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Risk Factors for Sexually Transmitted Disease Among Rural-to-Urban Migrants in China: Implications for HIV/Sexually Transmitted Disease Prevention

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Abstract

The objective of the study was to identify risk factors associated with sexually transmitted diseases (STDs) among rural-to-urban migrants in Beijing in 2002. Migrants with STDs consisted of 432 migrants who sought STD care in two public STD clinics. Migrants without STDs included 892 migrants recruited from 10 occupational clusters. Multiple logistic regression was used for data analysis. Compared to migrants without STDs, migrants with STDs were more likely to report having engaged in commercial sex (selling or buying sex) (odds ratio [OR] = 2.70, 95% confidence interval [CI]: 1.71–4.25), multiple sex partners in the previous month (OR = 6.50, 95% CI: 3.73–11.32) and higher perceived HIV-related stigma (OR = 1.89, 95% CI: 1.30–2.75). Being a migrant with an STD was also associated with female gender (OR = 4.10, 95% CI: 2.89–5.82), higher education (OR = 2.92, 95% CI: 1.40–6.06), and higher monthly salary (OR = 1.68, 95% CI: 1.23–2.29). Migrants with STDs visited their hometowns more frequently and had more stable jobs than migrants without STDs. Approximately 10% of the migrants with STDs and 7.7% of the migrants without STDs always used condoms. This study suggests that among migrants, acquisition of an STD is associated with higher participation in risk behaviors as would be expected, but also with higher perceived stigma, education, stable jobs, salary, and with female gender. Appropriate behavioral intervention programs are advocated to reduce the risk and stigma among the special population.

INTRODUCTION

The burden of sexually transmitted diseases (STDs) remains high, particularly in developing countries where resources for STD treatment and prevention are limited.¹ China has witnessed an explosion of reported STDs. The number of reported STD cases has risen dramatically since the initiation of economic reform in the 1980s.² Chen and colleagues³ described the epidemiology of STDs in China from 1989 to 1998. During this period, STD incidence increased significantly in both genders, 4.2-fold among women and 3.8-fold among men. The incidence of syphilis and gonorrhea increased approximately 20 times and 2.6 times, respectively. There were 860,000 new STD cases reported in 2000. The actual number of new

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STD cases is, however, thought to be 5–10 times higher than the reported.^{3,4} A recent population-based study reported that the overall prevalence of chlamydial infection and gonococcal infection was 2.6% and 0.08%, respectively.⁵ Recent evidence suggests that cultural sanctions against premarital and extramarital sexual relations are decreasing.⁶ For example, premarital sex and extramarital sex appear to have become more accepted among young people in China.^{7,8} The Chinese Public Security estimates that there are upwards of 4 to 6 million commercial sex workers in 2000.⁹ Economic changes are associated with the increase in commercial sex workers; women from poor rural areas seek better incomes and migrate to large cities seeking economic opportunities.¹⁰ Frequently all that is available are positions in the burgeoning sex trade, fueled by increases in disposable income among many men since economic reform.⁹

The massive rural-to-urban migration, involving an estimated 120 million migrants, is one of the factors fueling the STD epidemic.¹¹ More job opportunities, higher income, and a more attractive lifestyle are factors that attract rural residents to urban areas.^{9,10} Demographic and/or social-educational factors within the burgeoning floating population predispose migrants to higher risk for acquisition of HIV.¹² Most migrants are in the reproductive age. Typically, they are unmarried, living apart from their spouses and children if married, and have a low awareness of HIV/STDs.^{8,13} According to a recent report, the prevalence of any STD was 20.1% among market vendors who were mostly rural-to-urban migrants.¹⁴ Studies have consistently demonstrated that both genital ulceration and nonulcerative STDs act as cofactors for the transmission and acquisition of HIV.¹⁵ The increased incidence of sexually transmitted infections (STIs) foretells the rapid spread of HIV/AIDS in China. The first case of AIDS in China was reported in June 1985. The epidemic is now well established and the infection is spreading.² Although currently the majority of reported HIV infections in China are acquired through injection drug use, heterosexual transmission is now increasing and is expected to become the dominant mode of transmission.¹⁶ In 2000 in the city of Nanning, Guangxi, a 10% seroprevalence of HIV was found among commercial sex workers, most of whom also had a history of drug use. Sixty-three percents of the commercial sex workers reported never using a condom.⁹ The majority of commercial sex workers are migrants from rural areas.^{9,17} Rural-to-urban migrants, therefore, could play an important role in HIV and STD transmissions because they may serve as a bridge linking the transmission from high-risk populations to the general population. To date, studies on the sexual behaviors of Chinese patients with STDs have been limited to patients from the general population.^{18–22} Limited data are available regarding HIV risk and the risk factors for STD/HIV infections among Chinese rural-to-urban migrants, a population at risk of STD/HIV infection and transmission. Accordingly, we undertook a study to investigate the demographics, pattern of migration, sexual risk behaviors, and their association with occurrence of STDs among migrants who sought medical service in public STD clinics and migrants without a complaint of STDs.

