TABLE 3: Multivariate analysis predicting unintended pregnancy.

Variable	Adjusted OR (95% CI)[a]	*P* value
Marriage		
Single	1	
Cohabitation	2.55 (0.93–6.96)	0.068
Married	2.99 (1.12–7.96)	0.028
Ever nonconsent sex		
No	1	
Yes	5.83 (1.74–19.69)	0.004
STD history		
No	1	
Yes	3.31 (1.82–6.01)	0.000
Partner number over lifetime		
1	1	
2	2.09 (1.08–4.05)	0.029
≥3	3.02 (1.44–6.35)	0.004

[a]OR: odds ratio; CI: confidence interval.

had a history of STD were more likely to report a history of unintended pregnancy, suggesting that female STD clinic attendees use little contraception other than condom use.

Male condoms are the leading contraceptive method for unmarried young Chinese, followed, in order, by withdrawal, rhythm methods, and OC [22–24]. The rate of contraception use is high for married people, who mainly use IUD, sterilization, condom, or OC [25]. However, these findings do not apply to our study. Of our subjects, around 5% reported using OC always or often during their lifetimes and in the previous 6 months, which is even a much lower rate than that of condom use. High prevalence of unintended pregnancy and STD in our participants implies that the majority of our participants use not only condom and OC but also any other contraception either never or rarely. Chinese studies revealed that 50%–60% of females who become pregnant unintentionally and seek an induced abortion at a hospital did not use contraception [26, 27]. Doctors at STD clinics therefore should relay the importance of contraception to STD clinic attendees, specifically to STD-infected attendees, because they are at elevated risk of unintended pregnancy.

The rate and mean number of induced abortions in this study were slightly lower than that of unintended pregnancy. We speculate that the majority of unintended pregnancies were aborted artificially. The reason our pregnant participants chose abortion was unclear. This might be because some pregnancies occur with nonstable sexual partners. We found a high prevalence of multiple sexual partners among the participants during their lifetimes and even during the previous 6 months. The rate of abortion might also be related to the one-child policy among those who already had one child [28]. The high rates of unintended pregnancy and induced abortion emphasize the need for doctors at STD clinics to play an expanded role in sexual behavior intervention related to STDs to minimize these risks. The receipt of contraceptive counseling was associated with greater self-efficacy and increased contraception use to prevent unintended pregnancy [29, 30]. Therefore, contraception counseling should be considered a component of behavioral intervention at STD clinics.

We also found that having multiple sexual partners was a risk factor for unintended pregnancy, consistent with the results in Chinese university students [3]. The trend that the more sexual partners our female participants had the more likely they experienced an unintended pregnancy indicates that an increased number of sexual partners of those female participants did not result in increased contraceptive use. The fact that multiple sexual partnerships are very prevalent heightens the concern of unintended pregnancy for this population.

A history of nonconsensual sex was strongly related to unintended pregnancy in female attendees of STD clinics; this had the highest odds ratios for our participants, corroborating reports in other domestic and foreign populations [3, 31, 32]. Nonconsensual sex has also been reported to be associated with other risks, such as more sex partners, reduced condom use, and an increased risk of contracting STD/HIV [33–35]. These findings indicate that a history of nonconsensual sex in attendees at STD clinics warrants special consideration, and those so identified should be referred for appropriate counseling and reproductive health services.

Our study had several limitations. Its cross-sectional nature precluded determination of causal associations with unintended pregnancy; thus, further studies to identify factors associated with unintended pregnancy are necessary to better understand the associations we report here. Bias might have been introduced by the refusal of some attendees to participate. Self-reported sexual behaviors and STD histories might have been under-reported due to their sensitive nature in the Chinese culture, but this might not be evident because requesting an STD diagnosis and treatment at an STD clinic implies the acknowledgement of risky sexual behaviors. Finally, findings from four STD clinics might not be representative of STD clinic attendees in either this one province or all of China. However, we compared the demographic data of our study population and those females from the sentinel surveillance at 12 STD clinics in 2007, and we found that the distributions of age, marital status, and residence were all similar.

5. Conclusion

This study provides valuable information on unintended pregnancy in STD clinics in China. Female attendees seen in STD clinics feebly protect themselves during sexual intercourse, and they are vulnerable to both STDs and unintended pregnancy. The factors leading our attendees to expose themselves to these dual risks should be considered as an integral part of the development of prevention strategies. Doctors at STD clinics should attach importance to not only the STD problem of the attendees but also the unintended pregnancy and the associated factors. Contraceptive counseling and intervention should be promoted at STD clinics as a strategy to improve the efficiency and effectiveness of reproductive health services in China.

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The Characteristics of Heterosexual STD Clinic Attendees Who Practice Oral Sex in Zhejiang Province, China

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Abstract

Background: The characteristics of heterosexual attendees who visit sexually transmitted disease (STD) clinics and practice oral sex have not been revealed in China. This information is important for the development of targeted STD prevention programmes for this population.

Study Design: A self-administered questionnaire survey with a cross-sectional design was administered to consecutive attendees at four STD clinics in Zhejiang Province, China, between October and December in 2007. Demographic, psychosocial, and behavioural factors associated with oral sex over a lifetime were identified using univariate and multivariate analyses.

Results: Of the 872 attendees, 6.9% engaged in oral sex over their lifetimes. Of the oral-sex group, 96.6% also engaged in vaginal sex. The correlates for oral sex over a lifetime as determined by the multivariate analysis were high income (odds ratio [OR] = 2.53, 95% confidence interval [CI] 1.39–4.59), high human immunodeficiency virus (HIV)-related knowledge (OR = 2.71, 95% CI 1.26–5.81), early sex initiation (OR = 2.42, 95% CI 1.37–4.27), multiple sexual partners (OR = 3.09, 95% CI 1.58–6.06), and sexually active in the previous 6 months (OR = 7.73, 95% CI 1.04–57.39).

Conclusions: Though the prevalence of oral sex is low, the heterosexual STD clinic attendees practicing oral sex was found to have higher risks associated with STD/HIV transmission than those not. Behavioural and medical interventions conducted by clinicians in Chinese STD clinics should take into account the characteristics and related risks of those who practice oral sex.

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Introduction

Oral sex is more risky than people think. Oral sex can transmit sexually transmitted infections (STDs), including herpes simplex viruses, human papilloma viruses (HPV), syphilis, gonorrhoea, *Neisseria meningitidis*, *Chlamydia*, and chancroid [1–4]. STDs in the oral cavity can be asymptomatic or subclinical, and can be mistaken for ulcers or herpes, thus delaying curative treatment and allowing ongoing transmission. Oral STDs can also damage the mucosal surfaces of the oral cavity, and unprotected exposure, especially in the presence of lesions, can increase the risk of human immunodeficiency virus (HIV) transmission [1,2,4,5]. Although the oral transmission of HIV is infrequent and substantially lower than through vaginal and anal intercourse, oral exposure to HIV was identified as an independent risk factor for acquiring HIV [6–8].

Data from the United States and Great Britain indicate that the percentage of men and women who engage in heterosexual oral sex has increased [9–13]. Over 80% of 15–44-year-olds in the United States reported ever having oral sex [11], while over 75% of 16–44-year-olds reported having oral sex in the past year in Great Britain [12,13]. In Japan, the proportion of female STD clinic attendees practicing unprotected oral sex with regular and casual partners was 84% and 28%, respectively; the respective percentages were 55 and 2% for females in the general population [14]. A few studies have indicated that oral sex is associated with multiple sexual partnerships, having a non-monogamous sex partner [15,16], much lower condom use when having oral sex compared to vaginal sex [15,17,18], an oral STD diagnosis [15], and an increased likelihood of contracting multiple STDs [16].

In China, few studies have examined the characteristics of individuals who practice oral sex and the risks of oral sex, even for high-risk populations. This is excluding reports on homosexual men, which suggest that the prevalence of oral sex is over 70% [19–21]. Given the possible increasing prevalence of oral sex among heterosexual partners in China due to rapid socioeconomic development, and associated negative health outcomes of oral sex, it is important to examine this behaviour in high-risk populations. Therefore, this study determined the prevalence and correlates of

heterosexual oral sex in STD clinic attendees to understand the epidemiology and risks of this type of sexual behaviour.

