and 9.1%, respectively, with 35.9% of them claiming themselves to be an only child. Most participants' monthly expenditures ranged from 500 to 1999 CNY (79.9%). Additionally, 56.0% of the participants reported being in a relationship currently. Significant gender differences were observed in all these sociodemographic characteristics ($P < 0.05$). Refer to [Table 1](#) for details.

Sexual Orientation

The proportions of different kinds of sexual orientation in male participants (heterosexual: 88.3%; homosexual: 3.2%; bisexual: 3.9%; and unsure: 4.5%) differed significantly ($P < 0.001$) from that in female participants (heterosexual: 84.2%; homosexual: 3.0%; bisexual: 8.6%; and unsure: 4.2%). Refer to [Table 1](#) for details.

Risky Sexual Behavior

The proportion of male participants reporting early sexual debut (20.1%) was significantly ($P < 0.001$) higher than that of female participants (11.0%). Similarly, the proportion of male participants reporting having multiple sexual partners was significantly ($P < 0.001$) higher than that of female participants. However, no significant gender difference was observed as regards the proportion of participants reporting condom use in the last sexual intercourse ($P > 0.05$). Refer to [Table 1](#) for details.

Prevalence of Risky Sexual Behavior Among College Students With Different Sexual Orientations

There were significant differences in the prevalence of risky sexual behavior among college students with different sexual orientations ($P < 0.05$). For both male and female participants, the heterosexual groups reported the lowest prevalence of early sexual debut, condomless sex, as well as having multiple sexual partners. Refer to [Table 2](#) for details.

Logistic Regression Analyses of the Association Between Sexual Orientation and Risky Sexual Behavior

Unadjusted logistic regression analysis (model 1) revealed that sexual orientation was significantly associated with different types

Table 1. Gender differences in sociodemographic characteristics

	Full sample n (%)	Male n (%)	Female n (%)	P value
Grade				<.001
First-year	5,948 (46.8)	4,075 (50.1)	1,873 (40.9)	
Second-year	5,039 (39.6)	3122 (38.4)	1917 (41.9)	
Third-year	1,724 (13.6)	936 (11.5)	788 (17.2)	
Hometown				<.001
Urban	3,172 (25.0)	1,906 (23.4)	1,266 (27.7)	
Suburban	3,978 (31.3)	2,333 (28.7)	1,645 (35.9)	
Rural	5,561 (43.7)	3894 (47.9)	1,667 (36.4)	
Only child				.001
Yes	4,566 (35.9)	3,010 (37.0)	1,556 (34.0)	
No	8,145 (64.1)	5,123 (63.0)	3,022 (66.0)	
Nationality				<.001
Han	10,342 (81.4)	6,296 (77.4)	4,046 (88.4)	
Minority	2,369 (18.6)	1,837 (22.6)	532 (11.6)	
Mother's educational attainment				.008
Primary school and below	5,168 (40.7)	3,388 (41.7)	1,780 (38.9)	
Middle school	4345 (34.2)	2718 (33.4)	1627 (35.5)	
High school	2060 (16.2)	1288 (15.8)	772 (16.9)	
Vocational college and above	1138 (9.0)	739 (9.1)	399 (8.7)	
Father's educational attainment				.039
Primary school and below	3731 (29.4)	2435 (29.9)	1296 (28.3)	
Middle school	4998 (39.3)	3141 (38.6)	1857 (40.6)	
High school	2422 (19.1)	1580 (19.4)	842 (18.4)	
Vocational college and above	1560 (12.3)	977 (12.0)	583 (12.7)	
Family structure,				<.001
Two-parent biological family	10,365 (81.5)	6786 (83.4)	3579 (78.2)	
Stepfamily	1031 (8.1)	565 (6.9)	466 (10.2)	
Single-parent family	1161 (9.1)	682 (8.4)	479 (10.5)	
Other types	154 (1.2)	100 (1.2)	54 (1.2)	
Monthly expenditure				<.001
<500CNY	781 (6.1)	624 (7.7)	157 (3.4)	
500–999CNY	4598 (36.2)	3088 (38.0)	1510 (33.0)	
1,000–1,999CNY	5561 (43.7)	3405 (41.9)	2156 (47.1)	
≥2,000CNY	1771 (13.9)	1016 (12.5)	755 (16.5)	
Relationship status				<.001
Never	569 (4.5)	459 (5.6)	110 (2.4)	
Ever	5021 (39.5)	3751 (46.1)	1270 (27.7)	
Current	7121 (56.0)	3923 (48.2)	3198 (69.9)	
Sexual orientation				<.001
Heterosexual	11,038 (86.8)	7185 (88.3)	3853 (84.2)	
Homosexual	400 (3.1)	261 (3.2)	139 (3.0)	
Bisexual	712 (5.6)	320 (3.9)	392 (8.6)	
Unsure	561 (4.4)	367 (4.5)	194 (4.2)	
Early sexual debut				<.001
Yes	2138 (16.8)	1633 (20.1)	505 (11.0)	
No	10,573 (83.2)	6500 (79.9)	4073 (89.0)	
Condom use in the last sexual intercourse	0.423			
Yes	9592 (75.5)	6156 (75.7)	3436 (75.1)	
No	3119 (24.5)	1977 (24.3)	1142 (24.9)	
Multiple sexual partners				<.001
Yes	7641 (60.1)	5221 (64.2)	2420 (52.9)	
No	5070 (39.9)	2912 (35.8)	2158 (47.1)	
Psychosexual health (score)	91 (77,117)	91 (76,117)	92 (78,116)	<.001
Knowledge of AIDS Prevention (score)	7 (5,7)	7 (5,7)	7 (6,8)	<.001

