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HIV and associated risk factors among male clients of female sex workers in a Chinese border region

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Abstract

Background—Male clients of female sex workers (FSWs) serve as a potential bridge of HIV to the general population. Little is known about the characteristics and risk factors for HIV infection among male clients patronizing FSWs in Hekou County, Yunnan Province in southern China bordering with Vietnam.

Methods—Male clients were recruited through outreach of study staff, referrals by Vietnamese FSWs, their bosses, and snowball sampling. Each participant completed a questionnaire survey and donated a blood specimen to test for HIV, herpes simplex virus type 2 (HSV-2), and syphilis. Logistic regression models were fitted to identify factors associated with HIV infection.

Results—Among 306 participants, 28 (9.2%) were HIV positive, 81 (26.5%) were HSV-2 positive, and none were infected with syphilis. Approximately half (n=149, 49.2%) reported always using condoms with sex workers in the past year; 36 (11.8%) reported a history of injection drug use (IDU). Compared to HIV negative men, HIV positive men were more likely to have a history of IDU (64.3% vs. 6.5%) and be co-infected with HSV-2 (50.0% vs. 24.1%).

Conclusions—IDU was the most salient risk factor for HIV infection in this study, which suggests that male clients may acquire HIV from routes other than commercial sex, but the significance of HSV-2 infection indicates that sexual transmission is also of concern. HIV prevention intervention programs for this often ignored and hard-to-reach risk group should be two-pronged, addressing both drug use and commercial sex.

Keywords

HIV; HSV-2; injection drug use; male clients; female sex workers; China

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INTRODUCTION

Reports indicate that the HIV epidemic in China is shifting towards a greater role of sexual transmission, affecting sex workers and their clients, with the potential to spread to the general population.¹ In 2009, it was estimated that 47% of HIV new infections in China were acquired through heterosexual contact, which is considerably higher than the 2005 estimate of 11%.² In 2009 the prevalence of HIV in the general Chinese population was estimated to be 0.1%.^{2, 3} The Chinese Ministry of Health estimated in 2007 that the HIV prevalence was 1.0% among female sex workers (FSWs) and 1.2% among their male clients.⁴ A national probability sample of 2,707 men, found that 7% of Chinese men had ever had sex with a commercial sex worker and 4% had sex with a commercial sex worker in the past 12 months.⁵ Research conducted by UNAIDS indicates that HIV prevalence in Asian countries is correlated with the percentage of males that are clients of FSWs.⁶

Hekou County in Yunnan Province, China is situated at the border with Vietnam. Over the last three decades, China has experienced rapid economic development, which has contributed to the creation of upper-income social classes who have more dispensable income, creating a thriving tourism and migration around border areas in Yunnan Province. This has attracted women from neighboring countries, such as Vietnam, to find husbands or sell sex in China.⁷ Male clients of female sex workers (FSWs) serve as a potential bridge population and could propagate the HIV epidemic to the general population, as previous research indicates low levels of condom use among male clients of commercial sex work in China and high proportions of clients having other regular non-commercial partners.⁸⁻¹¹ Previous literature suggests that clients of FSWs in Hekou County are tourists, truck drivers, and business men,¹² although little is known about their sexual behavior, drug use, and risks of HIV and other sexually transmitted infections (STIs).

This study assessed the relationship between HIV infection and other STIs and risky drug use and sexual behaviors among male clients patronizing FSWs in this Chinese border region. Important leverage points considered in the current study were: socio-economic variables (ex. individual and family income, education, occupation, and hometown) and family variables (ex. marital status, regular sex partners, and biological children).

MATERIALS AND METHODS

Study site and population

This study of male clients of FSWs was conducted between November and December 2010 in Hekou County, Honghe Prefecture, Yunnan Province, China; a region on the Vietnam border. Men were considered eligible for study participation if they were at least 16 years of age, reported having paid for sexual services in the last 12 months, and were able to speak and understand Chinese.

