

Sexual behaviors and awareness of sexually transmitted infections among Chinese university students

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Abstract

Introduction: This study investigated the current state of attitudes, behaviors, and knowledge concerning sex and sexually transmitted infections (STIs) among Chinese university students.

Methodology: A cross-sectional anonymous university intranet-based survey was given to students attending the Shantou University, Guangdong, China using a 28-item questionnaire.

Results: Of 3425 website visitors, 1030 university students completed the survey, of which 80% were between 20 and 25 years of age, 76% considered pre-marital sex acceptable, 21% had had sexual intercourse, and 45% of sexually active students had engaged in oral sex, anal intercourse, or sex with strangers. Students had limited knowledge and awareness about common STIs, symptoms, and complications. Three percent of the sexually active students reported having had STIs and another 8% were not sure whether they had or not. Most students had misconceptions about transmission and prevention of STIs. The internet was the main information resource for 76% of students.

Conclusions: Despite having more open attitudes and behaviors towards sex, students' STI knowledge and awareness of STI risks was considerably limited, raising concerns about a likely rise in STI incidence. Prior knowledge of STIs had no significant influence. Targeted educational measures such as online education and counseling via Chinese websites and social media, and the provision of safer sex and STI-related information by health experts to university students are suggested.

Key words: questionnaire survey; sexually transmitted disease; sexual misconception; Chinese university students

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Introduction

While global new HIV infection has been reduced by 16% over the last decade due to HIV prevention efforts, the incidence of sexually transmitted infections (other than HIV/AIDS) continues to increase globally [1]. More than 340 million new cases of sexually transmitted infections (STIs) occur worldwide every year [2].

In China, the incidence of STIs, especially HIV/AIDS, has increased dramatically in the last ten years. A total of 180,036 new cases of STIs, including gonorrhea, syphilis, chlamydia, genital herpes, human papilloma virus (HPV) infection, and HIV/AIDS were reported in 2008 by the Chinese Center for Disease

Control and Prevention, compared to 62,998 new cases in 1997 [3].

Along with the social and demographic changes in China over the last three decades, sexual attitudes and behaviors among young Chinese, particularly youths in high schools and colleges, have changed considerably. Many in this social group now accept premarital sex, and a growing number of youth are engaging in premarital sexual activity [4,5]. Despite the rapid surge in sexual activity, sex education provided to adolescents in middle or high schools in China is still rudimentary [6]; as a result, there exist risks of unwanted pregnancies and sexually transmitted diseases among modern young Chinese.

Some studies in China have shown that medical students with prior knowledge of STIs (PKS) have better knowledge of HIV/AIDS than do other college students [7], indicating a positive impact of targeted education. However, knowledge of other STIs and the influence of PKS on sexual attitudes and practices were not examined in those studies; the role of PKS in other STIs was not evident.

Guangdong is one of the provinces with the highest morbidity from STIs (including nongonococcal urethritis, gonorrhea, condyloma acuminatum, syphilis, genital herpes, chancroid, and lymphogranuloma venereum) in China [8], where an increasing number of adolescents are being diagnosed with STIs (including HIV) [9]. A 2006 survey performed by Guangzhou's Guangdong Business Studies School showed that most students knew little about STIs and that there existed significant gender differences. However, that six-question based study was too simple to reliably assess the practical knowledge about sexual behaviors and STIs [4].

Attitude-behavior studies related to STIs in China have focused mostly on HIV/AIDS [10] and were done outside Guangdong, which is the southern economic hub known for its high rate of STIs [8].

The objective of this study was to investigate the sexual attitudes and behaviors, and knowledge about all STIs in Chinese university students in Guangdong using a self-reported questionnaire.

Methodology

An anonymous online questionnaire-based survey concerning sexual attitudes, behaviors, and STI knowledge was given to college students from Shantou University (STU) in Shantou, Guangdong, China via the school intranet.

Background of participants and study site

Shantou University is made up of eight colleges and schools (Medicine, Engineering, Science, Liberal Arts, Law, Business, Art and Design, and Journalism and Communication) with 9,383 undergraduate and graduate students in 2012. The Medical College is the largest in the university, accounting for 26.1% (2447/9383) of the total students.

