Published in final edited form as:

Sex Health. 2015 March ; 12(1): 39–47. doi:10.1071/SH14101.

Sexual practices, partner concurrency and high rates of sexually transmissible infections among male sex workers in three cities in Vietnam

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Abstract

Background—This paper examines sexual practices, partner concurrency and sexually transmissible infections (STI)/HIV infection among male sex workers (MSWs) in Vietnam.

Methods—Six hundred and fifty-four MSWs, aged 16–35 years, were recruited in Hanoi, Nha Trang and Ho Chi Minh City between 2009 and 2011. Survey measures included demographic characteristics, drug use, types of sexual partners and sexual practices. Subjects were screened for STIs, including HIV.

Results—MSWs in Ho Chi Minh City (33%) were more likely than those from the other two sites to be current users of one or more types of illegal drugs ($P < 0.001$). MSWs with both male and female elective partners (compared with other partnership types) were more likely to have anal sex with male client partners ($P < 0.001$), elective male partners ($P = 0.045$) and elective female partners ($P = 0.025$). At last sex with a male client partner, only 30% used a condom during anal intercourse. At last sex with an elective female partner, only 31% used a condom during vaginal sex and only 3% during anal sex. Although rates of HIV are low (4%), other STIs are high, including chlamydia (17%), gonorrhoea (29%) and human papillomavirus (33%). Most (57.3%) have never been tested for HIV and only 17% have ever disclosed to a healthcare provider that they have sex with men.

Conclusions—Complex patterns of sexual concurrency, coupled with high rates of STIs, signal the urgent need for health services interventions among MSWs, both to improve individual health outcomes and to reduce secondary STI/HIV transmission among sexual partner networks.

Additional keywords

HIV; epidemiological bridging patterns; sexual health

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Conflicts of interest: None declared.

Introduction

Surveillance data indicate that there are over 260 000 people living with HIV infection in Vietnam (more than double the number in 2000), with some 40 000 new infections each year.¹ Of the total number of cases, HIV among young adults aged 20–29 years has increased from 22% in 1997 to 70% in 2002. Most cases are male.² The burden of HIV disease is further complicated by high rates of co-infection with other communicable diseases, including tuberculosis (TB), hepatitis B (HBV), hepatitis C (HCV) and sexually transmissible infections (STIs).^{3–7} Historically, HIV risk in Vietnam was thought to be limited to high risk heroin injectors (IDU) and female sex workers (FSW). Although targeted programming for men-who-have-sex-with-men (MSM) has now been implemented, the near exclusive focus on IDU and FSW populations in the early epidemic may have left MSM populations especially vulnerable. Although the available epidemiological data about HIV among MSM in Vietnam remains limited, recent surveillance studies comparing trends from 2005 (when surveillance among urban MSM was first instituted) with more recent data collected in 2009, show an alarming increase. For example, HIV prevalence among MSM in Hanoi is estimated to be 17.4% (up from 9.4% in 2005).^{4,5} Similar increases were observed in Ho Chi Minh City (HCMC); it is currently estimated at 16.7%.

While epidemiological surveillance among MSM in Vietnam has improved in recent years, there are several MSM subgroups that are not easily identified within the existing surveillance data and that remain poorly understood. Among them is Vietnam's growing population of male sex workers (MSWs). Although sentinel surveillance studies include questions about sexual contact with commercial sex workers (male and female), they do not permit identification and sub-analysis by subgroups of MSM. Nationally, the HIV prevalence is estimated to be 4.9% for MSM and 19.8% for MSWs,⁶ although rates likely differ between cities and also between urban and rural areas. A recent study among MSWs in HCMC reported a HIV prevalence rate of 6.3%.⁷

Owing to their particularly complex sexual concurrency profiles, including international client partners, local (Vietnamese) male client partners and multiple types of female partners (including primary sex partner and female sex workers), this group may be an important bridge population for the diffusion of STIs and HIV across multiple types of risk networks. With the overall goal of informing our understanding of sexual risk practices among MSWs in Vietnam, this paper reports data on the prevalence of STI and HIV infection from a sample of MSWs recruited in Hanoi, Ho Chi Minh City and Nha Trang City in 2010.

