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Vaginal Douching, Condom Use, and Sexually Transmitted Infections Among Chinese Female Sex Workers

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Abstract

Background and Objective— Vaginal douching has been hypothesized to increase a woman's risk for human immunodeficiency virus (HIV) infection. However, data on the prevalence of this practice and its association with condom use and sexually transmitted infections (STIs) are limited.

Study— A cross-sectional survey among 454 female sex workers (FSWs) in a Chinese county.

Results— Vaginal douching was reported by 64.7% of the women. The prevalence of self-reported history of STI and that of current STI was 19.4% and 41.5%, respectively. Fifteen percent of the women reported consistent use of condoms with their clients and 8.4% with their regular partners. Vaginal douching was significantly associated with decreased use of condoms (with clients: OR = 0.31; with regular partner(s): OR = 0.22) and increased rate of self-reported STI history (OR = 1.95). However, there was no direct relation between douching and current STI. Over one third of the women believed that douching can prevent STI/HIV.

Conclusion— Vaginal douching exposes FSWs to a high risk of STI/HIV. Medical professional and public health workers should correct women's misconception about the effectiveness of douching and discourage women from douching through educational activities.

Since the early 1980s when commercial sex reemerged in mainland China after 2 decades of virtual extinction, prostitution has developed into a widespread industry.¹ In 2003, the number of women engaging in commercial sex in mainland China was estimated to range from 4 to 10 million.² In China, sentinel surveillance sites indicate that the human immunodeficiency virus (HIV) infection rate ranges from 0.1% to 5% among female sex workers (FSWs).³ More recently, there has been a large increase in the number of people infected through commercial sex, especially in coastal areas in east and south China and in big cities.⁴ Behavioral-risk assessment data reveal that a large proportion of FSWs never use a condom. The rates range from 31% in Beijing to 70% in Anhui Province. In addition, sexually transmitted infections (STIs) among FSWs are very high. A recent study showed that 86% of FSW in Kunming, Yunnan Province, had at least 1 STI.³ The rapid growth of the sexual industry and increasing rates of HIV/STI among FSWs have raised concerns that HIV/AIDS may more rapidly spread to the general population, possibly accelerating the growth of HIV/AIDS epidemic.^{5,6}

Several studies have shown that vaginal douching (water, water mixed with salt or commercial products, etc.) is a common practice among women around the world.^{7,8} There is some evidence that frequent vaginal douching may increase a woman's susceptibility to sexually transmitted agents through modification of the vaginal flora. A meta-analysis reviewing 13 studies revealed that frequent douching appears to be highly associated with pelvic inflammatory disease (PID) and modestly associated with ectopic pregnancy and cervical cancer.⁹ A recent comprehensive review indicates that vaginal douching is associated with adverse gynecologic and reproductive outcomes, including bacterial vaginosis, preterm birth, low-birth-weight infants, PID, chlamydial infection, tubal pregnancy, higher rates of HIV transmission, and cervical cancer. Previous studies suggested that cultural beliefs and educational factors strongly influence douching practices.¹⁰ Personal hygiene^{7,11} and preventing STI¹² were among the main reasons offered by women for douching. Because reproductive tract infections such as cervicitis and PID have been identified as risk factors for HIV acquisition, vaginal douching may indirectly facilitate the heterosexual transmission of HIV. However, inconsistent results are reported regarding the interrelationship between douching and STIs. Some studies suggest that adolescents who douche are more likely to have a history of a sexually transmitted disease,^{13,14} while other studies have found that women who have a history of a sexually transmitted disease are less likely to douche.^{15,16} Fonck and colleagues⁸ found no direct relation between douching and risk for HIV infection or other STIs. In addition, the relation between douching and condom use is a greatly underresearched area. Fonck and colleagues⁸ found that there was a positive association between condom use and douching among FSWs. Compared to those women who never used a condom, women who sometimes or always used condoms were 1.4 and 2.5 times more likely to douche.⁸

Condom use among Chinese FSWs is low. Data from sentinel surveillance sites show that about 10% of sex workers reported always using condoms with clients, and about half of them reported never using a condom.³ Results from a recent China-United Kingdom HIV/AIDS project have shown that clients' refusal (55%), embarrassment (19%), and inconvenience (12%) are the 3 main reasons for FSWs not using condoms.^{17,18} There are no data available regarding the association between vaginal douching and condom use among Chinese FSWs.

