HHS Public Access

Author manuscript

AIDS Behav. Author manuscript; available in PMC 2021 June 16.

Published in final edited form as:

AIDS Behav. 2012 January ; 16(1): 44–52. doi:10.1007/s10461-011-9960-8.

HIV Testing Behaviors Among Female Sex Workers in Southwest China

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Abstract

Despite the recognized importance of HIV testing in prevention, care and treatment, HIV testing remains low in China. Millions of female sex workers (FSW) play a critical role in China's escalating HIV epidemic. Limited data are available regarding HIV testing behavior among this at-risk population. This study, based on a cross-sectional survey of 1,022 FSW recruited from communities in Southwest China, attempted to address the literature gap. Our data revealed that 48% of FSW ever took HIV testing; older age, less education, working in higher-income commercial sex venues and better HIV knowledge were associated with HIV testing. Those who never took HIV testing were more likely to engage in high-risk behaviors including inconsistent condom use with clients and stable partners. A number of psychological and structural barriers to testing were also reported. We call for culturally appropriate interventions to reduce HIV risks and promote HIV testing for vulnerable FSW in China.

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Keywords

HIV testing; Female sex workers; China; HIV intervention

Introduction

HIV testing is the gateway to treatment, care and prevention. HIV testing may help people who are exposed to the risk of HIV infection know their HIV serostatus in order to have early treatment and prevent transmission to others [1]; HIV testing provides an effective means of secondary prevention, especially for those tested positive [2]. Literature documents the dilemma between high rates of acceptance of testing and low rates of actual testing (including not returning for results) [3]. Globally, the rates of HIV testing is low, even in the areas of high prevalence of HIV. In most developing countries the coverage of testing is about 10–20% [4].

Global literature also documents a number of factors associated with HIV testing [5, 6]. At an individual level, age, education, and perception of risks are major factors associated with testing behavior. At a structural level, access to preventive care, cost and convenience of testing, confidentiality and creditability of testing are significantly associated with HIV testing [7–9]. HIV/AIDS-related stigma is a major barrier at both individual and structural levels that keep many people from testing HIV [10]. People who actively have HIV testing were found to be more wary of their sexual risks, i.e., they were more likely to engage in safe sexual practices [11]. Despite a rich literature on HIV testing and associated factors in global literature, data are rather limited from the “new frontiers” of the HIV/AIDS epidemic such as China.

China has entered the third decade of the HIV epidemic. Among the official estimate of 740,000 HIV cases by the end of 2009, 105,000 were people living with AIDS [12]. Since 2005, the HIV epidemic in China has gradually shifted from drug driven to sex driven; sexual transmission has replaced transmission through injection drug use (IDU) and become the dominant mode of transmission. In 2009, heterosexual transmission accounted for 44.3% of new infections [12]. Meanwhile, the male to female ratio of people living with HIV/AIDS has plunged from 9 to 1.8 [13]. Such rapid increase of sexual transmission and the number of women infected suggest a potential danger of a generalized HIV epidemic.

The Chinese government has initiated several risk-reduction strategies in response to the growing HIV epidemic [14]. Voluntary Counseling and Testing (VCT) has been scaled up in early 2000s; however, the rates of participation was low [15]. VCT, a passive approach, was considered a failure despite the fact that testing was free; therefore, “active HIV testing” is implemented routinely. In active testing, community health workers conduct community outreach and invite members of HIV at-risk populations including female sex workers (FSW), injection drug users (IDU), MSM and prisoners to come for testing. Because the testing is free, and often testing could be done onsite, many invited people actually come to testing [16, 17]. Despite its controversies, the new polices have led to higher rates of HIV testing, especially in at-risk populations [17]. HIV testing in general populations, including migrant workers and market vendors remained very low (2.3–6%) [18–20]. Similar to those

reported in international literature, HIV testing in the general population was associated with older age, higher level of education, and perceived higher risks of HIV infection [8, 21].