Methods

Sample construction

In all three cities, MSWs were recruited using a combination of locally tailored 'targeted' and 'time-by-location' community sampling methods.^{8,9} Survey activities began in Hanoi in March 2010, and were subsequently initiated in Ho Chi Minh City in January 2011 and in Nha Trang in July 2011. In each city, data collection was preceded by formative ethnographic research (including observation, mapping and informal interviews) to identify and 'map' local settings, temporal patterns and social groups in which MSWs were present

and could be recruited for research, including bus stations, public parks, tea stalls, Internet cafes, massage parlours, drug ‘copping’ sites and similar types of public or semi-public settings. While no claim to formal representativeness is made, the ethnographic data served as the basis for development of a targeted sampling plan, which was oriented to maximising theoretical variability in the sample, and this included age, migration status, sexual identification, drug involvement, and different types of settings for client recruitment.

Selection of subjects was facilitated through the use of a brief, field-based, conversationally oriented screener interview, which included questions about male sex work but masked screening criteria, thus limiting potential for self-selection among non-male sex workers in the venues. In each city, potentially eligible subjects were referred to a private research office where formal screening, written informed consent, behavioural survey interviews and biological testing activities were conducted. Although the assessment measure included questions about a broad range of both monetary and non-material rewards in exchange for sex, eligibility was restricted to males between the age of 16 and 35 years who self-reported having exchanged sex for some form of material remuneration (including money, drugs, food, clothing or some other kind of material benefit) within 90 days before the interview.

Written informed consent procedures included a formal assessment of capacity for consent. Subjects were paid the equivalent of \$10 in local Vietnamese currency (Đồng) in compensation for their time.

All study procedures and instruments were reviewed and approved by both primary research institutions, the University of Puerto Rico and Hanoi Medical University.

Measures

The survey interview included five general domains: (1) A broad range of demographic indicators were accessed, including age, birth place, migration, education, employment and sexual self-concept. Subjects were asked to estimate their overall income, including an estimate of the percentage of their total income that was derived from sex work. (2) The measure included detailed questions about both lifetime and current use of a broad range of substances, including alcohol, tobacco and a wide range of illicit or illegal drugs. (3) Questions included age at first use (including age at first injection) and current use (including current injection risk). (4) The survey also included detailed questions about age at onset of sexual activity with different types of partners, current partners, current sexual practices (including condom use) and a series of last sexual event questions aimed at capturing details of sexual exchange and reducing social desirability in relation to self-reported condom use. (5) A series of questions assessed lifetime and current use of health services, including STI/HIV testing and disclosure of same sex activity to healthcare providers. This section also included a brief set of questions about awareness and acceptability of hepatitis B (HBV) and human papillomavirus (HPV) vaccination.

Following completion of the survey interview, each subject met with an onsite staff physician who conducted pre-test HIV counselling procedures (in accordance with applicable laws and standards in both the US and Vietnam) and scheduled an appointment for post-test counselling and disclosure of HIV test results. STI screening included blood

and urine specimens, as well as oral, penile and anal swabbing. Specimens were tested for syphilis, gonorrhoea, chlamydia, HPV, HBV (assessed using HBV sAg), hepatitis C (HCV) and HIV-1. Subjects were given an appointment to return for their STI/HIV test results. Those with an active STI were offered the option of free, onsite STI treatment or referral to a nearby STI treatment clinic. Those with HIV infection were provided with a referral to a local HIV treatment centre for additional screening and enrollment in HIV monitoring/treatment (as clinically indicated).

Statistical analysis

Univariate relationships were assessed using Chi-square tests for comparisons between categorical variables, and the Student's *t*-test was used to examine differences between means of continuous dependent variables. Logistic regression models were developed to identify independent risk correlates of four separate STIs (i.e. chlamydia, gonorrhoea, HBV and HPV). Risk correlates that were $P < 0.20$ in univariate analysis were entered into multivariate models using backward elimination, with variables significant at $P < 0.05$ retained in final models. Odds ratios (ORs) and adjusted odds ratios (aORs) with 95% confidence intervals (CIs) are reported. Statistical significance is two-sided at $P < 0.05$; Fisher's exact test *P* values are reported when cells have expected counts of less than five. SAS, version 9.1.3 (SAS Institute, Cary, NC, USA), was used for all statistical analysis.

Results

Sociodemographic characteristics

This analysis is based on 654 men who had at least one male client partner within 30 days before the interview (Table 1). With the exception of one individual born in China, all were born in Vietnam. More than half (53%) are migrants, defined for the purposes of this analysis as having moved to the city in which they were interviewed within the past 5 years, not having parents living in the interview city and having been born and raised somewhere other than one of the interview cities. Mean age is 22 years (s.d. 3.9, median 21 years, range 16–35 years). Education levels vary widely: 19.7% are currently in school but only one-third (38%) of those not at school had completed a full 12 years of secondary education. Mean monthly income is relatively high by general Vietnam standards, 523 6467 VN (approximately \$300 at the time of the study) and half (50%) of this income is derived from sex work.

