HIV Infection and Sexually Transmitted Diseases in Female Commercial Sex Workers in China

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Summary: A cross-sectional survey was conducted among female commercial sex workers (FSWs) in Zhengzhou, China, to estimate rates of HIV infection and sexually transmitted diseases (STDs) and to document their sexual behavior patterns from October 2000 to January 2001. FSWs were recruited by the snowball sampling technique and were interviewed at their working environments anonymously. This strategy resulted in high rates of response (92%) and concordance (98%) to sensitive questions. A total of 621 FSWs were enrolled. One direct FSW and 1 indirect FSW were positive for antibodies to HIV in oral fluids (prevalence of HIV infection, 1.4% and 0.2%, respectively). A history of STDs was reported by 49% of the FSWs. Most FSWs (87%) reported inconsistent condom use. Ten percent of FSWs recognized their clients as drug users. A few FSWs (2.2%) were injecting drug users, of whom 2 reported incidents of sharing needles/syringes with other injecting drug users. Direct FSWs had more risk characteristics and were more vulnerable to HIV infection and STDs than indirect FSWs. Inconsistent use of condoms and a high level of STDs underscore the urgent need to implement intervention strategies and condom promotion, particularly among direct sex workers in China.

Key Words: female sex workers (FSWs), HIV infection, sexually transmitted diseases (STDs), condom use, injecting drug users

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HIV infection in China has caused multiple epidemics in different population groups nationwide since HIV was first identified among injecting drug users in Yunnan Province in 1989.[1] By the end of 2003, 840,000 people were believed to be living with HIV infection/AIDS in China. Most (61.6%) of these individuals were infected through injection drug use, followed by blood/plasma donations (9.4%) and heterosexual transmission (8.4%).[2,3] However, the actual number of HIV infections was estimated to be >1 million by 2002 and may reach 10 million by 2010 unless effective responses are implemented immediately.[4]

Since the economic reform in 1978, the social structure of China has been changing dramatically. Sexually transmitted diseases (STDs) have reemerged as a major public health problem 30 years after their eradication in China.[5] The incidence of reported STDs (syphilis, condyloma acuminatum, chancroid, nongonococcal urethritis, genital herpes, gonorrhea, and lymphogranulomatosis) in 2002 (58.15 cases per 100,000 population) was 9-fold higher than in 1986 (6.44 cases per 100,000 population) and 1.7-fold higher than in 1996 (34.6 cases per 100,000 population).[6,7] Most STDS (72%) were transmitted by nonmarital sexual contact.[8] Female sex workers (FSWs) were believed to play a critical role in their dissemination due to the high prevalence of STDs among them.[9]

Zhengzhou has a population of >6.5 million, including 2 million people living in urban areas. There are massive population movements in Zhengzhou every day due to its central location in the nation and its railway station, through which 2 of the busiest national railways intersect. To date, HIV infection has been manifested in 2 population groups in Henan (blood/plasma donors and FSWs), although the prevalence of HIV infection has been uncertain among them. Since the early 1990s, HIV has been detected in thousands of villagers living in rural areas of Henan Province, who had donated blood/plasma and were infected as a result of unsafe procedures for blood donation that led to cross-contamination among the donors.[2,4] HIV infection in FSWs in Zhengzhou was first demonstrated by 3 cases in a national HIV sentinel surveillance site in 1997 and then by 2 more in 1999. These data were generated from FSWs who were detained in a local reeducation center due to their illegal sexual activities[10,11] and thus are probably not representative of the population of FSWs. In China, most epidemiologic studies of FSWs have been conducted among FSWs who were not in their commercial environment.[10–13] In this study, we undertook a survey among

nonincarcerated FSWs in Zhengzhou to examine the prevalence of HIV infection and STDs and to document their sexual behavior characteristics.

METHODS

Data Collection

A cross-sectional study was conducted among FSWs between October 2000 and January 2001 in Zhengzhou. To increase sampling efficiency and the response rate, both local female public health nurses and FSWs were invited to be interviewers after obtaining informed consent. The recruited FSWs were responsible for recruiting additional FSWs to participate in the study. The staff nurses administered the interview schedule. All team members had similar training about the study, which was based on the results of a pilot study that was conducted to evaluate operational procedures and the acceptability of the questionnaire.

