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## Sexually Transmitted Infections and Risk Factors for Gonorrhea and Chlamydia in Female Sex Workers in Soc Trang, Vietnam

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### Abstract

**Goal**—To determine the prevalence of selected STIs and correlates of chlamydia (CT) and gonorrhea (GC) infection among (FSWs) in Soc Trang province, Vietnam.

**Study Design**—Four hundred and six FSWs in Soc Trang province participated in a cross-sectional study between May and August, 2003. The study subjects were interviewed to obtain information about socio-demographic and behavioral characteristics and gynecologic and STI history, using a standardized interview. They underwent a physical examination during which cervical swabs were collected for GC and CT testing by polymerase chain reaction (PCR). Vaginal wet mount microscopy was performed to detect candidiasis and trichomoniasis (TV), and blood was drawn for testing for syphilis using rapid plasma reagin (RPR)+ *Treponema pallidum* hemagglutination assay (TPHA). Univariate and multivariate analyses were used to assess the associations of GC, CT, and GC/CT with selected variables.

**Results**—Prevalences were 14.9% for GC, 48.4% for CT, 54.9% for GC/CT, 3.8% for syphilis, 8.9% for trichomoniasis, and 12.2% for candidiasis. Increased risk for CT was associated with sex work for more than 6 months (aOR = 2.40, 95% CI: 0.99–5.82), receiving \$4 US or less per sexual transaction (aOR = 1.91, 95% CI 1.13–3.23), and ever having terminated a pregnancy (aOR = 1.68, 95% CI 1.00–2.82). Reduced likelihood of CT was associated with older age (aOR = 0.96, 95% CI: 0.93–1.00) and ever having douched in the past month (aOR = 0.60, 95% CI 0.36–1.00). Only ever douching in the past month was associated with decreased risk for GC (aOR = 0.47, 95% CI 0.25–0.87). Higher likelihood of GC/CT was associated with having more than 4 clients per month (OR = 2.35, 95% CI 1.02–5.41) and receiving \$4 US or less per sexual transaction (aOR = 1.74, 95% CI 1.04–2.93).

**Conclusions**—The prevalence of GC/CT is high amongst FSWs in Soc Trang. Therefore, periodic presumptive treatment (PPT) for cervicitis, together with World Health Organization-recommended periodic syndromic sexually transmitted disease management, for FSWs and further interventions should be considered, and a 100% condom use program should be promptly implemented. The existing STI health education program for FSWs should be strengthened, with special consideration of the correlates observed in this study.

Sexually transmitted infections (STIs) are a major health problem world-wide, especially in developing countries. STIs with or without genital ulcers have been shown to increase the risk for human immunodeficiency virus (HIV) transmission.<sup>1,2</sup> STI surveillance has been neglected, resulting in insufficient data on the global prevalence of STIs. Nonetheless, the World Health Organization (WHO) estimated that there are approximately 340 million new cases each year of syphilis, gonorrhea (GC), chlamydia (CT), and trichomoniasis (TV) occurring in men and women aged 15 to 49 years. STIs continue to be a major public health concern in many countries.<sup>3</sup>

In Vietnam, there were nearly 140,000 STI cases reported in 2005, but it was estimated that there were actually a million new STI cases.<sup>4</sup> One study that collected urine and blood from female sex workers (FSWs) in 5 border provinces of Vietnam reported that the prevalences of syphilis, GC, CT, and GC/CT were 10.7%, 10.7%, 11.9%, and 19.9%, respectively.<sup>5</sup> A high percentage (50%) of Quinolone-resistant *Neisseria gonorrhoeae* was also found in 2003.<sup>6</sup>

STI management continues to be one of the most important components of successful HIV/AIDS control programs, especially in areas where STIs are highly prevalent.<sup>7,8</sup> An important target group is FSWs, because this high-risk group can transmit STIs to the community through their clients. However, because sex work is stigmatized, considered a “social evil”, and prohibited in Vietnam,<sup>9</sup> sex workers often seek consultation and self-treatment in pharmacies rather than from private doctors, government hospitals, or clinics when they have reproductive health problems. Underdiagnosis and undertreatment therefore occur among FSWs, forcing these women to live with STIs and to be at increased risk for both becoming HIV-infected and transmitting their infections to their clients and other sexual partners.