Half (47%) are sexually attracted to both men and women, one-third (30%) are exclusively attracted to women and a minority (23%) are exclusively attracted to men. Only 14% describe themselves as 'Gay'.

Significant sociodemographic differences are observed between cities: MSWs in Hanoi are significantly more likely to have completed high school ($P < 0.001$), to be married ($P = 0.01$) and to have lived at their current residence for less than 6 months ($P < 0.001$). MSWs in Nha Trang are significantly less likely to be homeless than men from either of the other two cities ($P < 0.001$).

Alcohol and drug use

Almost all (99%) have used alcohol in their lifetime and a similarly high proportion (84%) currently consume alcohol (last 30 days). More than one-quarter (28%) have used marijuana in their lifetime and 10% are current users. A majority (94%) of current cannabis users are also consuming alcohol. Approximately half (47%) have used one or more types of 'hard drugs' in their lifetime (including heroin, opium, amphetamines, ketamine and cocaine). Only a low proportion (9%) has injected one or more of these substances in their lifetime (Table 1).

Male sex workers in Hanoi and Nha Trang are significantly more likely than men in HCMC to be currently using heroin or opium ($P=0.02$), although the prevalence was less than 11% in all cities. Men in HCMC (33%) are significantly more likely than those in Nha Trang (9%) or Hanoi (4%) to be current users of one or more types of 'hard drugs' (including heroin, opium, amphetamines, ketamine and cocaine; $P<0.001$).

Types of sex partners and sources of client partners

Male sex workers had an average of 9.6 male client partners in the last 30 days (s.d. 14.6, median 4 days, range 1–150 days), including at least one Vietnamese male client partner (99%) and at least one foreign (includes Việt Kiều—individuals of Vietnamese descent who are not residing in Vietnam) male client partner (19%). Just over half (53%) have less than one client per week. At first transactional sex, 94% had sex with a local Vietnamese client, 3% with a Việt Kiều, 2% with a non-Asian foreigner and 1% with an Asian foreigner. At last transactional sex with a foreign client, 65% had sex with a non-Asian foreigner, 19% had sex with an Asian foreigner and 16% had sex with a Việt Kiều. Strategies for recruiting male client partners vary widely, including opportunistic meetings in outdoor public settings (27%), phone contact (18%), liaisons in bathhouses or massage parlours (16%) and introductions from other sex workers (8%).

In addition to clients partners, most (74%) MSWs also currently have elective (non-client) sex partners, including female elective partners (47%), male elective partners (18%) and both elective male and female sex partners (9%). Only a minority (26%) have only male sex client partners. Table 2 shows sex practices in the last 30 days by exclusive sex partner types. MSWs that have both male and female elective partners in the last 30 days are more likely to have had anal sex with all three partner types; male client partners ($P<0.001$), elective male partners ($P=0.045$) and female partners ($P=0.025$).

Sexual practices by partner type

At last sex with a male client partner (limited to exchanges that occurred within the last 90 days), most (97%) have engaged in oral sex (giving and/or receiving) and nearly two-thirds (60%) have engaged in anal intercourse (insertive and/or receptive). At last sex with a client partner, only 8% used a condom in oral sex and only one-third (30%) used a condom during anal intercourse. Among those who had an elective male partner (also limited to exchanges within the last 90 days, 27% of sample), the majority (90%) engaged in both oral (96%) and anal (90%) sex. At the first and last sex with an elective male sex partner, approximately half (46% for first oral sex, 56% for first anal sex and 45% for last anal sex) were with new or

causal partners (partners that subjects have never met before) as opposed to regular partners (defined here as a partner with whom they had previous sexual contact). At last sex with a client partner, only 6% used a condom during oral sex and less than half (48%) used a condom during anal sex.

At last sex with a female elective partner, 100% of the exchanges involved vaginal penetration, 69% involved oral sex and 14% involved anal intercourse. At last sex with an elective female partner, only 1% used a condom during oral sex, one-third (31%) during vaginal sex and only 3% during anal sex.

In summary, over one-third (32%) had some form of unprotected anal intercourse (UAI) with client partners, one-third (34%) had UAI with elective male partners and over half (57%) did not use a condom in vaginal or anal sex with elective, female partners.

