Published in final edited form as:
AIDS Educ Prev. 2009 December ; 21(6): 570–581. doi:10.1521/aeap.2009.21.6.570.

KNOWLEDGE, ATTITUDES, AND PRACTICES OF VOLUNTARY HIV COUNSELING AND TESTING AMONG RURAL MIGRANTS IN SHANGHAI, CHINA

Na He,
Department of Epidemiology, School of Public Health, Fudan University, Shanghai, and the Key Laboratory for Public Health Safety, Ministry of Education, China

Jinling Zhang,
Minhang District Center for Disease Prevention and Control, Shanghai, China

Jinjian Yao,
Minhang District Center for Disease Prevention and Control, Shanghai, China

Xiuhong Tian,
Minhang District Center for Disease Prevention and Control, Shanghai, China

Genming Zhao,
Department of Epidemiology, School of Public Health, Fudan University, Shanghai, and the Key Laboratory for Public Health Safety, Ministry of Education, China

Qingwu Jiang, and
Department of Epidemiology, School of Public Health, Fudan University, Shanghai, and the Key Laboratory for Public Health Safety, Ministry of Education, China

Roger Detels
Department of Epidemiology, School of Public Health, University of California, Los Angeles

Abstract

A study of knowledge, attitudes and practices (KAP) of voluntary HIV counseling and testing (VCT) among rural migrants was conducted in Shanghai, China. An anonymous questionnaire was administered face-to-face. Among 2,690 participants, 78% reported having had lifetime sexual intercourse with 41.3% of singles reporting sexual intercourse, 9.2% having had multiple sex partners in the past year, only 19% of the participants always using condoms whereas 61.6% did not use in their sexual acts in the past month, 80% knew HIV infection was diagnosed through a blood test, 46.5% had heard of VCT ever before, but only 3.5% felt that they were likely to be HIV-infected now or in the future and only 62 (2.3%) had ever had HIV testing with 19 of them getting tested at a VCT site. Gender, working venue, multiple sex partnerships and knowledge of VCT were independently correlated with having had HIV testing. This study suggests that a much greater effort is needed to promote safer sex and to improve VCT knowledge and services among rural migrants particularly those who are engaging in risky behaviors.

Knowing one's HIV status is the first step to accessing care and preventing further infection (World Health Organization [WHO, 2002). This knowledge enables the tested individual to initiate or maintain safer behaviors to prevent acquisition of HIV and other sexually

Address correspondence to Roger Detels, MD, MS, Professor, Department of Epidemiology, School of Public Health, University of California, Los Angeles, Box 951772, Los Angeles, CA 90095-1772; detels@ucla.edu; or Na He, MD, PhD, Department of Epidemiology, School of Public Health, Fudan University, Shanghai 200032, China; nhe@shmu.edu.cn.

transmitted diseases (STDs), and if testing positive, to prevent infecting others and to gain early access to HIV-specific care, treatment and support (Kawichai et al., 2004; Otten, Zaidi, Wroten, Witte, & Peterman, 1993; Weinhardt, Carey, Johnson, & Bickham, 1999; WHO, 2002). Voluntary counseling and testing (VCT) has been demonstrated as one of the most effective strategies in this regards (Holtgrave & McGuire, 2007; Robles, Matos, Colon, Marrero, & Reyes, 1996; Voluntary HIV Counseling and Testing Efficacy Study Group, 2000). During the last 5 years, China has established 4,293 VCT clinics all over the country (China State Council AIDS Working Committee Office [CSCAWCO] & UN Theme Group on AIDS in China, 2007). However, among 700,000 people living with HIV in China, the majority still did not know their HIV infection status (CSCAWCO & UN Theme Group on AIDS in China, 2007). This underscores the need for increasing acceptance and utilization of HIV testing services in China. Such need might be particularly relevant for rural-to-urban migrants as they have played important roles in HIV transmission in China (He et al., 2006; He, Wong, Huange, Ding, et al., 2007; He, Wong, Huang, Thompson, & Fu, 2007; Li et al., 2004; Liu et al., 2005; Qian, Vermund, & Wang, 2005), and they have no entitlement to urban health cares and services accorded to most urban dwellers owing to their nonurban residency (Wong, Li, & Song, 2007).