Using baseline data of a large HIV prevention project in a group of FSWs in China, this study was designed to explore the association between vaginal douching, condom use, and STIs among FSWs. Specifically, we address the following questions: (1) What is the rate of vaginal douching among this FSW population? (2) Is there an association between vaginal douching and women's condom use with their sexual clients and regular partner(s)? (3) Are women who douched more likely to report a history of any STI or have a current STI than women who did not?

Methods

Survey Sites

The study was conducted in a suburban area (H County) of Nanning, the capital city of Guangxi Zhuang Autonomous Region ("Guangxi"). Guangxi, one of China's 5 autonomous and multi-ethnic regions, is located in the southern part of the country. Guangxi has witnessed an alarming rise in HIV prevalence in the past decade. A total of 8602 HIV-infected cases were officially reported at the end of 2003, which places Guangxi third among Chinese provinces in terms of reported HIV-seropositive cases.¹⁹ A prosperous economy, increased international contact, and general tourism in Guangxi have created a market for commercial sex. According to the statistics from the public security agency, there are at least 50,000 FSWs in Guangxi.²⁰ H County, about 90 km northeast from Nanning, is the most populous county in the Nanning suburban area. There are an estimated 200 entertainment establishments, with more than 2000 women engaging in commercial sex service in the county.

Subjects and Survey Procedure

Participants in the current study were recruited from restaurants, barbershops, and hair-washing rooms in 3 geographic locations in H County: the county seat, a recently established development zone in rural-urban conjunction, and 1 rural township. Detailed recruitment procedure has been described elsewhere.^{20a} Briefly, the research team and local health workers identified 85 establishments in the 3 targeted areas (53 in the county seat, 12 in the development zone, and 20 in the township) through an ethnographic mapping of entertainment establishments providing commercial sex service. The owners/managers of these establishments were contacted for their permission to conduct research in their premises. Once we received their permission, well-trained outreach health workers from the county Anti-Epidemic Station and local hospitals approached women in the establishments to ask their participation. Among the 582 women contacted, 454 women agreed to participate in this study and completed a self-administered questionnaire, and 410 women provided specimens or received clinical examination for testing of 5 STIs (i.e., syphilis, gonorrhea, chlamydia, trichomonas, genital warts).

A structured questionnaire was administered to all women who provided written informed consent. The survey was conducted in separate rooms or private spaces. The questionnaire was pretested in 2 waves among 22 women (7 in wave 1 and 15 in wave 2) to ascertain that the content and language were appropriate for the study population. No one was allowed to stay with the participant during the survey except the interviewer, who provided the participant with necessary assistance. For participants with limited literacy (approximately 10%), the interviewer read each question and response options from his/her copy of the questionnaire while the participant marked the response on her own copy. Therefore, the interviewers would not see their answers. The questionnaire took about 45 to 60 minutes to complete. The study protocol was approved by the institutional review boards at Wayne State University in the United States and Beijing Normal University and Guangxi Center for Disease Control and Prevention in China.

The questionnaire gathered data on demographics such as age, ethnicity, education level, hometown, marital status, and living arrangement. Information was collected on women's sexual behavior, including age at first sex, duration of prostitution, the maximum number of clients per day, the average number of clients per week, practice of anal sex, sex during menstruation or sex after drinking alcohol, and whether women had regular partner(s). The survey also contained questions regarding STI/HIV knowledge, practice and perceived effectiveness of vaginal douching, and history of any STI.

STI Testing

Blood specimens were drawn and initially screened for syphilis using the Rapid Plasma Reagin (Xinjiang Xinde Co., China). Positive results were confirmed using the Serodia Treponema Pallidum Particle Agglutination (Fujirebio Inc., Japan) procedure. Cervical swab specimens were obtained from FSWs to detect gonorrhea, chlamydia, and trichomonas. *Neisseria gonorrhoeae* was identified using standard culture procedure. Chlamydial infection is detected by rapid antigen test (Clearview, Unipath, UK). Trichomoniasis was diagnosed by detecting the motile parasite under a microscope. Genital warts were diagnosed by clinical examination performed by the STI clinician. All STI assays were conducted at the Heng County Anti-Epidemic Station STI Laboratory. Investigators from the China CDC National Resource Center for STD Control provided supervision and quality control for all STI testing and diagnosis. All women who tested positive for any of the 5 STIs were provided with free treatment.