MATERIALS AND METHODS

Participants

This study was conducted in Beijing in 2002, the capital city of China with a large rural-to-urban population. Participants were recruited from two different populations in the same city, migrants seeking care for an STD and migrants with no STD complaints. Migrants with STDs were those who sought for care in public STD clinics. Eligibility criteria for selection of migrants with STDs included (1) being a rural-to-urban migrant, (2) 18–30 years of age, and (3) attendance at a public STD clinic for diagnosis and treatment. All eligible migrants with STDs were consecutively invited to participate from November 2002 through January 2003. Two specialized STD clinics in urban districts of Beijing were selected.

Migrants without STDs were derived from participants in a larger feasibility study of an HIV/STD behavioral prevention intervention among Chinese rural-to-urban migrants in the same city in 2002.²³ The original sample was recruited using “quota-sampling” of 10 occupational groups. Based on available government statistics regarding migrant occupations in China, 10 occupational clusters accounting for more than 90% of migrants were selected as the main sampling frame. The number of participants recruited in each occupational cluster was approximately proportionate to the overall estimated distribution of migrants in the cluster. The criteria for the selection of the migrants without STDs from the existing study included: (1) being a rural-to-urban migrant; (2) 18–30 years of age; (3) being sexually experienced; and (4) no report of a prior episode of STD, or current STD-related complaints at the time of interview.

Interview

After obtaining informed consent, each participant was provided a structured questionnaire during a face-to-face interview.²³ Demographic data on age, marital status, level of education, and employment status were ascertained. A detailed sexual history of the number and types of sexual partners, condom use and history of previous STD symptoms were recorded. Migrants with STDs were interviewed in a private waiting room before seeing a doctor.

Measures

Sexual behaviors—HIV/STD risk sexual behaviors were assessed among migrants with STDs and those without through three items: (1) involvement in commercial sex (selling, exchanging, and/or buying sex), (2) number of sexual partners in the last month, and (3) sex with a promiscuous partner (with 3 possible responses: sex with a monogamous partner; sex with a promiscuous partner, or do not know if sex partners were monogamous or promiscuous). In addition, the frequency of condom use was measured by the following possible responses: did not use them, used them occasionally, often or always used them.

HIV/STD-related stigma—As an index of perceived HIV/STD-related stigma, seven statements were developed to capture the pattern of prejudice, discounting, discrediting and discrimination against individuals infected with HIV or STDs: (1) “HIV infected people should be ostracized by their spouse and family members”; (2) “HIV infected people should be forced to leave from their villages”; (3) “People who acquired AIDS through sex or drug use deserve no sympathy”; (4) “I would keep normal relationship with my HIV-infected friends”; (5) “People with HIV or STD would lose their friends”; (6) “HIV-infected people should have the same rights to education and employment as others”; and (7) “Once a person is infected HIV or STD, his/her life will become hopeless.” Participants responded on a four-point Likert scale ranging from 1 = strongly disagree to 4 = strongly agree. The Cronbach α for this scale was 0.60. Responses to the seven items were averaged to create a composite index of HIV-related stigma.