Commercial sex plays a significant role in China's skyrocketing incidence of sexual transmission of HIV, however, data on HIV testing among FSW are rather limited [22]. An estimated 10 million FSW operate in a complex commercial sex hierarchy. Commercial sex in China is primarily establishment-based with a small proportion of "freelance". Typically, FSW encounter their clients in entertainment establishments (e.g., karaoke [KTV], night clubs, dance halls, discos, bars), or personal service sectors (e.g., saunas, hair salons, massage parlors, barbershops, restaurants, mini-hotels). FSW in higher-level of the hierarchy such as night clubs and saunas are strikingly different from those working in lower-level venues such as restaurants and streets in terms of age, income, and HIV-related behaviors [23]. Notable differences also exist within the same type of commercial sex venues [22, 24]. Only limited studies reported HIV testing or infection among FSW [22]. The government estimates HIV prevalence of 0.33–0.94% among FSW [15]; however, several community-based studies in areas of high HIV prevalence reported HIV prevalence among FSW was between 2.3 and 10.3% [25–27].

With an attempt to fill out the literature gap on the HIV testing among FSW in China, we conducted the current study with the following research questions. First, what was the HIV testing rate among FSW in China and what factors attributed to their testing? Second, how was HIV testing associated with HIV risks including inconsistent condom use, drug abuse, and STD history? Third, what were the barriers to HIV testing?

Methods

Study Site

This study was conducted in Guangxi Zhuang Autonomous Region (Guangxi). Guangxi, one of the five autonomous and multi-ethnic regions in China, is located in the south-west border. Guangxi is ranked the second in terms of HIV prevalence and the first in terms of new HIV infection cases among China's 31 provinces [28]. Two cities in Guangxi, Beihai and Guilin, served as research sites for the current study. Guilin is located in the Northeast of Guangxi with a population of 1.34 million including an urban population of 620,000. Beihai is located in the southern coast of Guangxi with a population of 1.36 million including 550,000 urban residents. Both cities are famous tourist spots, attracting 4–10 million tourists to each city every year. Because of the booming economy in Guangxi and significant tourism in Guilin and Beihai, commercial sex flourishes in both cities. An estimate of 2,000 FSW work in at least 155 commercial sex venues in each city.

Participant Recruitment and Data Collection Procedure

Commercial sex is a highly fluid and dynamic industry; most FSW change their workplaces every 3 months or less [24]. Because of high mobility of the target population, we recruited our participants through ethnographic targeted sampling strategy that has been used in our previous studies with FSW in China [24, 29]. Participants were recruited from nine different kinds of commercial sex venues that represent different levels of commercial sex hierarchy,

including night clubs, saunas, karaoke (KTV), bars, hair salons, massage parlors, mini-hotels, restaurants, and streets. The research team and local health workers identified entertainment establishments in Guilin and Beihai through ethnographic mapping. The owners/managers or other gatekeepers of these establishments were contacted for their permission to conduct research in their premises. A total of 56 different establishments participated in the study. Once we obtained permission from the gatekeepers, trained outreach health workers from the local anti-epidemic stations approached the women in establishments to ask for their participation. Similar to our previous studies with FSW in China, [24] about 70% of FSW approached agreed to participate in this study. A total of 1,022 women, including 515 in Beihai and 507 in Guilin, provided written informed consent, and completed a self-administered questionnaire. Each participant received a small gift with a value equivalent to US$4.50.

The survey was conducted in separate rooms or private spaces in the establishments where participants were recruited. No one was allowed to stay with the participant during the survey except the interviewer who provided the participant with necessary assistance. The questionnaire took about 45 min to complete. The study protocol was approved by the Institutional Review Boards at Wayne State University in the U.S. and Beijing Normal University in China.

Measures

The questionnaire was developed from literature search, our formative research and piloting.—*Demographic information* collected in the study included the participant's age, ethnicity, rural or urban residency, education, marital status, length of working in the city (in month), living arrangement, working venue, and monthly income. For the purpose of data analysis in the current study, we categorized ethnicity into Han and non-Han, education into no more than middle school versus more than middle school. Because of the hierarchy of commercial sex establishments, the venues were categorized into four types by the mean income of FSW at each venue: level one were those venues with mean income higher than 3,000 Yuan each month (sauna), level two were those venues with mean income between 2,000 and 3,000 Yuan (night club, KTV, bar), level three were those venues with mean income between 1,000 and 2,000 Yuan (message parlor, hair salon), and level four were those venues with mean income less than 1,000 Yuan (restaurant, mini hotel, and streets).