Soc Trang is a typically poor Mekong Delta province in southern Vietnam. Many women augment their income by selling sex. Sex workers in this province also come from many other Mekong Delta provinces. However, recently, a few projects have been implemented in Soc Trang to reduce transmission of HIV in FSWs. STI prevention is a key component of these projects.

Before preventive measures were implemented in Soc Trang to address STIs in FSWs, a study on selected STIs in FSWs was conducted. This study provides a profile of STIs and risk factors among FSWs in Soc Trang, which may be relevant for other Mekong Delta provinces in Vietnam.

## Methods

Initially, a process of identifying local sites (“hot spots”) where FSWs could be found and the numbers of FSWs in each hot spot was conducted by meeting with various local provincial and district sector officials, including health workers, police, the women’s union, the Department of Labor, Invalid and Social Affairs, and peer educators.

Using information from mapping, 406 FSWs in Soc Trang province were identified and invited to participate in a cross-sectional study between May and August 2003. It was not feasible to do systematic random sampling to recruit subjects in each hot spot, because no lists of FSWs were available. The interviewers obtained agreement from the owners of establishments and FSWs before they could enroll the subjects needed for the study by convenience sampling. Therefore, the number of refusals (FSWs who avoided meeting with the interviewers) was not known. Informed verbal consent was obtained from all subjects.

Study subjects were classified as either direct FSWs (earning money from selling sex only) working on the streets, in parks, at bus stops, on boats, on ferry piers, in brothels, at small cafés

and at guesthouses; or indirect FSWs who sell sex in addition to their work in hotels, restaurants, massage parlors, karaoke lounges, bars, and barbershops.

The sample size at baseline was calculated using the STATCAL component of EPI-INFO 6.04d (CDC, USA, & WHO, 2001) with the following parameters: estimated prevalence of outcome of interest (P for GC: 10%, P for CT: 30%), confidence interval ( $1-\alpha = 95\%$ ), precision ( $d = 5\%$ ), and an additional 10% for refusal, damage, or loss of specimens, etc. The required sample size was estimated to be 356, but was rounded up to 400 subjects.

Using a standard guide in Vietnamese, subjects were interviewed by a peer educator about selected sociodemographic characteristics, sexual behavior, healthcare-seeking behavior, and history of STIs. After being interviewed, subjects were accompanied by peer educators to the STI examination room of the Center for Social Diseases (CSD) of Soc Trang province, where they were physically examined (including speculum examination) by physicians.

Samples of vaginal fluid were taken for laboratory examination to identify TV and candidiasis. Samples of cervical fluid were tested for the presence of GC and CT. Blood was drawn for detection of syphilis.

Diagnoses were made, taking into consideration the results of the interview, risk assessment, and physical examination. Free treatment was provided, using the WHO sexually transmitted disease (STD) case management guidelines.<sup>10</sup> FSWs were also given STD/HIV education and counseling.

### Laboratory Methods

Blood samples were sent to the Provincial Center for Preventive Medicine of Soc Trang (adjacent to the CSD) for detection of syphilis with rapid plasma reagin (RPR; Bio-Rad; 2003). Positive sera were first stored at  $-20^{\circ}\text{C}$ , then batched and sent to the Pasteur Institute in Ho Chi Minh City (PIHCM) every 2 weeks for confirmation with the *Treponema pallidum* hemagglutination assay (TPHA; Bio-Rad, 2003) for syphilis.

