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Prevalence and Risks for Sexually Transmitted Infections Among a National Sample of Migrants vs. Non-migrants in China

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Summary

This study aims to describe and compare the gender-specific prevalence of chlamydia and gonorrhea, sexual behaviors and experiences, and risk factors associated with STIs among migrants vs. rural as well as urban residents in China. Data were abstracted from the Chinese Health and Family Life Survey conducted from 1999 to 2000 which provided a nationally representative adult (ages 20 to 64) sample. STI results were determined using a urine-based technology. Of the samples, the prevalence of chlamydia for migrant women was triple that of rural non-migrant women. Migrants were more likely to engage in STI-associated risk behaviors than non-migrants (e.g., receiving money for sex). Being female was a significant risk factor of STIs among migrants. The high STI prevalence among migrants highlighted the urgent need to implement comprehensive sexual behavior prevention and intervention programs targeting the cultural, social and structural needs for migrants in the city, especially female migrants.

Keywords

Sexually transmitted infection; Migrants; Prevalence; Risk factors

In China, economic reforms initiated in the early 1980s have led to a number of social movements, including large internal migration and the re-emergence of sexually transmitted infections or STIs.^{1–3} According to the recent One Percent National Population Sample Survey report, there were approximately 147 million migrants in China in 2005, two-thirds of whom were rural-to-urban migrants⁴ and the majority of whom did not hold legal permanent urban residency status and thus received little to no social welfare such as medical and educational benefits.⁵ Migration in China appears “temporary and unstable” in the sense that migrants return periodically to their homes, families, and villages, and often move from city to city in search of employment.⁶

This internal rural-to-urban migration seems to be a major factor in the spread of STIs.^{7–11} Yang et al. argued that lax social control, social isolation, and selective migration (those who choose to move from their legal rural residence [or *hukou*] to an urban area vs. those who choose to remain in their home village) were contributing factors to higher STI rates

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among Chinese migrants.¹¹ For example, a study of migrants of both genders revealed that 8% had ever bought sex and 6% had ever sold sex, and 36% had never used a condom during sex.⁸ Frequent social activities¹⁰ and frequent travel⁷ correlate with increased rates of unprotected commercial sex and increased STI-associated risk behaviors. These increased risks associated with high mobility also tend to correlate with a decreased perception of STI severity and vulnerability.⁸ Additionally, migrants who are more mobile tend to be younger and unmarried, factors which correlate with increased risk behaviors and increased use of commercial sex.^{7, 8}

Nonetheless, these non-population-based studies have limitations, possibly under- or over-estimating STI prevalence among migrants. These studies also tend to neglect analyses of how and why migrant populations may or may not differ from non-migrant populations. Notably, for example, these studies also cannot address what factors differentiate rural-to-urban migrants from either urban residents or individuals who have remained in their home villages. In other words, more research is needed to systematically examine and/or elucidate behaviors and practices that are unique to each type of individuals (e.g., migrants, urban non-migrants, rural non-migrants). To that end, in this study we used data from the Chinese Health and Family Life Survey (CHFLS), a nationally representative survey administered in 60 communities that is hitherto the largest of its type to be conducted in China. We aim to (a) describe and compare STI prevalence as determined by urine analysis among migrants versus non-migrants, (b) determine risk behaviors and experiences of migrants versus non-migrants using a valid measurement of sexual risk behaviors and experiences, and (c) explore the risk factors associated with STIs among migrants versus non-migrants.

METHODS

Sample

The data for this study were abstracted from the CHFLS conducted during 1999–2000. The CHFLS was a collaborative project of the University of Chicago/National Opinion Research Center, Chicago, USA; Renmin University, Beijing, China; Peking Union Medical College, Beijing, China; and the University of North Carolina, Chapel Hill, USA. The final sample (from 18 provinces and/or municipalities: Anhui, Beijing, Fujian, Gansu, Guangdong, Hebei, Heilongjiang, Henan, Hunan, Inner Mongolia, Jiangsu, Jilin, Liaoning, Shanxi, Shanghai, Tianjin, Shandong, and Zhejiang; Hong Kong and Tibet were excluded) was nationally representative of the adult population of China aged 20 to 64 years. For more details on the sample, see <http://www.spc.uchicago.edu/prc/chfls.php>.