Methods

Participants and Data Collection

In China, people who are concerned about current or possible STD problems will visit STD clinics for examination and treatment. The participants in this study were derived from a cross-sectional survey conducted at four STD clinics in Zhejiang Province, Eastern China, between October and December in 2007. Zhejiang Province is one of the most economically developed areas in China and is reported to have the highest incidence of syphilis and gonorrhoea in China [22,23]. In 2007, Zhejiang Province established 12 HIV surveillance sentinels at STD clinics to collect basic information including HIV prevalence, demographic data (four questions), sexual behaviours in the last 3 months (three questions), drug use (one question), and blood plasma donation (one question) from April to June. Of these 12 STD clinics, 4 clinics located in the east, west, north, and middle area of the province agreed to participate in this study, the remaining eight declined participation due to a lack of interest in this research after review of the study protocol. Analysis was performed to compare the HIV prevalence and the attendees' demographic characteristics in terms of gender, age, marital status, and residence among the four STD clinics and the remaining eight non-participating clinics. The analysis revealed that significant difference was not shown for HIV prevalence (0.40% versus 0.23%) and these demographic characteristics were generally evenly distributed between the two groups.

The research method has been introduced somewhere [24]. All sexually active attendees visiting these STD clinics for STD diagnosis and treatment who were >14 years of age were recruited to the study. Those attendees who were not sexually active, unwilling to participate in the study, had a language barrier, or who visited clinics for general skin diseases were excluded. During the study period, 1187 individuals (721 males, 466 females) visited the clinics for STD problems and 935 (601 males, 334 females) agreed to participate in the research. The response rate was 83.4% for males, 71.7% for females, and 78.8% overall. Of the 935 respondents, 908 responded validly. Of these, 16 of 586 males and 6 of 322 females had ever had sex with a same-sex partner. To avoid confounding heterosexual oral sex with same-sex oral sex, we excluded these 22 individuals from further analyses, resulting in a sample size of 886. Since the purpose of this study is to explore the characteristics of those attendees who practice oral sex, 14 attendees who did not answered the question regarding the types of sexual intercourse they performed over their lifetimes were not included in the analysis, therefore the final sample size is 872.

The questionnaire used in this study was developed after reviewing that used for HIV surveillance at the STD clinics at that time, the domestic and international literature, then modified after repeated discussion among the research team and doctors/nurses at the clinics. The final questionnaire had five sections consisting of 7, 10, 21, 8, 5 questions, respectively. The questionnaires were anonymous and self-administered by the STD clinic attendees. A nurse or doctor, who was trained by the research team prior to the study, explained the research and questionnaire to the participants. There was no incentive provided to the participants.

Ethical Considerations

All attendees of the four clinics who met the recruitment criteria and adolescent attendees' guardian were informed of the study purpose and method, and that participant privacy and confidentiality would be strictly protected, and whether participating in this study was at their discretion. They were also explained that filling in the questionnaire were regarded as that they understand and accept the survey. The above information was also printed at the beginning of the questionnaire. Since the research instrument was a questionnaire, those attendees including the guardian for adolescent attendees who gave verbal consent were given the survey after being documented in a register book.

Those responsible for institutional review at Zhejiang Province's Center for Disease Control and Prevention and the four STD clinics approved the study protocol and consent procedure. The four clinics are situated in Haining city of Jiaxing prefecture, Jiangshan city of Quzhou prefecture, Deqing county of Huzhou prefecture, Yongkang city of Jinhua prefecture.

Measures

Those attendees who engaged in any oral, anal, or vaginal sex were defined as sexually active. Oral sex was described as sexual activity involving contact between an attendee's mouth and his or her partner's genital. The participants were divided into two groups, i.e., those who did and did not practice oral sex. The oral-sex group included those who engaged only in oral sex, those who engaged in oral and vaginal sex, and those engaged in oral, vaginal, and anal sex; the no-oral-sex group included those who engaged only in vaginal sex and those who engaged in both vaginal and anal sex.

The HIV-related knowledge scale included four statements: 1) reported HIV cases had increased rapidly in recent years in Zhejiang, 2) HIV is spread from the high-risk population to the general population through sexual intercourse, 3) STDs makes a person more vulnerable to HIV, and 4) the correct use of condoms can reduce the transmission of HIV. There were three possible responses to the four statements: correct", "incorrect", and "unsure". The scores for this scale ranged from 0–4, and participants were categorized into three groups based on the frequency distribution of this scale with 4 reflecting a high level of knowledge, 0–1 reflecting a low level of knowledge, and 2–3 an intermediate level of knowledge. Cronbach's alpha for the internal consistency of this scale was 0.826.

Statistical Analysis

The data were analysed using SPSS for Windows (ver. 17.0; SPSS, Chicago, IL). Initial analyses were conducted to describe the frequency and prevalence of various types of sex. The main study analyses compared participants who reported ever engaging in oral sex with participants who did not report oral sex activity over a lifetime in terms of demographic characteristics, history of sexual behaviour, reported STD history, and STD-related symptoms. We also compared the groups with respect to HIV-related knowledge, and STD and HIV risk perception.

The type of sexual intercourse over a lifetime was used as the dependent variable in the logistic regression analysis. Logistic regressions compared participants who did and did not engage in oral sex over a lifetime for different factors. Finally, variables that were significant in the univariate analyses, other than the number of sexual partners and condom use during the previous 6 months, were entered into a multivariate backward stepwise logistic regression model with a P-value >0.10 as the criterion for removing a variable, to examine independent factors associated with oral sex. All results were reported as odds ratios (OR) and 95% confidence intervals (95% CI), and were considered significant when $P<0.05$.

Results

Type of Sex Practiced by the Participants

Of the 872 attendees, 60 had engaged in oral sex at some time point (6.9% of total, 8.3% of males, and 4.2% of females), while 812 (93.1%) had not. Of the oral-sex group, 2(3.3%) performed only oral sex, 53(88.3%) engaged in both oral and vaginal sex, and 5(8.3%) engaged in oral, vaginal, and anal sex. Of the no-oral-sex group, 808(99.5%) engaged only in vaginal sex, while 4(0.5%) engaged in vaginal and anal sex.

Demographic Factors Associated with Practicing Heterosexual Oral Sex

In the oral-sex group, 78.3% were male; the rate was 63.7% in the no-oral-sex group (Table 1). For those who performed oral sex and those who not, respectively, 51.7% versus 39.4% were les than 30 years older, 55.0% versus 69.5% were married, 80% versus 71.4% were local resident, 53.3% versus 66.0% didn't get high school education, 36.7% versus 61.0% earned an income less than 2000 Yuan per month, 26.7% versus 54.6% were unemployed or a peasant.

Table 1 also showed that practitioners of heterosexual oral sex were more likely to be male (OR = 2.06, 95% CI 1.10–3.88), less likely to be married (OR = 0.54, 95% CI 0.31–0.92), more likely to have earned an income >2000 RMB per month (OR = 3.45, 95% CI 1.98–6.02), more likely to have been employed by the government (OR = 3.57, 95% CI 1.75–7.25), and more likely to have worked in sectors other than being unemployed/a peasant or employed by the government (OR = 3.26, 95% CI 1.72–6.18) as compared with those who did not practice oral sex. The practitioners of oral sex did not differ significantly from non-practitioners in terms of age, residence, and education.

Psychosocial and Behavioural Factors Associated with Engaging in Heterosexual Oral Sex

Table 2 indicates that the practitioners of heterosexual oral sex had significantly more knowledge about HIV (OR = 4.05, 95% CI 1.88–8.75 for intermediate score group, OR = 2.47, 95% CI 1.10–5.56 for high score group), and higher risk perception for HIV (OR = 2.54, 95% CI 1.02–6.31). In addition, they were more likely to have initiated sex before 20 years of age (OR = 2.86, 95% CI 1.68–4.86), experienced non-consensual sex (OR = 3.09, 95% CI 1.31–7.32), had a history of unwanted pregnancy (female or male's female partner; OR = 1.84, 95% CI 1.08–3.15), reported multiple sexual partners (OR = 5.96, 95% CI 2.49–14.29 for >2 partners over lifetimes; OR = 2.21, 95% CI 1.08–4.53, OR = 10.56, 95% CI 5.26–21.18 for 2 and >2 partners, respectively, during the previous 6 months), reported sometimes/frequent condom use (OR = 2.52, 95% CI 1.46–4.35 for lifetime; OR = 2.10, 95% CI 1.20–3.67 for previous 6 months), and had been sexually active in the previous 6 months as compared with those who did not engage in oral sex.

Performance of oral sex was not significantly associated with awareness that oral sex can transmit STDs, risk perception for contracting STDs, the length of sexual activity, reported history of a STD, or STD-related symptoms on the genitals in the previous 6 months as compared with participants who did not engage in this behaviour.