Questionnaire design and administration

The survey instrument was designed based on the STI-related information available on the US Centers for Disease Control and Prevention (CDC) and World Health Organization (WHO) websites, discussions with undergraduate and graduate students, review of

the scientific literature, and a previous study [11]. Twenty-eight questions (with 142 possible answers) assessed demographic information, attitudes and practice of sex, and knowledge of STIs. Students were invited via the university website to participate in the online survey available at <http://www.sojump.com/jq/714018.aspx> (translated English version for review). Only one IP address was allowed to prevent multiple submissions.

Ethics and confidentiality

This online survey was anonymous and security and confidentiality of all the submitted questionnaires were guaranteed by the online survey website. Ethics approval was obtained from the Student Affairs department of Shantou University and the Shantou University Medical College Ethics Committee. To preserve anonymity, only students' gender, age, major, and year of college were documented.

Data analysis

SPSS version 13 (SPSS, Chicago, USA) was used for all analyses. The Chi square method was used for analysis of single-choice and multiple-choice questions. All statistical tests were two-tailed, and a p -value < 0.05 was considered statistically significant. Correct answers for the knowledge section were taken from the US CDC and WHO guidelines.

Results

There were 3425 visits to the questionnaire website; 1030 respondents, including 510 medical students and 520 students from other colleges/schools, completed the study. Table 1 shows the demographic information of respondents. The median age was 22 years (range 17-34), represented by age groups < 20 ($n = 70$, 7%), 20-25 ($n = 829$, 80%), 26-30 ($n = 121$, 12%), and > 30 ($n = 10$, 1%). On the basis of their PKS, the respondents were divided into two groups: without PKS (first-year medical students, who would only have studied anatomy and no other medically related subjects, and students from other majors, 65.3%) and with PKS (all medical students except the first-year students, 34.7%).

Attitudes

As shown in Table 2, 75.6% of students (more males than females; $p < 0.05$) considered premarital sex acceptable. A significant hometown difference in the rate was observed ($p = 0.04$).

Table 1. Demographic information of students and their sexual experience^a

Variable	Total (%)	Had sex (%)	Odds ratio	95% CI	P
Gender					
Male	595 (57.8)	154 (25.9)	1	-	-
Female	435 (42.2)	66 (15.2)	0.51	0.37-0.71	<0.0001
Education					
Undergraduate	774 (75.1)	119 (15.4)	1	-	-
Graduate	256 (24.9)	101 (39.5)	3.59	2.61-4.93	<0.0001
Prior STI Knowledge (PKS)					
Without PKS	673 (65.3)	108 (16.0)	1	-	-
With PKS	357 (34.7)	112 (31.4)	2.39	1.77-3.24	<0.0001
Hometown					
Non-Guangdong	331 (32.1)	100 (30.2)	1	-	-
Guangdong	699 (67.9)	120 (17.2)	0.48	0.35-0.65	<0.0001

^a Values are given as number (percentage), analyzed by Chi-square test

Risk of pregnancy and infections (STIs) were the two main reasons selected by the students for not having sex. For STI prevention, 75.7% of students stated that they would seek related information from any available websites (data not shown). Regarding health-seeking behaviors in an event of an STI, while most students (65.5%) would see a doctor, 11.1% would not consult anyone. Students with PKS would be more likely to consult doctors than would those without PKS (72% *vs.* 62.1%, $p < 0.05$).

Sexual practice and STI

Of 1030 respondents, 220 (21.3%) had engaged in sex (sexual intercourse) and 45% of sexually active students had practiced oral sex, anal intercourse, or having sex with strangers (Table 3). Approximately 11% (25/220) of students had their first sexual encounter at 19 years of age or less (data not shown). The majority of students who had sex (196/220, 89.1%) claimed that they did not contract STIs.

Knowledge

Students' answers to individual questions showed that they were aware of higher profile STIs such as HIV/AIDS (79%), gonorrhea (82.8%), and syphilis (94.7%), but they were unaware of hepatitis A (2.6%), hepatitis B (11.9%), chlamydia (28.1%), bacterial vaginosis (42.3%), and chancroid (44.9%). Significant difference in perception of some STIs, such as chancroid, chlamydia, genital human papillomavirus, gonorrhea, hepatitis B, genital herpes, HIV/AIDS, and syphilis, was detected between the students with and without PKS ($p < 0.01$).