Direct and indirect FSWs were identified by previous observations and pilot studies in Zhengzhou. Direct FSWs were not establishment based; most were "roadside girls" in mini-motels. They receive lower compensation than indirect FSWs, who usually provide other services in addition to sexual services in establishments such as hair salons, massage parlors, and other commercial entertainment centers. FSWs were recruited by a snowball sampling technique, which was initiated in 2 local private STD clinics. Verbal informed consent was obtained from each participant before collection of data and an oral fluid sample in the participants workplace. A flyer about HIV/STDs and a pen were distributed to each participant. The Institutional Review Boards of both UCLA and the China Centers for Disease Control and Prevention approved the protocol used in this study.

A 2-part anonymous questionnaire was developed. The first part, concerning socioeconomic and demographic information and knowledge of HIV/AIDS, was administered by the staff nurses. The questions in the second part were designed to collect sensitive information, such as sexual behavior practices, drug use, and STD history. This part was administered in Mandarin using a tape recorder with earphones and an answer sheet,[14] which had only the numbers corresponding to each question on it. Upon completing the questionnaire, a small amount of oral fluid was collected, using the Epitope OraSure HIV-1 Oral Specimen Collection Device (Epitope, Inc., Beaverton, OR). The screening tests for antibodies to HIV in the oral fluid samples were carried out by the Henan Central Blood Bank (Red Cross Blood Center, Henan) with Vironostika HIV Uni-Form II oral test kits (Organon-Teknika Corporation, The Netherlands) according to the manufacturer's instructions. There was no confirmation of positive samples.

Statistical Analysis

All analyses were performed using Epi Info 2000 (Centers for Disease Control and Prevention, Atlanta, GA) and the SAS 6.12 software package (SAS Institute, Cary, NC). Differences between direct and indirect FSWs were assessed by univariate analysis, using the χ^2 test and the Student t test for proportional and continuous variables, respectively. Logistic regression was performed for multivariate analysis by assessing the adjusted odds ratios from the univariate analyses. Selection of variables for entry into the logistic model was based on the odds ratios with $P < 0.10$ in univariate analysis. The variables of knowledge about HIV/AIDS transmission included 12 questions. Correct answers were assigned 1 point and summed to obtain the individual's score.

RESULTS

Description of Participants

Thirty-nine FSWs (12 direct and 27 indirect) refused to participate in the survey, and 14 participants (5 direct and 9 indirect) withdrew from the study because they were unwilling to answer the sensitive questions in the second part of the questionnaire. Three potential establishments did not agree to participate. A total of 621 FSWs, 92% of those approached, were enrolled in the study, including 105 direct and 516 indirect FSWs. Twenty-two establishments were involved in enrollment of indirect FSWs, with an average of 23 indirect FSWs per establishment.

General characteristics of the participants are listed in Table 1. The mean age of the participants was 23 years. Three hundred ninety-six (63.8%) of the respondents were born in rural areas. The average duration of schooling was 7.3 years. More than one half (64.4%) of the participants graduated from middle school or higher. Employment/career before sex work included the following: farmers, 134 (21.6%); waitresses in establishments such as massage parlors and hair salons, 145 (23.3%); unemployed, 102 (16.4%); and various other occupations.

Participants' knowledge of HIV/AIDS was evaluated by scoring correct answers on 12 statements to which they agreed or disagreed (Table 2). Although most (86.5%) of them had heard of HIV/AIDS, their knowledge about HIV/AIDS was relatively poor (median score = 6). When asked about their personal risk of being infected by HIV, most participants (81%) answered either "no chance" or "don't know."

Fourteen FSWs (2.3%) admitted to drug use, of whom 10 were currently using drugs. Two of the 5 injecting drug users reported sharing needles/syringes with others $\geq$1 times during the last 7 days.

Sexual Behavior

The median duration of sex work was 1 year, but 10% of participants had worked as FSWs for >3 years. Most FSWs (63.3%) had been involved in sex work only in Henan, but 88 (14.2%) had migrated among at least 3 different provinces for sex work.

The median number of clients reported by each woman was 6 per week. When asked the occupation of their most frequent clients, more than one half (59.3%) of the participants answered businessmen. Other major client occupations included officers (29%), drivers (24%), and workers (17%). Fifty-nine participants (9.5%) reported drug-using clients. Forty-eight women (7.7%) admitted to engaging in intercourse during menstruation.