Recruitment of participants

Participants were recruited from the three large, geographically concentrated brothel-based commercial sex markets near the Hekou border crossing. Study staff approached all men entering the commercial sex markets to inform them about the study. Male clients were also recruited through snowball sampling through Vietnamese FSWs, their bosses, and other clients. An incentive of 10 CNY (\$1.50 USD) was provided to the person referring for each participant recruited. Written informed consent was obtained from all participants. No data were collected on participant refusal.

Data collection

Local Hekou study staff were trained in standardized methods of data collection by specialists from the National Center for AIDS/STD Control and Prevention (NCAIDS) of China CDC. Graduate students from NCAIDS were present for the duration of the study for quality assurance purposes. The study questionnaire was in Chinese. The questionnaire was created based on the HIV Behaviors Surveillance Survey (BSS) developed by Family Health International;¹³ a questionnaire developed by the Population Council for use among South African mine workers and sex workers in the Carletonville Study;¹⁴ and the China National Guidelines for HIV Baseline Surveys.¹⁵ The study questionnaire was reviewed by the male study staff to assure that the questions would be acceptable to the target population. Data were collected on demographics, sexual behavior, medical history, and drug use through face-to-face questionnaire interviews conducted by male study staff. Venous blood samples were collected by trained physicians. Subjects were compensated 50 CNY (7 US\$) for study participation. Study participants who provided specimens for laboratory testing were given an appointment card with their participant identification number to return four weeks after the study visit to receive their results and post-test counseling. HIV/STI treatment was not provided by the study, but HIV positive participants were referred to the Hekou County People's Hospital and considered for eligibility in the national free antiretroviral therapy program. STI positive participants in need of treatment were referred to the Hekou County People's Hospital.

Laboratory testing

Blood specimens were screened for HIV antibodies by enzyme-linked immunosorbent assay (ELISA: Organon Teknica, Boxtel, Co., Ltd., the Netherlands), and positive tests were confirmed by HIV-1/2 Western blot assay (HIV Blot 2.2 WBH; Genelabs Diagnostics, Singapore). Blood specimens were also tested for antibodies for HSV-2 by ELISA (Herpe Select-2 ELISA IgG; Focus Technologies, Cypress, CA). Syphilis was tested using rapid plasma reagin (RPR; RPR Diagnostics kit; Xinjiang Xindi, China) for *Treponema pallidum* and positive specimens were confirmed using *T. pallidum* particle assay (Serodia; Fujirebio, Inc., Fuji, Japan).

Data analysis

Data from the questionnaires and laboratory tests were entered into EpiData 3.1 (Odense, Denmark). All data were analyzed using SAS 9.1 (Cary, NC). Means and standard deviations (for normal continuous data); medians and interquartile ranges (IQR) (for non-normal continuous data); and the frequencies and percents for each level of categorical variables were calculated. The outcome of interest was HIV infection. Prevalence ratios (PR) and 95% confidence intervals (CI) were calculated to examine associations in bivariate analyses using single variable log-binomial general linear regression models. Variables significant ($P < 0.1$) in bivariate analyses were considered for inclusion in a multivariate general linear regression model with a Poisson distribution. Variables were entered and eliminated from the model in a stepwise manner with $P < 0.1$ for entry and $P > 0.05$ for exit.

Ethics approval

This study received approval from the institutional review boards of NCAIDS and Tulane University.

RESULTS

Demographic characteristics

Table 1 displays the demographic characteristics of study participants. Of 306 male clients, the median age was 36 (range: 18–70). All participants were Chinese; 214 (69.9%) of whom were Han majority ethnics. Two fifths of participants were residents of Hekou County (n=125, 40.8%), 36 (11.8%) were from other counties in Honghe Prefecture, 94 (30.7%) were from other prefectures in Yunnan Province, and 51 (16.7%) were from other Chinese provinces. Most had not gone beyond middle school education (n=265, 86.6%). Over half were married (n=174, 56.9%), 5 (1.6%) cohabitating, 93 (30.4%) single, 31 (10.1%) divorced, and 3 (1.0%) widowed. The population of male clients in the current study is somewhat mobile, with 59.2% and 47.4% having registered residence outside of Hekou County and Honghe Prefecture, respectively.