Pattern of migration—The pattern was described by (1) a mobility index, (2) number of jobs that migrants had taken, and (4) frequency of home visit. The mobility index was developed as follows. Respondents were queried about the total years of their migratory experience and the number of cities in which they had lived during their migration. The ratio of the number of migratory cities to years of total migration was used as an index of mobility. The mobility index in the two groups ranged from 0.07 to 10 (median, 0.50; mean, 0.76) with higher values indicating higher levels of mobility. The index was then parceled across four groupings according to its distribution (0.07–0.34, 0.35–0.50, 0.51–1.00, and 1.01–10.00).

Analysis

Bivariate analyses (Student's *t* test or χ^2 test) and multiple logistic regression analysis were performed to estimate the crude odds ratios (cORs), adjusted ORs (aOR), and their 95% confidence intervals (CIs) of potential risk factors, using SAS 8.02 (SAS Institute, Cary, NC). To assess the independent associations, three models with hierarchical combinations of potential predicting variables were developed. Model 1 assesses the association between social demographic variables and STDs. Model 2 explores, after adjusting for the social demographic variables, the relationships between the patterns of migration and having an STD. Model 3 is the full model including all potential predictors. The stigma index was entered into the models as a continuous variable.

RESULTS

Demographic characteristics

A total of 432 migrants with STDs and 892 migrants without STDs were recruited in the study. The migrants without STDs were selected from among 2222 subjects participating in the larger feasibility study.²³ Subjects who did not meet the criteria for the selection of migrants without STDs were excluded. The majority of excluded subjects were those who reported having no sexual experience (92%, 1230/1330). The male to female ratio of the excluded subjects was 1.33. The mean age of included subjects was 25.1 years old and 21.1 years old for the excluded ones ($t = 30.3$, $p < 0.01$). The mean age was higher in the migrants without STDs than in the migrants with STDs. More migrants with STDs were female, single, and received secondary education. The average monthly salary was higher in the migrants with STDs than in the migrants without STDs (Table 1).

Patterns of migration

The median number of cities that migrants had lived in was 2 (range, 1–5 cities). The median year that migrants had stayed in cities was 4 years (range, 0.25–17 years). The level of mobility index was similar in the two groups. The migrants with STDs were less likely to change jobs. Eighty-three percent of the migrants with STDs and 78% of the migrants without STDs visited their home at least once a year during their migration. The migrants with STDs visited their home more frequently than did the patients without STDs. Three percent of migrants without STDs and 2.6% of migrants with STDs reported to be former commercial blood donors (Table 1).

HIV-related sexual behaviors

A significantly greater percentage of the migrants with STDs than of the migrants without STDs reported having engaged in commercial sex (23.6% versus 6.8%), having had two or more number of sexual partners (25% versus 6.4%), and having had sex with promiscuous partners (29.6% versus 10.3%). Eight percent of the subjects (9.6% of STD migrants and 7.7% of non-STD migrants) reported always using condoms (Table 2).

HIV-related stigma and perception of HIV infection

The average score of HIV-related stigma index was 2.46 among migrants with STDs and 2.37 among the migrants without STDs ($t = 4.29$, $p < 0.01$). The proportion of subjects who understood that abstinence from causal sex was a way to prevent STDs was the same in both groups (86.3%), whereas a larger percent of migrants with STDs than of migrants without STDs acknowledged that using condoms could prevent the infections (81.2% versus 61.8%). Overall, perception of vulnerability to HIV infection was low in both groups (7.7% in STD migrants and 3.3% in migrants without STDs), although the migrants with STDs were significantly more likely to perceive the vulnerability (Table 2).

Results of multiple logistic regression

The results of multiple logistic regression analyses are presented in Table 3. Model 1 shows that being single, having received a higher education and average monthly salary were associated with having an STD (Wald test: $\chi^2 = 163.8$, $p < 0.01$; goodness-of-fit test: $\chi^2 < 11.1$, $p = 0.19$). After adjusting for the social demographic variables, the variables describing the pattern of migration in model 2 were significantly associated with having an STD, except for the mobility index (Wald test: $\chi^2 = 190.4$, $p < 0.01$; goodness-of-fit test: $\chi^2 = 11.6$, $p = 0.17$). In the full model (Wald test: $\chi^2 = 281.2$, $p < 0.01$; goodness-of-fit test: $\chi^2 = 11.9$, $p = 0.15$), the following variables were positively associated with having an STD; female gender, at least 13 year of education, higher average monthly salary, frequently travels to home, involvement in commercial sex, more sex partners, sex with promiscuous partners, acknowledgment that condom use could prevent STDs, and higher HIV-related stigma. Having an STD was negatively associated with number of jobs changed, and acknowledgement that abstention from casual sex was a way to prevent STDs. The frequency of condom use was not associated with having an STD.