Public health practitioners have informally observed that the number of individuals voluntarily receiving HIV counseling and/or testing is unexpectedly low in China. Moreover, none of these VCT sites and promotion programs has been specifi-cally designed and developed for migrants and very few migrants have ever received an HIV test and face-to-face counseling. Therefore, we conducted a cross-sectional survey among rural migrants in Shanghai, the most populous and economically developed city in China, to better understand HIV/AIDS knowledge, attitudes and awareness, and VCT-related knowledge, attitudes, and practices (KAP) among them. A *rural migran*t was defined as someone born and registered as a permanent resident in a rural area but who worked in Shanghai.

METHODS

STUDY SITE

Shanghai has 17 million permanent residents and 5 million migrants. By the end of 2007, 3,010 HIV/AIDS cases had been reported, 70% of them were migrants (personal communication, Shanghai CDC HIV/STDs surveillance data, 2007). The present study was carried out in three communities in southwestern Shanghai having 288,000 officially registered local permanent residents (i.e., having *hu-kou* of Shanghai) and 94,400 registered rural migrants.

SAMPLE SELECTION

Before the main study, a pilot ethnographic study was conducted among rural migrants in the study site to better understand sociodemographic characteristics, working and living situations of rural migrants, which would be useful for selecting a study sample. It revealed that rural migrants in the studied communities were primarily employed or self-employed in six broad venue categories. The proportion of rural migrants falling in a venue category was about 24.2% for markets; 34.1% for factories or enterprises; 8.8% for construction sites; 14.7% for commercial service, including restaurants, hotels, and guest houses; 4.0% for entertainment establishments; and 14.1% who have odd jobs in areas populated by rural migrants. However, given the large size of the rural migrant population in the studied communities and the lack of a sampling frame, a semirandom sampling approach called quota-sampling was employed for the sample selection. The quota sampling required that the number of subjects recruited from a specific venue category in the sample was proportional to the number of subjects employed in that specific venue category in the whole

migrant population. From each venue category, rural migrants were recruited conveniently (i.e., usually not randomly) until the required number of study participants for that venue category was met. Totally, 2,832 rural migrants (about 3% of the migrant population in the study site) working in the above six broad venue categories were approached. Finally, a total of 2,690 (95.0%) rural migrants agreed to participate in the survey following administration of informed consent.

DATA COLLECTION

An anonymous questionnaire containing 53 questions was developed to obtain information about sociodemographic characteristics, migration status, knowledge and attitudes concerning HIV/AIDS and infected individuals, sexual behavior, and KAP of HIV testing and voluntary HIV counseling and testing in particular. The majority of the questions have been widely used or reported in the literature. The questionnaires were administered face-to-face by experienced and trained public health workers. A small incentive equivalent to U.S. $3 was given to each participant for compensation of their time. The completed questionnaires were placed in a large bag containing other completed questionnaires, reassuring the participants that no one could identify their answered questionnaires.

STATISTICAL ANALYSIS

Descriptive analyses were conducted to illustrate the knowledge, attitudes, and acceptance of VCT for HIV. Tests of associations between certain categorical variables were based on the chi-square test or Fisher's exact test, depending on which was appropriate. A summary score was developed from the 11 HIV knowledge questions (5 questions were about the three transmission modes of HIV and condom use for HIV prevention, 4 regarding misconceptions about HIV transmission, 1 about HIV diagnosis, and 1 on whether HIV/AIDS was curable). The total score for HIV knowledge ranged from 0 to 11 (a score of 0 was designated for a wrong answer or an answer of unknown, and 1 for a correct answer). Two separate multiple logistic regression analyses were conducted to identify factors independently associated with knowledge and the actual uptake of VCT. Their respective odds ratios and 95% confidence intervals were calculated. All statistical analyses were carried out using the SAS System for Windows (Cary, NC), Version 8.0.

RESULTS

DESCRIPTION OF STUDY PARTICIPANTS

Table 1 presents the characteristics of study participants. About 43.8% were male, 76.4% were less than 35 years of age, 70% were educated through middle school or less, and 37.5% were never married. About 47.8% had migration experience in one or more cities other than Shanghai, and more than half had stayed in Shanghai for more than 3 years. The study subjects were employed or self-employed in factories, markets, construction sites, community services, and entertainment establishments. Fifty-eight percent of the participants were living with their spouse or a sex partner. Males and females were significantly different in all the social and demographic characteristics.