Only about 20% of the students (significantly more with PKS than those without; $p < 0.01$) knew that STIs could be asymptomatic or presented with flu-like symptoms. But most students (> 60%) correctly

identified other symptoms of STI such as lymphadenopathies (619/1030, 60.1%), unusual vaginal bleeding (674/1030, 65.4%), dysuria (776/1030, 75.3%), genital ulcers (805/1030, 78.2%), or penile or vaginal discharge (944/1030, 96.5%).

With regard to STI complications, more than 70% of students (significantly more students with PKS than those without; $p < 0.01$) were able to identify pelvic inflammatory diseases (754/1030, 73.2%), miscarriage (785/1030, 76.2%), and infertility (846/1030, 82.1%), whereas only some students recognized serious complications of syphilis in babies, such as deafness (380/1030, 36.9%) and blindness (423/1030, 41.1%).

Most students knew the mode of STI transmission as vaginal intercourse (994/1030, 96.5%), anal intercourse (893/1030, 86.7%), and oral sex (719/1030, 69.8%). However, some thought that sharing clothing (333/1030, 32.3%), swimming in a pool (423/1030, 41.1%), or using a public toilet (489/1030, 47.5%) could also transmit STIs.

Students were able to correctly identify high-risk factors of STIs such as having unprotected sex (710/1030, 68.9%), receiving contaminated blood (777/1030, 75.4%), drug addiction (809/1030, 78.5%), having sexual relations with prostitutes (935/1030, 90.8%), being sex workers (961/1030, 93.3%), or having multiple sex partners (969/1030, 94.1%).

Students recognized the effective measures of preventing STIs such as using a male condom (938/1030, 91.1%) or female condom (636/1030, 61.7%) and avoiding sexual contact with prostitutes (863/1030, 83.8%).

Table 2. Attitude of students towards sex and STIs^a

Responses	Total	Gender		Education		Prior knowledge of STI (PKS)		Hometown	
	(n=1030)	Male (n=595)	Female (n=435)	Undergraduate (n=774)	Graduate (n=256)	Without (n=673)	With (n=357)	Non-GD (n=331)	GD (n=699)
Pre-marital sex is acceptable	779 (75.6)	499 (83.9)	280 (64.4) ^b	576 (74.4)	203 (79.3)	513 (76.2)	266 (74.5)	264 (79.8)	515 (73.7) ^f
I do not want to have sex because of									
Pregnancy	481 (46.7)	291 (48.9)	190 (43.5)	359 (46.4)	122 (47.7)	310 (46.1)	171 (47.9)	158 (47.7)	323 (46.2)
Infections (STIs)	399 (38.7)	237 (39.8)	162 (37.1)	302 (39.0)	97 (37.9)	268 (39.8)	131 (36.7)	128 (38.7)	271 (38.8)
Bad reputation	85 (8.3)	36 (6.1)	49 (11.2) ^c	63 (8.1)	22 (8.6)	49 (7.3)	36 (10.1)	28 (8.5)	57 (8.2)
Religious belief	39 (3.8)	16 (2.7)	23 (5.3)	28 (3.6)	11 (4.3)	26 (3.9)	13 (3.6)	13 (3.9)	26 (3.7)
Parental discoverability	26 (2.5)	15 (2.5)	11 (2.5)	22 (2.8)	4(1.6)	20 (3.0)	6 (1.7)	4 (1.2)	22 (3.2)
If I have an STI, I would talk to									
Doctors	675 (65.5)	408 (68.6)	267 (61.1)	501 (64.7)	174 (68.0)	418 (62.1)	257 (72.0) ^h	208 (62.8)	467 (66.8)
Friends	117 (11.4)	59 (10.0)	58 (13.3)	87 (11.2)	30 (11.7)	84 (12.5)	33 (9.2)	38 (11.5)	79 (11.3)
None	114 (11.1)	70 (11.8)	44 (10.1)	75 (9.7)	39 (15.2)	68 (10.1)	46 (12.9)	53 (16.0)	61 (8.7) ^g
Parents	99 (9.6)	42 (7.1)	57 (13.0) ^d	87 (11.2)	12 (4.7) ^e	83 (12.3)	16 (4.5) ⁱ	31 (9.4)	68 (9.7)
Others	25 (2.4)	16 (2.7)	9 (2.1)	24 (3.1)	1 (0.4)	20 (3.0)	5 (1.4)	1 (0.3)	24 (3.4)

