

HIV and syphilis in migrant workers in eastern China

T Hesketh, L Li, X Ye, H Wang, M Jiang, A Tomkins

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See end of article for authors' affiliations

Correspondence to: Therese Hesketh, Centre for International Child Health, Institute of Child Health, University College London, 30 Guilford Street, London WC1N1EH, UK; t.hesketh@ich.ucl.ac.uk

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Objective: To measure the prevalence of HIV and syphilis in migrant and urban workers in eastern China, and to determine their knowledge and attitudes towards HIV.

Methods: A cross sectional survey involving dried blood spot testing and self completion questionnaires. Migrants and urban workers in 39 work units in two districts of Hangzhou, Zhejiang Province, were recruited. Respondents completed a questionnaire about knowledge and attitudes towards HIV. Testing for antibodies to HIV-1 and syphilis was carried out on dried blood spots using a gelatin particle agglutination technique.

Results: Data were obtained from 4148 migrants and 2197 urban workers. There were no HIV infections detected in either the migrant or urban populations. Syphilis was detected, but the prevalence was not significantly different between urban workers (0.68%, 95% CI: 0.35 to 1.02) and migrant workers (0.48%, 95% CI 0.26 to 0.66, $p=0.07$). 36% of the migrants had migrated with a partner, and 7% had also migrated with children. Urban workers were consistently more knowledgeable than migrants about HIV, but knowledge of the major modes of transmission was good in both groups. Traditional attitudes to sexual behaviour were still pervasive in both groups and attitudes towards individuals with HIV were generally intolerant. The use of sex workers appears rare and no more common in migrants than urban workers.

Conclusion: At present HIV is probably not spreading in the internal migrant population in eastern China. Syphilis is a problem in both the migrant and urban populations. The tendency to migrate with partners makes migrants relatively low risk for engaging in casual sex.

The number of people infected with HIV in China is currently estimated to be between 450 000 and 1.5 million, or between 0.06% and 0.2% of the adult population.¹ It is predicted that this could rise to 10 million by 2010.² At present the majority of diagnosed cases are in high risk groups, mainly injecting drug users (IDUs) who accounted for 61% of all reports to the end of 2003.³ But the predicted dramatic rises assume considerable spread in the general population, for which there is sparse evidence at present.⁴ A number of reports have suggested that internal migrants could be critical to this spread.^{1–5} The number of rural to urban migrants has increased from around 50 million in 1990 to 120 million in 2000, with predictions of at least 160 million by 2010. They are mostly concentrated in the booming cities of eastern China.⁶

Population mobility is known to facilitate the spread of infectious diseases,⁷ including HIV and sexually transmitted infections (STIs).^{8–9} Studies from sub-Saharan Africa have found a higher prevalence of HIV in migrant workers when compared with non-migrants.^{10–13} Similar findings have been made in Burmese migrant workers in Thailand.¹⁴ This higher prevalence has been explained by separation from long term partners, increased partner changes, increased contact with high risk partners, such as commercial sex workers, and increased rates of concurrency.⁸ But very little is known about HIV prevalence, knowledge, and attitudes towards HIV among migrant workers in China. Routine reports from a number of cities suggest that they are at greater risk of acquiring HIV. For example, 52% of all HIV reports in Beijing, 61% in Xian, and 66% in Shanghai in 2000 were in migrant workers¹⁵ but without denominator figures, and given that migrants are predominantly in sexually active age groups, these figures are impossible to interpret.

The prevalence of other STIs, including syphilis, is regarded as an indicator of unprotected sex and the potential for HIV spread within a population.^{16–17} China has seen a dramatic increase in reports of STIs from under 6000 nationwide in

1985 to 860 000 in 2000,¹⁸ although this certainly represents significant under-reporting. Reports of syphilis have risen disproportionately compared with other STIs. In Zhejiang province there was a 20-fold increase between 1985 and 2001, compared with a 12-fold increase in gonorrhoea.¹⁹

This study was carried out to measure the prevalence of HIV and syphilis in migrant workers in an eastern Chinese city, and to determine their levels of knowledge and attitudes to HIV, in order to determine whether migrants are likely to substantially contribute to the HIV epidemic in the future.