Measures

The primary variables of interest included women's vaginal douching practice, condom use, STI history, and STI testing. For the purposes of statistical analyses, subject responses regarding the frequency of lifetime condom use were grouped into 3 categories: never, sometimes (including occasionally, sometimes, and most times), and always in bivariate analyses. In multivariate analyses, condom use was indicated by a dichotomous variable: women used condoms consistently with their sexual clients or regular partner(s) (1) or not (0). Women's STI was coded as women reported a history of any STI (1) or not (0), and 1 or more STI tests were positive (1) or negative (0). Women douched (water, water mixed with salt, or other commercial products) in the past month was coded (1) or not (0). We defined the variable "risky sexual behaviors" as women had sex during menstruation, anal intercourse, or using alcohol before sex.

In addition, we created 3 continuous variables called "knowledge of STI symptoms," "knowledge of HIV transmission," and "HIV misconception." In the questionnaire, there were 10 items addressing knowledge of STI symptoms, 6 items for HIV transmission routes, and 6 items for misconception of HIV transmission.

STI and HIV knowledge was measured by adding the number of correct answers to 10 questions on STI symptoms and 6 questions on HIV transmission. Conversely, HIV misconception was measured by adding the number of incorrect answers to 6 questions on HIV transmission.

Analysis

The analyses were performed using the SAS 9.1 statistical software package. Bivariate comparisons, using Pearson's χ^2 , Fisher exact test, and Cochran-Mantel-Haenszel χ^2 test, were conducted to assess the association between douching practice and condom use, other contraceptive use, and STI prevalence. Student *t* test was used for comparison of means.

Multivariate analysis was performed, using logistic regression, to assess the association of douching with condom use or STI, controlling for potential confounders including age, ethnicity, education level, hometown, marital status, living arrangement, age at first sex, years as a sex workers, the number of clients per day or per week, sexual risk behaviors, perceived effectiveness of douching, knowledge of STI symptoms, HIV transmission, and correct condom use. These models included potential confounders that were associated with vaginal douching, condom use, and STI in bivariate analysis ($P < 0.10$). The dependent variable indicated whether women used condoms consistently with their clients or regular partner(s) and whether women reported a history of any STI or had a positive STI test.

Results

Individual Characteristics

Data on 454 FSWs were collected between March and May 2004. Specifically, 380 women were recruited from 34 restaurant-type establishments, and 74 from 23 hair salons, hair-washing rooms, or massage parlors in the 3 geographic locations. The women averaged 23.5 (SD = 5.1) years of age and had 5.7 (SD = 3.3) years of formal schooling. Approximately 60% of the women received no more than primary school education. More than half of the women were Han ethnicity, and Zhuang ethnicity constituted about one third of the sample. Three quarters of the women lived with other FSWs, while in H County, 14% women lived alone and 12% lived with their boyfriend, family members, or other relatives. Most (80%) of the women grew up in rural areas. Forty percent of the women were married. The women worked as sex workers for an average of 12.2 months. The women had their first sexual experience at a mean age of 18.6 years. On average, the women had 2 sexual clients per week and 1.2

maximum clients per day. Two thirds of the women reported having a regular sexual partner. About 7% of the women had sex with clients during menstruation, and 2% engaged in anal sex. Nearly 30% reported having had sex with their clients after drinking alcohol. About 20% women said they had contracted at least 1 STI. Of the 454 women, 293 (64.7%) had a history of vaginal douching after having sex with their clients. Women had limited knowledge on STI symptoms, and misconceptions on HIV transmission were common. However, most women knew the correct use of a condom. Thirty-seven percent of the women believed that douching after sex can prevent STI/HIV (Table 1).

Demographic characteristics, sexual behavior, knowledge on STI symptoms, HIV transmission and condom use, and misconceptions of HIV transmission were compared between douching and nondouching women in Table 1. A distinction is made with regard to douching after sex with clients and douching after sex with regular partners. There was no association of douching with age, education, hometown, marital status, and duration of prostitution. Douching women had their first sexual experience at a younger age than nondouching women and were more likely to live with other FSWs and had significantly more sexual clients per day or per week. Douching women used alcohol before having sex with their clients more frequently and were more likely to report a history of STI. Nondouching women were less likely to believe that vaginal douching could prevent STI/HIV. When analysis was conducted among 308 FSWs having regular partner(s), the results were similar to that with the total of 454 FSWs, with the exception of the number of clients (Table 1).