Multivariate Model of Oral Sex

A multivariate logistic regression analysis showed that high monthly income (OR = 2.53, 95% CI 1.39–4.59), high HIV-related knowledge (OR = 2.71, 95% CI 1.26–5.81), early sex initiation (OR = 2.42, 95% CI 1.37–4.27), multiple sexual partners (OR = 3.09, 95% CI 1.58–6.06), and being sexually active in the

Table 1. Demographic characteristics of STD clinics attendees who did and did not practice oral sex.

		Oral-sex group		No-oral-sex group			
Characteristics	**Subgroups**	**n**	**(%[a])**	**n**	**(%)**	**OR (95% CI)[b]**	***P*-value**
Gender	Female[c]	13	(21.7)	295	(36.3)	1	
	Male	47	(78.3)	517	(63.7)	2.06(1.10–3.88)	0.024
Age	<30[c]	31	(51.7)	320	(39.4)	1	
	30–39	17	(28.3)	258	(31.8)	0.68(0.37–1.26)	0.218
	≥40	12	(20.0)	234	(28.8)	0.53(0.27–1.06)	0.070
Marriage	Unmarried[c]	26	(43.3)	238	(29.3)	1	
	Married	33	(55.0)	564	(69.5)	0.54(0.31–0.92)	0.022
Residence	Locally[c]	48	(80.0)	580	(71.4)	1	
	Other area	12	(20.0)	200	(24.6)	0.73(0.38–1.39)	0.334
Education	Below high school[c]	32	(53.3)	536	(66.0)	1	
	High school and over	27	(45.0)	270	(33.3)	1.68(0.98–2.85)	0.058
Income	≤2000[c]	22	(36.7)	495	(61.0)	1	
	>2000	35	(58.3)	228	(28.1)	3.45(1.98–6.02)	0.000
Occupation	Unemployed/peasant[c]	16	(26.7)	443	(54.6)	1	
	Employed by government	17	(28.3)	132	(16.3)	3.57(1.75–7.25)	0.000
	Other	27	(45.0)	229	(28.2)	3.26(1.72–6.18)	0.000

[a]The percentage of attendees may not add up to 100% due to non-response for some items.
[b]OR: unadjusted odds ratio; CI: confidence interval.
[c]Reference category.
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Table 2. Psychosocial and sexual behaviours of STD clinics attendees who did and did not practice oral sex.

		Oral-sex group		No-oral-sex group			
Characteristics	**Subgroups**	**n**	**(%[a])**	**n**	**(%)**	**OR (95% CI)[b]**	***P*-value**
HIV knowledge scale	Low (0–1)[c]	9	(15.0)	302	(37.2)	1	
	Intermediate (2–3)	28	(46.7)	232	(28.6)	4.05(1.88–8.75)	0.000
	High (4)	19	(31.7)	258	(31.8)	2.47(1.10–5.56)	0.029
Oral sex transmits STDs	Unsure/no[c]	34	(56.7)	466	(57.4)	1	
	Possible	26	(43.3)	338	(41.6)	1.05(0.62–1.79)	0.845
STD risk awareness	Unsure/no[c]	31	(51.7)	526	(64.8)	1	
	Possible	25	(41.7)	276	(34.0)	1.54(0.89–2.66)	0.123
HIV risk awareness	Unsure/no[c]	54	(90.0)	777	(95.7)	1	
	Possible	6	(10.0)	34	(4.2)	2.54(1.02–6.31)	0.045
Age of first sex	≥20[c]	27	(45.0)	559	(68.8)	1	
	<20	33	(55.0)	239	(29.4)	2.86(1.68–4.86)	0.000
Length of sexual activity	1–6 years[c]	19	(1.7)	259	(31.9)	1	
	7–15 years	25	(41.7)	263	(32.4)	1.30(0.70–2.41)	0.413
	>15 years	16	(26.7)	276	(34.0)	0.79(0.40–1.57)	0.501
Experienced non-consensual	No[c]	53	(88.3)	772	(95.1)	1	
sex	Yes	7	(11.7)	33	(4.1)	3.09(1.31–7.32)	0.010
History of unwanted	No[c]	35	(58.3)	580	(71.4)	1	
pregnancy	Yes	25	(41.7)	225	(27.7)	1.84(1.08–3.15)	0.026
History of STDs[d]	No[c]	43	(71.7)	637	(78.4)	1	
	Yes	16	(26.7)	154	(19.0)	1.54(0.84–2.81)	0.159
Number of lifetime sex	1[c]	6	(10.0)	263	(32.5)	1	
partners	2	7	(11.7)	220	(27.2)	1.40(0.46–4.21)	0.555
	≥3	40	(66.7)	294	(36.4)	5.96(2.49–14.29)	0.000
Condom use lifetime	Never/rarely[c]	23	(38.3)	489	(60.2)	1	
	Sometimes/often	35	(58.3)	295	(36.3)	2.52(1.46–4.35)	0.001
	Always	2	(3.3)	23	(2.8)	1.85(0.41–8.32)	0.423
Sexually active in last 6	No[c]	1	(1.7)	125	(15.4)	1	
months	Yes	58	(96.7)	646	(79.6)	11.22(1.54–81.78)	0.017
STD-related symptoms[e] in	No[c]	28	(46.7)	404	(49.8)	1	
last 6 months	Yes	32	(53.3)	392	(48.3)	1.18 (0.70–1.99)	0.542
Number of sex partners in	1[c]	17	(29.3)	416	(64.6)	1	
last 6 months	2	15	(25.9)	166	(25.9)	2.21(1.08–4.53)	0.030
	≥3	22	(37.9)	51	(7.9)	10.56(5.26–21.18)	0.000
Condom use in last 6	Never/rarely[c]	29	(50.0)	429	(66.4)	1	
months	Sometimes/often	26	(44.8)	183	(28.3)	2.10(1.20–3.67)	0.009
	Always	3	(5.2)	31	(4.8)	1.43(0.41–4.96)	0.572

[a]The percentage of attendees may not add up to 100% due to non-response for some items.
[b]OR: unadjusted odds ratio; CI: confidence interval.
[c]Reference category.
[d]STD mainly refers to gonorrhea, syphilis, chancroid, condyloma acuminatum, chlamydia, genital herpes, non-gonococcal urethritis, etc. in this research.
[e]STD-related symptoms refers to such symptoms as feeling pain or burning during one's micturition, abnormal sexual organ secretion, anal ulcer or pain, skin damage or neoplasm on sexual organs, etc. in this research.
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previous 6 months (OR = 7.73, 95% CI 1.04–57.39) were significantly associated with oral sex (Table 3).

Discussion

This study is among the first to examine the practices of oral sex among heterosexual STD clinic attendees in China. We found that among heterosexual participants, 8.3% of males and 4.2% of females practiced oral sex; this prevalence is consistent with a data from married women in urban area of one city, southern China [25]. The practice of oral sex is quite low among STD clinic attendees, a population at higher risk of STDs as compared with female STD clinic attendees in Japan [14] and the general populations in other developed countries [11–14]. Of those practicing oral sex, less than 4% practiced oral sex only, and the remaining practiced at least vaginal sex, indicating that most of

Table 3. Multivariate analysis predicting the practice of oral sex.

Variable	Subgroups	AOR (95% CI)[a]	*P*-value
Income	<2000[b]	1	
	≥2000	2.53(1.39–4.59)	0.002
Knowledge scale	Lower (0–1)[b]	1	
	Intermediate-high (2–4)	2.71(1.26–5.81)	0.011
Age of first sex	≥20[b]	1	
	<20	2.42(1.37–4.27)	0.002
Number of lifetime	<3[b]	1	
sex partners	≥3	3.09 (1.58–6.06)	0.001
Sexually active in last	No[b]	1	
6 months	Yes	7.73(1.04–57.39)	0.046

[a]AOR: adjusted odds ratio; CI: confidence interval.
[b]Reference category.
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these participants engaged in the 2 types of sex and were consequently at possibility of acquiring an STD by either vaginal intercourse or oral sex.

In this study, we define sexual activity as any oral, vaginal, or anal sex. Condom use was evaluated over a lifetime and during the previous 6 months. Unfortunately, we did not ask how often the subjects used condoms with each type of sexual behaviour. Consequently, we do not know how often oral sex was protected, or how the rate of protection differed from vaginal and anal sex. In our subjects, condom use was extremely low; 40~50% of the participants in the oral-sex group never/rarely used condoms, while only 3% always used condoms throughout their lives and 5% always used condoms within the past 6 months. Other studies have shown that condom use is much lower during oral sex than during vaginal sex [15,17,18]. Therefore, it is reasonable to speculate that during oral sex, few of our participants were protected, leading to concern regarding the oral STD risk for this group.