GD: Guangdong province

^a Values are given as number (percentage), analyzed by Chi-square test; ^{b, c, d} p<0.05 compared with male students; ^e p<0.05 compared with undergraduate students; ^{f, g} p<0.05 compared with non-Guangdong students; ^{h, i} p<0.05 compared with students without PKS

Table 3. Sexual practice of students^a

Responses	Total	Gender		Education		Prior knowledge of STI (PKS)		Hometown	
	(n=220)	Male (n=154)	Female (n=66)	Undergraduate (n=119)	Graduate (n=101)	Without (n=108)	With (n=112)	Non-GD (n=100)	GD (n=120)
Sex with									
Girlfriend	129 (58.6)	128 (83.1)	1 (1.5)	67 (56.3)	62 (61.4)	64 (59.3)	65 (58.0)	61 (61.0)	68 (56.7)
Boyfriend	66 (30.0)	2 (1.3)	64 (97.0)	38 (31.9)	28 (27.7)	32 (29.6)	34 (30.4)	30 (30.0)	36 (30.0)
Stranger	25 (11.4)	24 (15.6)	1 (1.5)	14 (11.8)	11 (10.9)	12 (11.1)	13 (11.6)	9 (9.0)	16 (13.3)
Frequency									
Occasionally	160 (72.6)	112 (72.7)	48 (72.7)	90 (75.6)	70 (69.3)	87 (80.6)	73 (65.2) ^e	70 (70.0)	90 (75.0)
Regularly	43 (19.6)	30 (19.5)	13 (19.7)	17 (14.3)	26 (25.7) ^b	12 (11.1)	31 (27.7) ^f	23 (23.0)	20 (16.7)
Only once	17 (7.8)	12 (7.8)	5 (7.6)	12 (10.1)	5 (5.0)	9 (8.3)	8 (7.1)	7 (7.0)	10 (8.3)
Sex was									
Consensual	208 (94.5)	146 (94.8)	62 (93.9)	110 (92.4)	98 (97.0)	99 (91.7)	109 (97.3)	98 (98.0)	110 (91.7)
Forced by my partner	10 (4.6)	6 (3.9)	4 (6.1)	7 (5.9)	3 (3.0)	7 (6.5)	3 (2.7)	2 (2.0)	8 (6.7)
Under peer pressure	2 (0.9)	2 (1.3)	0 (0)	2 (1.7)	0 (0)	2 (1.9)	0 (0)	0 (0)	2 (1.7)
Type of sexual activity									
Vaginal intercourse	201 (91.4)	139 (90.3)	62 (93.9)	92 (77.3)	70 (69.3)	99 (91.7)	102 (91.2)	71 (71.0)	91 (75.8)
Kissing	162 (73.6)	112 (72.7)	50 (75.8)	55 (46.2)	39 (38.6)	80 (74.1)	82 (73.2)	36 (36.0)	58 (48.3)
Oral sex	94 (42.7)	69 (44.8)	25 (37.9)	103 (86.6)	98 (97.0) ^c	53 (49.1)	41 (36.6)	96 (96.0)	105 (87.5)
Anal intercourse	18 (8.2)	14 (9.1)	4 (6.1)	12 (10.1)	6 (5.9)	11 (10.2)	7 (6.3)	7 (7.0)	11 (9.2)
Past history of STI									
No	196 (89.1)	137 (89.0)	59 (89.4)	102 (85.7)	94 (93.1)	93 (86.1)	103 (92.0)	92 (92.0)	118 (98.3)
Not sure	18 (8.2)	14 (9.1)	4 (6.1)	14 (11.8)	4 (4.0) ^d	12 (11.1)	6 (5.4)	6 (6.0)	2 (1.7)
Yes	6 (2.7)	3 (1.9)	3 (4.5)	3 (2.5)	3 (3.0)	3 (2.8)	3 (2.7)	2 (2.0)	0 (0)