Survey

The survey instrument consisted of 18 sections and was pre-tested in China during three field trials by 50 husband-wife pairs using shortened versions of the questionnaire. The trained interviewers (a total of 39) were primarily social workers in their forties and fifties. All interviewers received one-week training and sampling took place between August 1999 and August 2000. In the field, the interviewer was of the same sex as the respondent. To ensure privacy, interviews took place away from the respondent's home.

Oral and computer-entered consent were obtained prior to the hour-long interview. Respondents were also asked to provide a urine sample. The survey was approved by the institutional review boards (IRBs) of the University of Chicago, Renmin University, and Peking Union Medical College.

Measures

The prevalence of two STIs (Chlamydia and gonorrhea) was estimated using a urine-based technology. Urine specimens were collected from participants, frozen, and taken to a central laboratory where assays were performed within 30 days using ligase chain reaction (Abbot Laboratories, Chicago) to detect *Neisseria gonorrhoeae* and *Chlamydia trachomatis*.

Migrant status was determined by “two equivalent items” used at the different sites (i.e., location of participant’s legal resident registration). One item (used at sites 1 through 6, and 22 through 25)¹ asked: “Is your permanent household registration in this neighborhood committee?” The other item (used at sites 17 through 21, and 26 through 70) asked: “Is your permanent household registration in (a) this urban neighborhood committee, (b) this city, (c) the countryside outside this city, (d) other place within in this province or (e) another province? Those who responded negatively to the first question were identified as “migrants”, as were those who answered c, d or e to the second question. For this paper, we classified an individual as a “non-migrant” if s/he self-identified as living in an urban or rural area with legal residence status at the time of the survey.

Demographic and social characteristics, including geographic location, marital status (e.g., “Currently, your marital status is...?”), education level (e.g., “Your level of education is...?”), employment (e.g., “Are you currently working?”), living situation (e.g., “Who do you live together with at this location?”), and monthly income (e.g., “Over the past 12 months, approximately how much was your personal income per month?”) were examined to explore the risk factors for STI infections. The frequency of social activities (e.g., “During the past 12 months, how often did you participate in social activities after work [excluding activities with family or relatives]?”) was also included in the analysis.

Additionally, items used in the present study include questions on sexual risk behaviors and experiences, such as sexual experience, premarital sex, living with spouse or long-term partner or not, gender of current spouse or partner, frequency of sex with current spouse or partner, frequency of masturbation, potential effect of living conditions on sex life, lifetime experiences with casual sexual partners, and commercial sex.

Weighting and Statistical Analysis

Using “svy methods” in the STATA 9.0 statistical package (STATA Corp, College Station, TX, USA), the analysis was adjusted for sampling strata, primary sampling units, and population weights. Migrant status- and gender-specific estimates on the prevalence of STIs were presented with 95% confidence intervals. Associations between the potential risk factors (e.g., commercial sex) and STI prevalence and sexual risk behaviors were quantified.^{10, 12} Logistic regression models were used to obtain odds ratios. For multivariate logistic regression model analyses, we first selected variables relevant to migrant status on STI prevalence from existing literatures.^{7, 8, 12, 13} Then we conducted a correlation analysis to reduce the number of variables and refine the regression model to control for potential collinearity.

¹According to the original Study Protocol (<http://www.spc.uchicago.edu/prc/chfls.php>): “By-and-large, the 60 field sites were visited in the order listed. Note that starting site 7, a value of 10 was added to each site number simply in order to insure all sites occupied a 2-digit space in the computer entry routine. So, there are no sites 7-16” (p. iii).