Table 2. Prevalence of risky sexual behavior among college students with different sexual orientations

Gender	Sexual orientation	Early sexual debut	Condomless sex	Having multiple sexual partners
Male	Heterosexual	1324 (18.4)	1657 (23.1)	4511 (62.8)
	Homosexual	89 (34.1)	74 (28.4)	206 (78.9)
	Bisexual	105 (32.8)	107 (33.4)	239 (74.7)
	Unsure	115 (31.3)	139 (37.9)	265 (72.2)
	<i>P</i> value	<0.001	<0.001	<0.001
Female	Heterosexual	361 (9.4)	865 (22.5)	1996 (51.8)
	Homosexual	28 (20.1)	79 (56.8)	83 (59.7)
	Bisexual	81 (20.7)	130 (33.2)	237 (60.5)
	Unsure	35 (18.0)	68 (35.1)	104 (53.6)
	<i>P</i> value	<.001	<.001	.004

Note: "*P* value <.05" indicates that there were significant differences in the prevalence of risky sexual behavior among college students with different sexual orientations.

of risky sexual behavior (including early sexual debut, condomless sex, and having multiple sexual partners; $P < 0.05$).

Sensitivity analyses (model 2 and model 3) indicated that the odds ratios and 95% confidence intervals did not change significantly after adding the two factors, psychosexual health and knowledge of AIDS prevention, to the models (except that the association between the male homosexual group and condom use in the last sexual intercourse became insignificant).

With factors including sociodemographic characteristics, psychosexual health, and knowledge of AIDS prevention adjusted (model 3), it seemed that the homosexual (OR = 1.88, 95% CI = 1.43–2.47), bisexual (OR = 1.96, 95% CI = 1.52–2.51) and unsure (OR = 1.68, 95% CI = 1.31–2.14) groups in male participants as well as the homosexual (OR = 1.87, 95% CI = 1.19–2.94), bisexual (OR = 2.07, 95% CI = 1.56–2.74) and unsure (OR = 1.53, 95% CI = 1.01–2.32) groups in female participants were more likely to have early sexual debut than the heterosexual participants.