METHODS

The study was carried out from January to July 2004 in Hangzhou, the capital of Zhejiang Province and typical of the booming cities of eastern China. It has a population of 6.2 million with a migrant population of about 0.8 million.²⁰

The study was carried out in two of the city's 10 districts: inner city Xihu and suburban Xiaoshan. In each district a list of work units employing 30 or more migrants was drawn up, giving 51 in Xihu and 56 in Xiaoshan. Work units were then selected to represent the range of types of migrant labour in the city across the manufacturing, service, construction, and retail sectors. Sixteen work units in Xiaoshan and 21 in Xihu were asked to participate and none refused. For study purposes migrants were defined as individuals who hold rural household registration (*hukou*), and who have worked at an urban destination for between 3 months and 5 years. Urban worker controls were drawn where possible from the same work units as the migrants, but some work units employ few, if any, urban workers, so two other work units were added to achieve the sample size for the control group. In each work unit all workers present on the day were recruited into the study.

Abbreviations: IDUs, injecting drug users; STIs, sexually transmitted infections

The sample size was calculated according to the best estimates of the prevalence of HIV obtained from National Sentinel Surveillance data.³ These were an urban prevalence of 0.05%, rural of 0.001, and migrant 0.5%. To obtain a statistically significant difference ($p < 0.05$) at a power of 80%, using a 2:1 ratio 3190 migrants and 1590 urban workers were required. This represented 8–10% of the migrant population who met the inclusion criteria.

The questionnaire was piloted and amended according to feedback. Respondents were asked first to complete a questionnaire about knowledge and attitudes towards HIV. Before blood samples were taken, all participants were provided with information about HIV and syphilis, and an information leaflet was provided. All were offered free consultation and treatment if found to be test positive. Testing for HIV and syphilis was offered on an anonymous or a named basis. Consent was then obtained. Fifteen individuals, nine migrants and six urban workers, opted for anonymous testing. (All of these tested negative for both HIV and syphilis.)

Finger prick blood was collected onto filter paper and transported to the laboratory. Testing for antibodies to both HIV-1 and syphilis was carried out using a gelatin particle agglutination technique using Serodia reagents.²¹ Quality control was ensured through participation in the Dried Blood Spot HIV Quality Control programme conducted by CDC Atlanta. (This programme involves the addition of positive and negative controls to every test plate, and blind testing of a panel of spots every 3 months.) All syphilis test positives were confirmed by serum VDRL testing on referral to the city infectious diseases hospital for treatment. Approvals for the study were obtained from the ethics committee of the Institute of Child Health, University College London, and Hangzhou Bureau of Public Health.

Analysis

Prevalence with 95% confidence intervals was calculated for HIV and syphilis. For knowledge and attitudes comparisons were carried out using cross tabulations and Pearson χ^2 where appropriate. Analysis was carried out on SPSS 11.5.

RESULTS

Sociodemographic characteristics

Data were obtained from 4148 migrants and 2197 urban workers. Their sociodemographic characteristics by gender are shown in table 1. Migrants were younger, less well educated ($p < 0.001$), and more likely to be single than urban

workers ($p < 0.001$). They originated from 29 of the 31 Chinese provinces: 831 (20%) were from Zhejiang, but 2445 (59%) were from the poor inland provinces of Anhui, Jiangxi, Henan, and Hubei. Of the migrant workers 2293 (55%) were engaged in manufacturing, 625 (15%) in hotels and bars, 500 (12%) in the retail sector, 42 (1.2%) in domestic service, with nearly one third of the men, 667 (32%), in the construction industry. Of the urban workers, 1239 (56%) were in manufacturing, 431 (20%) in the retail sector, 309 (14%) worked in hotels and bars, and 212 (9.6%) were in clerical jobs. Thirty six per cent of the migrant workers had migrated to Hangzhou with a partner—721 (34%) of the men and 812 (40%) of the women; 131 (6.2%) of the men and 152 (7.5%) of the women were also accompanied by children.

Prevalence of HIV and syphilis

There were no HIV infections detected, but syphilis was detected. Fifteen urban workers tested positive (0.68%, 95% CI: 0.35 to 1.02) and 20 migrant workers (0.48%, 95% CI 0.26 to 0.66, $p = 0.06$). Of the 15 urban workers who tested positive for syphilis, eight were male ($p = 0.95$) and the median age was 28 (range 20–47) with the prevalence significantly higher in younger workers ≤ 28 years $\nu > 28$ years $p = 0.003$. Of the 20 migrants who tested positive 14 were male ($p = 0.001$), the median age was 27 (range 19–46) with the prevalence significantly higher in younger workers, ≤ 28 years $\nu > 28$ years ($p = 0.001$) and they originated from 10 different provinces.