Prevalence of sexual transmissible infections and HIV

Perhaps reflecting the young age of the sample, only 4% (29 out of 654) tested positive for HIV infection. Between-city differences in HIV infection rates were noted, with HCMC at 7.3% (21 out of 654), Nha Trang at 2.0% (3 out of 654) and Hanoi at 2.3% (6 out of 654) ($P = 0.006$). However, current STIs are high across all three cities, including gonorrhoea (29%), chlamydia (17%), active syphilis [3% (22 out of 654)], active HPV (33%), and HBV (13%).

Among the 4% who tested positive for HIV infection, two-thirds (66%) had co-infections (five were co-infected with three additional STIs, six were co-infected with two additional STIs and eight were co-infected with one additional STI). Overall, almost half (45%) of the HIV-infected MSWs were co-infected with HPV. Men in HCMC were significantly more likely than men from the other two cities to have HIV ($P = 0.006$), chlamydia ($P < 0.001$), gonorrhoea ($P < 0.001$) and HPV ($P < 0.001$). The relationship between current STI status and sex partnerships outside of sex work – important for understanding potential epidemiological bridging patterns – were assessed and are shown in Table 3. Both HIV and HPV are significantly associated with having elective male partners in addition to sex work clients ($P = 0.010$ and $P < 0.001$).

Independent risk factors for STIs

Independent risk factors for the four highest prevalent STIs (i.e. HPV, gonorrhoea, chlamydia and HBV) were examined separately and are shown in Tables 4 and 5. At the univariate level, city of recruitment and amphetamine use are consistently associated with STI prevalence for three of the four infections (i.e. HPV, gonorrhoea and chlamydia). Sex partner characteristics and the number of sex work partners in the last 30 days are also significantly associated with specific STIs. However, in multivariable analyses, having been recruited in HCMC independently increases risk of chlamydia, gonorrhoea and HPV infection, while having been recruited in Nha Trang independently decreases risk of gonorrhoea and HPV infection. In addition, having elective male sex partners independently increases risk for HPV ($P < 0.001$). An increasing number of sex work clients also independently increases risk for gonorrhoea ($P < 0.05$) and HPV ($P < 0.001$). None of the risk factors examined are associated with current HBV infection.

Health services utilisation

Despite high rates of STIs, MSWs evidence relatively low rates of engagement in health services. One in five (22.5%) have never visited a health services clinic. Among those who have ever visited a health clinic, only 51% have done so within the last 12 months. Moreover, health services utilisation appears to be symptom-driven; for example, among those who had ever used any kind of health services, on the last occasion that they went to a clinic, most (41%) did so for an acute problem (disease, physical injury). Only 8.7% (35 out of 404) did so in response to STI symptoms, which are self-treated by obtaining antibiotics from a pharmacy. Only 19% went for a general check-up or any kind of objective associated with preventative care. Also noteworthy is the fact that less than one-quarter (17.9%) have ever disclosed to a healthcare provider that they have sex with men, a fact that may contribute to inadequate health screening (e.g. rectal STI screening).

Reflecting this poor engagement in health services, rates of elective HIV testing (i.e. outside the context of participation in our research study) are also extraordinarily low; less than half (42.7%) have taken a HIV test (41.5% in HCMC, 35.8% in Nha Trang and 48.1% in Hanoi, $P=0.056$). Moreover, only approximately half (55.4%) of those who have ever been tested, had done so within the previous 12 months. Among those who had ever elected to be tested for HIV (excluding screening for school or military service, etc.), less than half (41%) had returned for their results. Similarly, among those who tested positive for HIV in the context of our research study, only 6.9% (2 out of 29) were aware of their infection before being tested as part of their participation in this study and only approximately half of these (3.4%, 1 out of 29) were enrolled in HIV care (monitoring or treatment). Similarly, although the majority (84.3%) evidence awareness of their risk for hepatitis B, only 21.5% have been tested for it. Although the majority (81.5%) are aware of a HBV vaccine, only a minority (21.5%) have been vaccinated. The majority of the unvaccinated (84.0%) indicated that they would be willing to accept HBV vaccination if it were freely available, suggesting that cost may be a major contributing factor to low rates of vaccination.

Discussion

Detailed data on the MSW population in Vietnam is very limited. Although every effort was made to build theoretical variability into the sampling frames used in this study, it is not possible to evaluate the formal representativeness of the sample described here. Additionally, although complex behavioural and clinical measures were used, this is an out-of-treatment population that is difficult to recruit and retain for research. This placed practical constraints on the kinds of study design and measures that could be applied, the level of detail that could be achieved, and accordingly, on the types of inferences the data can support.