Health knowledge and attitudes

Almost all participants had ever heard of STIs (n=267, 87.3%) and HIV (n=294, 96.1%). Slightly more than a quarter (n=71, 26.6%) perceived that they have no risk of acquiring an STI and 23 (8.6%) did not know their risk. Similar numbers perceived that they had no risk of acquiring HIV (n=78, 26.4%) and 40 (13.6%) did not know their risk; of those who reported no perceived risk of acquiring HIV, only 28 (36.4%) consistently used condoms with FSWs in the past year. HIV knowledge was moderate in this population. Less than half knew that someone with HIV can appear healthy (n=115, 38.9%). Misconceptions were common for incorrect HIV transmission routes as demonstrated by the lower numbers of those who correctly answered that HIV cannot be transmitted by the following transmission routes: sharing food with someone who is HIV-infected (n=188, 63.5%), shaking hands with someone who is HIV-infected (n=219, 74.0%), and mosquito bites (127, 42.9%). More participants correctly answered questions pertaining to the actual methods of HIV transmission including injection drug use (n=228, 77.0%), sharing needles with someone who is HIV-infected (n=262, 88.5%), having more than one sexual partner (n=257, 86.8%), having unprotected sex with casual partners and FSWs (n=249, 84.1%), HIV positive mothers transmitting to their baby in delivery (n=244, 82.4%) or breastfeeding (n=225, 76.0%), and having a blood transfusion with HIV-contaminated blood products (n=254, 85.8%). There was no significant difference between the number of 11 HIV knowledge questions that were answered correctly between HIV positive (median: 10 (90.9%), (IQR: 7.5, 10)) and HIV negative (median: 8 (72.7%), (IQR: 7, 10)) participants (Wilcoxon test, $P=0.15$).

The primary sources of HIV/STI information were conversations with friends (n=218, 73.6%), television (n=217, 73.3%), brochures and posters (n=190, 64.2%), newspapers and magazines (n=185, 62.5%), local health workers (n=158, 53.4%), and radio programs (n=137, 46.3%). Only 34 (11.5%) had ever been tested for HIV, of which only 9 (26.5%) knew their results.

Sexual behavior and drug use

The median age of sexual debut was 19 (IQR: 18–22). Two-thirds (n=202, 66.0%) of men had a regular (non-commercial) sex partner at the time of the study and 133 (65.8%) lived with these partners. Only 13 (6.4%) reported always using condoms with their regular sex partners. The median age at first sex with an FSW was 26 (IQR: 21–36). The median typical FSW payment was 50 CNY (7 US\$) (IQR: 30–50 CNY (4–7 US\$)). As a comparison, although the minimum wage varies by province and municipality, in Yunnan Province in July 2010, the minimum hourly wage ranged from 6–8 CNY (0.90–1.20 US\$) and the minimum monthly salary ranged from 630–830 CNY (90–120 US\$).¹⁶ Slightly less than

half (n=140, 47.0%) reported having sex with a FSW in the past 30 days. In the past year, clients had sex with a median number of 3.5 FSWs (IQR: 2–12) and 149 (49.2%) reported always using condoms with FSWs during this time frame. More than half (n=195, 64.4%) reported ever drinking alcohol prior to visiting FSWs in the past year. One (0.3%) participant reported ever having sex with a man.

Thirty-nine participants reported ever using illicit drugs (n=39, 12.8%); of these drug users, 36 (92.3%) had ever injected drugs and of these 14 (38.9%) reported ever sharing injection equipments.