Those who earn a high income are more likely to practice oral sex. Though data is not shown in the table, the further analysis revealed those who earned an average income >2000 Yuan per month, compared with those who earned ≤2000 Yuan, were more likely to be employed by the government (40.3% vs. 7.0%), less likely to be a peasant or unemployed (27.8% vs. 65.4%), more likely to have a high school or higher education (48.9% vs. 27.4%), more likely to have had sex with more than two partners (53.4% vs. 34.2%), more likely to report STD-related symptoms in the last half year (54.9% vs. 45.0%). However, there was no significant increase in those who always used condoms (3.8% vs. 2.5%). These data imply that our STD clinic attendees from a high social level are more sexually active and at higher risk for STD/HIV infection.

Not surprisingly, those practicing oral sex had more knowledge, given their higher socioeconomic status. Nevertheless, this knowledge did not translate into protective behaviour. Our findings indicate that those who practiced heterosexual oral sex were more likely to have sex with multiple sexual partners, be sexually active in the last 6 months? Multiple sexual partnerships and frequent sex are undoubtedly risky behaviours for STD/HIV infection if they are not effectively protected. Oral sex practitioners were also found to initiate sex at a younger age. The age at first sexual intercourse is a strong indicator of later adult sexual activity, and early sex initiation has been confirmed to be related to having more sexual partners, having sex more frequently [26–28], which is consistent with our findings, and being more likely to ever have been diagnosed with an STD. These findings suggest that those STD clinic attendees who practiced oral sex were more vulnerable to STD/HIV, the intervention program targeting them for STD/HIV prevention should centre on behaviour rather than knowledge, though we all understand that knowledge is important for a person to identify risky and protective behaviours, and the basis for behaviour change.

Although this study revealed an association between oral sex and risk factors for STD/HIV infection, there was no significant difference in the reported STD history over a lifetime or STD-related symptoms on the genitals in the last 6 months between the oral-sex and no-oral-sex groups. It appears that those STD clinic attendees who practise oral sex have no increased report of STD occurrence. Considering that there were no differences in condom use between the two groups in the multivariate analysis, and Chinese studies have revealed that those who practice oral sex are more likely to contract gonorrhoea, syphilis, condyloma acuminatum, etc [16,29], further research therefore is needed to explore the difference of clinical and laboratory evidences between those who do and do not practice oral sex, and the causes behind them.

Previous research has shown that oral sex can transmit HIV [6–8] and specific STDs [1–4]. Only 43% of our subjects who engaged in oral sex believed that STDs could be transmitted through oral sex. Their risk perception for STDs and HIV was poor. More importantly, condom use during sex was extremely low. These data underscore the need to educate heterosexual STD clinic attendees practicing oral sex about their risk of orally transmitted STDs and HIV.

Our findings are limited by the cross-sectional design of the study, which does not permit us to ascertain cause-and-effect relationships. The participants may have differed from those who chose not to participate. The use of a consecutive sampling in 4 clinics over a limited period of time may result in selection bias, and limit the generalisability of our findings. Nevertheless, we believe that our findings have value as we compared the 908 participants in this study with 3072 participants from 12 HIV sentinels at STD clinics in 2007 for gender, age, marital status, and residence, and found that the distributions of them were all similar. Our findings may also be limited by the validity of the self-reported measures, as some participants may over-report socially desirable behaviours or under-report socially undesirable behaviours. Finally, those who practice insertive oral sex might be different from those who practice receptive oral sex to some extent. However, their exact difference is unknown in this study.

Our findings have important implications. First, although the reported prevalence of oral sex is low, and the risk of transmitting STDs via oral sex is lower than via vaginal intercourse, those heterosexual STD clinic attendees who practiced oral sex tended to have a profile placing them at higher risk for STD, including early sex initiation, multiple sexual partners, more frequent sex, and no increase of condom use even though they were more knowledged about HIV. Therefore, clinicians at STD clinics should note the characteristics and related risks of practitioners of oral sex. STD/HIV intervention targeting this population should focus more on sexual behaviour than knowledge. Second, the majority of our participants who practiced oral sex also performed vaginal intercourse and their rate of consistent condom use was extremely low. Therefore, this population is at a potential risk of contracting STDs or HIV through both vaginal and oral sex. STD clinics should highly recommend condom use during both vaginal and oral sex, in particular, emphasize that STD and HIV can be transmitted by oral sex as well. Third, heterosexual STD clinic

attendees from a high socioeconomic level might be more sexually active and at greater risk. The characteristics of this group should be noted at STD clinics. In summary, oral sex practitioners among heterosexual STD clinic attendees are more sexually active and risky in comparison with that practising no-oral sex. STD clinic in China should take heed of the characteristics of this group, and implement appropriate behavioural and medical intervention for identifying and counselling them to reduce their sexual risks related to STD and HIV.

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Author Contributions

Conceived and designed the experiments: QM XP GC JY YX MOK MK. Analyzed the data: QM GC. Contributed reagents/materials/analysis tools: XP JY YX. Wrote the paper: QM. Coordinated the study in field: QM XP JY. Supervised statistical analysis and made critical comments on the manuscript: MOK MK.

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HIV antibody testing and its correlates among heterosexual attendees of sexually transmitted disease clinics in China

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Abstract

Background: This study was conducted to determine the prevalence of HIV antibody testing and associated factors among heterosexual sexually transmitted disease (STD) clinic attendees in China.

Methods: A self-administered questionnaire was administered among 823 attendees of 4 STD clinics of Zhejiang Province, China in October to December 2007. Psychosocial and behavioural factors associated with HIV antibody testing were identified in both genders using univariate and multivariate analyses.

Results: Of all 823 STD clinic attendees, 9.3% of male and 18.0% of female attendees underwent HIV antibody testing in the most recent 6 months, and 60% of the participants had gotten no educational/behavioral intervention related to HIV prevention. The correlates for HIV antibody testing in the most recent 6 months as identified by multivariate analysis were ever condom use [odds ratio (OR), 10.37; 95% confidence interval (CI), 1.32–81.22]; ever anal/oral sex (OR, 3.13; 95% CI, 1.03–9.50) during their lifetime; having ever received three to seven types of behavioural interventions in the most recent 6 months (OR, 3.70; 95% CI, 1.32–10.36) among male subjects; and ever condom use (OR, 12.50; 95% CI, 2.20–71.01), STD history (OR, 3.86; 95% CI, 1.26–11.86) over their lifetime, or having ever received three to seven types of behavioural interventions in the most recent 6 months (OR, 8.68; 95% CI, 2.39–31.46) in female subjects. A lifetime experience of casual/commercial sex partners was strongly negatively associated with HIV testing in female subjects (OR, 0.08; 95% CI, 0.01–0.83).

Conclusion: The low prevalence of HIV antibody testing and behavioural intervention among STD clinic attendees indicates a need for more targeted, intensive behavioural interventions to promote HIV antibody testing in this population.

Keywords: HIV, HIV antibody testing, Sexually transmitted diseases, China

Background

The HIV epidemic in China continues to expand. It is driven by high-risk behaviour within particular subpopulations. The Ministry of Health, UNAIDS, and WHO assessed in 2009 that by the end of that year, approximately 740,000 Chinese people would be HIV-positive (range, 560,000–920,000) with an HIV prevalence of 0.057% (range, 0.042%–0.071%). Data from national sentinel surveillance and a survey in 61 cities showed that the HIV positive rates exceed 5% among men who have sex with men in some parts of China. Among affected individuals, heterosexual transmission accounts for 44.3% and homosexual transmission accounts for 14.7%. The proportion of sexual transmission is increasing annually; heterosexual transmission increased from 30.6% in 2006 to 47.1% in 2009, homosexual transmission increased from 2.5% in 2006 to 8.6% in 2009. Of the estimated 48,000 new HIV infections that took place in 2009, heterosexual transmission accounted for 42.2% and homosexual transmission accounted for 32.5%, sexual transmission is now the main mode of transmission of HIV [1]. Meanwhile, the prevalence of syphilis has increased rapidly in recent years, indicating the re-emergence of an epidemic. The reported national syphilis incidence increased from 7.39

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per 100,000 in 2004 to 24.66 per 100,000 in 2009, which is an annual rate of increase of 26.6% [2]. The increasing prevalence of sexually transmitted diseases (STDs) has complicated the HIV epidemic in China.

Research conducted in developed and developing countries has shown that knowledge of one's HIV status is the basis for accessing care and preventing further infection. HIV antibody testing could encourage safer behaviours of the tested individual to prevent contraction of HIV and other STDs. A positive test may prevent them from infecting others and encourage acquisition of early access to specific care, support, and anti-retroviral therapy [3-6].