The presence of candidiasis and *Trichomonas vaginalis* were detected by immediate direct microscopy of a saline wet preparation at the CSD. Cervical fluid was drawn with a tampon placed into the cervical canal. The tampons were placed into a tube with physiological sodium chloride (0.9%), stored at  $-20^{\circ}\text{C}$ , then transferred in a cool box to the PIHCM at 2-week intervals. Cervical specimens were tested for *Neisseria gonorrhoea* (GC) and *Chlamydia trachomatis* (CT) by polymerase chain reaction (PCR; AM-PLICOR, Roche, 2003) at the Molecular Biology Laboratory of PIHCM, which is part of the international Pasteur network system for quality control. Gonorrhoea-positive specimens were confirmed with an in-house method using specific primers to amplify a 273-bp fragment from the plasmid-encoded cpxB region that is part of the 390-bp sequence on the same plasmid.<sup>11,12</sup> Detection was performed by hybridization, using a digoxigenin probe. Inhibited samples underwent a repeated freeze-thaw procedure, DNA purification using the QIAamp DNA mini kit (Qiagen) and in-house PCR testing.

The study protocol, questionnaire, and informed consent document were reviewed and approved by the Pasteur Institute, Ho Chi Minh City and the AIDS Standing Bureau of the Soc Trang province (now called the Center for HIV/AIDS Prevention and Control of Soc Trang province).

### Data Analysis

Data were entered into Epi-info version 6.04d (CDC, Atlanta, GA) and analyzed by STATA version 9.2 (Texas, 2006). Frequency distributions and percentages were used to describe

qualitative variables; mean, median, and variance were estimated for continuous quantitative variables. Odds ratios (with 95% confidence intervals) were used to measure the magnitude of the association between selected sociodemographic, sexual, behavioral, and gynecologic and STI history variables with a positive test result for GC, CT, and GC and/or CT (GC/CT). In univariate analysis, chi-square and Fisher exact tests were used to identify potential variables ( $P$ -value  $<0.25$ ) for inclusion in multivariate logistic regression analyses. Any variables known to have biologic plausibility for increasing the risk of GC, CT, or GC/CT infection were also included in the multivariate models.

Multivariate logistic regression analysis with backward elimination ( $P = 0.05$ ), together with the log likelihood ratio test, was performed to determine the relationship between GC, CT, GC/CT and selected variables of interest, using STATA version 9.2.

## Results

Four hundred and six FSWs participated in the study, of whom 97.3% (395/406) agreed to undergo a gynecological examination and give specimens for testing. The major reasons for refusing the physical examination were menstruation, fear of specimen collection, and fear of going to a hospital.

More than 80% of the subjects were of Kinh ethnicity, which is the major ethnicity in Vietnam (Table 1). The majority of FSWs were between 20 and 39 years of age. Almost half came from other provinces, and slightly less than 19% had lived in Soc Trang for less than 6 months. Nearly 92% had been sex workers for more than 6 months, and 2.2% had engaged in sex work in Cambodia. More than 24% were cohabiting with either husbands or live-in partners. The majority (64.3%) had little education (primary school or less). Half of the subjects had an average income of \$100 US or less per month.

Almost half of the study subjects were direct sex workers, and more than half had more than 16 clients per month. Less than 6% had had their first sexual debut at 15 years of age or younger, and 10% had first sex with clients or were forced. Only 2.7% had engaged in anal sex. Although 91.4% had ever used condoms, 77% reported that they consistently used condoms with their clients (either irregular or regular) in the past month. Consistent condom use with nonpaying regular partners (27.6%) and cohabiting partners (5.1%) was low. Slightly more than 9% had ever used drugs.

Almost all (94.1%) had used at least 1 contraceptive method; 87.6% had used condoms as one of their contraceptive methods. Withdrawal, an intrauterine device, oral contraceptives, and douching were used by 33.7%, 22.6%, 8.2%, and 2.1%, respectively. Despite sex work and contraceptive use, half of them had been pregnant, and nearly 24% (or half of those ever pregnant) had terminated a pregnancy. Only 71.9% had ever heard about STIs, and less than half knew of at least 1 STI-related symptom. One-fourth reported acquiring an STI in the past (diagnosed by a physician, pharmacist or nurse), and more than 80% had recently had at least 1 STI-related symptom. Nearly 86% had sought treatment for vaginal discharge. The majority of them (73.4%) visited a pharmacy for treatment. Less than half strictly followed the treatment instructions.

