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Herpes simplex virus-2 infection in male rural migrants in Shanghai, China

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Summary

The overall herpes simplex virus (HSV)-2 seroprevalence was 5.5% among male rural migrants working in construction sites, markets and factories, 5.4% among those reporting having had sexual intercourse and 5.8% among those reporting no sexual intercourse. Multiple logistic regression analyses indicate that migrants having higher income were more likely to have HSV-2 infection. None of the HSV-2-positives realized their infection status. Future sexually transmitted disease (STD) intervention programmes should target migrants with higher income and migrant market vendors and should not exclude those who self-report no STDs or no history of sexual intercourse.

Keywords

HSV-2; rural migrants; Shanghai; China

INTRODUCTION

Genital herpes infection is one of the most prevalent sexually transmitted infections (STIs) in developed and developing countries. Herpes simplex virus (HSV)-type 2 (HSV-2) is a major cause of genital herpes, which is typically transmitted sexually, is asymptomatic and infects anogenital sites.¹ Active HSV-2 infection has been identified as a significant risk factor for acquiring HIV.^{2,3} Very few data are available on HSV-2 seroprevalence in China. Cross-sectional studies reported that the HSV-2 seroprevalence was 10.8% among women attending an antenatal clinic,⁴ 9.3% among market vendors reporting a history of sexual intercourse and 4.5% among market vendors reporting never having had sexual intercourse⁵ in the Capital City of Fujian province in Southeastern China, 4.4% among male long-distance truck drivers in Anhui province of eastern China,⁶ 7.8% among men who have sex with men in Jiangsu province of eastern China,⁷ and 65.1% and 70.8% among female sex workers in two cities in Yunnan province of southwestern China.^{8,9} However, there is no study specifically designed to ascertain the seroprevalence of HSV-2 among general male rural migrants, a large population that deserves more public health attention. Therefore, here we report a cross-sectional study designed to determine the seroprevalence of HSV-2 infection and its sociodemographic correlates among male rural migrants in Shanghai,

China. A rural migrant was defined for this study as someone born and registered as a permanent resident in a rural area but who worked in Shanghai.

MATERIALS AND METHODS

A total of 895 subjects were recruited from three categories of venues that hired most male migrants: construction sites, markets and small factories in a community of northwestern Shanghai. After obtaining informed consent, a questionnaire including social and demographic information, knowledge of HIV/AIDS/STDs and sexual behaviours was administrated by trained staff from Fudan University. Blood samples were collected, centrifuged and stored at -22°C for serological testing. HSV-2-specific IgG antibodies were tested in the HIV/STD Laboratory of The National Center for STD and Leprosy Control using the HerpeSelect HSV-2 ELISA Kit (Focus Technologies, CA, USA). The study was approved by the institutional review boards (IRB) of the University of California, Los Angeles and Fudan University.

HSV-2 seroprevalence was tabulated according to sociodemographic characteristics. Two separate multiple logistic regression analyses were conducted to identify factors independently associated with HSV-2 infection status. Their respective odds ratios (ORs) and 95% confidence intervals were calculated. All statistical analyses were carried out using the SAS System for Windows (Cary, NC, USA), version 8.0.

RESULTS

The mean age of the 895 participants was 33.2 (SD 8.5) years. About 73.4% of participants had completed middle school or higher level education, 83.4% were married and 53.0% reported living with their wife. Ninety percent (809/895) reported having had sexual intercourse. The mean age at first sexual intercourse was 23.2 (SD 2.8) years, but the earliest reported sexual intercourse occurred at 15 years of age. About 16.1% of the participants reported having had more than one lifetime sex partner. Only 16 (1.8%) of the participants reported a history of sexually transmitted diseases (STD) and 21.3% reported having ever used condoms.

The overall HSV-2 seroprevalence was 5.5% (95% CI 4.0–7.0%), 5.4% (44/809) among those reporting having had sexual intercourse and 5.8% (5/86) among those reporting never having had sexual intercourse. HSV-2 seroprevalence among the study participants was tabulated by sociodemographic characteristics and by reported sexual behaviours, respectively (Tables 1 and 2).

Two separate multiple logistic regression analyses were conducted for all the study participants (Tables 1 and 2). Higher monthly income was a risk factor for HSV-2 seropositivity. The odds of HSV-2 infection among participants whose monthly income was over 1500 Yuan (approximately 8 Yuan = 1 US\$ at the time of this study) was 2.53 times (95% CI 1.03–6.21) higher than those with monthly income less than 1000 Yuan. The odds ratio of HSV-2 infection among market vendors was 2.05 times (95% CI 0.86–4.85) higher than construction workers, although this association was not statistically significant ($P=0.1037$). The results did not show that early initiation of sexual intercourse, having premarital sex and having more sexual partners were significant risk factors for HSV-2 infection among this study sample.