In 2003, the Chinese government began to enforce the free voluntary counselling and testing (VCT) policy. In response to this, many VCT clinics, mainly at different levels of centres for disease prevention and control (CDC) have been established nationwide. In 2006, the Chinese government further required every county to establish at least 2 to 3 VCT clinics at CDC, and/or general hospitals, gynaecology and obstetrics hospitals (it is not compulsorily requested to establish VCT at STD clinic, which is usually affiliated to a general hospital or run independently)[7]. The number of VCT clinics climbed to approximately 8000 by 2010 [8]. However, by the end of 2009, the cumulative total of reported HIV-positive patients was 326,000. Reported cases and epidemic estimations show that about 55% of HIV-positive individuals have not been identified. The high proportion of HIV-positive individuals who do not know their status are particularly high-risk in terms of the potential spread of HIV infection, indicating the critical importance of promoting HIV testing in China.

In 2010, the State Council of China issued a document that stated the requirement to further strengthen HIV/AIDS prevention and control; one of its aims is expansion of the coverage of HIV/AIDS surveillance and testing services to the greatest extent possible [9]. To promote HIV testing, it is important to conduct surveys to elucidate the correlates of HIV testing among various populations. Some Chinese literature has documented that VCT could promote HIV testing among drug users [10], sex workers [11-13], men who have sex with men [14,15], premarital examinees [16], pregnant women [17-19], rural-to-urban migrants [6,20], and general adults [21,22]. Although the literature focuses on high-risk populations, including STD clinic attendees using VCT services [23,24], studies of HIV antibody testing and its correlates among STD clinic attendees are few, let alone among heterosexual STD clinic attendees. Given the high risk of sexual transmission of HIV among STD clinic attendees [25-28], it is crucial to understand the indicators that influence the performance of HIV testing to address the efficiency of identification of HIV cases among this population. Therefore, a cross-sectional survey of four STD clinics in Zhejiang Province was conducted.

Methods

Participants and data collection

The participants in the present study were derived from a cross-sectional survey conducted among attendees of four STD clinics in Zhejiang Province of Eastern China in October to December, 2007. In 2007, a total of 12 HIV surveillance sentinels at STD clinics performed surveillance on HIV prevalence and collected information on behaviours related to HIV transmission from April to June in Zhejiang Province. Of them, four clinics participated in this study; the remaining eight declined participation due to a lack of interest in this research after review of the study protocol. Analysis was performed to compare the HIV prevalence and the attendees' demographic characteristics in terms of gender, age, marital status, and residence among the four STD clinics and the remaining eight non-participating clinics. The analysis revealed that significant difference was not shown for HIV prevalence (0.40% versus 0.23%) and these demographic characteristics were generally evenly distributed between the two groups. In principle, all >14-year-old sexually active attendees visiting these four STD clinics for diagnosis and treatment of STDs were included in the research. Those attendees who were not sexually active, not willing to participate in the research, had a language barrier, or visited clinics for general skin diseases were excluded from the research. During the study period, 1187 individuals (721 males, 466 females) visited the clinics for STD-related problems, and 935 (601 males, 334 females) agreed to participate in the research. The response rate was 83.4% for males, 71.7% for females, and 78.8% overall. Of the 935 respondents, 908 responded validly.

Of the 908 attendees, 16 of 586 males and 6 of 322 females had ever participated in sex with a same-sex partner and were not included in the analysis, resulting in a sample size of 886. Those attendees who completed the questions regarding HIV antibody testing in the most recent 6 months were included in the analysis; therefore, the final sample size of this study was 823.

The questionnaire was developed based on that used for HIV surveillance at the STD clinics at that time and a thorough review of the domestic and international literature, then modified according to repeated discussions among the research team and the doctors and nurses at the clinics studied. The final questionnaire comprised five sections that contained 7, 10, 21, 8, 5, questions, respectively. The questionnaires were self-administered and anonymous and were collected by doctors or nurses of the clinics during October and December, 2007.

Ethical considerations

This research was ratified by Zhejiang Provincial Health Ministry. The institutional review board of Zhejiang Provincial Centre for Disease Prevention and Control

reviewed the protocol and approved this research. All attendees of the four clinics who met the criteria for recruitment were advised of the study's purpose and assured that their privacy and confidentiality would be strictly protected. Every attendee was invited to participate in the research, but the final decision was theirs.

Measures

Those attendees who engaged in any oral, anal, or vaginal sex activities were defined as sexually active. HIV antibody testing during the most recent 6 months was used as a dependent variable in the analysis. The independent variables used included sociodemographic measures, those related to sexual behaviour and STD/HIV risk awareness, and scales of HIV-related knowledge and intervention that each participant received. For each scale, Cronbach's alpha coefficients for internal consistency and the range of scores were computed; participants were categorised into three or four groups according to the ranges of scores based on the frequency distribution of each scale.

The HIV-related knowledge scale included four statements about whether the number of HIV cases reported in Zhejiang province has increased rapidly in recent years, whether HIV is spreading from high-risk populations to the general population through sexual intercourse, whether STDs make a person more vulnerable to HIV, and whether correct use of a condom can reduce the transmission of HIV. There were three possible responses to each of these four statements: 'correct', 'incorrect', and 'unsure'. The scores for this scale ranged from 0 to 4, with 4 reflecting a high level of knowledge, 0 reflecting a low level of knowledge, and 1 to 3 reflecting an intermediate level of knowledge. The Cronbach's alpha coefficient for this scale was 0.826.

The intervention scale reflected the educational/interventional services that an attendee received during the most recent 6 months, including seven statements regarding whether an attendee had ever received any pamphlets, lubricants, condoms, STD diagnoses or treatments, individual-to-individual counselling related to HIV/STD, group training for HIV/STD prevention, or services other than those listed. The possible responses of each statement were 'yes' or 'no'. This scale had a Cronbach's alpha coefficient of 0.710, and scores ranged from 0 to 7, with scores of 3 through 7 classified as high, 0 representing a person who received no interventional services, and 1 and 2 representing a person received one or two types of services, respectively. The seven statements of this scale were first analysed separately in bivariate analyses. Associations were found between HIV antibody testing and each above-mentioned service other than pamphlet and lubricant distributions.

Statistical analysis

Data were analysed using SPSS for Windows (version 17.0; SPSS Inc., Chicago, IL). Frequency distributions of the independent variables and the prevalence of HIV antibody testing were determined by univariate analysis. Associations between the dependent variable and each independent variable were computed using an odds ratio (OR) with corresponding 95% confidence interval (95% CI) and a p value based on a chi-square test of proportions. Variables identified as significantly associated with HIV antibody testing in the bivariate analyses were then entered into a multivariate logistic regression model to determine the independent contribution of each factor to prediction of HIV antibody testing. A backward elimination procedure was adopted with a p value of > 0.10 as the removal criterion. Age, residence, income per month, marital status, and educational background were fixed in the model to control for possible confounding effects. A p value of < 0.05 was considered to indicate statistical significance in these analyses.

Results

Characteristics of study participants

Of the 823 attendees, 517 were male and 306 were female. A total of 34% of males and 55% of females were aged < 30 years old, 69% of males and 65% of females were married, and 76% of males and 66% of females were local residents (Table 1). Most males and females had a junior high school education and above and earned an income of > 1000 yuan/RMB per month.

Behavioural and psychosocial factors and performance of HIV antibody testing

Of all participants, 9.3% (48) of males and 18.0% (55) of females (total, 12.5% [103]) underwent HIV antibody testing in the most recent 6 months.