Douching and Contraceptive Use

Of 454 FSWs interviewed, 68 women (15%) reported always using condoms with their clients, 299 (66%) sometimes using, and 86 (19%) never using a condom. One quarter of the women had used condoms consistently in last 3 sexual intercourses, while 33% not used them and 43% used them on 1 or 2 occurrences. For other contraceptive methods, 14% of the women used oral contraceptive pills, 13% used IUDs, and 12% and 11% of the women reported having used withdrawal and rhythm respectively. For women who had regular partner(s), only 8% of them used condoms consistently, and 14% had always used condoms in the last 3 sexual intercourses (Table 2).

As shown in Table 2, fewer douching women consistently used condoms with their clients or regular partner(s) compared with their counterparts, although the association between condom use and vaginal douching was only significant with regular partners. In addition, douching women were more likely to have used nonbarrier contraception (e.g., withdrawal or rhythm) with their clients or regular partner(s) relative to nondouching women.

In multivariate analysis, controlling for other variables associated with condom use in this study, vaginal douching was significantly associated with reduced rates of consistent condom use. Douching FSWs were less likely than nondouching FSWs to use condoms consistently either with their clients or regular partner(s). Compared with nondouching women, the adjusted odds ratio of douching women is 0.31 (95% CI, 0.17–0.60) and 0.22 (95% CI, 0.07–0.63) for clients and regular partner(s), respectively. In addition, ethnicity, duration of prostitution, and HIV misconception were significantly associated with consistent condom use with clients. Ethnic minority status (including Zhuang, Tong, Yao, etc.), longer duration of engagement in commercial sex, and higher level of misconception on HIV transmission were associated with less consistent use of condoms with clients (Table 3).

Douching and STI

Of 454 women in the study, 88 (19.4%) women reported a history of any STI. The prevalence of self-reported gonorrhea was 5.3%, trichomonas 5.1%, genital warts 2.9%, nongonococcal

urethritis (NGU) 1.6%, syphilis 0.4%. In addition, 6.6% of women did not specifically report what type of STI they had contracted. Of 410 women who were tested for 5 STIs, 41.5% were positive with at least 1 of the 5 STIs. Rates of STIs among this group of women were found to be 18.9% with chlamydia, 16.4% with gonorrhea, 8.5% with syphilis, 7.1% with trichomonas, and 1.7% with genital warts (Table 4).

Both self-reported history of STI and current STI at the time of screening stratified by douching practice are shown in Table 4. Twenty-two percent of the women who douched reported a history of any STI, significantly higher than the women who did not douche (14%). A history of gonorrhea was nearly 3 times more prevalent among douching women than nondouching women. About 26% of the douching women with regular partner(s) said they had contracted at least 1 STI, and 18% of the nondouching women reported such experience, although the difference failed to achieve statistical significance. There was no significant difference in current STI between women who douched and women who did not.

Multivariate logistic regression analysis indicates that vaginal douching was significantly associated with self-reported history of STI (OR = 1.95, 95% CI = 1.01–3.79) but not associated with current STI (OR = 0.95, 95% CI = 0.59–1.56). In addition, the results of the logistic regression analysis suggest that living arrangement, duration of prostitution, and risky sexual behaviors (i.e., anal intercourse, sex during menstruation, or under the influence of alcohol) were significantly associated with history of any STI. Women who had a longer duration of sex work, engaged in risky sexual behaviors, and lived alone were more likely to report a history of STI. Whereas vaginal douching was not associated with current STI, women who grew up in the urban area, who had limited knowledge and high misconceptions regarding HIV transmission, were more likely to have a current STI (Table 5).

Discussion

The current study indicates that vaginal douching is a common practice among FSWs in China. The practice did not differ by most of the individual characteristics and sexual behaviors except that more women having sex with clients under the influence of alcohol or having a history of STI reported douching.

One important finding in the current study is that women who douched were less likely to report consistent use of condom, which is inconsistent with a study by Fonck and colleagues⁸ among FSWs in Nairobi, Kenya. They found that women who reported douching were more likely to report using condoms all the time. A high proportion of the women in our study cleaned the vagina after having sex with their clients, possibly because they consider douching as a means of pregnancy or STI/HIV prevention, so they perceived no need for additional protection (e.g., condoms).