HIV-Related Perceptions—Participants' self-rated HIV-related knowledge was assessed by asking them to self-rate their knowledge (little, a little, some, and a lot). Those who answered "some" or "a lot" were considered having good self-rated HIV-related knowledge. Their perceived risks of HIV infection was assessed by asking them how likely they thought they would be infected with HIV (very unlikely, unlikely, likely, and very likely). The responses of "likely" or "very likely" were grouped as perceived HIV risk.

HIV Risk Behaviors—Participants' HIV risk behaviors were measured by inconsistent condom use, STI history and drug abuse. Six questions pertaining to condom use with clients and stable partners were asked. First, "how often do you use condoms with clients/

stable partners (never, occasionally, often, and always)"; those who didn't answer "always" were considered inconsistent condom use with clients/stable partners. Second, "how often do you use condoms with clients/stable partners (never, occasionally, often, and always) in the last three sex acts"; those who didn't answer "always" were considered inconsistent condom use with clients/stable partners in the last three sex acts. Third, "do you intend to use condoms with clients/stable partners in the future (never, occasionally, often and always)"; those who didn't answer "always" were considered having the intention of inconstant condom use with clients/stable partners. Participants were also asked whether they had STI history (yes, no, and I don't know). A question related to their history of drug abuse was asked with response options of yes and no.

HIV-testing was assessed by a question of "have you ever had HIV testing" (yes/no).

Barriers to HIV testing included 18 reasons for not taking an HIV test or not returning for testing results. The 18 reasons covered psychological barriers (8 items), structural barriers (6 items) and other barriers (4 items) with dichotomous response options (yes/no).

Data Analysis

First, participants' demographic characteristics and HIV/STI-related perceptions were compared between those who ever had HIV testing and those who never did using Chi-square (for categorical variables) and ANOVA (for continuous variables). Second, to further assess the independent relationship between HIV testing and key demographics and HIV-related perceptions, a multivariate logistic regression model was built with HIV testing as a dependent variable; the variables of significant association with HIV testing in the first step served as independent variables. To control for potential intra-class correlation (ICC) by venue due to cluster-sampling, we used random effect models. Adjusted odds ratio (aOR) and 95% confidence intervals (95% CI) were used to examine the independent relationship between dependent variable and independent variables. Third, the association between HIV testing and 6 indicators of sexual risks (inconsistent condom use with clients/stable partners, intention of inconsistent condom use with clients/stable partners, history of STI, and history of drug abuse) were assessed using Chi-square. Fourth, multivariate logistic regression models were performed to further examine the association between HIV testing and HIV risks. Similar to step 2, random effect modeling was employed to control for venue-level ICC, aOR and 95% CI were used to examine the relationship between HIV testing and HIV risks while controlling for potential confounders. Finally, we used frequency analysis to examine the distribution of 18 barriers to HIV testing. All statistical analyses were performed using Stata 10.0.

Results

HIV Testing by Key Demographic Characteristics and HIV-Related Perceptions

As shown in Table 1, the mean age of the 1,022 participants was 24.9 (SD = 6.7) with a range of 15–50 years. Most of them were Han, more than half of them were from rural areas, and 71% were never married. They had worked in the cities on an average of 44 months, and earned 2,660 (SD = 2,360) Yuan a month. The income varied considerably among

individuals and across different venues; about 27% FSW worked in venues with mean income higher than 3,000 Yuan/month, 57% in venues with mean monthly income between 2,000 and 3,000 Yuan, and the rest were in venues with a monthly income of less than 2,000 Yuan.

About 48% of FSW ever had HIV testing. HIV testing was significantly associated with age, education, marital status, length of working, venue type, and monthly income. Specifically, older age, less education, being married, working in the city longer and higher income were associated with HIV testing. FSW working in high-income venues (i.e., sauna) were more likely to be tested.

About 87% of FSW self-rated some or good knowledge of HIV/AIDS, and only 5.8% perceived at risk of HIV. FSW with good self-rated HIV-related knowledge were more likely to have HIV testing; however, perceived HIV risk was not significantly associated with HIV testing.