Nearly one-third had used antibiotics to treat STI-related symptoms in the past month, and the majority (78.3%) had been prescribed by a pharmacy. Self-prescription (antibiotics bought by FSWs themselves) was high (41.9%). Douching was also common in this high-risk population. Only 24.4% had not douched in the past month (Table 1).

The prevalences of laboratory-confirmed STIs were GC, 14.9%; CT, 48.4%; cervical infection with either GC and/or CT, 54.9%; syphilis, 3.8%; and TV, 8.9% (Table 2). In addition, 12.2%

of women had candidiasis. The STI prevalences were higher amongst direct than amongst indirect sex workers for CT (53.0% vs. 44.3%;  $P = 0.08$ ) and syphilis (7.6% vs. 0.5%;  $P < 0.001$ ).

In univariate analysis, sex work for more than 6 months (CT OR = 2.2, 95% CI 1.01–4.78; GC/CT OR = 2.18, 95% CI 1.03–4.59), more than 4 clients per month (CT OR = 2.11, 95% CI 1.00–4.47; GC/CT OR = 2.46, 95% CI 1.18–5.12), and receiving \$4 US or less per sexual transaction (CT OR = 2.20, 95% CI 1.01–4.78; GC/CT OR = 2.18, 95% CI 1.03–4.59) were associated with being test-positive for CT and GC/CT. Ever having douched in the past month was associated with reduced likelihood of CT (OR = 0.6, 95% CI 0.38–0.96) and GC (OR = 0.51, 95% CI 0.28–0.92).

Table 3 presents the adjusted correlates for GC, CT, and GC/CT, using multivariate analysis. Increasing age was associated with a lower prevalence of CT (aOR = 0.96, 95% CI 0.93–1.00); when age was increased by 1 year, the odds of CT were lowered 1.04-fold. Ever having douched in the past month (aOR = 0.60, 95% CI 0.36–1.00) was also associated with a lower likelihood for CT. Higher likelihood of CT was associated with sex work for a duration of more than 6 months (aOR = 2.40, 95% CI 0.99–5.82), receiving \$4 US or less per sexual transaction (aOR = 1.91, 95% CI 1.13–3.23), and ever having terminated a pregnancy (aOR = 1.68, 95% CI 1.00–2.82). Low education (aOR = 1.52, 95% CI 0.96–2.42) and condom use (aOR = 0.30, 95% CI 0.08–1.10) were only marginally associated with CT.

Reduced likelihood of GC (aOR = 0.47, 95% CI 0.25–0.87) was only associated with having douched in the past month. An increased risk for GC/CT was associated with having more than 4 clients per month (aOR = 2.35, 95% CI 1.02–5.41) and receiving \$4 US or less per sexual transaction (aOR = 1.74, 95% CI 1.04–2.93).

## Discussion

A very high prevalence of cervical infection with GC and/or CT (54.9%) was observed in this population. Both GC (14.9%) and CT (48.4%) were much higher than reported by another study conducted in the 5 provinces of Vietnam bordering China, Laos and Cambodia, 3 provinces of which are in southern Vietnam (GC ranged from 5.7%–9.4%, and CT from 7.3%–17.3%). The testing had been carried out in the same laboratory with the same personnel and PCR test kits.<sup>5</sup> Cervical specimens obtained during speculum examination were used in the current study, which may have resulted in higher sensitivity and specificity for diagnosis, especially GC, using the same PCR test kits. Higher sensitivity and specificity were also reported for cervical specimens in a study by Crotchfelt et al.<sup>13</sup>

The GC prevalence in this study was lower than that found in FSWs in parts of China (Yunnan, 37.8%; Guangxi, 16.4%),<sup>14,15</sup> and in Kupan, Indonesia (30.9%).<sup>16</sup> However, CT was higher in our study than reported in studies in Kupan, Indonesia (23.9%),<sup>16</sup> Laos (26%),<sup>17</sup> and Cambodia (indirect sex workers, 14%),<sup>18</sup> but lower than in Yunnan, China (58.6%).<sup>15</sup>