Compared with the male heterosexual group, the bisexual (OR = 0.65, 95% CI = 0.51–0.83) and unsure (OR = 0.60, 95% CI = 0.48–0.76) groups were less likely to use condoms in the last sexual intercourse, and the bisexual (OR = 1.66, 95% CI = 1.26–2.18), unsure (OR = 1.31, 95% CI = 1.02–1.68) and homosexual (OR = 2.06, 95% CI = 1.50–2.85) groups were more likely to have multiple sexual partners.

Compared with the female heterosexual group, the bisexual (OR = 0.54, 95% CI = 0.43–0.69), homosexual (OR = 0.21, 95% CI = 0.15–0.30) and unsure (OR = 0.68, 95% CI = 0.50–0.94) groups were less likely to use condoms in the last sexual intercourse, and only the bisexual group (OR = 1.46, 95% CI = 1.15–1.86) were more likely to have multiple sexual partners. Refer to [Table 3](#) for details.

DISCUSSION

The prevalence of risky sexual behavior among adolescents is increasingly high.²² Risky sexual behavior and its consequences among adolescents have become an alarming public health

concern all over the world. Prevention of risky sexual behavior among adolescents, especially college students, should be listed as a priority so as to counter its negative consequences.²⁷ The purpose of this study was to examine the gender differences in the association between sexual orientation and risky sexual behavior and contribute to the development of adolescent sexual health education programs.

Consistent with previous researches,^{5,10} the findings of our study confirmed that the proportion of male sexual minorities was lower than female sexual minorities, which could be explained by gender inequality caused by cultural factors, gender roles, and power differences in gender relations.^{28,29} The results showed that China's college students have a lower proportion of early sexual debut compared with other studies,³⁰ which may indicate the relatively conservative attitude towards sex among Chinese college students.³¹ However, a considerable number of Chinese students have sexual debut at an early age, which may bring negative health consequences to them, including unplanned pregnancy and sexually transmitted infections.³² Consistent with previous researches,^{22,33} our findings showed that college students tended to have multiple sexual partners, which is a great risk factor for HIV/STD infection.³⁴ More attention should be paid to this phenomenon, especially in the context of China, where there is not enough formal and comprehensive sexual education and counseling for adolescents. Similar to previous findings,^{19,35} our study also revealed the gender differences in terms of early sexual debut and having multiple sexual partners, indicating that male students are more likely to engage in risky sexual behavior than female students.

The results also showed that sexual minorities (homosexual, bisexual, or unsure) were less likely to use condoms, except for the homosexual male students, which differs slightly from previous studies. A study conducted in the US found that homosexual male students had 1.56 greater odds of condomless sex compared with heterosexual students.³⁶ However, according to Koh Audrey S, lesbians had a higher rate of condom use than bisexual or heterosexual women.³⁷ In China, the incidence of HIV infection among young students aged 15–24 is increasingly high,