DISCUSSION

This study depicts factors associated with STDs among Chinese rural-to-urban migrants; several of these associations might not have been anticipated in advance, but are consistent with a migratory lifestyle. Frequency of home visit was associated with having an STD. Migrants who had STDs more frequently visited their hometown than those who did not. According to a recent report in China,²² 40% of male patients with STDs reported having sex in the interval between noticing symptoms and presenting for treatment, offering the opportunity to bring STD causative agents between their migratory city and hometown. This finding is particularly important given that 70% of HIV-infected persons in China are from rural areas while the majority of STD cases were reported in urban areas.^{2,5,24} Another finding is that, compared to the migrants without STDs, there were more females than males among patients with STDs. Yang and colleagues²⁵ reported that migrants' workplaces including "hair salons," "massage houses," and "nightclubs" were associated with increased HIV/STD risk among female migrant workers. Another study conducted in market vendors in Eastern China indicated that female gender and multiple sexual partners were the single most important factors in predicting STDs (OR = 3.17 and 3.30, respectively).¹⁴ Gender is an emerging issue for STD study in China. According to the data from the National STD Surveillance Program, reported STDs have increased more rapidly for females than males from 1989–1998.³

Interestingly, migrants who frequently changed jobs were less likely to acquire STDs. This finding may suggest that migrants are more likely to develop risky sexual behaviors when they become wealthier or their life becomes more stable in migratory cities. The findings from the current study support this hypothesis in that migrants with STDs possessed a higher level of education and had higher earnings. Although a previous study suggested that mobility was associated with both sexual risk and other health risks,²³ the data in the current study did not reveal a significant difference in the level of mobility between the two groups. One possible explanation is that both migrants with and without STDs had similar levels of mobility because both were migrants. Our data supports the explanation (Table 1).

As would be expected, this study also suggests that risky sexual behaviors were positively associated with STDs. Engaging in commercial sex, having more sexual partners, and having sex with promiscuous partners strongly predict the acquisition of STDs. These risks exist among patients without STDs. Approximately 7% of the patients without STDs reported having engaged in commercial sex and having had multiple sex partners in the previous month and 10% had ever had promiscuous partners. Once there were a source of STD infection, they would have acquired an STD. Despite engaging in HIV-related risky behaviors, the patients

with STDs perceived their vulnerability to HIV infection as relatively low. Consistent use of condoms among migrants was low. While condoms should protect against acquisition of STDs, this relation was not observed in our study. The poor correlation between self-reported condom use and STDs has been reported in other studies. For example, a case-control study conducted in Harare, Zimbabwe, showed that 20.1% of patients with STDs and 12.9% of controls without an STD reported always using condoms in the past 3 months.²⁶

Many of the obstacles to the intervention of HIV/STDs are directly or indirectly attributable to social stigmatization associated with STDs. Perception of HIV-related stigma undermines the ability of individuals, families and societies to protect themselves and provide support and reassurance to those infected.²⁷ The higher perception of HIV-related stigma among migrants who had an STD may complicate prevention efforts for both STD and HIV infection in the migrants. Support for this concern was found in another study conducted among STD patients in China, in which Liu and colleagues¹⁸ reported that the majority of STD patients (80%) felt stigmatized because of their sexually transmitted infections. Those who perceived stigma were less likely to agree to notify their spouses of their STI status.

This study has several limitations. First, seeking care in an STD clinic was taken as a proxy for having an STD although diagnoses were not confirmed for inclusion in this study. Accordingly, misclassification bias might occur if they were eventually not patients with STDs. Likewise, migrants without STDs may in fact have been infected; again no laboratory confirmation was obtained to verify their uninfected status. Second, because the study subjects were recruited from one city, they might not be representative of other migrant populations in China; therefore, the findings may have limited generalizability. Third, because of lack of financial support, we recruited patients with STDs from only two public STD clinics. Fourth, the sampling scheme differed in the two populations: we used consecutive sampling for the migrants with STDs and quota-sampling was conducted for the migrants without STDs from 10 occupational groups. The difference might generate low comparability (caused by potential selection bias) between the two samples. Fifth, questions related to sexual behaviors are very sensitive, thus, sexual behaviors might be underreported. Finally, because of the retrospective nature of this study, our findings may be subject to recall bias.