Most FSWs (87%) did not insist on condom use with their clients, averaging 2 non-condom-using clients per month. When asked for reasons why not (multiple choice), the most

TABLE 1. Sociodemographic and Sexual Behavior Characteristics of 621 FSWs

Characteristic	No. (%)
Age (y)	
19 or younger	170 (27.0)
20–24	250 (41.0)
25–29	131 (19.7)
30 or older	70 (11.5)
Marital status	
Married	117 (18.8)
Never married	414 (66.7)
Other	90 (14.5)
Schooling (y)	
0–4	135 (21.7)
5–8	208 (33.5)
9–11	217 (34.9)
≥12	61 (9.8)
Education level	
No education	86 (13.8)
Primary school	135 (21.7)
Middle school	282 (45.4)
High school	74 (11.9)
College and higher	44 (7.1)
Ever heard of HIV/AIDS	537 (86.5)
Score of knowledge about HIV/AIDS (based on 12 answers)	
Poor (≤4)	238 (38.3)
Medium (5–8)	264 (42.5)
High (9–12)	119 (19.2)
Perception of personal risk for HIV infection	
No chance	175 (28.2)
Some chance	64 (10.3)
Very likely	54 (8.7)
Do not know	328 (52.8)
Age at first intercourse (y)	
14 or younger	25 (4.0)
15–19	381 (61.4)
20–24	207 (33.3)
25 or older	8 (1.3)
Age of initiating sex work (y)	
14 or younger	3 (0.5)
15–19	250 (40.3)
20–24	230 (37.0)
25–29	98 (15.8)
30 or older	40 (6.4)
No. provinces in which engaged in sex work	
1	393 (63.3)
2	140 (22.5)
3	50 (8.1)
4	27 (4.3)
≥5	11 (1.7)
Median no. clients per week	6
Consistent use (always) of condom with clients	
Yes	82 (13.2)
No	539 (86.8)
No. sex services without using a condom per month	
0	60 (11.1)
1	102 (18.9)
2	140 (26.0)
3	112 (20.8)
4	61 (11.3)
≥5	64 (11.9)
Recognized client as drug user	59 (9.5)
History of drug use	
Injection	5 (0.8)
Noninjection only	9 (1.4)
HIV infection	2 (0.3)
Self-reported STD history	
STD	123 (19.8)
Genital ulcers	69 (11.1)
Vaginal warts	67 (10.8)
Vaginal discharge	268 (43.2)

frequently reported reasons were "know the client" (49.2%) and "like the client" (48.6%), followed by "clients' offering more compensation" (18%) and "clients' request only" (17.8%). The answers to the question "Do you have a boyfriend?" asked in both parts of the questionnaire separately showed a 98% concordance rate.

Prevalence of HIV Infection and STDs

Two (1 direct and 1 indirect) of 545 FSWs (90 direct and 455 indirect) whose oral fluid specimens were available for testing were positive for antibody to HIV, a prevalence of HIV infection of 0.4% (1.1%, direct FSWs; 0.2%, indirect FSWs). The HIV-positive indirect FSW was an injecting drug user.

One hundred twenty-three (19.8%) of the respondents reported being previously diagnosed with an STD by a physician. However, when asked whether they ever had "genital ulcers," "vaginal warts," or "vaginal discharge," either diagnosed by a physician or self-diagnosed (multiple choice), 69 (11.1%), 67 (10.8%), and 268 (43.2%) of the participants, respectively, recalled that they had ever had such episodes. Combining FSWs reporting these 3 conditions with those reporting an STD, a total of 304 participants (49%) had been infected with an STD: 61.9% of direct FSWs and 46.3% of indirect FSWs.

Direct and Indirect FSWs

Characteristics of direct and indirect FSWs that were significantly different are shown in Table 3. Indirect FSWs were younger (mean age, 22.4 years), less often married (15.7%), more highly educated (mean duration of schooling, 7.8 years; 71.5% completed middle school), and less likely to have a rural background (60.3%) than direct FSWs (26.8 years, 34.3%, 4.9 years, 29.5%, and 81.0%, respectively). No direct FSWs, but 14 indirect FSWs (2.7%), reported a history of drug use.