In the multivariate model that assessed the independent relationship between HIV testing and the above variables, HIV testing was significantly associated with older age (aOR = 1.09, 95% CI = 1.04, 1.13), less education (aOR = 0.64, 95% CI = 0.47, 2.86), and working in higher-income venues. In addition, FSW of good self-rated HIV-related knowledge were 3.25 (95% CI = 1.90, 5.55) times more likely to report HIV testing (Table 2).

Association of HIV Testing and HIV Risk Behaviors

The participants reported high rates of HIV risk behaviors. For example, 46% of the FSW reported inconsistent condom use with clients and 82% had inconsistent condom use with stable partners. In the last three sex acts with clients or stable partners, 33 and 66% did not use condoms consistently, respectively. And about 20 and 74% of FSW expressed the intention of inconsistent condom use in the future with clients and stable partners, respectively. About 7.6% of the FSW self-reported current or history of STI, and 18% reported drug abuse problem (Table 3).

HIV-testing was strongly associated with most of the HIV risk behaviors, including inconsistent condom use with clients/stable partners, inconsistent condom use in the last three sex acts with clients/stable partners, intention of inconsistent condom use with clients, and drug abuse (Table 3). In the multivariate model that assessed the independent relationship between HIV testing and sexual risks while controlling for potential confounders, HIV testing remain significant in the association with inconsistent condom use with stable partners (aOR = 0.64, 95% CI = 0.41, 0.97), inconsistent condom use with clients (aOR = 0.63, 95% CI = 0.46, 0.84), and intention of inconsistent condom use with clients (aOR = 0.64, 0.44, 0.93) (Table 4).

Barriers to HIV Testing

For FSW who never had HIV testing or never returned for their testing results, a number of reasons contributed to their behavior. Table 5 lists the frequencies of the 18 reasons endorsed by FSW. The biggest barrier was low perceived risk (70%), followed by don’t know where

to do HIV testing (47%) and no time for HIV testing (41%). Stigma such as fear of others knowing their HIV status or the identity of FSW was also a major barrier.

Discussion

Our data indicate that 48% FSW ever had an HIV test. Such rates of testing were higher than the general population in China (2.3–6%), [20, 25, 26] but lower than other vulnerable populations such as MSM (72.3%) [30]. Comparing with FSW in other Asia countries, such a rate is relatively low. For instance, a study conducted in Thailand indicated that the HIV testing rate among street-based sex workers was as high as 91% [31]. Our study found that HIV testing was associated with older age, less education, and working in venues of higher income such as sauna. The findings of lower education associated with HIV testing appeared contradictory with previous studies. However, it might be that “active testing” conducted by local CDC had targeted certain commercial sex venues, for instance those provide more “explicit” commercial sex services such as massage parlors and streets. In some venues such as hotels, night clubs and salons where commercial sex was more hidden under the cover of other services; the outreach for “active testing” in these venues were therefore less common. Further, literature suggests that the FSW who work in the venues that offer more “explicit” commercial sex venues were more likely to be less educated [22, 23], which might explain the strong association between lower education and HIV testing observed in the current study. We also found that self-rated HIV-related knowledge was a strong factor associated with HIV testing (aOR = 3.25), but perceived HIV risk was not significantly related to testing. Such findings were inconsistent with literature on the relationship between perceived HIV risks and HIV testing. FSW in our study perceived very low risk of HIV infection (only 5.8% perceived at risk of HIV); it might be that statistical difference was not detected due to the skewed distribution of the responses. The strong association between HIV testing and self-rated HIV-related knowledge might also be attributed to the counseling provided to the women after the testing.

We found that *never* having HIV-testing was significantly associated with higher rates of HIV risk behaviors such as inconsistent condom use with clients/stable partners as well as intension of inconsistent condom use. Such findings were also inconsistent with literature that people with higher sexual risks were more likely to take HIV testing [8, 9]. Such inconsistency might also be due to the very low perceived risks by FSW in the current study. Those who did the testing were equipped with good HIV-related knowledge and motivation for protection through the counseling *after* testing. The high rates of HIV risks and the double jeopardy of engagement of HIV-risks and no HIV-testing underscore an urgency to develop effective interventions to reduce HIV risks and promote testing and counseling among FSW in China. Our data revealed that participants reported a low rate of consistent condom use with their stable partners/clients. Such a low rate may be due to perceived low risk of HIV among FSW which deserved more attention from health promotion practitioners. Culturally appropriate interventions to promote their condom use and HIV testing are urgently needed.