RESULTS

Participant Characteristics

Table 1 presents the demographic and socioeconomic characteristics of the participants. This sample included 760 rural non-migrants (386 males and 374 females), 485 migrants (272 males and 213 females) and 2576 urban non-migrants (1247 males and 1329 females). Majority (98.6%, 478/485) of the migrants were moving from rural to urban. Compared with non-migrants, migrants were significantly younger and female migrants were more likely to be single. Migrants were more likely to obtain higher level of education than rural non-migrants, but less likely than urban non-migrants (weighted males: 12.71% rural vs. 38.15% migrants vs. 49.31% urban; weighted females: 5.38% rural vs. 27.84% migrants vs. 46.68% urban). Migrants were also more likely to take temporary jobs (weighted males: 8.07% rural vs. 41.25% migrants vs. 19.68% urban; weighted females: 6.62% rural vs. 51.21% migrants vs. 21.02% urban).

Prevalence of Two STIs: Chlamydia and Gonorrhea

Table 2 shows that the prevalence of having any of two STIs did not differ significantly among males. Among females, however, migrants and urban non-migrants had higher STI rates than rural non-migrants (4.99%, 95%CI = 2.90–8.46 vs. 5.33%, 95%CI = 4.12–6.86 vs. 1.62%, 95%CI = 0.64–4.00, $p = 0.010$). Chlamydia had a higher prevalence (2.07%, 95%CI = 1.31–3.26 among men; 2.59%, 95%CI = 1.65–4.05 among women) than gonorrhea. The prevalence of chlamydia (4.79%, 95%CI = 2.74–8.24 vs. 5.09%, 95%CI = 4.07–6.33 vs. 2.52%, 95%CI = 1.57–4.04, $p = 0.013$) and gonorrhea (0.20%, 95%CI = 0.03%–1.62% vs. 0.30%, 95%CI = 0.06%–1.37% vs. 0.00%, 95%CI = 0.00–0.00, $p = 0.030$) were higher among female migrants and urban non-migrants than rural non-migrants. Compared to men, women had a higher prevalence of any STI (2.66%, 95%CI = 1.68–4.18 vs. 2.09% 95%CI = 1.33–3.28).

Sexual Behaviors

Differences in sexual behaviors between migrants and non-migrants are presented in Table 3. Female migrants were significantly less likely to report having had sex in the past 12 months than female non-migrants (73.71% migrants vs. 80.01% urban non-migrants vs. 88.11% rural non-migrants, $p = 0.002$). A significantly higher proportion of female migrants reported having had premarital sex than female non-migrants (25.90% migrants vs. 15.33% urban non-migrants vs. 7.42% rural non-migrants, $p < 0.001$).

Male migrants were less likely to live with their spouse or long-term sex partner than non-migrants (59.53% migrants vs. 76.30% urban non-migrants vs. 78.12% rural non-migrants, $p < 0.001$). A significantly higher proportion of male migrants (31.71% vs. 16.90% male urban non-migrants vs. 4.79% male rural non-migrants, $p < 0.001$) reported ever having had casual sexual partners. Although there is no significant difference between migrants and non-migrants on money, gifts, or valuables given for sex in the past 12 months, a significantly higher proportion of migrants reported receiving money, gifts, or valuables for sex (weighted males: 2.56% migrants vs. 1.81% urban non-migrants vs. 0.42% rural non-migrants, $p = 0.008$; weighted females: 0.77% migrants vs. 0.26% urban non-migrants vs. 0.00% rural non-migrants, $p = 0.004$).

Risk Factors of STIs among Migrants vs. Non-migrants

Table 4 shows that risks for STIs were higher among female than male migrants (adjusted odds ratio [Adjusted OR] = 5.083, 95%CI = 1.697–15.228). Among urban non-migrants, those who (1) were female (Adjusted OR = 3.860, 95%CI = 1.896–7.859), (2) were 25 to 35 years old (Adjusted OR = 4.855, 95%CI = 1.382–17.049), and (3) reported ever having had

commercial sex (Adjusted OR = 3.983, 95%CI = 1.334–11.890) were more likely to have an STI.