Among females, but not males, those who had two or more sexual partners during their lifetime were less likely to report HIV testing during the most recent 6 months (OR, 0.50) (Table 2). Participants were classified into two groups with respect to type of sexual partner: those who had only regular partners (regular partner-only group) and those who had ever had a casual or commercial partner (ever-casual/commercial partner group). Those who engaged in ever-casual/commercial partnership were less likely to have undergone HIV testing (OR, 0.31) among females, but this was not significant among males. Condom use was strongly associated with HIV testing; the OR was 17.63 and 36.00 for sometimes and always users among males, respectively, and 3.52 for sometimes users among females. Participants were categorised into three groups with respect to type of sex: those who conducted only vaginal sex, those who ever conducted anal sex, and those who ever conducted oral sex (excluding anal sex). Ever oral sex was associated with HIV antibody testing

Table 1 Socio-demographic characteristics of the participants

	Male	Female	Total
	(n = 517)%[a]	(n = 306)%[a]	(n = 823)%[a]
Age			
<30	33.5	55.2	41.6
30-39	33.7	27.5	31.3
≥40	32.9	17.3	27.1
Marriage			
Single	22.2	14.4	19.3
Cohabitation	7.5	18.3	11.5
Married	69.2	65.4	67.8
Residence			
Local resident	76.2	65.7	72.3
Out of the city	20.7	30.8	24.5
Education			
Illerate/Primary school	13.2	19.0	15.3
Junior high school	47.0	52.9	49.2
High school and over	38.7	27.8	34.6
Income			
<1000	14.7	29.4	20.2
1000-1999	41.0	37.3	39.6
≥2000	37.5	15.7	29.4

[a]The percentage of respondents may not add up to 100% due to missing data.

among males (OR, 2.98), but not females. HIV testing was associated with a participant's history of STDs among females (OR, 2.89), but not among males; however, HIV testing was associated with unintended pregnancies among male's partner (OR, 1.97), but not among female.

Those who thought it was possible to be infected with STDs showed no association with HIV testing in both genders, but those who thought it was possible to be infected with HIV were more likely to undergo HIV testing among males (OR, 4.04). Awareness that every county has established a VCT clinic that is free of charge and anonymous was associated with HIV testing (OR, 2.99 and 2.75 for males and females, respectively). It seems that there was a trend in that those with a higher level of knowledge were more likely to undergo HIV testing among both males and females compared with those with a lower level of knowledge. The OR for attendees with knowledge scores of 1–3 and 4 was 5.93 and 9.90 for males and 1.13 and 3.16 for females, respectively, compared with the reference indicator score of 0.

Behavioural intervention and performance of HIV antibody testing

Regarding the type of intervention received during the most recent 6 months, 60% of the participants received no educational/intervention; 15–24% received condoms, STD/HIV counselling, and STD checks and treatments; and 3–10% received lubricants, pamphlets, training for STD/HIV prevention, and others interventions not mentioned above (Table 3). Participants who responded that they received condoms, services related to STD/HIV counselling, training for STD/HIV prevention, STD checks and treatments, and other services during the most recent 6 months were markedly more likely to have undergone HIV antibody testing in the most recent 6 months than were those who responded otherwise (OR, 1.91–6.41 for males and 4.42–9.05 for females). Whether a participant received pamphlets and lubricants was unrelated to HIV antibody testing.

Our findings showed that receipt of a high number of intervention services was a strong indicator for undergoing HIV testing among both males and females. There was a clear trend showing that the greater the types of services an individual received, the more likely they were to have undergone HIV antibody testing. Only 5.0% of males and 9.0% of females received HIV testing among those who received no services during the most recent 6 months, which increased to 30.4% and 71.4% among male and female participants, respectively, who received three to six types of services.

Multivariate analysis

Table 4 shows the results of multiple logistic regression analyses. After age, marital status, residence, educational background, income per month had been controlled for; ever condom use (OR, 10.37), and ever anal/oral sex (OR, 3.13) during their lifetime, having ever received three to seven types of behavioural interventions (OR, 3.70) among males; and sex only with a regular partner (OR, 1), ever condom use (OR, 12.50), and STD history (OR, 3.86) over their lifetime, and having ever received behavioural intervention (OR, 8.68) among females remained significant correlates of HIV testing during the most recent 6 months. In addition, in the multiple logistic regression model the trend for STD clinic attendees who received a greater number of types of intervention services showed that they were more likely to have been HIV tested compared with those who received fewer types of interventions.

Given the coexistent relationship between the numbers of casual/commercial partnerships and sexual partners, those who ever engaged in casual/commercial partnerships are probably more likely to have more than one sexual partner than those with regular partners. Therefore, we excluded the partner type over lifetime variable from the model, and found that those females with more than two sexual partners were less likely to have undergone HIV testing (OR, 0.27; 95% CI, 0.09–0.83), which corroborated the results of the bivariate analysis.

Table 2 Bivariate correlates of HIV testing in the recent 6 month with sexual behavioural and psychosocial factors

Variable	Male (n = 517)				Female (n = 306)			
	n(%)[a]	HIV testing	Crude OR (95% CI)[b]	*P* value	n(%)[a]	HIV testing	Crude OR (95% CI)[b]	*P* value
Partner number over life time								
1	98 (19.0)	12.2	1.00		162 (52.9)	20.4	1.00	
≥ 2	384 (74.3)	7.3	0.56 (0.28-1.15	0.117	133 (43.5)	11.3	0.50 (0.26-0.96)	0.038
Partner type over life time								
Regular only	170 (32.9)	10.0	1.00		232 (75.8)	20.3	1.00	
Ever casual/commercia	342 (66.2)	8.8	0.87 (0.46-1.62)	0.651	68 (22.2)	7.4	0.31 (0.12-0.82)	0.018
Condom use over lifetime								
Never	133 (25.7)	0.8	1.00	98 (25.7)	8.2	1.00		
Sometime	365 (70.6)	11.8	17.63 (2.40-129.33)	0.005	193 (70.6)	23.8	3.52 (1.59-7.80	0.002
Always	14 (2.7)	21.4	36.00 (3.45-375.70)	0.003	10 (2.7)	10.0	1.25 (0.14-11.16)	0.842
Type of sex over lifetime								
Only vaginal	465 (89.9)	8.0	1.00		284 (92.8)	18.0	1.00	
Ever anal	3 (0.6)	33.3	5.78 (0.51-65.29)	0.156	6 (2.0)	16.7	0.91 (0.11-7.99)	0.935
Ever oral	44 (8.5)	20.5	2.98 (1.33-6.66)	0.008	10 (3.3)	0.0	0.00	0.999
STD history over lifetime								
No	432 (78.1)	10.3	1.00		211 (69.0)	13.3	1.00	
Yes	75 (19.4)	22.5	1.60 (0.76-3.36	0.219	85 (27.8)	30.6	2.89 (1.57-5.30	0.001
Unintended pregnancy overlifetime								
No	403 (77.9)	7.9	1.00		175 (57.2)	15.4	1.00	
Yes	110 (21.3)	14.5	1.97 (1.04-3.75)	0.038	128 (41.8)	21.9	1.54 (0.85-2.76)	0.152
STD risk								
Impossible/unsure	175 (33.8)	12.6	1.00		99 (32.4)	18.2	1.00	
Possible	332 (64.2)	7.8	0.59 (0.32-1.08)	0.086	203 (66.3)	17.2	0.94 (0.50-1.76)	0.84
HIV risk								
Impossible/unsure	490 (94.8)	8.4	1.00		298 (97.4)	17.8	1.00	
Possible	26 (5.0)	26.9	4.04 (1.60-10.16)	0.003	7 (2.3)	14.3	0.77 (0.09-6.53	0.811
HIV related knowledge								
0	120 (23.2)	1.7	1		88 (28.8)	12.5	1	
1-3	197 (38.1)	9.1	5.93 (1.35-26.04)	0.018	137 (44.8)	13.9	1.13 (0.51-2.50)	0.768
4	188 (36.4)	14.4	9.90 (2.31-42.43	0.002	74 (24.2)	31.1	3.16 (1.42-7.03)	0.005
Awareness that every county has established VCT site								
Incorrect/unsure	388 (75.0)	6.4	1		210 (68.6)	12.9	1	
Correct	123 (23.8)	17.1	2.99 (1.61-5.56)	0.001	90 (29.4)	28.9	2.75 (1.50-5.06)	0.001

[a]Percentages may not add up up to 100 due to missing data for some items;
[b]OR, odds ratio; CI, confidence inerval.

Discussion

This is the first study in China specifically examining actual HIV testing correlates among heterosexual STD clinic attendees. Therefore, this study not only augments the limited data available on HIV testing among STD clinic attendees in China, but, more importantly, provides information valuable for development of more effective HIV testing services for this population.