Knowledge

Urban workers were consistently more knowledgeable than migrants about HIV (table 2). Most misinformation related to assuming modes of transmission, such as through mosquitoes or kissing, and ignorance about the protective effects of condoms: 28% of migrants and 56% of urban workers knew that condoms protect against HIV transmission.

Attitudes

These are shown in table 3. Only 6% thought it acceptable to have multiple sexual relationships before marriage. Over 90% of both groups said their workmates never went to sex workers with less than 1% saying “a lot” of their workmates went to sex workers. Attitudes towards people with HIV are strikingly intolerant: the majority would keep their distance from someone they knew had HIV and most thought that HIV positive individuals should not be allowed to get married or have children.

Table 1 Sociodemographic characteristics of the group by gender

		Urban		Migrant					
		Male (n = 1023) 47%	Female (n = 1174) 53%	Male (n = 2118) 51%	Female (n = 2030) 49%				
Age (years)	Median (range)	33 16–71		34 17–65		25 14–67		22 16–60	
Education	Primary 7–12 years	No	%	No	%	No	%	No	%
	Middle 13–15 years	102	10	82	7	240	11	265	12
	High/tertiary 16+	332	32	422	36	1213	57	1443	65
Marital status	Single	589	57	669	57	665	31	522	23
	Married/cohabiting	219	21	169	14	911	43	1189	53
	Divorced/separated	797	78	974	83	1148	54	1019	46
	Widowed	6	0.6	29	2.5	55	2.6	16	0.7
Work units	Factory	1	0.1	2	0.2	4	0.2	6	0.2
	Hotel/restaurant/bar	568	55	671	57	1061	50	1232	61
	Construction	125	12	184	16	164	7.7	461	23
	Shops/retail	6	0.6	0	0	667	31	17	0.8
	Office	210	21	221	19	222	10	278	13.6
	Domestic service	114	11	98	8.3	0	0	0	0
		0	0	0	0	4	0.2	42	2.1

Table 2 Knowledge of HIV by migrant and urban workers

		Urban workers (n = 2197)		Migrant workers (n = 4148)		p Value
		No	%	No	%	
Have you heard of a condition called HIV/AIDS?	Yes	2153	98	3820	92	<0.001
	No	43	1.9	328	7.9	
HIV can be acquired through Shaking hands	Correct	1735	79	2613	63	<0.001
	Incorrect	195	8.9	515	12	
	Don't know	263	12	1018	24	
Kissing	Correct	1011	46	1410	34	<0.001
	Incorrect	879	40	1660	40	
	Don't know	307	14	1078	26	
Chopsticks	Correct	1230	56	1457	35	<0.001
	Incorrect	527	24	1576	38	
	Don't know	439	20	1115	27	
Toilets	Correct	1252	57	1651	40	<0.001
	Incorrect	483	22	1078	26	
	Don't know	461	21	1416	34	
Mosquitoes	Correct	664	30	873	21	<0.001
	Incorrect	1154	53	2196	53	
	Don't know	373	17	1075	26	
Sexual intercourse	Correct	2046	93	3316	80	<0.001
	Incorrect	50	2.3	211	5.1	
	Don't know	98	4.5	620	15	
Blood transfusion	Correct	2019	92	3110	75	<0.001
	Incorrect	61	2.8	207	5.0	
	Don't know	114	5.2	829	20	
From pregnant mother to child	Correct	1909	87	2984	72	<0.001
	Incorrect	103	4.7	302	7.3	
	Don't know	183	8.3	862	21	
Breast milk	Correct	1453	66	2240	54	<0.001
	Incorrect	391	18	560	13	
	Don't know	351	16	1344	32	
Condoms protect against HIV	Yes	1230	56	1163	28	<0.001
	No	593	27	1949	47	
	Don't know	373	17	1034	25	

DISCUSSION

Assumptions that Chinese migrant workers will become drivers of the HIV epidemic are based on their huge numbers, evidence from studies of migrant workers elsewhere, and

routine reports from some Chinese cities. To our knowledge this is the first Chinese study which measures the prevalence of HIV and syphilis in migrant workers on a population basis. The study has limitations: it is a small sample in one eastern