The prevalence of syphilis was low in Soc Trang (3.8%) compared with several other places in southern Vietnam (ranging from 10.7%–13.4%), as well as in Indonesia (12.9%) and China (8.5%–9.5%).<sup>5,14–16</sup> Using the same methodology, wet mount preparation, the prevalence of TV in the current study (8.9%) was higher than in Indonesia (4.9%),<sup>16</sup> Bangladesh (7.5%),<sup>19</sup> Guangxi, China (7.1%),<sup>14</sup> and much lower than in Mongolia (28%).<sup>20</sup>

Younger age was considered an important risk factor for CT and/or GC in several studies, as well as by the guidelines for STI management of WHO.<sup>10,16,19,21</sup> In our study, we found that the younger the subject, the higher the prevalence of CT. Younger age could reflect more sexual activity, more partners, and possibly less knowledge and experience with STI prevention,

including negotiating condom use. Cervical ectopy and weaker immune response could also place younger women at increased risk for CT infection.<sup>21</sup> Moreover, older sex workers may have developed acquired immunity associated with earlier CT infection.<sup>22</sup>

Those who had engaged in sex work for more than 6 months were at increased risk for CT. This probably reflected more lifetime exposures with different clients. More than 4 clients per month was found to be associated with a higher prevalence of GC/CT, although the numbers of clients might be underreported in this study. Low payment for single sexual transactions, which correlated with increased risk for CT and GC/CT, could reflect several social aspects, such as more clients and being a low-class sex worker (low income, low education), which could result in less information about STI prevention and poor skills in negotiating condom use with clients. Low payment for sex may also reflect higher-risk clients.

A high proportion of the subjects had terminated a pregnancy, and they were found to be at higher risk for CT infection. This is possibly due to unsafe sexual behaviors such as less condom use, making these persons more vulnerable to STIs, including CT.

Surprisingly, douching was associated with a lower prevalence of CT and GC in this study. Several other studies in different populations have reported that douching increases the risk for CT infection among primary care clinic attendees,<sup>23</sup> and is associated with a higher prevalence of STIs in pregnant women<sup>24</sup> and a higher prevalence of GC and CT.<sup>5</sup> However, studies by both Wang<sup>14</sup> and Fonck<sup>25</sup> did not find a significant relationship between douching and current STIs. A 1999–2004 prospective observational study of 1199 American women who were at high risk for acquiring CT and who were followed for up to 4 years found no association between douching and the prevalence of GC and CT.<sup>26</sup>

It is possible that douching is associated with several factors that might not be sufficiently controlled. Douching could reflect an increased awareness and concern for health, including STI prevention, resulting in a lower prevalence of CT and GC in the current study. Studies using a more sophisticated design, such as a cohort study, should be implemented to assess the effect of douching on STIs in women.

Although consistent condom use in this study was fairly high, STI transmission still occurred, probably because only 56% of subjects reporting consistent condom use had actually used condoms properly (defined as using condom from the beginning to the end of intercourse). This could explain the high prevalence of STIs in this group. Use of public STI clinics was limited. Many chose to visit a pharmacy for medications, including antibiotics, probably because they fear stigma, discrimination, and a lack of confidentiality in clinics and hospitals. The quality of care from the pharmacy was probably inadequate. This was supported by a study in Hanoi, Vietnam, where pharmacists usually gave incorrect treatment for STIs; Quinolone was typically prescribed.<sup>27</sup>

This study had several limitations. We do not know the exact number of FSWs in the study area, because there are no lists of FSWs at each sex venue. Interviewers asked the owners of sex venues if they could enroll the number of subjects needed for the study by convenience sampling. Selection bias could have occurred if nonparticipants were different from participants for both prevalence of STIs and specific sociodemographic and behavioral factors. Self-reported risk behaviors such as drug use and number of clients could have been underreported, and consistent condom use overreported. Last but not least, this cross-sectional design could not distinguish temporal relationships between factors of interest and NG/CT infections. The magnitude of the association of interest would be towards null if FSWs had changed their risk behaviors once they knew they had been infected with NG/CT.