Data in the current study suggest that FSWs with a history of STI were more likely to report douching than FSWs without a history of STI. One possible reason was that those women with a history of STI might start douching as one means to prevent further (or repeated) infection. The finding that over one third of women believed the douching prevents STI/HIV supports this hypothesis. Another possibility was that douching women might expose themselves to a higher risk of STI. However, our data regarding the current STI did not support the later speculation. Further study, with a prospective design, is needed to determine a causative relationship between douching and STI.

The current study did not find a significant relationship between douching and current STI, which is consistent with the finding by Fonck and colleagues.⁸ This result might suggest that vaginal douching did not prevent STI, even though nearly half of the douching women believed it could. The prevalence of STIs among this population of women was high. The rates of

chlamydia and gonorrhea in the current study (18.9% and 16.4%) were similar to findings from other studies conducted in China.^{21,22} Because chlamydia and gonorrhea have been reported to facilitate human immunodeficiency virus transmission,²³ these high rates suggest FSWs in China are at high risk for HIV infection.

The rates of women's self-reported history of STI were lower than those of current STI tests. There were several possible reasons for this discrepancy. First, women might not know they had been infected with a STI as many STIs are asymptomatic. In addition, women might underreport their history of STI because of the social stigma associated with it. Further, women might experience STI symptoms but they were not aware of the significance of these symptoms.

There are potential limitations in this study. First, 32.9% of eligible entertainment establishments and 21.9% of FSWs refused to participate in this study. The refusal rates for establishments and the individuals were both relatively high. Some owners/managers or FSWs might choose not to participate because of the legal implications of commercial sex in China. Another recent study regarding commercial sex in China also reported a high refusal rate (e.g., 50%) of establishments.²⁴ Second, because the original study was not designed to study douching, some detailed information such as the frequency of douching and douching agents were not collected in our study. Third, the behavioral data were collected through self-report. Thus, it might be subject to self-reporting bias. Finally, some of the STI testing procedure (e.g., chlamydia testing) we employed may have relatively low sensitivity and specificity. However, the selection of the procedures was determined largely based on availability of technology and resource in the local site (i.e., county STI laboratory).

Given the preponderance of evidence that suggests an association between vaginal douching and adverse reproductive health outcomes and the prevalent douching practice that exposes FSWs to a high risk for STI/HIV, medical professional and public health workers should correct women's misconception of effectiveness of douching and discourage them from douching through educational and prevention activities. HIV/STI prevention intervention efforts should focus on promotion of awareness of their risk of HIV/STI and consistent condom use. Women must be educated about the health risks associated with vaginal douching.

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TABLE 1
Individual Characteristics of Female Sex Workers, by Their Practice of Vaginal Douching With Clients and Regular Partner(s)

Characteristics	Douching After Sex With Clients (%)		Douching After Sex With Regular Partner(s) (%)		
	Overall	No	Yes	No	Yes
N	453 [*]	160	293	117	191
Mean age (years)	23.5	23.4	23.5	24.7	24.4
Ethnicity [†]					
Han	54.5	61.8	50.7 ^a	65.8	58.3
Zhuang	31.8	28.7	33.3	27.4	32.6
Other (Tong, Yao, etc.)	13.7	9.5	16.0	6.8	9.1
Schooling (years)					
0–6	58.2	53.8	60.8	49.6	55.0
7–9	34.8	40.0	31.7	41.0	37.2
10–12	7.1	6.2	7.5	9.4	7.9
Living arrangement [‡]					
Alone	14.1	14.5	13.7 ^b	18.1	14.1 ^b
With other FSWs	74.2	64.1	79.9	59.5	74.9
With family member/relatives	11.7	21.4	6.5	22.4	11.0
Hometown					
Rural	79.6	78.3	80.2	75.7	79.0
County seat	13.4	14.0	13.1	15.6	12.9
Medium/large city	7.0	7.7	6.7	8.7	8.1
Marital status					
Single without boyfriend	35.6	37.3	34.8	20.5	20.9
Single with boyfriend	24.3	20.9	25.9	26.1	30.4
Married	40.0	41.8	39.3	53.9	48.7
Mean age at first sex (years)	18.6	19.0	18.4 ^b	19.3	18.6 ^b
Mean duration of prostitution (months)	12.2	12.4	12.1	13.4	14.3
Mean number of maximum sex partners per day	1.2	1.1	1.3 ^b	1.2	1.3
Mean number of sex partners per week	2.0	1.8	2.1 ^a	1.8	2.0
Having regular partner(s) (%)	68.4	70.9	66.9	—	—
Sex during menstruation	6.7	5.7	7.2	8.6	7.4
Anal intercourse	2.0	0.6	2.7	0.9	3.7
Alcohol use before having sex	29.4	21.4	33.8 ^b	18.8	36.8 ^c
History of STI	19.4	14.4	22.3 ^a	18.0	25.6
Knowledge of STI symptoms (0–10)	3.3	2.9	3.5 ^a	3.5	3.8
Knowledge of HIV transmission (0–6)	4.4	4.2	4.5	4.3	4.6
HIV misconception (0–6)	2.6	2.4	2.7	2.4	2.7
Knowledge of condom use (0–6)	4.9	4.8	4.9	4.8	5.0
Perceived effectiveness of douching	37.3	20.0	46.8 ^c	18.8	45.6 ^c