Our findings have suggestive implications for HIV/STD control programs in the rural-to-urban migrants in China, as well as other similar countries. Because the frequency of home-town visit was associated with STDs, HIV/STD control programs should be given to both migrants and nonmigrants in the migration destination areas and their rural hometowns. Given the nature of mobility, it is more practical to set up intervention programs targeting rural residents before they leave for cities for a temporal job. Intervention targeting population should include migrants who are wealthy, well educated, and have a stable job. This will require intensive education efforts to increase the awareness of sexually active people to change their sexual behavior by practicing “safer sex” and to reduce HIV/AIDS related stigma. Information-oriented education per se has limited effect on HIV/STD prevention. Therefore, theory-based behavioral intervention programs should be implemented and its effects and sustainability should be evaluated in the local settings.

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Table 1

Demographic Characteristics and Pattern of Migration Among Two Groups

	Migrants		Migrants without STDs		cOR ^a	95% CI ^b
	n	%	n	%		
Age in years (mean/SD)	24.7(3.17)		25.1(3.30)		0.95	0.92–0.99
Gender						
Male	158	36.6	588	65.9	1	
Female	274	63.4	304	34.1	3.35	2.64–4.26
Education (years)						
≤ 6	32	7.4	61	6.9	1	
7–9	181	42.0	506	56.9	0.68	0.43–1.08
10–12	153	35.5	287	32.3	1.01	0.63–1.63
> 12	65	15.1	35	3.9	3.54	1.96–6.41
Marital status						
Married	180	42.5	475	54.0	1	
Single	243	57.5	405	46.0	1.58	1.25–2.00
Average monthly salary						
≤ 97 USD	165	38.2	470	52.7	1	
> 97 USD	267	61.8	422	47.3	1.80	1.43–2.28
Mobility index						
0.07–0.34	150	34.7	303	34.0	1	
0.35–0.50	86	19.9	243	27.2	0.71	0.52–0.98
0.51–1.00	159	36.8	271	30.4	0.90	0.60–1.56
1.01–10	37	8.6	75	8.4	0.99	0.64–1.55
No. of jobs taken						
0–1	182	42.2	265	29.8	1	
2–3	216	50.1	449	50.5	0.70	0.55–0.90
> 3	33	7.7	176	19.7	0.27	0.18–0.41
Frequency of home visit						
Never	36	8.4	85	9.6	1	
Once every 2–3 years	35	8.2	110	12.5	0.75	0.44–1.30
Once per year	213	49.9	491	55.6	1.02	0.67–1.56
2 or more per year	143	33.5	197	22.3	1.71	1.10–2.68
Former blood donors						
No	421	97.4	864	96.9	1	
Yes	11	2.6	28	3.1	0.81	0.40–1.64

^aCrude odds ratio.^b95% confidence interval.

STDs, sexually transmitted diseases; cOR, crude odds ratio; CI, confidence interval.

Table 2
The Distribution of Sexual Risky Behaviors and HIV Perception in the Two Groups

	Migrants with STDs		Migrants without STDs		cOR ^a	95% CI ^b
	n	%	n	%		
Engaged in commercial sex						
No	330	76.4	831	93.2	1	
Yes	102	23.6	61	6.8	4.21	2.99–5.93
No. of sexual partners in the previous month						
0	50	11.6	300	33.6	1	
1	274	63.4	535	60.0	3.08	2.20–4.29
≥2	108	25.0	57	6.4	11.37	7.33–17.63
Had sex with promiscuous partners						
No	157	36.3	565	63.3	1	
Yes	128	29.6	92	10.3	5.01	3.63–6.90
Did not know	147	34.1	235	26.4	2.25	1.72–2.95
Condom use						
Never	221	51.2	518	58.1	1	
Sometimes	119	27.6	221	24.8	1.26	0.96–1.66
Often	50	11.6	84	9.4	1.39	0.95–2.05
Always	42	9.6	69	7.7	1.43	0.94–2.16
Acknowledged that no casual sex was a way to prevent STDs						
No	59	13.7	122	13.7	1	
Yes	373	86.3	770	86.3	1.00	0.72–1.40
Acknowledged that using condoms was a way to prevent STDs						
No	81	18.8	341	38.2	1	
Yes	351	81.2	551	61.8	2.68	2.03–3.54
Perception of vulnerability to HIV infection						
Unlikely	247	57.3	605	68.0	1	
Somewhat likely	151	35.0	256	28.7	1.44	1.16–1.85
Likely	33	7.7	29	3.3	2.79	1.66–4.67