GD, Guangdong province

^a Values are given as number (percentage), analyzed by Chi-square test; ^{b, c, d} p<0.05 compared with undergraduate students; ^{e, f} p<0.05 compared with students without PKS

On the contrary, some students thought that before- or after-sex antibiotics (124/1030, 12%, or 83/1030, 8.1%), taking a before- or after-sex shower (300/1030, 29.1%, or 242/1030, 23.5%), using a before- or after-sex detergent wash (420/1030, 40.8%, or 384/1030, 37.3%), and having a single partner (827/1030, 80.3%) could prevent all STIs. More students with PKS opted for preventive measures such as having single partner, using a male condom, and urinating after sex ($p < 0.01$).

True-or-false questions about STI-related issues identified that 31.9% (329/1030) of the students had no idea that a person with STIs, including HIV, may look no different from non-infected persons, and 56.2% (579/1030) of the students did not know that having another STI could increase the risk of HIV. Significant differences in the misconceptions were found among students according to gender and PKS variables ($p < 0.05$). More male than female students believed that latex male condoms could prevent all STIs and that using double condoms was safer than using a single condom during sex. More students without PKS thought that completing the treatment course of an STI episode would prevent re-infection. Approximately 25% (252/1030) of students were afraid that insects (*e.g.*, mosquitoes) could transmit HIV or that one could become infected with STI pathogens from sharing toothbrushes, chopsticks, or cups, and from sharing a room or living with a person who is HIV positive.

Discussion

This study, the first of its kind in Guangdong, China, reports sexual attitudes and behaviors, and knowledge of STIs among Chinese university students.

Changing attitudes and behaviors towards sex

Shantou, where this study was conducted, is one of the most conservative cities in China. Three-fourths of the respondents (more male than female students) accepted pre-marital sex. This was surprising because previous reports from Guangzhou, the provincial capital of Guangdong, reported that only 52% of the college students in 2006 [4] and 55% in 2009 considered pre-marital sex acceptable [5]. The acceptance rate of Chinese students in this study is much higher than that of Korean college students (59.3%) [12] and close to that of Japanese college students (87.6%) [13]. The rate of premarital sex among Chinese college students also appears to have increased from 7% in 2006 [4] and 14% in 2009 [5] to

21% in the current study, even though these rates are comparatively lower than those in Korea (32.6% in 2008), Japan (65.7% in 2006), and the US (70.8% in 2011) [13-15].

Sex is still a cultural taboo in China, and in traditional Chinese society, female virginity was highly regarded; therefore, having sex before marriage has been frowned upon [16]. Nevertheless, our finding in this study of students with little concern for traditional attitudes, parental discovery, or religious belief, reflects an apparent change in attitudes and sex culture among young people in China today.

Until recently, many other Asian societies also valued chastity highly and had conservative attitudes toward premarital sex, while Western European and North American societies were more tolerant [17,18].

As is common in other countries, noted among students were high-risk sexual behaviors such as anal intercourse. Adolescents who initiate sexual activity early or engage in more risky behaviors have reportedly higher risks of unwanted pregnancies and STIs [19]. Nearly half of students in this study were more concerned about pregnancy than about STIs, which suggests their ignorance of the consequences of unsafe sex. These findings reflect changing attitudes and behaviors towards sex, with a heightened risk of STIs among young Chinese.

Deficient knowledge in STI

It has been reported that adolescents in Europe have low levels of knowledge and awareness of STIs, with the exception of HIV/AIDS [20]. Likewise in this study, there exist considerable deficiencies in students' knowledge about STI symptoms, complications, transmissions, and preventive methods. While most students knew about the three most common STIs – HIV/AIDS, syphilis, and gonorrhea—the majority were ignorant of other STIs (*e.g.*, chlamydia, which is associated with infertility [21] and is also the fourth most common STI in China [8]). Female students were no better than their male counterparts in recognizing HPV, the leading cause of cervical cancer worldwide. In contrast, female college students in Mexico had higher mean knowledge of HPV compared to men [22].