The high burden of STIs, with more than half of the subjects infected with GC and/or CT, suggests the need to consider implementing periodic presumptive treatment (PPT) for cervicitis for FSWs through effective STI services, such as free-of-charge mobile STI clinics in Soc Trang. The cost-effectiveness for this initial strategy, followed by WHO-recommended periodic syndromic STD management, including promotion of partner treatment, is high. The primary objective of PPT is to achieve a rapid reduction in the prevalence of GC and CT infections.<sup>28,29</sup> It is also clear that STI clinics need to be made more acceptable to FSWs and their clients in terms of cost (free if possible, at least for FSWs), location, and hours of operation. Moreover, a comprehensive and appropriate intervention includes better HIV/STI health education, counseling and testing, and a condom use promotion program involving both clients and regular partners that includes instruction on correct use. Finally, it is suggested that the sex industry be regulated so that a STI/HIV control program for FSWs requiring periodic examination and treatment can be implemented. Regulation of the sex industry in neighboring Cambodia and Thailand has been very effective.<sup>30</sup>

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TABLE 1

Selected Socio-Demographic Factors, Sexual Behaviors, and Gynecologic and STI History of 406 FSWs in Soc Trang, Vietnam, 2003

Variables	Number	Percent
Socio-demographic factors	406	—
Kinh ethnicity	328	80.8
Age groups (years)		
16–19	61	15.1
20–29	253	62.5
30–39	71	17.5
40+	20	4.9
From another province	181	44.6
Living at study site for ≤6 mo	76	18.7
Engaged in sex work >6 mo	373	91.9
Ever worked in Cambodia	9	2.2
Cohabiting	99	24.4
Low-level education (none or primary school only)	261	64.3
Income (VND/mo)		
Mean	2,024,950	
Median	1,500,000	
Range	400,000–8,000,000	
Direct sex work	192	47.3
Clients/mo Mean	18.4	
Median	16.0	
Range	1.0–81.0	
Sexual behaviors		
Sexual debut at age of ≤15 yr	23	5.7
First sex with clients or forced	40	9.9
Had oral sex	61	15.0
Had anal sex	11	2.7
Ever used condoms	371	91.4
100% condom use with clients	315	77.6
Proper condom use among those who reported 100% condom use with clients	176	55.9
100% condom use with non-paying regular partner	59	27.6
100% condom use with cohabiting partner	5	5.1
Drug use		
Ever heard about recreational drugs	362	89.2
Ever used recreational drugs	37	9.1
Gynecologic history		
Contraceptive use	380	94.1
Condoms	333	87.6
Oral contraceptives	31	8.2
IUD	86	22.6

Variables	Number	Percent
Withdrawal	128	33.7
Vaginal washing	8	2.1
Ever pregnant	204	50.3
Ever terminated pregnancy	97	23.9
Ever had an abortion	30	7.4
Douching in the past month >3 times/mo	132	32.5
1–3 times/mo	175	43.1
None	99	24.4

\* Proper condom use: use condom throughout intercourse.

1USD = 15,000 VND.