DISCUSSION

To our knowledge, this study provides the first-ever population-based findings of STI prevalence and STI risks among Chinese migrants versus non-migrants. Our findings indicate that female migrants have high rates of STIs, a finding consistent with the literature.¹² Yang et al. reported that female migrants tend to work in hair salons, massage houses, and nightclubs, environments which are conducive to commercial sexual transactions and thus serve as a reservoir for STIs.^{13, 14} This suggests that a high proportion of migrant women may have been involved in commercial sex and likely underreport the experience,¹⁵ indicating hidden high-risk sex behaviors among female migrants, as discussed above. Moreover, urban residents (i.e., migrants and urban non-migrants) have a higher STI prevalence than rural non-migrants (5% migrants vs. 5% urban non-migrants vs. 2% rural non-migrants). Of the two STIs, we found chlamydia infections to be much more common than gonorrheal infections. The prevalence of chlamydia infections among female migrants and urban non-migrants was more than three times the rate for female rural non-migrants; this difference suggests that the experience of living in cities has a substantial impact on the prevalence of chlamydia infections. The STI prevalence rates for this study are similar to those from a study of 986 Chinese migrants, which found that the prevalence of Chlamydia and gonorrhea was 3.5% and 0.5%, respectively.¹⁶

Our findings indicate that migrants in China are more likely to engage in STI-associated risk behaviors than rural non-migrants. A number of cross-sectional studies have indicated that geographical mobility appears to be highly correlated with increased sexual risk among Chinese migrants.^{7, 17} Consistent with other studies, we found that Chinese migrants in cities were relatively young and more likely to be unmarried, with about half of them taking temporary jobs.

Half of migrants do not live with their partner or spouse. However, because they tend to be young and in their sexual prime, migrants have a higher frequency of sex with current spouse/partner than non-migrants. Also, female migrants are more likely to have engaged in premarital sex than their urban non-migrant and rural non-migrant counterparts, a finding that is consistent with a recent study in Anhui Province, China of couples applying for a marriage license who were required to provide information regarding premarital sex.¹⁸

These patterns also may help explain why more migrants reported having ever had casual sexual partners. More male migrants have ever had casual sexual partners than male urban non-migrants and male rural non-migrants. Although migrants and non-migrants do not differ in their likelihood of purchasing sex, migrants were more likely than non-migrants to have sold sex in the past year. Urban non-migrants who having ever had experiences of commercial sex are significantly more risky to be infected with STIs. Although not significant, among rural non-migrants, those having ever had commercial sex would be 4.6 times as likely as those having never had commercial sex to be infected with STIs. The insignificance and the large standard error may be due to the small sample size of the persons in the non-migrant group who have ever had commercial sex.

One limitation of this study is that we were unable to determine the association of STIs and migration history due to a lack of information about migrants' migration experiences. Thus, future research must investigate these questions in order to understand more specific contexts so that proper behavioral interventions can be conducted. A second limitation is that since the data was collected over eight years ago, the results may have been

compromised. However, because this is a national, population-based study and because the migrant situation in China has not changed dramatically during the intervening years, the present findings appear to have strong external validity.

In conclusion, this study suggests an urgent need to implement comprehensive sexual behavior education and intervention programs targeting migrants, especially female migrants. Future studies should be designed to further our understanding of the migration experience, risk behaviors, and the STI epidemic among migrants in China.