These limitations notwithstanding, the data clearly demonstrate complex and alarming patterns of sexual risk among MSWs in Vietnam. As noted earlier, a large proportion of the sample reported sexual attraction to women, or to both men and women. Only a minority were exclusively attracted to men and even fewer self-identified as 'Gay.' As might be expected, given these patterns in sexual self concept, attraction and identity substantial complexity was evidenced in sexual partnering; in addition to large numbers of male client partners, MSWs also often have male and/or female elective partners (some of whom may

also be sex workers). High rates of unprotected anal or vaginal intercourse were found in all three types of partners. This constellation of sexual risk practices and partnering groups sets the stage for rapid amplification of STIs/HIV across a complex set of sexual partner networks. The fact that a large proportion of the sample are also highly mobile (i.e. ‘circular migration’), suggests that there is also the potential for substantial geographic diffusion of STI/HIV across both rural and urban risk settings and sexual partner networks.

Particularly, in low-resource settings such as Vietnam where there is a general dearth of social and mental health services, much of the burden for delivery of health-related interventions inevitably falls to the healthcare system. Because most MSWs lack the economic means to enrol in privately funded healthcare services, publicly funded outpatient clinics are often their only available source of care. Unfortunately, the capacity to deliver high-quality behavioural health interventions in publicly funded healthcare settings in Vietnam is quite limited. The technical and human resources available in these settings are primarily oriented to a narrow range of medical interventions. Expertise and resources necessary for advancing behavioural health interventions are generally absent. Moreover, these background structural problems are exacerbated by the fact that the behavioural practices that are associated with HIV infection, including high-risk drug injection and high-risk sexual practices, confer great risk for stigma and discrimination in Vietnam, thereby exacerbating alienation from health services in this group. In the context of this social climate, MSWs often withhold information about the nature of their drug and sexual practices from healthcare providers and hence are not easily identifiable for targeted behavioural interventions in these settings.

Historically, HIV prevention in Vietnam has focussed primarily on the use of peer education programming. These programs disseminate prevention materials and HIV-related information in community settings, with a primary emphasis on recruitment to local HIV testing sites. Theoretically, these sites provide education related to behavioural health, provide STI treatment and also link HIV-infected patients with a continuum of HIV care. Although there is some recent data showing that peer education among MSWs is positively associated with willingness to use pre-exposure prophylaxis (PrEP),¹⁰ at a general level, little is known about the impact of peer education programming on either reducing behavioural risk or on increasing protective factors in any risk group in Vietnam, including MSWs. Indeed, the fact that MSWs do not identify as MSM suggests that the reach and impact of peer network programming may be limited. The low rates of HIV testing evidenced in this study support this concern. Moreover, it is noteworthy that increased police pressure in public settings where MSWs have traditionally found client partners (e.g. public parks, bars and cafes oriented to MSM, etc.) has served to ‘push’ MSM sexual partnering activities (including MSW activities) into private or semi-private settings (including Internet-based partnering venues, as well as an increasing variety of brothels, saunas and massage parlours). This shift from public or private settings in sexual partnering among MSM may further constrain the reach and impact of peer education programs among MSWs.

Beyond the issue of ‘reach’ itself, there are perhaps more fundamental questions about how much can be reasonably expected from peer education strategies in terms of the capacity of peer education to ‘grasp’ the complex nature of risk in this group. Biello *et al.* (2014) have

recently elaborated a set of psychosocial factors, most notably depression and substance abuse, that were positively associated with sexual risk among MSWs in HCMC.¹¹ Extending this initial framework in the light of the three-city data presented in this paper, the syndemic among MSWs in Vietnam may be understood to include the following constellation of interacting factors: The MSW population is increasingly composed of heterosexually-identified internal migrants, moving from rural to urban areas in search of wage labour, often entering complex urban environments with limited preparation, few marketable skills and little or no social support. Although MSWs explicitly conceptualise sexual exchange with client partners as a form of paid labour, it is not viewed in this way by the larger society and involvement in male sex work confers high risk for stigma and discrimination, both in society at large as well as in healthcare institutions.¹² MSWs have high levels of mental health distress, including anxiety, depression and history of suicide thoughts.^{11,13} MSWs evidence high rates of substance use, including alcohol and a wide variety of drugs.^{7,11,14–16} MSWs evidence substantive gaps in knowledge and understanding of STI/HIV transmission risk. As detailed above, MSWs have high rates of unprotected sex with both male and female sexual partners, including both client partners and elective partners. As a consequence of this pattern of practices and partners, MSWs have high rates of STIs, notably ulcerative STIs that may facilitate HIV transmission. Despite multiple sources of behavioural risk and high rates of STIs, rates of health services utilisation are low, largely symptom-driven, lacking in full disclosure of sexual risk, and often abandoned before treatment has been completed.