Table 3. Association between sexual orientation and risky sexual behavior

	Risky sexual behavior	Early sexual debut Odds Ratio (95% CI)	Condom use in the last sexual intercourse Odds Ratio (95% CI)	Having multiple sexual partners Odds Ratio (95% CI)
Model 1	Male			
	Heterosexual(ref)	-	-	-
	Homosexual	2.29 (1.76, 2.98) [‡]	0.76 (0.58, 1.00)*	2.22 (1.64, 3.00) [‡]
	Bisexual	2.16 (1.70, 2.75) [‡]	0.60 (0.47, 0.76) [‡]	1.75 (1.35, 2.26) [‡]
	Unsure	2.02 (1.61, 2.54) [‡]	0.49 (0.40, 0.61) [‡]	1.54 (1.22, 1.94) [‡]
	Female			
	Heterosexual(ref)			
	Homosexual	2.44 (1.59, 3.74) [‡]	0.22 (0.16, 0.31) [‡]	1.38 (0.98, 1.95)
	Bisexual	2.52 (1.93, 3.29) [‡]	0.58 (0.47, 0.73) [‡]	1.42 (1.15, 1.76) [†]
	Unsure	2.13 (1.45, 3.12) [‡]	0.54 (0.40, 0.73) [‡]	1.08 (0.80, 1.44)
Model 2	Male			
	Heterosexual(ref)			
	Homosexual	1.90 (1.44, 2.49) [‡]	0.73 (0.55, 0.97)*	2.24 (1.65, 3.03) [‡]
	Bisexual	2.03 (1.58, 2.61) [‡]	0.60 (0.47, 0.77) [‡]	1.70 (1.31, 2.20) [‡]
	Unsure	1.77 (1.39, 2.25) [‡]	0.54 (0.43, 0.67) [‡]	1.45 (1.14, 1.84) [†]
	Female			
	Heterosexual(ref)			
	Homosexual	1.91 (1.22, 3.00) [†]	0.21 (0.15, 0.30) [‡]	1.36 (0.96, 1.93)
	Bisexual	2.09 (1.58, 2.76) [‡]	0.54 (0.43, 0.68) [‡]	1.40 (1.13, 1.73) [†]
	Unsure	1.70 (1.13, 2.54)*	0.64 (0.47, 0.88) [†]	1.03 (0.77, 1.38)
Model 3	Male			
	Heterosexual(ref)			
	Homosexual	1.88 (1.43, 2.47) [‡]	0.76 (0.57, 1.01)	2.06 (1.50, 2.85) [‡]
	Bisexual	1.96 (1.52, 2.51) [‡]	0.65 (0.51, 0.83) [†]	1.66 (1.26, 2.18) [‡]
	Unsure	1.68 (1.31, 2.14) [‡]	0.60 (0.48, 0.76) [‡]	1.31 (1.02, 1.68)*
	Female			
	Heterosexual(ref)			
	Homosexual	1.87 (1.19, 2.94) [†]	0.21 (0.15, 0.30) [‡]	1.14 (0.77, 1.69)
	Bisexual	2.07 (1.56, 2.74) [†]	0.54 (0.43, 0.69) [‡]	1.46 (1.15, 1.86) [†]
	Unsure	1.53 (1.01, 2.32)*	0.68 (0.50, 0.94)*	0.91 (0.66, 1.25)

**P* < .05.[†]*P* < .01.[‡]*P* < .001.

Note: Model 1: univariate; Model 2: sociodemographic characteristics (grade, hometown, only child, nationality, mother's educational attainment, father's educational attainment, family structure, monthly expenditure, relationship status); Model 3: factors including sociodemographic characteristics (grade, hometown, single-child, nationality, mother's education, father's education, family structure, monthly expenditure, relationship status), psychosexual health, and knowledge of AIDS prevention adjusted.

which is mainly transmitted through male-to-male sex (69.2%).² Therefore, homosexual male students at higher risk of HIV infection should be encouraged to use condoms actively in male-to-male sex. However, affected by heterosexism, lesbians, and bisexual individuals would internalize negative thoughts about themselves and their sexual orientation, so they are reluctant to engage in safe sex, such as condom use in sexual intercourse.²⁷ Besides, condom is usually used to prevent pregnancy,³⁸ which may help explain why female sexual minorities are less likely to use condoms. On the contrary, heterosexual students are prone to unplanned pregnancy than other population groups, thus lead to their high frequency of using condoms.

In line with previous studies,¹⁰ our findings showed that early sexual debut was more frequently reported among sexual

minorities (homosexual, bisexual, or unsure) than heterosexual participants, which may be explained from many aspects. First, sexual minorities are more sexually active.⁹ Second, social acceptance of sexual minorities may vary in different social backgrounds,³⁹ and discrimination against sexual minorities still exist.⁴⁰ Social discrimination may lead to mental health disparities among sexual minorities and thus indirectly incline them towards risky sexual behavior.⁴¹ According to our observation, sexual minorities might overcome the mental pressure to disclose their sexual orientation in the face of social discrimination, let alone early sexual debut, which is less sensitive. However, other studies have reported some inconsistent results. A cross-sectional study in Thailand and Swede found no significant differences between sexual orientation and early sexual debut.⁹ Studies have

shown that early sexual debut was associated with sexual risk-taking, substance abuse, condomless sex, injury, and suicide.¹⁰ Therefore, special attention should be paid to sexual minorities to improve their sexual and reproductive health.