cOR, crude odds ratio; CI, confidence interval; STDs, sexually transmitted diseases.

Table 3
Risk Factors for Sexually Transmitted Diseases among Rural-to-Urban Migrants

	Model 1		Model 2		Model 3	
	aOR	95% CI	aOR	95% CI	aOR	95% CI
Age (years)	1.02	0.97–1.07	1.02	0.97–1.08	1.04	0.98–1.10
Gender						
Male	1		1		1	
Female	4.15	3.17–5.43	3.94	3.00–5.19	4.10	2.89–5.82
Education (years)						
≤ 6	1		1		1	
7–9	0.70	0.43–1.14	0.73	0.44–1.20	0.75	0.43–1.30
10–12	0.98	0.59–1.62	0.99	0.59–1.66	1.08	0.60–1.91
> 12	3.05	1.60–5.79	2.62	1.36–5.03	2.92	1.40–6.06
Marital status						
Married	1		1		1	
Single	1.62	1.16–2.25	1.69	1.21–2.38	1.20	0.81–1.78
Average monthly salary						
≤ 97 USD	1		1		1	
> 97 USD	1.91	1.46–2.50	1.87	1.42–2.46	1.68	1.23–2.29
Mobility index						
0.07–0.34	1		1		1	
0.35–0.50			0.72	0.51–1.03	0.81	0.55–1.20
0.51–1.00			1.21	0.87–1.67	1.06	0.73–1.52
1.01–10			1.03	0.61–1.73	0.90	0.49–1.64
No. of jobs taken						
1–2	1		1		1	
3–5			0.70	0.53–0.93	0.63	0.46–0.86
> 5			0.34	0.22–0.53	0.24	0.15–0.40
Frequency of home visit						
Never	1		1		1	
Once every 2–3 years			1.14	0.63–2.08	1.14	0.59–2.22
Once a year			1.17	0.74–1.87	1.15	0.68–1.95
2 or more per year			1.94	1.19–3.18	1.80	1.04–3.13
Former blood donor						
No	1		1		1	
Yes			0.87	0.40–1.86	0.64	0.26–1.55
Smoking						
No	1		1		1	
Yes			0.82		0.82	0.58–1.17
Drunk						
No	1		1		1	
Yes			1.35		1.35	0.97–1.88
Engaged in commercial sex						
No	1		1		1	
Yes			2.70		2.70	1.71–4.25
No. of sexual partners in the previous month						
0	1		1		1	
1			2.82		2.82	1.87–4.24
≤ 2			6.50		6.50	3.73–11.32
had sex with promiscuous partners						
No	1		1		1	
Yes			3.50		3.50	2.29–5.34
Did not know			2.30		2.30	1.63–3.24
Condom use						
Never	1		1		1	
Sometimes			1.04		1.04	0.73–1.46

	Model 1		Model 2		Model 3	
	aOR	95% CI	aOR	95% CI	aOR	95% CI
Often					0.84	0.52–1.38
Always					1.14	0.66–1.96
Acknowledged that no causal sex was a way to prevent STDs						
No					1	
Yes					0.67	0.44–1.03
Acknowledged that using condoms was a way to prevent STDs						
No					1	
Yes					2.26	1.60–3.20
Perception of vulnerability to HIV infection						
Unlikely					1	
Somewhat likely					3.25	1.66–6.39
Likely					1.24	0.91–1.70
HIV-related stigma					1.89	1.30–2.75

aOR, adjusted odds ratio; CI, confidence interval; STDs, sexually transmitted diseases.