Our data suggest that the prevalence of having undergone HIV antibody testing in the previous 6 months among STD clinic attendees was 9.3% for males and 18.0% for females, indicating that a high proportion of the STD clinic attendees had not undergone HIV antibody testing. The facts that the rate of always condom use was < 5% and multiple sexual partnerships and commercial/casual sex were quite prevalent among our participants suggests the importance of promotion of safer behaviours among this group. Such health behaviour promotion should include HIV testing because there is a concern that such a low testing rate may lead

Table 3 Bivariate correlates of HIV testing in the recent 6 month with various intervention exposed

Variable	Male (n = 517)				Female (n = 306)			
	n(%)[a]	HIV testing	Crude OR (95% CI)[b]	*P* value	n(%)[a]	HIV testing	Crude OR (95% CI)[b]	*P* value
Intervention								
Condom								
No	390 (75.4)	7.4	1.00		236 (77.1)	11.9	1.00	
Yes	121 (23.4)	15.7	2.32 (1.25-4.31)	0.008	67 (21.9)	37.3	4.42 (2.35-8.33)	0.000
Lubricant								
No	484 (93.6)	9.5	1		277 (90.5)	17.3	1	
Yes	25 (4.8)	8.0	0.83 (0.19-3.63)	0.802	24 (7.8)	16.7	0.95 (0.31-2.92)	0.934
Pamphlet								
No	460 (89.0)	9.1	1		272 (88.9)	16.5	1	
Yes	49 (9.5)	12.2	1.39 (0.56-3.45)	0.480	28 (9.2)	28.6	2.02 (0.84-4.87)	0.118
STD/HIV counselling								
No	425 ()82.2	5.9	1		254 (83.0)	11.8	1	
Yes	83 (16.1)	27.7	6.13 (3.27-11.49)	0.000	46 (15.0)	47.8	6.84 (3.42-13.68)	0.000
Training for STD/HIV Prevention								
No	491 (95.0)	8.6	1		286 (93.5)	15.7	1	
Yes	17 (3.3)	29.4	4.45 (1.50-13.25)	0.000	15 (4.9)	46.7	4.69 (1.62-13.57)	0.000
STD check/treatment								
No	405 (78.3)	5.2	1		228 (74.5)	9.6	1	
Yes	104 (20.1)	26.0	6.41 (3.45-11.93)	0.000	73 (23.9)	41.1	6.53 (3.44-12.40)	0.000
Other								
No	483 (93.3)	9.1	1		284 (92.8)	14.8	1	
Yes	25 (5.2)	16.0	1.91 (0.63-5.80)	0.000	18 (5.9)	61.1	90.5 (3.32-24.68)	0.000
Intervention scale								
0	308 (59.6)	5.2	1		182 (59.5)	9.3	1	
1	80 (15.5)	8.8	1.75 (0.69-4.41)	0.235	44 (14.4)	11.4	1.24 (0.43-3.58)	0.685
2	57 (11.0)	15.8	3.42 (1.43-8.18)	0.006	34 (11.1)	23.5	2.99 (1.17-7.62)	0.022
3-7	60 (11.6)	25.0	6.08 (2.81-13.15)	0.000	36 (11.8)	55.6	12.13 (5.31-27.70)	0.000

[a]Percentages may not add up to 100 due to missing data;
[b]OR, odds ratio; CI, confidence interval.

to a possible delay in the diagnosis of HIV/AIDS in this high-risk population.

HIV testing services are widely available in China, especially in economically developed areas such as Zhejiang Province, where all local CDCs and some hospitals offer free, anonymous, voluntary HIV counselling and testing services. In addition, the majority of hospitals in every county offer HIV testing if a doctor or patient believes it to be necessary. Considering the fact that free anti-retroviral therapy services were already available for all AIDS patients in China at the time of this study, the introduction of anti-retroviral therapy may dramatically drive people to get HIV testing, the low prevalence of HIV antibody testing in this population is surprising. This may be be related to the inadequacy of relevant HIV prevention programs. Our findings showed that ~60% of attendees had received no intervention services during the most recent 6 months. This may be related to inadequate risk assessment and mobilisation of doctors at hospitals and clinics, which was reported to be a predictor for undergoing HIV testing services [29-32]. However, many medical providers are reluctant to discuss HIV risk behaviour with a patient, which has already been reported in the US [33-35]. This may be related to the perception of a low risk of HIV infection. The majority of our participants believed that it was impossible for them to contract HIV. This may be related to fear of stigmatisation and a positive result [36], therefore, they refrained from testing. This may be possibly because of a low awareness of the VCT services that have been established in every county. Our results showed that awareness of VCT services is associated with HIV testing, but this factor was present in < 30% of both genders. Multiple efforts, therefore, should be made to remove the psychosocial barriers that prevent HIV testing,

Table 4 Multivariate analyses predicting HIV testing in the recent 6 months

Variable	Male		Female	
	Adjusted OR (95% CI)[a]	*P*-value	Adjusted OR (95% CI)[a]	*P*-value
Partner type over lifetime				
Regular only			1.00	
Ever casual/commercial			0.08 (0.01-0.83)	0.034
Condom use over lifetime				
Never	1.00		1.00	
Ever	10.37 (1.32-81.22)	0.026	12.50 (2.20-71.01)	0.004
Awareness that every county has established VCT site				
Incorrect/unsure	1.00			
Correct	2.07 (0.93-4.59)	0.075		
Type of sex over lifetime				
Only vaginal	1.00			
Ever anal or oral	3.13 (1.03-9.50)	0.044		
STD history over lifetime				
No			1.00	
Yes			3.86 (1.26-11.86)	0.018
Behavioural intervention				
0	1.00		1.00	
1	1.02 (0.31-3.38)	0.974	0.69 (0.14-3.40)	0.648
2	2.52 (0.93-6.84))	0.069	3.34 (0.85-13.22	0.085
3-7	3.70 (1.32-10.36)	0.013	8.68 (2.39-31.46	0.001

[a]OR, odds ration; CI, confidence interval.

and counselling services and intervention programs should be provided for this risk group. STD clinic doctors' recommendations and mobilisation may play an important role in this regard.

The present study did not replicate a previous finding that the self-perceived chance of HIV infection and knowledge variables were significantly associated with the incidence of HIV testing [29,37]. Instead, we found that STD clinic attendees who had sexual intercourse with commercial or casual sexual partners and females who had multiple lifetime sex partners were more likely to have been HIV tested. In addition, lifetime ever condom use was the strongest correlate of HIV testing among both males and females; this association has also been reported elsewhere [38]. These findings suggest that participants' decisions regarding taking an HIV test are more likely to be based on personal sexual behaviours than estimation of personal risk or knowledge.

Reports from other countries regarding the relationship between HIV testing and the diagnosis of an STD have been inconsistent [37,38]. Females who had ever been tested were more likely to report an STD history in this study. This may be because some Chinese women who had suffered psychological trauma due to an STD or experience of STD diagnosis and treatment may be driven to, or subsequently adopt safer behaviours, including HIV testing, reinforcing the hypothesis that information on prevention through counselling, exam and treatment of gynaecological diseases can assist substantial behavioural modifications, allowing for safer sexual practices [39].

We found that heterosexual male attendees who had ever engaged in oral sex were more likely to have been tested. Although not shown, the data revealed that male participants who had ever practiced both oral and vaginal sex were more likely to have had multiple sexual partnerships and an STD compared with those who participated only in vaginal sex. However, they were more likely to believe that it was possible to contract HIV; unfortunately, their condom-use rate was not increased. Males who practiced oral sex were more sexually active and practiced higher-risk behaviours; therefore, they may be more aware of their risk and more likely to undergo HIV testing. In this study, 8.5% of heterosexual men had performed oral sex; the HIV and STD risk for this population should therefore be noted.

Reports from other countries indicate that heterosexual anal sex is prevalent among STD clinic patients, with more than one in five patients reporting anal sex in the previous 3 months and 39% reporting anal intercourse

in the past year [40,41]. Although our research reported a much lower lifetime anal sex rate (0.6% for males and 2.0% females), although penile–anal intercourse is more efficient at transmitting HIV and STDs than is vaginal intercourse [42,43], anal sex was not associated with HIV testing. Because the number of heterosexual individuals engaging in anal sex practices in China may be increasing, which has also been reported for the US [44], future HIV prevention interventions for heterosexual men in China must attach importance to the risk of HIV posed by anal sex.

One of the most important findings of this study was the dosage-response relationship between type of intervention and HIV testing. A clear trend was shown in that the greater the number of types of intervention the participants received, the more likely they were to undergo HIV testing, implying that intervention programs must implement packages comprising various components to encourage STD clinic attendees to undergo HIV testing.