^{*} One woman had missing value on vaginal douching;

^a $P < 0.05$;

^b $P < 0.01$;

^c $P < 0.001$.

[†] Difference between douching with clients was significant ($P < 0.05$).

† Differences between douching with clients and regular partner were significant ($P < 0.01$ for both).

TABLE 2

Douching and Contraceptive Use With Clients and Regular Partners

Contraceptive use	With Clients			With Regular Partner(s)		
	Overall	Nondouching	Douching	Overall	Nondouching	Douching
Condom use (n)*	(453)	(160)	(293)	(308)	(117)	(191)
Never	19.0	22.0	17.4 [†]	42.2	38.5	44.5 ^{†a}
Sometimes	65.9	53.5	72.7	49.4	46.2	51.3
Always	15.0	24.5	9.9	8.4	15.4	4.2
Condom use in last 3 sexual acts (times) [‡]						
0	33.1	30.6	34.5 [†]	58.1	51.3	62.3 ^{†a}
1-2	42.9	40.8	44.0	27.9	29.1	27.2
3	24.0	28.7	21.5	14.0	19.7	10.5
Other contraceptive use						
Use of oral contraceptives	13.7	11.3	15.0	16.6	18.0	15.7
Use of withdrawal	11.9	5.6	15.4 ^a	16.2	10.3	19.9 ^a
Use of rhythm	10.6	6.3	13.0 ^a	15.9	9.4	19.9 ^a
Use of IUD	13.0	13.1	13.0	19.2	26.5	14.7 ^a

* Difference between douching with regular partner was significant ($P < 0.05$).

[†] CMH χ^2 test.

^a $P < 0.05$.

[‡] Difference between douching with regular partner was significant ($P < 0.05$).

TABLE 3

Odds Ratios From Logistic Regression Analysis Showing Impact of Douching on Condom Use With Clients and Regular Partner(s), Among a Group of Female Sex Workers in China

Characteristics	Consistent Condom Use With Clients (N = 421)		Consistent Condom Use With Regular Partner (N = 287)	
	OR	95%CI	OR	95%CI
Age (years)	1.03	0.94~1.14	0.94	0.80~1.11
Ethnicity				
Han	1.00		1.00	
Other (Zhuang, Jingpo, Tong, etc.)	0.42	0.21~0.85	0.34	0.10~1.13
Education				
Primary school or below	1.00		1.00	
High school	0.94	0.49~1.82	1.36	0.46~4.07
Hometown				
Rural	1.00		1.00	
Urban (county seat, city)	1.59	0.81~3.10	1.85	0.66~5.17
Marital status				
Single	1.00		1.00	
Married	0.59	0.23~1.50	1.29	0.28~5.85
Living arrangement				
Alone	1.00		1.00	
With other FSWs	1.11	0.48~2.61	2.76	0.50~15.18
With family member/relatives	1.50	0.51~4.39	3.27	0.51~21.00
Age at first sex (years)	1.11	0.94~1.31	1.20	0.93~1.54
Duration of prostitution (years)	0.57	0.38~0.86	0.64	0.33~1.24
Number of sex partners per day	0.76	0.38~1.54	0.84	0.25~2.84
Number of sex partners per week	1.09	0.90~1.32	0.97	0.62~1.51
Risky sexual behaviors				
No	1.00		1.00	
Yes	0.67	0.33~1.38	0.90	0.27~3.01
Perceived effectiveness of douching				
No	1.00		1.00	
Yes	1.56	0.80~3.03	0.99	0.30~3.26
Knowledge of STI symptoms	1.07	0.94~1.20	1.07	0.88~1.30
Knowledge of HIV transmission	1.09	0.91~1.29	1.07	0.78~1.46
HIV misconception	0.82	0.68~0.98	1.04	0.78~1.37
Vaginal Douching				
No	1.00		1.00	
Yes	0.31	0.17~0.60	0.22	0.07~0.63

* Risk sexual behaviors include having sex during menstruation, anal intercourse and using alcohol before sex. FSW = female sex worker; HIV = human immunodeficiency virus; STI = sexually transmitted infection.