While additional research is needed to understand how individual factors interact, and which are most determinate of poor health outcomes, the available evidence indicates that the complexity of risk in this group will likely require more than peer educator programming alone. There is an urgent need to develop targeted interventions in this population, both to reduce behavioural risk as well as to increase protective factors, particularly effective engagement and retention in health services. Given the abjectly negative social climate towards sex workers in Vietnam, such programming should include specific and substantial emphasis on improving stigma management and health-seeking skills. Achieving higher rates of engagement and retention in health services may be expected to contribute to early detection and treatment of STIs and also to contribute to more timely and effective engagement in the continuum of care required to effectively manage HIV. This would confer substantive individual level benefit and may confer substantial community-level benefits as well, including reductions in secondary STI/HIV transmission across the broad array of sexual partnering networks.

Acknowledgments

First and foremost, we would like to thank the many young men who participated in the study. This research was supported by the Grant DA022170 (Diffusion of HIV-1 among Drug Using Men in SE Asia) from the USA National Institute on Drug Abuse, USA National Institutes of Health. Data collection was conducted by our collaborating research team in the Department of Epidemiology at Hanoi Medical University. Additionally, we would like to thank the Hanoi Provincial AIDS Center, Ho Chi Minh City's Office of Committee for AIDS Prevention and Control and Khanh Hoa's Center for Health Education and Communication. Professor Nguyen Tran Hien, MD, PhD provided valuable guidance and support in the planning and implementation of the study.

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Sociodemographic characteristics and drug use information for 654 active male sex workers from three Vietnamese cities**Table 1**

Sociodemographic characteristics	N (%)	Hanoi n = 217 N (%)	Nha Trang n = 151 N (%)	City in Vietnam Ho Chi Minh City n = 286 N (%)	χ^2 (df)	P-value
Age (years)						
<21	258 (39.4)	86 (39.6)	66 (43.7)	106 (37.1)	1.8 (2)	0.40
21	396 (60.6)	131 (60.4)	85 (56.3)	180 (62.9)		
Highest education						
<Secondary education	379 (57.9)	99 (45.6)	95 (62.9)	185 (64.7)	20.4 (2)	<0.001
Secondary education	275 (42.1)	118 (54.4)	56 (37.1)	101 (35.3)		
Income (Vietnam Dong)						
<3 875 000 (median)	327 (50.0)	110 (50.7)	81 (53.6)	136 (47.6)	1.5 (2)	0.47
3 875 000	327 (50.0)	107 (49.3)	70 (46.4)	150 (52.4)		
Marital status						
Single, never married	633 (96.8)	204 (94.0)	147 (97.4)	282 (98.6)	8.6 (2)	0.014
Married/Separated/Divorced	21 (3.2)	13 (6.0)	4 (2.6)	4 (1.4)		
Stable housing during the last 30 days						
Yes	78 (11.9)	35 (16.1)	2 (1.3)	41 (14.3)	21.4 (2)	<0.001
No	576 (88.1)	182 (83.9)	149 (98.7)	245 (85.7)		
How long lived at current residence?						
<6 months	220 (33.6)	105 (48.4)	46 (30.5)	69 (24.1)	75.9 (6)	<0.001
6 months but <2 years	105 (16.1)	37 (17.1)	10 (6.6)	58 (20.3)		
2 years but <5 years	104 (15.9)	41 (18.9)	16 (10.6)	47 (16.4)		
5 years	225 (34.4)	34 (15.7)	79 (52.3)	112 (39.2)		
Drugs used in the past 30 days						
Marijuana	66 (10.1)	25 (11.5)	20 (13.2)	21 (7.3)	4.5 (2)	0.10
Amphetamines	117 (17.9)	9 (4.1)	13 (8.6)	95 (33.2)	82.5 (2)	<0.001
Ecstasy or ketamine	99 (15.1)	29 (13.4)	20 (13.2)	50 (17.5)	2.2 (2)	0.34
Heroin or opium	48 (7.3)	23 (10.6)	13 (8.6)	12 (4.2)	7.9 (2)	0.019
Any hard drugs ^A	168 (25.7)	40 (18.4)	23 (15.2)	105 (36.7)	32.8 (2)	<0.001
Injecting drug use	29 (4.4)	10 (4.6)	12 (7.9)	7 (2.4)	7.1 (2)	0.029

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df, degrees of freedom

Includes the use of the following substances: heroin, opium, amphetamines, ketamine and cocaine.