Our study also reports a number of barriers to HIV testing at individual, health care, and structural levels. Despite the fact that VCT has been offered free for almost 10 years in

Guangxi, about half (46%) of FSW didn't know where to get tested, and 21% thought the cost of testing was too high. Such findings were consistent with previous studies on VCT participation and evaluation [21, 32, 33]. Similar to observations in other populations and cultures, low-perceived risks, stigma associated with AIDS and people living with HIV/AIDS are major barriers to testing. Furthermore, a significant portion of FSW who tested for HIV never returned for their results. The current study didn't compare FSW who never had HIV testing and those who did HIV testing but never returned for results. It deserves further study on the group who never returned for HIV testing results.

As noted by Kalichman and Coley [34], interventions to promote HIV testing need to be "framed" for the cultural context and individual needs. Our data provide valuable information on how to design culturally appropriate and effective interventions to promote HIV testing and reduce HIV risks among FSW in China. For example, "active testing" implemented since 2006 appeared to increase testing in this population [16]. However, such targeted testing might miss certain populations who do not fit into the "high-risk" profile, for example, those in "implicit" commercial sex venues. The notable differences of testing rates in different types of commercial sex venues as reported in our study confirmed this speculation. Attention should be directed to those FSW who perceive low risk of HIV infection, specifically those who are young, more educated, or new in commercial sex, and work in venues that are not routinely covered by "active testing". Stigma reduction through massive media campaign and enforcement of laws to protect the HIV positive individuals is critical to reduce the fear and worries associated with testing [35]. About 41% of FSW reported they had no time for testing and 26% considered the testing location was too far, which suggest that extended office hours in testing clinics, mobile testing vans or other rapid testing approaches might also be viable solutions to provide testing for this special population [36]. In addition, counseling that provide knowledge of HIV/STI transmission, assessment of risks and motivation for risk reduction would be an important component in HIV testing and counseling [2, 11].

Several limitations exist in the current study. The significant limitation was that we did not differentiate between voluntary testing and "active testing" conducted by local CDC. It is difficult to differentiate as routing testing has been carried in certain commercial sex venues as part of "sentinel surveillance" to monitor the HIV epidemic. Second, we might have over-sampled FSW working in higher-income commercial sex venues. Our sampling scheme was based on the map of commercial sex venues maintained by local CDC. The map was updated in our formative phase of the project. It might be that women in lower level of commercial sex hierarchy were less visible (most did not have regular venues) and therefore were not identified in our ethnographic mapping. However, the demographic characteristics of the current sample were consistent with other studies of FSW in urban areas of China [25, 37, 38]. Third, in examination of barriers to HIV testing, we did not separate those who never took HIV testing from those who did the testing but never returned for results. Fourth, we used self-rated items to measure HIV-related knowledge; it is more desirable to use scientifically valid scales. However, our previous studies with FSW in China revealed that self-rated HIV-related knowledge had as good predictability as the scientific scale [24, 25]. Fifth, our study was based on a cross-sectional design, which precluded us from drawing any

causal conclusions. And last but not least, like all other community-based studies, our data were subject to volunteer bias and social desirability bias.

Despite these limitations, the current study represents one of the first efforts to investigate HIV testing, related factors and associated HIV risks among FSW in China. Our data underline an urgency to reduce HIV risks and promote HIV testing in this population. Culturally appropriate interventions that integrate individual counseling and stigma reduction are needed.

Acknowledgment

This study was supported in part by NIH Research Grant R01AA018090 by the National Institute for Alcohol Abuse and Alcoholism (NIAAA). The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIAAA.