KNOWLEDGE AND ATTITUDE ABOUT HIV/AIDS

Eighty percent knew that HIV infection is diagnosed through a blood test, but 46% thought AIDS is curable. Over 95% (95.6%) understood that HIV could be transmitted through blood transfusion, and 93.4% that HIV could be sexually transmitted. More than 83% (83.4%) understood that HIV could be transmitted from a pregnant woman to her child, but only 72.4% thought HIV could be transmitted from mother to child through breast-feeding. Only 56.7% thought that consistent condom use could prevent HIV transmission. Although

83.7% believed that shaking hands could not transmit HIV, nearly 30% thought that sharing food could transmit the virus. More than half of the respondents (57.1%) thought HIV could be prevented by regular use of antibiotics. The question that the participants missed the most was whether HIV could be transmitted through mosquito bites; 73.5% said that it could. In general, females had less knowledge of HIV/AIDS than males (see Table 1). Nearly half of the participants were not willing to work with an HIV-infected colleague. This negative attitude toward HIV-infected individuals was more obvious among females (see Table 1).

SEXUAL BEHAVIOR AND HIV RISK PERCEPTION

Sexual life—Seventy-eight percent (2,097/2,690) of the study participants reported having had lifetime sexual intercourse, with 41.3% of singles reporting sexual intercourse. Among those having sexual experience, 84% had sex in the past month. The percentage of having sex in the part month was high among both single and married participants (Table 2).

Condom Use—In their sexual acts in the past month, only 19% of the participants always used condoms whereas 61.6% did not use them. Condoms were used primarily for prevention of pregnancy and to a lesser extent, for prevention of disease. Compared with married migrants, single migrants used condoms more frequently (see Table 2).

Multiple Sex Partners—Among those (2,097) having had lifetime sexual intercourse, only 28 (1.3%) reported no sex in the past year whereas nearly 10% (193) reported having had multiple sex partners. The proportion of having had multiple sex partners was significantly higher among males (10.0%), singles (22.8%), employees in entertainment establishments (31.3%), those having been in Shanghai for less than 1 year (21.9%) and those separated from their spouse or sex partner (16.6%).

HIV Risk Perception—Very few (3.5%) felt that they were likely to be HIV infected now or in the future. The low awareness of HIV risk was not different between males and females (3.6% vs. 3.4%, $p = .768$). Even among 193 subjects who reported having multiple sex partners during the past year, only 11 (5.7%) were aware of the HIV risk but still rarely used condoms.

VOLUNTARY COUNSELING AND TESTING

Knowledge of VCT—Fewer than half (46.5%) of the participants had heard of VCT for HIV (Table 3). A logistic regression analysis indicated that migrants who were more educated, employed as construction workers, more knowledgeable about HIV/AIDS, aware of HIV risks and who engaged in a multiple sex partnership were more likely to have ever heard of VCT for HIV (data not shown). However, having heard of VCT for HIV was not statistically associated with gender, age, marital status, period of staying in Shanghai, number of migration cities, and current living status with a spouse or a sex partner. Moreover, among those having heard of VCT for HIV, only 66.4% males and 57.7% females correctly realized the availability of a free VCT at a local Centers for Disease Control and Prevention (CDC), further indicating a very limited knowledge of the availability of a free VCT service for HIV among rural migrants.

Attitudes and Acceptance of VCT—After receiving a face-to-face introduction of the concept of VCT for HIV, 2,477 (92.1%) would intend to take a free VCT if they self-perceived a risk of HIV infection. The intention of VCT acceptance was higher among males than females (see Table 3). About 56.7% of the study participants preferred to have VCT at a local CDC, but more than one third (36.7%) of the study participants also preferred to get VCT at general hospitals. General hospitals were more preferable for women (see Table 3). Very few chose to take VCT at family planning clinics or mobile VCT

service (i.e., at anywhere VCT service upon request). Reported reasons for unwillingness to take a free VCT even if self-perceiving a risk of HIV infection included stigma associated with the behavior of taking a VCT, concern about testing positive for HIV, and no perceived benefit of knowing HIV status.

Practice of HIV Testing and VCT—Sixty-two people (2.3% of the total sample) reported having ever had HIV testing, of whom 19 (30.6%) got HIV tested at a VCT site. Among them, 74.2% tested negative, 16.1% did not know testing results, 8.1% refused to tell testing results. Only one male reported that he tested positive for HIV. He was 22 years old, single, had been in Shanghai for more than 3 years, was currently living with his girlfriend, had migrated to two other cities before coming to Shanghai, mistakenly thought that HIV could be prevented by antibiotics and was curable, and had never heard of VCT for HIV. He received only one HIV test for blood donation before migrating outside of hometown and found he was HIV infected. However, during the past year in Shanghai, he had many sex partners and never used condoms, demonstrating a potential threat of transmitting HIV.