HIV and associated risk factors

Twenty eight (9.2%; 95% CI: 5.9%, 12.4%) participants were HIV positive, 81 (26.5%; 95% CI: 21.5%, 31.4%) were infected with HSV-2, and none was infected with syphilis. Risk factors for HIV infection are shown in Table 6.2. Registered residence in Hekou County (PR: 4.3; 95% CI: 1.9, 9.9), personal monthly income <400 RMB (60 US\$) (PR: 2.4; 95% CI: 1.2, 4.8), ever having been tested for HIV prior to this study (PR: 2.6; 95% CI: 1.2, 5.6), having a regular noncommercial sex partner (wife or girlfriend) (PR: 0.2; 95% CI: 0.1, 0.5), history of illicit drug use (PR: 12.3; 95% CI: 6.1, 24.7), history of injection drug use (PR: 13.5; 95% CI: 6.8, 26.9), and HSV-2 infection (PR: 2.8; 95% CI: 1.4, 5.6) were considered significant for HIV infection at the bivariate level. History of injection drug use (PR: 12.1; 95% CI: 5.7, 25.7) and HSV-2 infection (PR: 2.0; 95% CI: 1.0, 3.9) were retained in the multivariate model.

DISCUSSION

The mobility of this population, coupled with the high mobility of Vietnamese FSWs in Hekou County increases the potential of spreading infections beyond provincial and national borders. This study found alarmingly high HIV (9.2%; 95% CI: 5.9%, 12.4%) and HSV-2 (26.5%; 95% CI: 21.5%, 31.4%) prevalences among male clients of FSWs in Hekou County, Yunnan Province, China. More than half (64.3%) of HIV infections were likely due to IDU. This HIV prevalence is higher than that found among male clients in other towns in Yunnan Province (1.8%–6.0%), Sichuan Province (1.7%), and in two beach towns in northeast Vietnam (4.1%–6.3%).^{8, 17, 18} The low prevalence of syphilis is surprising given the clients reported high risk behaviors. Other studies in southern China have found syphilis prevalence between 2–5% among clients of female sex workers.^{8, 18} There were no known syphilis treatment campaigns in Hekou County. Low prevalence of syphilis may be due to small sample size or reflective of low syphilis prevalence within these clients' sexual networks.

History of injection drug use and HSV-2 infection were factors associated with HIV infection. Although reported condom use with FSWs was low, it was somewhat higher than that reported from other studies of male clients in Yunnan Province.^{8, 17} The current study did not find a significant difference between HIV-related knowledge between those who were HIV positive and HIV negative. Among male miners who patronize FSWs in Gejiu, Yunnan, greater HIV knowledge was associated with HIV infection in bivariate analysis, but no longer significant in multivariate analysis.⁸ The results from the current study emphasize that interventions that promote HIV knowledge, although necessary, are not sufficient in preventing HIV transmission.

Injection drug use

IDU was the strongest predictor for HIV infection among this population of male clients of commercial sex. Both drug use and injection drug use have previously been found to be

associated with HIV in China.^{19, 20} Mathematical models have indicated that IDUs are an important source of the heterosexual HIV epidemic in Asia.²¹ A phylogenetic analysis of HIV in Northern Vietnam, frequently found that sequences associated with IDUs were combined with those associated with sexual transmission.²² The relationship between IDU and HIV infection is thought to have exacerbated China's HIV epidemic through heterosexual transmission.^{23, 24} Among migrant males in Beijing, Shanghai, and Nanjing, those who were clients of commercial sex were more likely to use illegal drugs compared with those who did not purchase commercial sex.²⁵ It has been estimated that there are approximately 80,000 IDUs in Yunnan Province,²⁶ and HIV prevalence among IDUs could be as high as 28.4%.²⁷ Previous studies in Yunnan Province found that 1.6–1.8% of male clients had positive urine testing for opiates.^{8, 17} Research of FSWs in Kaiyuan, Yunnan (200 km north of Hekou) found a high prevalence of IDUs among FSWs; IDU was the most significant risk factor for HIV infection in this population.²⁸ Since history of drug use has also been shown to be associated with being a client of sex workers in other cities in China,²⁵ it is worth considering the development of two-pronged HIV prevention programs that address both drug use and commercial sex. A study of Vietnamese FSWs in this region conducted by the authors of the current study, showed that HIV prevalence was 3.2%, and none reported using illicit drugs (K.H. Reilly, unpublished data, 2011). Chinese male clients were found to have higher HIV prevalence than Vietnamese FSWs in this border region. Vietnamese FSWs likely become infected from their Chinese clients, and these women could play a bridging role of bringing the disease from the destination country of their commercial sex trade to their home country.