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Table 1
Demographic characteristics of migrants versus urban non-migrants and rural non-migrants in China

	Men (weighted %)			Women (weighted %)		
	Migrants (n = 272)	Urban non-migrants (n = 1247)	Rural non-migrants (n = 386)	Migrants (n = 213)	Urban non-migrants (n = 1329)	Rural non-migrants (n = 374)
Age						
<25 years old	20.17	10.64	8.60	36.05	11.22	10.95
25–35 years old	55.56	24.54	30.42	46.06	23.82	34.89
>35 years old	24.26	64.82	60.98	17.89	64.96	54.16
Marital status						
Never married	22.50	11.66	10.47	25.32	10.13	5.23
Married/remarried/co-habiting	76.46	86.51	86.54	69.79	86.57	92.37
Divorced/widowed	1.04	1.83	2.99	4.89	3.30	2.40
Education level						
Junior high school	61.85	50.69	87.29	72.16	53.32	94.62
Monthly income						
523 Yuan	26.38	34.10	74.16	69.17	63.60	94.23
Employment status						
Unemployed	4.60	19.07	4.80	17.06	36.97	10.55
Temporarily employed	41.25	19.68	8.07	51.21	21.02	6.62
Employed full-time	54.15	61.25	87.12	31.73	42.01	82.83

Note:

* P value obtained from χ^2 -test;

** $P < 0.05$;

*** $P < 0.01$

Table 2
Prevalence of STIs for migrants versus urban non-migrants and rural non-migrants in China

	Men, weighted % (n)				Women, weighted % (n)				P value*	P value*
	Overall	Migrants	Urban non-migrants	Rural non-migrants	Overall	Migrants	Urban non-migrants	Rural non-migrants		
Any STI	2.09 (1688)	1.77 (234)	2.25 (1095)	2.05 (359)	2.66 (1737)	4.99 (198)	5.33 (1184)	1.62 (355)	0.900	0.010***
95% CI	1.33–3.28	0.63–4.87	1.42–3.53	1.07–3.89	1.68–4.18	2.90–8.46	4.12–6.86	0.64–4.00		
Gonorrhoea	0.00 (1688)	0.00 (234)	0.00 (1095)	0.00 (359)	0.00 (1737)	0.20 (198)	0.30 (1184)	0.00 (355)	0.584	0.030**
95% CI	0.00–0.00	0.00–0.00	0.00–0.38	0.00–0.00	0.00–0.39	0.00–1.62	0.00–1.37	0.00–0.00		
Chlamydia	2.07 (1688)	1.77 (234)	2.16 (1095)	2.05 (359)	2.59 (1737)	4.79 (198)	5.09 (1184)	1.62 (355)	0.941	0.013**
95% CI	1.31–3.26	0.63–4.87	1.36–3.41	1.07–3.89	1.65–4.05	2.74–8.24	4.07–6.33	0.64–4.00		

Note: Prevalence rates based on urine test results; n = number of observations; CI = confidence interval

* P value obtained from χ^2 test;

** P < 0.05;

*** P < 0.01

Table 3
Sexual behaviours of migrants versus urban non-migrants and rural non-migrants in China

	Men (weighted %)			Women (weighted %)				
	Migrants (n = 272)	Urban non-migrants (n = 1247)	Rural non-migrants (n = 386)	P value *	Migrants (n = 213)	Urban non-migrants (n = 1329)	Rural non-migrants (n = 374)	P value *
Had sex in the past 12 months	80.38	86.64	84.15	0.616	73.71	80.01	88.11	0.002 **
Ever had premarital sex	37.43	32.00	19.35	0.057	25.90	15.33	7.42	<0.001 **
Current spouse/sex partner: male †	1.11	0.39	0.00	0.063	100.00	99.99	100.00	0.827
Living with partner or spouse	59.53	76.30	78.12	<0.001 **	50.38	74.66	72.16	0.051
Frequency of sex with current sex spouse/partner †								
More than once a week	74.6	56.14	50.00	0.161	67.25	51.52	47.99	0.213
How often thought about sex in the past 12 months								
Once daily or more	11.03	10.28	9.00	0.067	4.10	2.69	0.93	0.090
Once to several times a month	75.41	68.84	60.29		44.56	49.56	42.30	
Less than once a month or never	13.56	20.88	30.71		51.34	47.75	56.78	
Ever masturbated in the past 12 months								
Once a week or more	8.82	5.30	7.12	0.581	0.64	0.26	0.00	0.165
Less than once a week	40.00	29.34	25.55		9.77	3.78	3.48	
Never	51.18	65.36	67.33		89.59	95.97	96.52	
How seriously had living conditions affected sex life †								
Considerably	3.45	4.54	3.4	0.544	1.60	3.84	4.66	0.740
Insignificantly	32.76	20.38	23.12		22.79	22.29	24.19	
No affect	63.78	75.08	73.47		75.61	73.87	71.16	
Ever had casual partners								
Yes	31.71	16.90	4.79	<0.001 **	6.49	2.80	1.59	0.086
Received money, gifts, or valuables for sex in the past 12 months								
Yes	2.56	1.81	0.42	0.008 **	0.77	0.26	0.00	0.004 **
Gave money, gifts, or valuables for sex in the past 12 months								
Yes	7.68	9.67	4.96	0.189	0.00	0.39	0.69	0.803