**TABLE 2**

History and Prevalence of STIs in 406 FSWs in Soc Trang, Vietnam, 2003

Variables	Number	Percent
STI history	406	—
Ever heard about STIs	292	71.9
Knew of at least one symptom of STIs	183	45.3
Believe sex is safe with a person who looks healthy	28	14.3
Ever had an STI	101	26.0
Recently had at least one STI-related symptom	324	80.2
Sought treatment for vaginal discharge	346	85.9
Ways of managing of vaginal discharge		
Visited a hospital	147	42.5
Visited a private clinic	70	20.2
Visited a pharmacy	254	73.4
Used condoms during sex while infected	66	19.1
Visited traditional medicine doctor	2	0.6
Self treatment	123	35.6
Abstained from sex while infected	9	2.6
Strictly followed the directions of prescriptions	194	48.5
Ever used antibiotics to treat STIs	142	36.8
Used antibiotics in the past month	129	33.4
Sources of antibiotic prescriptions in the past month		
Physician at hospital	53	41.1
Community health station	1	0.8
Private doctor	20	15.5
Pharmacy	101	78.3
Traditional medicine physician	1	0.8
Self prescription	54	41.9
Relatives or friends (not a doctor)	1	0.8
Laboratory-confirmed STI	395	Prevalence (%) and 95% CI
Gonorrhea	59	14.9 (11.6–18.9)
Chlamydia	191	48.4 (43.3–53.4)
Cervical infection with either gonorrhea and/or chlamydia	217	54.9 (49.9–59.9)
Syphilis	15	3.8 (2.2–6.3)
Trichomoniasis	35	8.9 (6.3–12.2)
Candidiasis	48	12.2 (9.2–15.9)

**TABLE 3**  
Adjusted Correlates of Gonorrhea, Chlamydia, and Gonorrhea and/or Chlamydia Among FSWs in Soc Trang, Vietnam

Variables	CT			GC			GC/CT		
	aOR (95% CI)	P	aOR (95% CI)	P	aOR (95% CI)	P	aOR (95% CI)	P	
Age of subjects (1 yr increments)	0.96 (0.93–1.00)	0.05	1.00 (0.95–1.04)	0.88	0.97 (0.941.01)	0.12			
Low-level education	1.52 (0.96–2.42)	0.07	1.22 (0.63–2.36)	0.25	1.39 (0.87–2.21)	0.16			
Cohabiting	1.11 (0.63–1.96)	0.71	0.87 (0.40–1.89)	0.73	1.01 (0.57–1.76)	0.99			
Sexual debut at age of ≤15 yr	1.36 (0.51–3.64)	0.62	2.07 (0.69–6.23)	0.19	1.78 (0.64–4.98)	0.27			
Engaged in direct sex work	1.37 (0.79–2.39)	0.26	0.76 (0.36–1.60)	0.47	1.12 (0.64–1.94)	0.69			
Working as FSW >6 mo	2.40 (0.99–5.82)	0.05	1.83 (0.39–8.53)	0.44	2.05 (0.84–4.98)	0.11			
More than four clients/mo	2.08 (0.88–4.92)	0.10	2.87 (0.63–13.15)	0.18	2.35 (1.02–5.41)	0.04			
Receiving ≤60,000 VND (\$4 U.S.) per sexual transaction	1.91 (1.13–3.23)	0.02	1.17 (0.52–2.59)	0.71	1.74 (1.04–2.93)	0.04			
Ever used condoms	0.30 (0.08–1.10)	0.07	—	—	0.36 (0.10–1.28)	0.12			
≥1 pregnancy termination	1.68 (1.00–2.82)	0.05	1.36 (0.69–2.70)	0.37	1.43 (0.84–2.41)	0.19			
Oral contraceptive use	1.19 (0.49–2.92)	0.70	1.06 (0.37–3.05)	0.92	1.35 (0.54–3.33)	0.52			
Intrauterine device	0.83 (0.48–1.44)	0.51	1.16 (0.57–2.37)	0.68	0.90 (0.52–1.53)	0.69			
Douched at least once in the past month	0.60 (0.36–1.00)	0.05	0.47 (0.25–0.87)	0.02	0.67 (0.39–1.15)	0.15			
Knew of at least one STI symptom	0.81 (0.49–1.32)	0.40	0.71 (0.37–1.38)	0.31	0.80 (0.50–1.27)	0.34			
Ever used recreational drugs	0.55 (0.24–1.26)	0.16	1.58 (0.58–4.29)	0.37	0.62 (0.27–1.42)	0.26			

GC indicates gonorrhea; CT, chlamydia; GC/CT, GC and/or CT; aOR, adjusted odd ratio.