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Table 1

Demographic characteristics and HIV-related perceptions among FSW: comparing those who did HIV testing and who did not

	Total	HIV testing status	
		Never tested	Ever tested
Age, mean (SD)	24.89 (6.67)	24.0 (7.06)	25.88 (6.11)*
Ethnicity			
Han (%)	84.37	51.39	48.61
Non-Han (%)	15.63	58.23	41.77
Residency			
Urban (%)	44.41	50.56	49.44
Rural (%)	55.59	53.76	46.24
Education			
≤Middle school (%)	60.23	49.92	50.08*
>Middle school (%)	39.76	56.91	43.09
Marital status			
Never married (%)	71.51	54.77	45.23*
Ever married (%)	28.49	46.53	53.47
Length of working	43.98 (35.81)	38.42 (32.27)	49.31 (37.12)***
Living arrangement			
Living with partner (%)	27.25	51.07	48.93
Not living w. partner (%)	72.75	52.96	47.04
Venue level[a]			
Level 1 (>3,000 Yuan) (%)	29.94	35.14	64.86****
Level2 (2,000–3,000) (%)	54.11	60.55	39.45
Level3 (1,000–2,000) (%)	7.24	47.30	52.70
Level4 (<1,000) (%)	8.71	57.30	42.70
Monthly income 1,000 Yuan, mean (SD)	2.67 (2.36)	2.49 (2.34)	2.87 (2.41)*
Self-rated HIV-related knowledge			
Not at all (%)	13.73	80.71	19.29****
Some (%)	71.57	53.84	46.16

	Total	HIV testing status	
		Never tested	Ever tested
A lot (%)	14.71	20.00	80.00
Perception risk of HIV infection[b]			
Likely (%)	5.82	57.63	42.37
Unlikely (%)	94.18	52.15	47.85

FSW female sex workers

[a] Venues are classified into 4 levels by the mean monthly income of FSW in each venue

[b] For perceived risks, regroup the responses into likely (very likely, likely) and unlikely (unlikely, very unlikely)

* $P < 0.05$

** $P < 0.01$

*** $P < 0.005$

**** $P < 0.0001$

Table 2

Multivariate logistic regression on HIV testing on demographic characteristics and HIV/STI-related perceptions (random effect model controlling for ICC[a] in each venue)

	HIV testing aOR 95% CI
Age	1.09 (1.04, 1.13) ****
Education	0.64 (0.47, 0.86) ***
Marital status	0.78 (0.51, 2.20)
Length of working	1.00 (1.00, 1.00)
Venue level	
Level 1	Reference
Level 2	0.39 (0.23, 0.66) ****
Level 3	0.44 (0.19, 1.02)
Level 4	0.12 (0.04, 0.38) ****
Income	1.01 (0.94, 1.08)
HIV-related knowledge	3.25 (1.90, 5.55) ****
Perceived risk of HIV infection	0.70 (0.47, 1.05)

ICC intra-class correlation, *aOR* adjusted odd ratio, *95% CI* 95% confidential interval

[a] Rho = 0.12 ****

*** $P < 0.005$

**** $P < 0.0001$

Table 3

Association of HIV testing and sexual risks

Sexual risks	Total N (%)	Never tested N (%)	Ever tested N (%)
Inconsistent Condom use with clients	46.49	59.31	40.69****
Inconsistent condom use with clients in last three sex acts	33.44	64.40	35.60****
Intention of inconsistent condom use with clients in future	20.14	60.50	39.50**
Inconsistent condom use with stable partners	82.48	54.62	45.38*
Inconsistent condom use with stable partners in last three sex acts	66.21	55.99	44.01*
Intention of inconstant condom use with stable partners in future	74.20	53.88	46.12
History of STD infection	7.61	57.89	42.11
History of Drug abuse	18.21	65.95	34.05****