The 2 groups also had different sexual behaviors. Indirect FSWs were characterized by earlier first intercourse (mean age, 18.3 years), earlier involvement in sex work (mean age, 20.8 years), a higher rate of consistent condom use (14.9%),

TABLE 2. Statements About HIV/AIDS to Assess Participant Knowledge

1. AIDS is a disease that has been found to affect only injection drug users.
2. You can tell someone has the AIDS virus by looking at them.
3. You can get infected by the AIDS virus by shaking hands with an infected person.
4. A woman can infect her baby with HIV during pregnancy and/or delivery.
5. If one member of a couple is infected by the AIDS virus, it is very likely that his/her partner will become infected.
6. The AIDS virus can be transmitted by sexual intercourse.
7. Use of a condom can reduce the chance of being infected by the AIDS virus through sexual intercourse.
8. AIDS can be prevented by a vaccine.
9. AIDS can be cured by medicines.
10. It is difficult to cure AIDS, but one can live with AIDS; there will be few serious outcomes in the future if proper treatment is offered.
11. Treatment of AIDS is very expensive.
12. AIDS virus can be spread by sharing unclean needles/syringes.

Responses were agree, disagree, or don't know.

fewer clients (average, 6 per week), and fewer STDs (17.1%) than direct FSWs (19.7 years, 25.5 years, 4.4%, 8 per week, and 33.3%, respectively).

Risk Factors for STDs

A logistic model was set up to estimate adjusted odds ratios of variables related to STDs (either an STD history or related disorders) (Table 4). The entry of variables into the model was based on the results of univariate analyses ($P < 0.1$).

Inconsistent condom use was independently associated with STDs; the more episodes of sexual contact without using condoms, the higher the likelihood of STDs. FSWs who reported not using a condom at least 2 times per month were more likely to have reported having had an STD (64.1%; 152 of 237). A relatively lower proportion of those FSWs who claimed <2 unprotected sexual encounters reported an STD history (46.3%; 112 of 242). An STD history was reported by 30% (40 of 142) of FSWs who reported either consistent condom use or seldom providing sex services without condoms (less than once per month). FSWs who reported sex work during menstruation and intercourse with drug users had more previous STDs. A higher proportion of direct FSWs reported a history of STDs than indirect FSWs.

DISCUSSION

Results of several epidemiologic surveys among FSWs in China have been reported recently.[10–13] Most of these studies collected data from women who were detainees in reeducation centers, clinic attendees, or hospital patients. FSWs in China are difficult to access because of their illegal status and the covert nature of their work. In this study, we tried to recruit FSWs and collect data in their working environments, using a snowball sampling technique and administering the questionnaire anonymously. These strategies probably contributed to the relatively high response rate (92%) and high concordance of our data (98% concordance rate of answer to the question "Do you have a boyfriend?" in parts 1 and 2 of the questionnaire).

Initially we entered establishments under the guise of being customers. Usually once they knew the purpose of the visit, FSWs denied being involved in prostitution and informed their managers, who would then ask us to leave the establishments because they were afraid we were police or journalists. At the same time, all the FSWs in the establishment immediately "disappeared." Therefore, we recruited establishments through our colleagues who, for various reasons, had friendly relations with the managers and were willing to introduce us as "legitimate." Nonetheless, 3 of 25 establishments still refused to participate.

Some of the women were recruited into sex work by FSWs who were their friends and usually came from the same region of China. This would lead to a high efficiency of sampling among those with similar backgrounds. On the other

TABLE 3. Selected Characteristics of Direct and Indirect FSWs

Characteristic	Direct (95% CI)	Indirect (95% CI)	*P*
No. FSWs	105	516	—
Mean age (y)	26.8 (25.4–28.2)	22.4 (22.0–22.8)	<0.001*
Percent married	34.3 (25.2–43.4)	15.7 (12.6–18.8)	<0.001†
Mean duration of schooling (y)	4.9 (4.2–5.6)	7.8 (4.5–8.1)	<0.001*
Percent completing middle school	29.5 (20.8–38.2)	71.5 (67.6–75.4)	<0.001†
Percent born in a rural area	81.0 (71.4–88.5)	60.3 (56.0–64.5)	<0.001†
Mean age at first intercourse (y)	19.7 (19.0–20.4)	18.3 (18.1–18.5)	<0.001*
Mean age at initiation of sex work (y)	25.5 (24.2–26.8)	20.8 (20.5–21.1)	<0.001*
Mean no. clients per week	8.1 (7.3–9.1)	6.0 (5.8–6.4)	<0.001*
Percent always using condoms	4.4 (0.0–8.8)	14.9 (11.8–18.0)	<0.001†
Percent reporting history of STDs	33.3 (24.3–42.4)	17.1 (13.8–20.3)	<0.001†‡
Percent ever having used drugs	0.0	2.7 (1.3–4.1)	—

*Student *t* test.
†χ^2 test.
‡Fisher exact test.
CI indicates confidence interval.