Our study has some limitations. First, the participants may differ from those who chose not to participate, but the direction of this bias is unknown. Second, HIV testing information was based on self-reports. The results may have been affected by the respondents' concern about social desirability and whether they felt comfortable reporting such behaviours in STD clinics. However, HIV testing recall error might not have been evident because the time of recall was limited to 6 months. HIV testing is a stressful experience, and the respondents' HIV status was not requested. Furthermore, some participants may have felt uncomfortable responding to the sexual behaviour questions; this may have led to underreporting bias. Third, we did not inquire whether HIV tests were initiated by the test-seeker or the provider; this should be taken into consideration in analyses of the incidence of HIV testing and its correlates. Fourth, the cross-sectional nature of this study limits the drawing of causal inferences between HIV testing and its correlates. The association of HIV testing with behavioural intervention might be due to that some participants may get HIV testing and behavioural intervention at VCT at the same time, however, we believe that the proportion for our participant to get HIV testing at VCT is low as we limited HIV testing to the previous 6 months, and the major concern for STD clinic attendee is STD, not HIV, which is reported in our study that HIV risk awareness is 5.0% and 14.3% for male and female, respectively.

Conclusion

Our findings have important implications for development of intervention programs targeting STD clinic attendees in China. First, a high level of multiple sexual partnerships and low level of condom use was found, putting STD clinic attendees at risk of HIV infection and emphasising the importance of encouraging this population to undergo HIV testing. Second, more intensive and multiple behavioural interventions that promote HIV testing should be conducted within this population. Third, to make HIV testing services more available and accessible to STD patients, it may be helpful to establish VCT service in every STD clinic to not only provides STD diagnosis and treatment, but also counselling and testing. Finally, intervention programs intended to promote HIV testing among this population must be scientifically designed and take sexual behaviours and gender differences into account.

Competing interests

The authors declare that there are no competing interests for this manuscript.

Authors' contributions

All authors contributed to the design of this research. MQ performed the statistical analysis and drafted the manuscript; PX coordinated the study in field; PX, CG helped analyze the data; YJ played a major role in the field survey. MOK and MK supervised statistical analysis and made critical comments on the manuscript. All the authors read and approved the contents of the manuscript.

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Vulnerability to HIV infection among female drug users in Kathmandu Valley, Nepal: a cross-sectional study

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Abstract

Background: Women who use drugs are extremely vulnerable to HIV and sexually transmitted infections (STIs), but studies on risk behaviours and HIV infection among female drug users are limited in Nepal.

Methods: In this cross-sectional study conducted between September 2010 and May 2011, HIV prevalence and risk factors for HIV infection were investigated among female drug users recruited in drop-in centres, parks and streets in the Kathmandu Valley. The participants completed face-to-face interviews for a structured questionnaire, HIV pre-test counselling, specimen collection for HIV test and they were provided with their results at post-test counselling.

Results: A total of 269 female drug users were recruited, of whom 28% (n = 77) were found HIV positive; the majority (78%, n = 211) being injecting drug users and aged below 25 years (57%, n = 155). Nearly half (n = 137) of the total participants had shared needles or syringes in the past month, and 131 and 102 participants were involved in commercial or casual sex respectively with only half or less of them having had used condoms in the last 12 months. In multivariate analysis the variables associated with HIV infection included: (a) older age; (b) history of school attendance; (c) frequency of sharing of injection instruments; and (d) unsafe sex with commercial or casual partners.

Conclusions: HIV was highly prevalent among female drug users in the Kathmandu Valley, with its risk being strongly associated not only with unsafe injection practice but also with unsafe sexual behaviours. Awareness raising programmes and preventive measures such as condom distribution, needle or syringe exchange or methadone maintenance therapy should be urgently introduced in this neglected subpopulation.

Keywords: HIV, Female drug user, Injecting drug use, Sexual behaviour, Nepal

Background

The World Drug Report 2013 estimated that in 2011 between 167 to 315 million people aged 15–64 (3.6% - 6.9% of the world's population in that age group) had used an illicit substance at least once in the previous year [1]. In the same report, the United Nations Office on Drugs and Crime (UNODC) estimated that about 14 million people inject drugs globally and of them 1.6 million (11.4%) are living with HIV. Countries with higher prevalence of HIV infection among people who inject drugs are located in Western and Central Europe, Sub-Saharan Africa, and South and South-East Asia including Nepal [2]. In recent years, there has been a rapid increase in female injecting drug users, especially in Asia and Eastern Europe [3,4]. In Central Asia and the countries like China, India and Russia, drug use and sharing injection equipment is increasing rapidly among females, and in many regions more females are seeking harm reduction services and drug treatment [5,6].

In Nepal, the first case of HIV/AIDS was reported in 1988. As of 2011, national estimates indicated that approximately 50,200 adults and children were infected with HIV, with an estimated overall HIV prevalence of 0.30% in the adult population of 15 to 49 years. Out of

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the total infections, around one third is estimated to have occurred among females [7]. Although estimated HIV prevalence among Nepal's adult population is fairly low, the HIV epidemic in Nepal is extremely heterogeneous with respect to the most at risk populations and geographic distribution [8,9]. The epidemic is concentrated in key subpopulations such as commercial sex workers, injecting drug users (IDUs), men who have sex with men, and migrants. IDUs are the subpopulation most heavily affected by the epidemic [10,11]. The drug user population is concentrated in the Kathmandu Valley and in the locations along the East–west Highway, where 30% of all the people living with HIV are IDUs. According to a government report, 42,954 (92.8%) male and 3,356 (7.2%) female drug users were living in the Kathmandu Valley alone in 2007 where 34.8% of IDUs were estimated to be HIV positive [12,13].

Compared to male drug users, information has been limited for female drug users regarding HIV prevalence and their risk behaviours. Though smaller in number, the situation of female drug users could be more serious than that of male drug users for several reasons. Firstly, female drug users are known to trade sex for money or drugs. A study has shown that over half of the female IDUs in China have been involved in sex work [14]. Secondly, female drug users who exchange sex for drugs or cash may not identify themselves at risk of HIV infection because they do not consider themselves as sex workers [15]. Thirdly, condom use can be infrequent among them because drug dependency and financial problems may impair their judgment and power to negotiate for condom use with their sex partners [16-19]. Fourthly, female drug users depend in many cases on male partners for drugs and injections, leading them to an elevated risk of equipment sharing practice [20,21]. Fifthly, female drug users are socially stigmatized more than male drug users, making them hidden and thus it is difficult for them to access preventive services [21-23]. For these reasons, female drug users could expose themselves to exceptional risk of HIV infection and play a critical role in the local HIV epidemic by bridging infection to the broader population through their drug injection network as well as sexual network [18,24,25]. These situations, however, largely remain unknown in Nepal.

With these backgrounds, this study aims to investigate prevalence of HIV infection and social and behavioural correlates of HIV infection among female drug users in Kathmandu Valley, Nepal, with a hope that it may help to improve intervention programmes for female drug users in Nepal.

Methods

Setting and sampling procedures

This cross-sectional study was conducted between September 2010 and May 2011 among female drug users of Kathmandu Valley, in which the capital city is situated. Female drug users were recruited in drop-in centres (DICs) that were working for various drug-related harm reduction programmes for female drug users as well as in parks and on the street. Recruitment was carried out directly by ex-drug users and trained outreach workers and indirectly through personal networks. The outreach workers first mapped out the groups and areas where they expect to encounter the target population, and they then set out to actively recruit potential candidates there. The time of field observations varied to cover morning, afternoon, evening, and late night hours. They often made use of existing social networks within a population. As selection proceeds, suitable new candidates with appropriate characteristics or behaviour were sought within the social networks of respondents already included in the study (snowball sampling) [26]. The inclusion criteria for the study was that they were current drug users of at least 16 years old and willing to give informed consent for both questionnaire survey and HIV testing. Eligible respondents received an explanation about the survey, its purpose and types of the questions to be asked.

Interview

Trained outreach workers and peer educators of the HIV/AIDS programme who had already established trust with female drug users through their daily activities interviewed participants face to face using structured questionnaires. A small incentive was provided to each participant for travel and refreshment. The name of the participants or their addresses were not recorded anywhere. Instead, they were provided with a unique identification (ID) number written on a plastic-coated card that was used for both questionnaire and HIV testing. Same ID was used for pre- and post-counselling and for the provision of test results.

Instrument

The structured questionnaire was developed from a questionnaire recommended and produced by Family Health International for IDUs [27]. With modifications made following the findings of the preliminary qualitative study (conducted among 21 female drug users in May 2010), the final questionnaire included 90 questions. The topics in the questionnaire included the main socio-demographic characteristics, drug use practices, frequency and duration of injection drug use, sexual activities and a history of sexually transmitted infections (STIs), and knowledge and perception of HIV/AIDS. Questions on knowledge included: (1) Can people protect themselves from HIV by using condoms?; (2) Can a person get HIV from mosquito bites?; (3) Can people protect themselves from HIV by having one uninfected faithful sex partner?; (4) Can people protect themselves from HIV by abstaining from sexual intercourse?; (5) Can a person get HIV by sharing a meal