Logistic regression analysis indicated that the proportion of having had HIV testing was significantly higher among males, those working in entertainment establishments, those having multiple sex partners in the past year, and those having heard of VCT (Table 4).

Disclosure of HIV Testing Results—About a half of the participants (49.4%) would disclose their positive HIV testing result to their spouse or a long-term sex partner, and a slightly higher proportion (61.9%) of the study participants would disclose a positive HIV status to other family members. A total of 508 participants (18.9%) chose not to disclose an HIV infection status to anyone else.

ACCEPTANCE OF ALTERNATIVE HIV TESTING APPROACH

Nearly 90% of the study participants accepted an “opt-out” approach for HIV testing in clinical settings such as integrating HIV testing in antenatal examinations, physical examinations for employment or marriage license (see Table 3). A community-based, confidential and free mass HIV screening program was also acceptable for the majority (82.6%) of the study participants (see Table 3).

DISCUSSION

Recently, several studies have been conducted to examine acceptability and practice of VCT in mainland China (Chen et al., 2007; Hesketh, Duo, Li, & Tomkins, 2005; Hesketh et al., 2003; Khoshnood et al., 2006; Li et al., 2006; Ma et al., 2007; Ma et al., 2008; Wu, Row, Xu, Lou, & Detels, 2005). One study was conducted to determine correlates of any HIV/STD testing behavior and willingness to test among rural-to-urban migrants in two metropolitan cities in China (Wang, Li, Stanton, & McGuire, 2008). But none of them was specifically designed to examine KAP of VCT among rural migrants in metropolitan areas. Therefore, the present study not only augments the limited data available on KAP of VCT for HIV among rural migrants in metropolitan areas in China, but more important, provides useful information for developing more effective VCT services for rural migrants in China.

The proportion (14.0%) of participants who did not know where to get HIV test was lower than the proportion (34.2%) in the study conducted by Ma et al. in two rural counties in Guizhou Province of western China (Ma et al., 2007). Fewer than half of the participants had heard of VCT for HIV, in spite of a wide availability of VCT service in China and particularly in Shanghai (CSCAWCO & UN Theme Group on AIDS in China, 2007). Moreover, although VCT is free at various CDC, a substantial proportion of the participants

did not recognize the availability. These observations highlight the urgent need of mass media programs providing concepts, procedures and availability of VCT in China.

Most participants were willing to accept VCT if they perceived a risk of HIV infection. However, only 19 study participants had ever actually taken VCT. Reasons for such a low rate of actual uptake of VCT could be ignorance of VCT, low awareness of HIV risks and expected nonbenefit of VCT. The disparity between intention to take VCT and actual uptake of VCT was also observed in other studies in China (Ma et al., 2007; Wu et al., 2005) as well as in other countries (Fylkesnes, Haworth, Rosensvald, & Kwapa, 1999). Taking VCT for HIV might be a complex behavior that is driven by many factors including but not limited to the intention to do so.

By the end of 2007, there were 4,293 VCT sites in China, of which 803 (19.1%) were located in hospitals (CSCAWCO & UN Theme Group on AIDS in China, 2007). This is very important for migrants because 36.7% of present study participants preferred taking VCT in hospitals. On the other hand, most participants indicated they would accept an “opt-out” approach for HIV testing in clinical settings such as integrating HIV testing in antenatal examinations, physical examinations for employment or marriage license, or community-based, confidential and free mass HIV screening programs. This attitude supports the present HIV testing strategy in China (Wu, Sun, Sullivan, & Detels, 2006).