Our study revealed the gender differences in the association between sexual orientation and multiple sexual partners. Compared with the heterosexual group, male sexual minorities (homosexual, bisexual, or unsure) were significantly more likely to have multiple sexual partners. However, only bisexual female students were more likely to have multiple sexual partners than the heterosexual group. This finding echoes a study conducted in a national sample of college students in the United States.⁴² The disparity may be explained by gender inequality.⁴³ Traditional sexual scripts and gender roles endow men with more sexual freedom, while women remain conservative towards sex.⁴⁴ For example, according to traditional sexual scripts, men are more interested in sex and should pursue every sexual opportunity, whereas women have less interest in sex and should act as restrictors of sexual contacts.⁴⁵ In addition, sex before marriage for males is considered common and acceptable, and even viewed positively, while it is considered shameful for females to have sex before marriage.⁴⁶

Limitations and Strengths

Several limitations of our study should be noted. First, the ability for cross-sectional survey to address causality is limited. Second, the use of self-report data for some variables, such as the age at sexual debut, may introduce recall bias. Third, expressing one's sexual orientation may be a private matter and participants may not make honest responses. Fourth, the sample was recruited from Sichuan Province, which has the largest number of newly-infected HIV/AIDS cases among youth,² thus the findings may not be generalized to the entire college student population. Fifth, far more male students than female students participated in our study, which may affect the generality and accuracy of the results. Finally, the AIDS prevention knowledge questionnaire was developed by the National Center for AIDS/STD Control and Prevention of China CDC. Though commonly used in China for assessing knowledge of AIDS among college students, it has not been fully validated.

What makes our study special is that we examined gender differences in the association between multiple sexual orientations and risky sexual behavior among college students with sexual experience.

CONCLUSIONS

Our study showed that a high percentage of college students have engaged in risky sexual behavior. Gender and sexual orientation affect the likelihood of risky sexual behavior in China among college students. Besides, gender differences in the

association between sexual orientation and having multiple sexual partners are observed. These findings could be useful for schools and health sectors to develop and carry out school-based sexual health education programs.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was approved by the institutional review board of Chengdu Preventive Medicine Association. Informed consent was obtained from all participants, and all methods were performed in accordance with the relevant guidelines and regulations. The records of participants were anonymized and deidentified before analysis.

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REFERENCES

1. Organisation UNJGSU. Global Report: UNAIDS report on the global AIDS epidemic 2013. 2013:553–556.
2. Cai C, Tang HL, Chen FF, et al. Characteristics and trends of newly reported HIV infection in young students in China, 2010-2019. *Chin J Epidemiol* 2020;41:1455–1459. doi: [10.3760/cma.j.cn112338-20200417-00592](https://doi.org/10.3760/cma.j.cn112338-20200417-00592).
3. Xinguang C, L EA, Shuang W. Cross-country Association of Press Freedom and LGBT freedom with prevalence of persons living with HIV: Implication for global strategy against HIV/AIDS. *J Global Health Res Policy* 2018;3:6.
4. Tangmunkongvorakul A, Carmichael G, Banwell C, et al. Coital experience among adolescents in three social-educational groups in urban Chiang Mai, Thailand. *Asian Populat Stud* 2012;8:39–63.
5. Kim JS, Kim K, Kwak Y. Differences in risky sexual behavior according to sexual orientation in Korean adolescents. *J Homosex* 2019;66:17–30.