STIs are common in sexually active youth, and lack of awareness of the early symptoms and complications of multi-stage STIs can result in serious consequences including irreversible organ damage and death. However, the majority of students did not know the early symptoms, which could delay their seeking proper treatment. The level of knowledge among the

students in this study is much lower than the levels reported from European adolescents in 1988 [20] (13% vs. 56%, correct answers for the same questions). The majority of students in this study exhibited appropriate health-seeking behavior, whereas a small percentage of infected students who would keep silent could be putting themselves and their partners at risk by delaying or refusing proper treatment. One survey conducted in northwestern China also reported that 28% of students would not disclose their STI to anyone [23].

Though most students understood the routes of STI transmission, a considerable number, including medical students with PKS, had misconceptions. Such misconceptions are also common among young adults in other developing countries, such as Brazil [24] and Malaysia [11]. As the number of HIV cases in China had reached 346,000 as of 2011 [25], without dedicated educational intervention, some students continue to live with fear of infection, which can also deter the eradication of discrimination against patients with HIV/AIDS.

WHO and CDC endorse using condoms during sex as the most effective preventive measure for STIs. However, condom misuse is common among college students worldwide [26]. STU students were unfamiliar with the correct use of condoms; some believed that using double condoms was safer than using one. Furthermore, this study found that students had a number of misconceptions about safe sex, believing that using pre- or post-sex detergent wash or antibiotics, showering, and urinating after sex were effective preventative measures.

Limited knowledge resources

The findings from the STI knowledge section in this study illustrate the knowledge deficiency college students have regarding transmission and prevention of STIs. These knowledge deficits are apparently linked to limited STI knowledge resources. There were only two main STI-related information resources identified in this study: the medical curriculum in the case of the students with PKS and Chinese websites. One study in Hebei, China, also reported a lack of sex-related knowledge sources despite active sexual behaviors among university students [27].

While medical education had some influence on students' knowledge (such as names of STIs, symptoms, complications, and health-seeking behaviors) in a positive way, it appears that this knowledge was not sufficient in helping medical students dispel their misconceptions and protecting

them from STIs. For example, the students with PKS also exhibited misconceptions about STI prevention. In fact, they had higher rates of sexual practice, which could be the result of their PKS-driven false sense of confidence in self-protection.

There are a number of trustworthy professional websites providing sex, sexuality, or STI-related information in English; however, the related information available on Chinese websites is mostly non-professional and often of very poor quality.

STI risk among students

The US CDC had reported that compared with older adults, sexually active adolescents between 15 and 19 years of age and young adults between 20 and 24 years of age are at a higher risk of acquiring STIs [29]. Chinese youth are also one of the recognized high-risk groups, but information on the prevalence and incidence of this group is scant [30]. Although only 3% of the sexually-active students in this study claimed that they had STIs and another 8% were not sure whether they had any or not, the rate could be higher or become higher in the future as is predictable from their inadequate symptomatic knowledge and risky attitudes.

Study limitations

We acknowledge limitations to our study. Presented rates concerning the acceptability and practice of premarital sex could be biased towards sexually liberal, sexually active, or health-conscious students, for some questions could be too sensitive for sexually conservative students to elect to participate in the study, which might be the reason why only 30% of the website visitors participated in the study. Also, we did not obtain students' marital status, which could have affected our results. We can, of course, not be sure that the answers the students gave accurately reflect their genuine knowledge and practices.

Conclusion

Despite having more open attitudes and behaviors towards sex, students' STI knowledge and awareness of STI risks was considerably limited, raising concerns about a likely future rise in STI incidence. Prior knowledge of STI had no significant influence. Without targeted educational intervention, STI incidence in young people in China could increase in the near future. Although there has been an increasing and more open public discussion on sexual attitudes and behaviors of Chinese adolescents and youths,

Chinese authorities and society as a whole has not been ready to accept school-based sex education. Therefore, a professional online educational website in Chinese, which was requested by almost all students (92%), where safer sex and STI-related information is provided by health experts, could be one of the practical solutions for university students or China's netizen community. It is time for China, one of the more sexually conservative countries, to reconsider its sex and sexuality education policy in conformity with its changing social and cultural profiles.

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