DISCUSSION

To our knowledge, this study is the first one to present type-specific HSV-2 seroprevalence among male rural migrants employed in construction sites, markets and factories in urban

China. HSV-2 seroprevalence (5.5%) was comparable with that observed in the study of male market vendors (6.4%) in eastern China⁵ and in the study of long-distance truck drivers (4.4%) in Tongling, China.⁶ Our finding that higher monthly income was a risk factor for HSV-2 infection in the present study is consistent with Chen's study in a capital city of eastern China, which also showed that women attending antenatal clinics with higher monthly income had a higher HSV-2 seropositivity rate.⁴ Liu et al.¹⁰ reported an association between a higher monthly salary and higher STIs among rural-to-urban migrants in Beijing. The possible reason is that rural migrants who have a higher income are more likely to have the money to spend their leisure time in entertainment venues and engage in risky sexual behaviour. Our study indicates that market vendors were at higher risk of HSV-2 infection than construction workers. Detels's study in the capital city of Fuzhou province in Eastern China found that the prevalence of any STD was 20.1% among 1316 market vendors reporting sexual intercourse.⁵ Considering the results of these studies together, it is imperative for future STD intervention programmes to target migrant market vendors. The identification of HSV-2 infection (5.8%) among migrants reporting no sexual intercourse suggests that some unmarried people might not tell the truth about their sexual behaviour, a problem that would be met in all surveys requesting sensitive information. Meanwhile, probably due to a relatively small sample size, a similar infection rate of HSV-2 was observed among migrants having only one sexual partner and those having more sexual partners. Taken together, it is cautious that future intervention programmes targeting only STD clinic patients and persons reporting multiple sex partners for intervention will exclude a high proportion of those with HSV-2 infection.

It is noteworthy that none of the HSV-2-positive participants thought that they were at risk for STDs. Thus, they probably would persist in engaging in risky sexual behaviours. This study underscores the need to implement health education programmes to improve awareness of the acquisition of HSV-2 infection as well as other STDs among rural migrants in Shanghai.

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Table 1

Herpes simplex virus (HSV)-2 seroprevalence and logistic regression analysis of sociodemographic correlates among male rural migrants

Sociodemographic characteristics	No. positives/no. tested*	HSV-2 prevalence (%)	Adjusted OR (95% CI)†	P value
Age (years)				
25	7/179	3.9	1.06 (0.32–3.47)	0.9217
26–35	22/419	5.2	0.87 (0.45–1.66)	0.6705
36	20/296	6.8		
Education (school)				
Illiterate or primary	17/238	7.1	1.01 (0.42–2.43)	0.9785
Secondary	22/546	4.0	0.51 (0.22–1.17)	0.1115
High	10/111	9.0		
Currently married				
Yes	43/736	5.8	1.14 (0.35–3.69)	0.8229
No	6/159	3.8		
Period since migration (year)				
<1	5/154	3.2		
1	44/740	6.0	1.51 (0.54–4.19)	0.4302
Frequency of visiting home (times/year)				
1	35/539	6.5		
>1	14/348	4.0	0.64 (0.32–1.28)	0.2059
Monthly income (Yuan RMB)				
<1000	22/500	4.4		
1000–1499	18/316	5.4	1.30 (0.67–2.53)	0.4373
1500–	8/71	11.3	2.53 (1.03–6.21)	0.0424
Working venue				
Construction site	8/255	3.1		
Market	31/398	7.8	2.05 (0.86–4.85)	0.1037
Factory	10/242	4.1	1.15 (0.43–3.08)	0.7864

* May not add up to 895, the total number of subjects due to missing values

† Odds ratio (OR) with 95% confidence interval (95% CI) that is adjusted for other sociodemographic characteristic variables in the table

Table 2

Herpes simplex virus (HSV)-2 seroprevalence and logistic regression analysis of sexual behavioural correlates among male rural migrants

Sexual behaviours	No. positives/ no. tested [*]	Prevalence (%)	Adjusted OR (95% CI) [†]	<i>P</i> value
Having premarital sex				
Yes	16/274	5.8	1.39 (0.63–3.06)	0.4188
No	28/540	5.2		
Age at first intercourse				
<22	10/205	4.9	0.69 (0.30–1.60)	0.3900
22	34/586	5.8		
Lifetime sex partner				
1	34/651	5.2	1.36 (0.56–3.30)	0.4910
>1	9/125	7.2		

* May not add up to 895, the total number of subjects, due to missing values

[†] Odds ratio (OR) with 95% confidence interval (95% CI) that is adjusted for sociodemographic characteristic variables and other two sexual behavioural variables in the table