6. Colledani D, Ciani AC. A worldwide internet study based on implicit association test revealed a higher prevalence of adult males' androphilia than ever reported before. *J Sex Med* 2020;18:4–16.
7. The International Society for Sexual Medicine(ISSM). Study explores explicit and implicit assessments of nonheterosexuality and androphilia. 2022 <https://www.issm.info/sexual-health-headlines/study-explores-explicit-and-implicit-assessments-of-nonheterosexuality-and-androphilia?highlight=WyJzZXh1YWwiLCInc2V4dWFsliwib3JpZW50YXRpb24iLCJzZXh1YWwgb3JpZW50YXRpb24iXQ==>.
8. Tornello SL, Riskind RG, Patterson CJ. Sexual orientation and sexual and reproductive health among adolescent young women in the United States. *J Adolesc Health* 2014;54:160–168.
9. Thitasan A, Aytar O, Annerback EM, et al. Young people's health and risk behaviours in relation to their sexual orientation: A cross-sectional study of Thailand and Sweden. *Sex Reprod Healthc* 2019;21:67–74.
10. Lowry R, Dunville R, Robin L, et al. Early sexual debut and associated risk behaviors among sexual minority youth. *Am J Prev Med* 2017;52:379–384.
11. Grant JE, Odlaug BL, Derbyshire K, et al. Mental health and clinical correlates in lesbian, gay, bisexual, and queer young adults. *J Am Coll Health* 2014;61:75–78.
12. Reed E, Prado G, Matsumoto A, et al. Alcohol and drug use and related consequences among gay, lesbian and bisexual college students: Role of experiencing violence, feeling safe on campus, and perceived stress. *Addict Behav* 2010;35:168–171.
13. Lindley LL, Kerby MB, Nicholson TJ, et al. Sexual behaviors and sexually transmitted infections among self-identified lesbian and bisexual college women. *J LGBT Health Res* 2007;3:41–54.
14. Lindley LL, Nicholson TJ, Kerby MB, et al. HIV/STI associated risk behaviors among self-identified lesbian, gay, bisexual, and transgender college students in the United States. *AIDS Educ Prev* 2003;15:413–429.
15. Jacob CW, K BS, K NB. Rural/Urban differences in health risk behaviors among gender and sexual minorities. *Health Behav Policy Rev* 2016;3:43–53.
16. Coker TR, Austin SB, Schuster MA. The health and health care of lesbian, gay, and bisexual adolescents. *Annu Rev Public Health* 2010;31:457–477.
17. Dermody SS, Friedman M, Chisolm DJ, et al. Elevated risky sexual behaviors among sexual minority girls: Indirect risk pathways through peer victimization and heavy drinking. *J Interpers Violence* 2020;35:2236–2253.
18. Chawla N, Sarkar S. Defining “high-risk sexual behavior” in the context of substance use. *J Psychosexual Health* 2019;1:26–31. doi: 10.1177/2631831818822015.
19. Settheekul S, Fongkaew W, Viseskul N, et al. Factors influencing sexual risk behaviors among adolescents: A community-based participatory study. *Nurs Health Sci* 2019;21:186–197.
20. Dolphin L, Fitzgerald A, Dooley B. Risky sex behaviours among college students: The psychosocial profile. *Early Interv Psychiatry* 2018;12:1203–1212.
21. Tang K, Qu X, Li C, et al. Childhood sexual abuse, risky sexual behaviors and adverse reproductive health outcomes among Chinese college students. *Child Abuse Negl* 2018;84:123–130.
22. Santelli JS, Brener ND, Lowry R, et al. Multiple sexual partners among U.S. adolescents and young adults. *Fam Plann Perspect* 1998;30:271–275.
23. Luo I, Zheng Y. A preliminary study on sexual mental health in adolescence. *Chinese J Clin Psychol* 2006;4:661–664. doi: 10.16719/j.cnki.1671-6981.2006.03.035.
24. Hou C, Chen Y, Yao S. The adolescent psychosexual health questionnaire in middle school students: Reliability and validity Chinese. *J Clin Psychol* 2012;20:442–444. doi: 10.16128/j.cnki.1005-3611.2012.04.002.
25. xxx 2022 The core knowledge of AIDS prevention and treatment for young students. Available: <http://ncaids.chinacdc.cn/qsnazbfk/allin/xzxx/201701/P020170109434770367618.pdf>.
26. Li W, Chu J, Zhu Z, et al. Epidemiological characteristics of HIV infection among college students in Nanjing, China: A cross-sectional survey. *BMJ Open* 2020;10:e035889. doi: 10.1136/bmjopen-2019-035889.
27. Castro Á. Sexual behavior and sexual risks among spanish university students: A descriptive study of gender and sexual orientation. *Sex Res Soc Policy* 2015;13(1):84–94.
28. Bermudez MP, Castro A, Gude F, et al. Relationship power in the couple and sexual double standard as predictors of the risk of sexually transmitted infections and HIV: Multicultural and gender differences. *Curr HIV Res* 2010;8:172–178.
29. McCoy SI, Watts CH, Padian NS. Preventing HIV infection: Turning the tide for young women. *Lancet North Am Ed* 2010;376:1281–1282.
30. Settheekul S, Fongkaew W, Viseskul N, et al. Factors influencing sexual risk behaviors among adolescents: A community-based participatory study. *Nurs Health Sci* 2019;21:186–197. doi: 10.1111/nhs.12580.
31. T HL, Chunhui S. Gender, social background and sexual attitudes among Chinese students. *Cul Health Sex* 2007;9:31–42. doi: 10.1080/13691050600963914.
32. Cederbaum JA, Putnam-Hornstein E, Sullivan K, et al. STD and abortion prevalence in adolescent mothers with histories of childhood protection involvement. *Perspect Sex Reprod Health* 2015;47:187–193.
33. Douglass CH, Qin C, Martin F, et al. Comparing sexual behaviours and knowledge between domestic students and Chinese international students in Australia: Findings from two cross-sectional studies. *Int J STD AIDS* 2020 :956462420921726.
34. Abdelrhman MB, Salih MM. Factors associated with HIV/AIDS in Sudan. *J BioMed Res Int* 2013;2013:971203. doi: 10.1155/2013/971203. E-pub ahead of print.
35. A BJ, B FC, N HJ, et al. Sexual risk behavior 6 months post-high school: Associations with college attendance, living with