Herpes simplex type-2

HSV-2 prevalence in this study is somewhat higher than that in another study in Gejiu City, Yunnan Province.⁸ Researchers have hypothesized that HSV-2 infection may facilitate the acquisition of HIV.²⁹ Studies of FSWs and male clients in other cities in Yunnan Province have also found significant associations between HIV and HSV-2 infections.^{8, 30–32} Those who are HIV positive may also be more likely to have infectious outbreaks of HSV-2 due to a weakened immune response, which could facilitate increased transmission of HSV-2 to others.³³ The significant association between HIV and HSV-2 in this study emphasizes the growing role of commercial sexual transmission in China's HIV epidemic.

Limitations

This study is subject to several limitations. The interviews were conducted by local CDC staff and the data collected are subject to social desirability bias. All interviewers, however, were trained in survey administration, with emphasis on asking study questions in an objective and neutral manner. The cross-sectional nature of this study also impedes the determination of temporal relationships. The size of the study population may have hindered the inclusion of other relevant variables in the multivariable model. Given the number of variables that were significant for HIV infection in bivariate analysis that were not included in the final multivariate model, it is likely that those excluded were confounding the relationship between HIV infection and those variables that were ultimately retained. Those male clients that elected to participate in the current study are likely of lower socio-economic status since high income clients may be less likely to patronize brothels and instead seek out FSWs in what are considered “high-end” sex work establishments (e.g., hotels and karaoke bars); the participants in the current study may, therefore, be at greater risk for HIV and HSV-2 infections compared with all male clients of commercial sex work. Because sex work is illegal, it is impossible to obtain a sampling frame for this population and draw a random sample of participants, therefore, our findings may not be applicable to all commercial sex clients in Hekou or other parts of China. The current study's population has lower socio-economic status compared with male clients of commercial sex work.

included in a national population-based sample of men.⁵ Sampling methods, such time location sampling (TLS) and respondent driven sampling (RDS),³⁴ which have been shown to effectively recruit difficult to reach populations and simulate a random sample when no sampling frame exists, should be considered for future research of clients of commercial sex work.

Conclusion

This is the first study to quantitatively examine the risk factors for HIV among clients of FSWs in this Chinese border region. This study reveals that IDU and HSV-2 are important risk factors associated with HIV infection among this group of male clients patronizing FSWs in Hekou County, Yunnan Province, China. Chinese AIDS control programs have employed mass media campaigns for safe sex in the general population and are provide condoms in hotels and entertainment venues. Programs are also being conducted with FSWs to encourage condom use. Efforts should continue and intensify to reach IDUs and encourage condom use along with harm reduction strategies such as needle exchange and methadone maintenance therapy in order to reduce the risk of HIV acquisition and transmission. Mobility and the hard to reach nature of male client populations indicate that broad-based educational campaigns should be considered, which target to inform the general population, thereby reaching potential male clients.

Given the high rates of both HIV infection and unprotected sex among male clients of FSWs, this group may serve as a bridge population and could propagate the HIV epidemic to the general population. HIV prevention interventions in China and East Asia typically focus on FSWs, but not their clients. Interventions that target male clients of FSW in China are greatly needed.

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SUMMARY

A study of clients of female commercial sex workers in Hekou, China found that injection drug use and herpes simplex type 2 virus were independently associated with HIV infection.