	Men (weighted %)		Women (weighted %)					
	Migrants (<i>n</i> = 272)	Urban non-migrants (<i>n</i> = 1247)	Rural non-migrants (<i>n</i> = 386)	<i>P</i> value *	Migrants (<i>n</i> = 213)	Urban non-migrants (<i>n</i> = 1329)	Rural non-migrants (<i>n</i> = 374)	<i>P</i> value *
Consistent condom-use with commercial sex [§]	27.92	64.53	6.83	< 0.001 ^{**}	-	-	-	-
Consistent condom-use with casual partner	25.63	15.21	27.85	0.729	15.19	18.16	3.33	^{††}
Consistent condom-use with long-term partner or spouse	6.31	3.72	0.77	< 0.001 ^{**}	6.11	2.84	1.10	0.003 ^{**}

Note: Casual partners: had sexual relationship for less than one month

* *P*-value obtained from χ^2 test;

** *P* < 0.01

[†] Proportions were calculated based on those who currently had spouse or long-term sex partner

^{††} Proportions were calculated based on those who had sex in the past 12 months

[§] Proportions were calculated based on those who have had experience of commercial sex

^{††} *P*-value cannot be obtained due to stratum with single sampling unit

Multivariate analysis of sexually transmitted infections (STIs) and risk factors for migrants versus urban non-migrants and rural non-migrants in China

Table 4

	Adjusted OR (95 % CI)		
	Migrants (n = 483) [†]	Urban non-migrants (n = 2505) [‡]	Rural non-migrants (n = 644) [§]
Gender			
Female/Male	5.083 (1.697–15.228) ^{**}	3.860 (1.896–7.859) ^{**}	0.757 (0.171–3.360)
Age			
25–35 years old/<25 years old	3.152 (0.449–22.132)	4.855 (1.382–17.049) [*]	3.762 (0.271–52.138)
>35 years old/<25 years old	3.617 (0.354–36.993)	3.065 (0.775–12.123)	1.377 (0.076–24.874)
Monthly income			
<523 Yuan/>523 Yuan ^{††}	3.521 (0.282–43.903)	1.443 (0.969–2.149)	0.593 (0.177–1.980)
Living with long-term partner or spouse			
Yes/No	0.857 (0.138–5.329)	0.823 (0.272–2.488)	2.547 (0.397–16.363)
Ever had commercial sex			
Yes/No	0.163 (0.013–2.039)	3.983 (1.334–11.890) [*]	4.570 (0.426–49.001)
Living environment hindered sex			
Considerably/insignificantly/no affect	-	1.376 (0.366–5.176)	-
Frequency of socializing per week			
Once/>Once	0.203 (0.037–1.122)	0.893 (0.579–1.377)	0.544 (0.141–2.090)

Note: OR = odds ratio; CI = confidence interval

^{*} P < 0.05;

^{**} P < 0.01

[†] Two cases were excluded from analysis due to stratum with single sampling unit

[‡] Sixty cases were excluded from analysis due to stratum with single sampling unit

[§] One hundred and fifteen cases were excluded from analysis due to stratum with single sampling unit

^{††} Average monthly income of urban Chinese residents in 2000²¹