- a parent, and prior risk behavior. *J Adolescent Health* 2008;42:573–579.
36. xxx 2022 <An examination of health inequities among college students by sexual orientation identity and sex.pdf>.
 37. S KA, A GC, Starley S, et al. Sexual risk factors among self-identified lesbians, bisexual women, and heterosexual women accessing primary care settings. *Sex Transmitt Infect* 2005;32:563–569.
 38. A CR, R MR, A GC, et al. Condom use motivations and selected behaviours with new versus established sex partners. *J Sexual Health* 2014;11:252–257.
 39. Noknoi C, Wutthirong P. Leveraging diversity through raising awareness: Sexual orientation discrimination in the Thailand workforce: Implications for human resource management. *Int J Hum Resour Dev Manage (Switzerland)* 2010;10:254–271.
 40. Leahy KE, Chopi WJ. The effect of social network size and composition on the link between discrimination and health among sexual minorities. *J Aging Health* 2020;32:1214–1221.
 41. Oginni OA, Jern P, Rijdsdijk FV. Mental health disparities mediating increased risky sexual behavior in sexual minorities: A twin approach. *Arch Sex Behav* 2020.
 42. Oswalt SB, Wyatt TJ. Sexual health behaviors and sexual orientation in a U.S. national sample of college students. *Arch Sex Behav* 2013;42:1561–1572.
 43. Tang K, Qu XQ, Li CY, et al. Childhood sexual abuse, risky sexual behaviors and adverse reproductive health outcomes among Chinese college students. *Child Abuse Negl* 2018;84:123–130.
 44. Settheekul S, Fongkaew W, Viseskul N, et al. Factors influencing sexual risk behaviors among adolescents: A community-based participatory study. *Nurs Health Sci* 2019;21:186–197.
 45. Byers ES. How well does the traditional sexual script explain sexual coercion? Review of a program of research. *J Psychol Human Sex* 1996;8:7–25.
 46. Sridawruang C, Crozier K, Pfeil M. Attitudes of adolescents and parents towards premarital sex in rural Thailand: A qualitative exploration. *Sex Reproduct Health* 2010;1:181–187.