TABLE 1

Characteristics of Male Clients of Female Sex Workers in Hekou, China (N = 306)

Variable	N	%
Age		
[lt]36 yr	146	47.7
[mtequ]36 yr	160	52.3
Ethnicity		
Han	214	69.9
Other	92	30.1
Registered residence		
Hekou County	125	40.8
Other county in Honghe Prefecture	36	11.8
Other prefecture in Yunnan Province	94	30.7
Other Chinese province	51	16.7
Highest level of education completed		
No schooling	19	6.2
Primary school	112	36.6
Middle school	134	43.8
High school	36	11.8
College or university	5	1.6
Marital status		
Married	174	59.9
Cohabiting	5	1.6
Single	93	30.4
Divorced	31	10.1
Widowed	3	1.0
Monthly income		
[lt]400 CNY (60 US\$)	100	32.7
[mtequ]400 CNY (60 US\$)	206	67.3
Age of sexual debut [lt]18 yr	73	24.3
Has regular noncommercial sex partner	202	66.0
Always uses condoms with regular sex partner	13	6.4
Typical FSW payment [lt]50 CNY (7 US\$)	104	34.8
No. FSWs sex with in the past year [mt]3	153	50.0
Always use condoms with FSWs in the past year	149	49.2
Ever drank alcohol prior to visiting FSWs in the past year	195	64.4
History of illicit drug use	39	12.8
History of injection drug use	36	11.8
HIV	28	9.2
HSV-2	81	26.5

TABLE 2

Risk Factors for HIV Infection Among Male Clients of Female Sex Workers in Hekou, China

Variable	N	N (%) of HIV Infections	PR (95% CI)	P
Age (yr)				
[lt]36	146	12 (8.2%)	0.8 (0.4, 1.7)	0.59
[mtequ]36	160	16 (10.0%)		
Han majority ethnicity				
Yes	214	20 (9.3%)	1.1 (0.5, 2.4)	0.86
No	92	8 (8.7%)		
Registered resident in Hekou County				
Yes	125	21 (16.8%)	4.3 (1.9, 9.9)	0.0005
No	181	7 (3.9%)		
Education				
[lt]9 yr	265	26 (9.8%)	2.0 (0.5, 8.2)	0.33
[mtequ]9 yr	41	2 (4.9%)		
Personal monthly income				
[lt]400 RMB	100	15 (15.0%)	2.4 (1.2, 4.8)	0.02
[mtequ]400 RMB	206	13 (6.3%)		
Age of sexual debut				
[lt]18	73	7 (9.6%)	1.0 (0.5, 2.3)	0.92
[mtequ]18	228	21 (9.2%)		
Having regular noncommercial sex partners (wife or girlfriend)				
Yes	202	9 (4.5%)	0.2 (0.1, 0.5)	0.0003
No	104	19 (18.3%)		
Having ever had an HIV test				
Yes	34	7 (20.6%)	2.6 (1.2, 5.6)	0.02
No	262	21 (8.0%)		
Inconsistent condom use with FSW in the past year				
Yes	154	17 (11.0%)	1.4 (0.7, 3.1)	0.28
No	149	11 (7.4%)		
Age at first episode of commercial sex				
[lt]26	148	17 (11.5%)	1.7 (0.8, 3.7)	0.15
[mtequ]26	151	10 (6.6%)		
Ever drank alcohol before having sex with an FSW in the past year				
Yes	195	17 (8.7%)	0.9 (0.4, 1.8)	0.67
No	108	11 (10.2%)		
Typical payment for FSW				
[lt]50 RMB	104	12 (11.5%)	1.4 (0.7, 2.9)	0.35
[mtequ]50 RMB	195	16 (8.2%)		
Ever visited Vietnam				
Yes	95	12 (12.6%)	1.7 (0.8, 3.4)	0.16
No	211	16 (7.6%)		

Variable	N	N (%) of HIV Infections	PR (95% CI)	P
History of illicit drug use				
Yes	39	18 (46.2%)	12.3 (6.1, 24.7)	[lt]0.0001
No	267	10 (3.7%)		
History of injection drug use				
Yes	36	18 (50.0%)	13.5 (6.8, 26.9)	[lt]0.0001
No	270	10 (3.7%)		
HSV-2				
Yes	81	14 (17.3%)	2.8 (1.4, 5.6)	0.004
No	225	14 (6.2%)		

1 US dollar = 6.6 RMB.

PR indicates prevalence ratio; RMB, Chinese Renminbi; FSW, female sex worker; HIV, human immunodeficiency virus; HSV-2, herpes simplex virus type 2.