Table 3 Attitudes of migrant and urban workers by percentage

		Urban workers		Migrant workers		p Value
		No	%	No	%	
Is it acceptable to have several sex partners before marriage?	Yes	136	6.2	270	6.5	<0.001
	No	1735	79	2902	65	
	Don't know	326	15	976	24	
Do the men in your work unit go to sex workers?	None	1999	91	3816	92	0.003
	One or two	92	4.2	149	3.6	
	A few	77	3.5	122	2.9	
	A lot	19	0.9	13	0.3	
	Don't know	10	0.5	38	0.9	
If you learnt that an acquaintance or workmate was HIV positive would you be supportive?	Yes	373	17	209	5	<0.001
	No	1362	62	3320	80	
	Don't know	462	21	619	15	
If you learnt that an acquaintance or workmate was HIV positive would you keep your distance?	Yes	1428	65	3358	81	<0.001
	No	220	10	13	0.3	
	Don't know	549	25	777	18	
Should someone with HIV be allowed to get married?	Yes	796	36	622	15	<0.001
	No	1120	51	2364	57	
	Don't know	581	26	1162	28	
Should someone with HIV be allowed to have children?	Yes	197	9	266	6.2	<0.001
	No	1604	73	2654	64	
	Don't know	396	18	1228	30	

city and inferences about migrant workers across the country must be made with caution. However, in order to be as representative as possible, we ensured that sampling took place across a range of different working groups, and the migrants themselves came from all over China. Further responses to questions about attitude may be prone to bias, since respondents may be influenced by what they feel is "correct." Despite the limitations this study has made important findings about the current and possible future contribution of migrant workers to China's HIV epidemic.

Firstly, our findings strongly suggest that HIV is not currently spreading among migrant workers in this part of eastern China. Secondly, undiagnosed syphilis is a problem in urban and migrant workers, not specifically of migrants. This is important in its own right, but may also be a warning sign for an increase in HIV in the near future.

The other results may help explain why migrant workers are less vulnerable than has been previously assumed. Firstly, unlike in many other countries¹⁰⁻¹³ almost half the migrating population are female. Official figures confirm this: of the migrants who moved across provinces in 2000, 47% were women.⁵ Secondly, over one third of the migrants in our study (36%) were accompanied by a partner, with 7% of these also accompanied by children. In Shanghai the proportion of migrants living with partners is even higher: 60% in 2003, up 3% from 2002.²² The mixed gender character of the migrating population not only reduces casual sexual encounters, but also may alter the sexual culture, so that single men are less likely to seek out casual or commercial sex partners. The apparently low use of sex workers lends support to this theory. This behaviour is underpinned by relatively traditional attitudes towards sex in both migrant and urban groups, as shown by the majority view that multiple sexual relationships before marriage are unacceptable. All of these characteristics are in contrast with those of the migrant workers studied in sub-Saharan Africa,⁸⁻¹³ and they emphasise the importance of not making assumptions based on other populations.

Our data show that most of the urban workers and migrants are reasonably well informed about the major modes of transmission. There is still some ignorance in some important areas such as condom use and there is much use of the "don't know" option. Despite reasonable levels of knowledge there is uninhibited intolerance towards individuals with HIV, more marked in migrant workers. HIV is clearly still highly stigmatised in the Chinese setting and health education interventions should explicitly address issues of destigmatisation of HIV.

We conclude that at present HIV is probably not spreading among migrant workers in eastern China. The prevalence of syphilis is similar in migrants and urban workers. The tendency to migrate with partners and families, and traditional attitudes to sexual relationships put migrant workers at low risk for engaging in casual sex.

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CONTRIBUTORS

TH designed the study, supervised implementation, and wrote the paper; LL helped design the study, supervised implementation, and commented on drafts of the paper; WHM and YXJ helped design the questionnaire and supervised the implementation of the study; JMM supervised the laboratory testing; AT helped to design the study and commented on drafts of the paper.

Key messages

- Studies from a number of countries have found a higher prevalence of HIV in migrant workers when compared with non-migrants
- It has been hypothesised that internal migrant workers, who number 120 million, could become a major driver of the Chinese HIV epidemic
- We found no HIV infections in migrant workers or urban controls. Syphilis prevalence was similar in the two groups at 0.68% and 0.48%, respectively
- The tendency to migrate with partners and relatively traditional attitudes to sexual relationships probably makes these migrant workers low risk for engaging in casual sex and acquiring HIV

Authors' affiliations

T Hesketh, A Tomkins, Centre for International Child Health, Institute of Child Health, University College London, UK

L Li, X Ye, H Wang, M Jiang, Institute of Social and Family Medicine, Zhejiang University, Hangzhou, PR China

There are no competing interests.

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