TABLE 4

Douching and STI Among Female Sex Workers

STI	With Clients			With Regular Partner(s)		
	Overall	Nondouching	Douching	Overall	Nondouching	Douching
History of STI (n)	(453)	(160)	(293)	(308)	(117)	(191)
Any STI	19.4	14.4	22.2 ^a	22.7	18.0	25.7
Syphilis	0.4	0.0	0.7 [†]	0.7	0.9	0.5 [†]
Gonorrhea	5.3	2.5	6.8 ^a	5.8	4.3	6.8
Trichomonas	5.1	3.8	5.8	6.2	5.1	6.8
Genital warts	2.9	1.3	3.8 [†]	3.9	1.7	5.2 [†]
NGU	1.6	0.0	2.4	1.6	0.9	2.1 [†]
Do not know	6.6	7.5	6.1	7.5	6.8	7.9
Current STI (n)	(410)	(146)	(264)	(284)	(105)	(179)
Any STI	41.5	39.7	42.4	39.8	35.2	42.5
Syphilis	8.5	7.7	9.0	9.0	9.9	8.5
Gonorrhea	16.4	17.5	15.8	15.5	16.8	14.8
Chlamydia	18.9	14.7	21.3	18.1	12.9	21.0
Trichomonas	7.1	4.9	8.3	6.9	5.0	8.0
Genital warts	1.7	1.4	1.9	1.1	1.0	1.1 [†]

* Fisher exact test; NGU = nongonococcal urethritis; STI, sexually transmitted infection;

^a $P < 0.05$.

TABLE 5

Odds Ratios From Logistic Regression Analysis Showing Impact of Douching on STI Among a Group of Female Sex Worker in China

Characteristics	Ever Had STI (N = 421)		Current STI (N = 380)	
	OR	95% CI	OR	95% CI
Age (years)	1.03	0.95~1.13	1.03	0.95~1.11
Ethnicity				
Han	1.00		1.00	
Zhuang (Jingpo, Tong, etc.)	0.84	0.46~1.54	0.76	0.47~1.24
Education				
Primary school or below	1.00		1.00	
High school	1.36	0.75~2.46	0.73	0.45~1.18
Hometown				
Rural	1.00		1.00	
Urban (county seat, city)	0.89	0.45~1.75	2.09	1.21~3.62
Marital status				
Single	1.00		1.00	
Married	0.77	0.32~1.84	0.67	0.33~1.36
Living arrangement				
Alone	1.00		1.00	
With other FSWs	0.45	0.22~0.94	1.21	0.64~2.29
With family member/relatives	0.80	0.31~2.12	1.19	0.51~2.78
Age at first sex (years)	0.88	0.74~1.04	0.92	0.81~1.06
Duration of prostitution (years)	1.64	1.26~2.13	0.85	0.67~1.08
Number of sex partners per day	0.83	0.49~1.40	0.99	0.64~1.54
Number of sex partners per week	1.14	0.96~1.35	1.09	0.93~1.27
Sexual risk behaviors*				
No	1.00		1.00	
Yes	1.98	1.12~3.49	1.24	0.77~1.99
Perceived effectiveness of douching				
No	1.00		1.00	
Yes	0.80	0.45~1.42	1.27	0.79~2.03
Knowledge of STI symptoms	1.15	1.03~1.29	0.96	0.88~1.05
Knowledge of HIV transmission	1.01	0.86~1.20	0.84	0.74~0.95
HIV misconception	0.99	0.85~1.15	1.13	1.00~1.29
Vaginal douching				
No	1.00		1.00	
Yes	1.95	1.01~3.79	0.95	0.59~1.56

* Sexual risk behaviors include having sex during menstruation, anal intercourse, and using alcohol before sex. FSW = female sex worker; HIV = human immunodeficiency virus; STI = sexually transmitted infection.