Table 2
Thirty-day sex practices of 654 Vietnamese male sex workers by sex partner types

Sex practice	Sex work clients, female elective partners, and male elective partners <i>n</i> = 57 N (%)	Sex work clients and male elective partners <i>n</i> = 119 N (%)	Sex work clients and female elective partners <i>n</i> = 306 N (%)	Sex clients only <i>n</i> = 172 N (%)	<i>P</i> -value
With male sex clients					
Anal sex	54 (94.7)	103 (86.6)	227 (74.2)	120 (69.8)	<0.001
Anal insertive	48 (84.2)	61 (51.3)	195 (63.7)	81 (47.1)	<0.001
Anal receptive	35 (61.4)	94 (79.0)	145 (47.4)	92 (53.5)	<0.001
Oral sex	46 (80.7)	117 (98.3)	223 (72.9)	150 (87.2)	<0.001
With elective male partners					
Anal sex	41 (71.9)	89 (74.8)			0.69
Anal insertive	36 (63.2)	56 (47.1)			0.045
Anal receptive	30 (52.6)	74 (62.2)			0.23
Oral sex	33 (57.9)	96 (80.7)			0.001
With female partners					
Anal sex	13 (22.8)		36 (11.8)		0.025
Oral sex	36 (63.2)		181 (59.2)		0.57
Vaginal sex	47 (82.5)		248 (81.0)		0.80

Bold numbers represents statistical significance <0.05, shading represents not applicable

Table 3
Sexually transmissible infection (STI) prevalence in 654 Vietnamese male sex workers by sex partner types

STI	Sex work clients, female elective partners, and male elective partners <i>n</i> = 46 <i>N</i> (%)	Sex work clients and male elective partners <i>n</i> = 119 <i>N</i> (%)	Sex work clients and female elective partners <i>n</i> = 306 <i>N</i> (%)	Number of non-sex clients partners <i>n</i> = 172 <i>N</i> (%)	<i>P</i> -value
HIV	4 (8.7)	3 (2.5)	9 (2.9)	13 (7.6)	0.06
Chlamydia	7 (15.2)	24 (20.2)	55 (18.0)	28 (16.3)	0.60
Gonorrhoea	7 (15.2)	43 (36.1)	91 (29.7)	50 (29.1)	0.01
Syphilis	2 (4.3)	3 (2.5)	9 (2.9)	8 (4.7)	0.73
HBV	7 (15.2)	18 (15.1)	38 (12.4)	19 (11.0)	0.78
HPV	14 (30.4)	59 (49.6)	88 (28.8)	57 (33.1)	<0.001

Bold numbers represents statistical significance above <0.05; HBV, hepatitis B virus; HPV, human papillomavirus

Table 4
Independent correlates of bacterial infections (chlamydia and gonorrhoea)

Risk factors	Chlamydia		Gonorrhoea	
	Positive <i>n</i> = 114 N (%)	Negative <i>n</i> = 540 N (%)	OR (95% CI)	aOR (95% CI) ^A
City in Vietnam				
Hanoi	27 (12.4)	190 (87.6)	1.0	1.0
HCMC	77 (26.9)	209 (73.1)	2.6 (1.6, 4.2) ***	9.3 (5.8, 14.9) ***
Nha Trang	10 (6.6)	141 (93.4)	0.5 (0.2, 1.1)	0.3 (0.1, 0.7) **
Age <21 years				
Yes	51 (19.8)	207 (80.2)	1.3 (0.9, 2.0)	1.0 (0.7, 1.4)
No	63 (15.9)	333 (84.1)		1.1 (0.8, 1.7)
Lower income (Vietnam Dong)				
<3 875 000 (median)	47 (14.4)	280 (85.6)	0.7 (0.4, 1.0) *	
3 875 000	67 (20.5)	260 (79.5)		
Homeless (30 days)				
Yes	11 (14.1)	67 (85.9)	0.8 (0.4, 1.5)	0.9 (0.5, 1.5)
No	103 (17.9)	473 (82.1)		
Sex with elective	24 (20.2)	95 (79.8)	1.2 (0.8, 2.1)	1.5 (1.0, 2.3)
men partners (30 days)	90 (16.8)	445 (83.2)		
Sex with women	55 (18.0)	251 (82.0)	1.1 (0.7, 1.6)	1.1 (0.7, 1.5)
(30 days)	59 (17.0)	289 (83.0)		
Foreign sex client	28 (16.3)	144 (83.7)	0.9 (0.6, 1.4)	1.0 (0.7, 1.5)
(30 days)	86 (17.8)	396 (82.2)		
Amphetamine use	30 (25.6)	87 (74.4)	1.9 (1.2, 3.0) *	2.6 (1.7, 3.9) ***
(30 days)	84 (15.6)	453 (84.4)		
HIV+				
Yes	5 (17.2)	24 (82.8)	1.0 (0.4, 2.6)	1.5 (0.7, 3.3)
No	109 (17.4)	516 (82.6)		
Mean no. of sex	11.8	9.1	<i>t</i> = -1.45	1.0 (1.0, 1.0) *
Work clients (30 days)			<i>P</i> = 0.15	<i>t</i> = -2.00 <i>P</i> < 0.05 *