TABLE 4. Factors Associated With Self-Reported STD History Among Direct and Indirect FSWs

Characteristic	Adjusted OR*	95% CI	*P*
>2 sexual services without using a condom per month	5.2	2.3–12.0	0.0001
1–2 sexual services without using a condom per month	4.6	2.0–10.4	0.0003
Providing sexual services during menstruation.	3.2	1.7–6.1	0.0004
Having drug-using clients	2.1	1.1–4.0	0.0191
Direct FSWs	2.4	1.5–3.9	0.0006

*Multiple logistic regression analysis.
CI indicates confidence interval; OR, odds ratio.

hand, some FSWs did not want anyone else to know about their sex work. Thus, they neither wanted to be involved in the study nor wanted to refer others, leading to low sampling efficiency. The difference in sampling efficiencies among different subgroups of FSWs may have introduced a sampling bias in this study.

In this report, the differences between direct and indirect FSWs in China are described for the first time. In Zhengzhou, indirect FSWs usually provide other services in addition to prostitution (such as massages, saunas, dancing, etc). Such establishments need to provide these other services to be registered with the local government. Each establishment has 1 manager ("mammy") over the indirect FSWs, but each indirect FSW usually also has at least 1 pimp, because they might be involved in sex services in different establishments at the same time or during a short period. Conversely, direct FSWs, who work in the streets or in minimotels, usually have no pimp managing them. Because they are not establishment-based, they provide no services other than sex. Our data indicate that direct FSWs are more vulnerable to HIV infection (1.1%) and STDs (61.9%), probably due to their lower education level, less knowledge about HIV/AIDS, and their lower rate of condom use.

Direct FSWs in Zhengzhou receive less compensation (median, US $6) than indirect FSWs (median, US $24). During the survey, we noticed that some direct FSWs traded sex for a meal. These FSWs probably reflect the increasing economic disparity between rich and poor resulting from the shift to a market-driven economy in China.

The prevalence (0.37%) of HIV infection observed in this study was commensurate with the prevalence among FSWs (0.39%) reported by the National Sentinel Surveillance in Zhengzhou in 1999.[10] However, it is much lower than that reported recently by other studies in China.[12,13] One study revealed a prevalence of HIV infection of 1.4% among FSWs in Guangzhou.[12] In that study, 7% of participants reported a history of injecting drug use. HIV infection was independently associated with injected drug use (adjusted odds ratio = 8.0). Another study found a prevalence of HIV infection of 10.3% among FSWs in Yunnan, where the HIV epidemic has been established among injecting drug users for >10 years.[13] Fifty-eight percent of FSWs in that study reported a history of drug use. However, injecting drug use among women participating in this survey was low (0.8%). Thus, the variation in the prevalence of HIV infection is probably due to the proportion of injecting drug users among FSWs.

In our study, an STD history was based on self-reporting. The lower percentage (19.8%) in our study compared with rates in other studies[12,13] might be partially due to underestimation or underreporting of an STD history, because most participants did not regularly have checkups for STDs. Forty-seven percent of the 287 women who had genital warts, vaginal warts, and/or vaginal discharge reported no history of STDs, underscoring their lack of awareness about STDs. As expected, unsafe sexual behaviors (sex work with inconsistent condom use, intercourse during menstruation, and having drug-using clients) were independently associated with STDs.

Although the prevalence of HIV infection is still very low among this group of FSWs, their high prevalence of STDs and their high percentage of inconsistent condom use suggest that once HIV infection is introduced into their network, it will spread rapidly. Accordingly, a "100% condom campaign"[15] and regular checkups for STDs should be implemented immediately to prevent the HIV epidemic before it takes hold in Zhengzhou. More health education programs targeting FSWs are urgently needed. Distribution of free condoms will greatly assist the prevention of HIV infection/STDs among direct FSWs. Direct FSWs in particular should be targeted for intervention efforts. There is a window of opportunity to stop the HIV epidemic in Zhengzhou, but health officials and the community must act now.

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