* $P < 0.05$

** $P < 0.01$

*** $P < 0.005$

**** $P < 0.0001$

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Table 4

Multivariate logistic regression on association of HIV testing and sexual risks

	Inconsistent condom use w. stable partner	Inconsistent condom use w. clients	Intention of inconsistent condom use w. stable partner	Intention of inconsistent condom use w. clients	STD infection	Drug abuse
	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)
HIV testing	0.64 * (0.41,0.97)	0.63 *** (0.46, 0,84)	0.83 (0.61, 1.13)	0.64 * (0.44, 0.93)	1.01 (0.60, 1.71)	1.21 (0.82, 1.78)
Age	1.04 (0.97, 1.10)	1.05 * (1.00, 1.09)	1.00 (0.96, 1.05)	1.04 (0.98, 1.09)	0.96 (0.89, 1.04)	0.82 **** (0.76, 0.88)
Had > middle school educ	0.78 (0.50, 1.20)	1.10 (0.81,1.49)	0.63 *** (0.46,0.86)	1.24 (0.85,1.79)	1.03 (0.604,1.77)	1.16 (0.79,1.69)
Ever married	1.03 (0.54, 1.97)	0.96 (0.62,1.48)	1.06 (0.67,1.66)	0.80 (0.46,1.40)	0.98 (0.43,2.22)	0.98 (0.51,1.89)
Length of working	1.0 (0.99, 1.01)	1.00 (0.99,1.00)	1.00 (1.0,1.0)	1.00 (0.99,1.01)	1.00 (1.00, 1.01)	1.00 (0.99,1.01)
Venue level						
Level1 (monthly income >3,000 Yuan)	Reference	Reference	Reference	Reference	Reference	Reference
Level2 (2,000–3000 Yuan)	3.15 **** (1.74, 5.69)	3.42 **** (2.18,5.37)	2.12 *** (1.39,3.23)	3.01 *** (1.45,6.23)	0.84 (0.43,1.63)	2.11 * (1.11,4.02)
Level3 (1,000–2,000 Yuan)	2.90 (0.96, 8.75)	2.13 * (1.03, 4.42)	2.48 * (1.14, 5.38)	5.28 *** (1.88, 14.81)	0.86 (0.26, 2.81)	2.72 (0.93, 7.97)
Level 4 (<1,000 Yuan)	1.10 (0.30, 4.07)	1.71 (0.65, 4.49)	1.23 (0.48, 3.13)	6.40 ** (1.72, 23.89)	2.24 (0.48, 10.43)	3.23e-09 (0)
Income	1.07 (0.97, 1.17)	0.90 * (0.83, 0.98)	1.06 (0.99, 1.13)	0.94 (0.84, 1.04)	1.10 * (1.01, 1.21)	1.07 (0.99, 1.16)
Good knowledge of STD	0.93 (0.45, 1.92)	0.90 (0.57, 1.44)	0.86 (0.51, 1.45)	0.89 (0.53, 1.50)	1.10 (0.46, 2.66)	1.02 (0.57, 1.81)
Perceived risk of STD	0.91 (0.51, 1.60)	0.97 (0.65, 1.46)	0.99 (0.65, 1.50)	0.71 (0.43, 1.18)	5.93 **** (3.55, 9.90)	1.97 *** (1.24, 3.13)

Random effect model controlling for intra-class correlation (ICC) within each venue

Rho for each model is: 0.08 *, 0.06 **, 0.04 *, 0.15 ****, 0.05, 0.12 ****

* $P < 0.05$

** $P < 0.01$

*** $P < 0.005$

**** $P < 0.0001$

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Table 5

Barriers of HIV testing and getting results

Reasons	N (%) of not tested or not getting results (N = 679)
Psychological barriers	
Perceive herself low risk for HIV infection	70.23
Fear of taking test (insert the needle and draw blood)	38.25
Fear of others knowing her HIV seropositive	28.12
Fear others know she is a female sex worker	27.58
Worry to be found out HIV positive	23.49
Fear of others suspecting herself infecting HIV	22.89
Fear of her boss knowing her HIV seropositive	16.46
Doubt test result	14.35
Structural barriers	
Don’t know where to go for HIV testing	46.47
No time to go for HIV testing	41.39
Medical personnel have stigmatizing attitude	29.22
Testing place is far away	26.44
Testing schedule is not convenience	22.24
Cost of HIV test is too high	21.84
Other reasons	
Don’t want to know her HIV serostatus	34.89
Have more trouble if she is found out HIV positive	26.02
Have nothing to do if knowing HIV seropositive, rather not test	17.50
Have known that she is HIV positive, no need for the test	6.81