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Bold numbers represent Statistical significance under <0.05; OR, odds ratio; aOR, adjusted odds ratio; HCMC, Ho Chi Minh City

* $P<0.05$,
** $P<0.01$,
*** $P<0.001$.

^A Age and city forced into all logistic regression models.

Risk factors	HBV			HPV				
	Positive <i>n</i> = 82 N (%)	Negative <i>n</i> = 572 N (%)	OR (95% CI)	aOR (95% CI) ^A	Positive <i>n</i> = 218 N (%)	Negative <i>n</i> = 436 N (%)	OR (95% CI)	aOR (95% CI) ^A
City in Vietnam								
Hanoi	33 (15.2)	184 (84.8)	1.0		42 (19.4)	175 (80.6)	1.0	1.0
HCMC	30 (10.5)	256 (89.5)	1.5 (0.9, 2.6)		169 (59.1)	117 (40.9)	0.2 (0.1, 0.3)***	0.2 (0.1, 0.3)***
Nha Trang	19 (12.6)	132 (87.4)	1.2 (0.7, 2.3)		7 (4.6)	144 (95.4)	4.9 (2.2, 11.3)***	5.6 (2.4, 13.2)***
Age <21 years								
Yes	26 (10.1)	232 (89.9)	0.7 (0.4, 1.1)		75 (29.1)	183 (70.9)	0.7 (0.5, 1.0)	0.7 (0.5, 1.1)
No	56 (14.1)	340 (85.9)			143 (36.1)	253 (63.9)		
Lower income (Vietnam Dong)								
<3 875 000 (median)	44 (13.5)	283 (86.5)	1.2 (0.7, 1.9)		99 (30.3)	228 (69.7)	0.8 (0.5, 1.1)	
3 875 000	38 (11.6)	289 (88.4)			119 (36.4)	208 (63.6)		
Homeless (30 days)	14 (18.0)	64 (82.0)	1.6 (0.9,3.1)		25 (32.1)	53 (67.9)	0.9 (0.6, 1.6)	
Sex with elective men partners (30 days)	68 (11.8)	508 (88.2)			193 (33.5)	383 (66.5)		
Sex with women (30 days)	18 (15.1)	101 (84.9)	1.3 (0.7, 2.3)		59 (49.6)	60 (50.4)	2.3 (1.6, 3.5)***	2.3 (1.3, 4.0)**
Foreign sex client (30 days)	64 (12.0)	471 (88.0)			159 (29.7)	376 (70.3)		
Amphetamine use (30 days)	38 (12.4)	268 (87.6)	1.0 (0.6, 1.6)		88 (28.8)	218 (71.2)	0.7 (0.5, 0.9)	
HIV+	44 (12.6)	304 (87.4)			130 (37.4)	218 (62.6)		
Yes	19 (11.0)	153 (89.0)	0.8 (0.5, 1.4)		57 (33.1)	115 (66.9)	1.0 (0.7, 1.4)	
No	63 (13.1)	419 (86.9)			161 (33.4)	321 (66.6)		
Mean no. of sex work clients (30 days)	14 (12.0)	103 (88.0)	0.9 (0.5, 1.7)		60 (51.3)	57 (48.7)	2.5 (1.7, 3.8)***	
	68 (12.7)	469 (87.3)			158 (29.4)	379 (70.6)		
Yes	4 (13.8)	25 (86.2)	1.1 (0.4, 3.3)		13 (44.8)	16 (55.2)	1.7 (0.8, 3.5)	
No	78 (12.5)	547 (87.5)			205 (32.8)	420 (67.2)		
Mean no. of sex work clients (30 days)	8.2	9.7	<i>t</i> =0.87		12.1	8.3	<i>t</i> =-2.85	1.0 (1.0, 1.0)***
			<i>P</i> =0.39				<i>P</i> =0.005**	

Sex Health. Author manuscript; available in PMC 2016 July 27.

A Age and city forced into all logistic regression models.

 $P<0.001$.

**
 $P<0.01$

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