In the present study, fewer than half of the study participants would disclose their HIV infection status to their spouse or long-term sex partner. This is contrary to current regulations in China that requires HIV-infected individuals to disclose their HIV status to their spouse. Moreover, concealment of HIV status between couples could be problematic because on one hand it may prevent the HIV-infected individual from seeking support from his/her spouse and on the other hand, it may become a barrier to accepting behavioral interventions for prevention of HIV transmission between the serodiscordant couple. Our study also indicated that a total of 508 participants (18.9%) would not disclose their HIV infection status to anyone else. In this circumstance, the HIV-infected individuals would lack social and psychological support from anyone other than health workers who were obligated to know their HIV infection status. The low willingness to disclose HIV infection status found among the participants reflects the high prevalence of stigma toward HIV-infected individuals. In fact, nearly half of the study participants were not willing to work with an HIV-infected colleague. Serious stigma toward HIV infection and related risk behaviors has been observed among Chinese populations and has been a severe barrier to HIV prevention and care efforts (Deng, 2007; Derlega, Yang, & Luo, 2006; Li et al., 2007; Lieber et al., 2006; Liu & Choi, 2006; Qian et al., 2007). Thus, campaigns to reduce stigma associated with HIV-related behaviors and living with HIV should be an important part of any future HIV prevention and intervention programs targeted on rural migrants in China.

Our study also showed that many migrants held misconceptions about HIV transmission and prevention as well as negative attitudes toward HIV/AIDS. Considering a similar study conducted by He et al. (2006) on rural migrants in the same city, it seems that HIV/AIDS-related knowledge and attitudes among rural migrants in Shanghai has not significantly improved during the past several years. Because the Shanghai governments have devoted tremendous efforts to anti-HIV epidemic including mass media health education campaigns for HIV prevention and intervention, these efforts clearly have not impacted the migrant population and may need to be redesigned to reach them.

The majority of study participants including a substantial proportion (41.3%) of singles had had sexual intercourse but rarely used condoms or used condoms primarily for prevention of pregnancy. Multiple sex partnership in the past year was reported by nearly 10% of those

having sexual experience and, in particular, by 23.3% of single participants. The high percentage engaging in multiple sex partnership among single participants suggests the importance of promoting safer sexual behaviors especially condom use among single migrants in China.

The study has certain limitations, for example, information bias. Some participants might feel uncomfortable with some sensitive questions such as questions about sexual behaviors, number of sexual partners, and HIV testing practice. Some participants might have misunderstood some of the questions about voluntary counseling and testing. To minimize such bias, we asked local health providers and senior public health practitioners to be interviewers and trained them. All interviews took place in a private space. A pilot investigation was conducted before the main survey to examine the appropriateness of the interview process, the questions in the questionnaire and to provide practice for interviewers before the main survey.

In conclusion, China has launched a national anti-HIV campaign. However, this campaign will not succeed if large numbers of rural migrants are not reached and HIV-infected individuals are not identified and do not know their infection status. Findings from the present study have important implications for developing intervention programs targeting migrants in urban areas in China. First, a much greater effort is needed to improve HIV/AIDS and VCT knowledge and to increase understanding of and social support for HIV-infected individuals among migrants. Second, the relatively high percentage having multiple sex partners and the low rate of using condoms among these rural migrants underscores the importance of promoting safer sexual behaviors. More intense efforts should be made with migrants who are single or living separately from their spouse, as they are more likely to engage in risky behaviors. Third, it is time to make voluntary HIV counseling and/or testing a routine part of health services that are accessible to rural migrants, especially in general hospitals or other public health settings. Finally, programs intended to improve awareness of HIV risk among rural migrants and particularly among those engaging in risky behaviors need to be designed and implemented.

Acknowledgments

This study was supported by the U.S. National Institute of Health Fogarty International Center Grant R01 TW007298 (NIH/FIC) and partially supported by Shanghai Leading Academic Discipline Project (No. B118). This study was approved by the institutional review board of Fudan University, China.

References

China State Council AIDS Working Committee Office & UN Theme Group on AIDS in China. A joint assessment of HIV/AIDS prevention, treatment and care in China. 2007

Chen HT, Liang S, Liao Q, Wang S, Schumacher JE, Creger TN, et al. HIV voluntary counseling and testing among injection drug users in south China: A study of a nongovernment organization based program. AIDS and Behavior. 2007; 11(5):778–788. [PubMed: 17347877]

Deng R, Li J, Sringernyuang L, Zhang K. Drug abuse, HIV/AIDS and stigmatisation in a Dai community in Yunnan, China. Social Science and Medicine. 2007; 64(8):1560–1571. [PubMed: 17257727]

Derlega VJ, Yang X, Luo H. Misconceptions about HIV transmission, stigma and willingness to take sexual risks in southwestern China. International Journal of STD and AIDS. 2006; 17(6):406–409. [PubMed: 16734964]

Fylkesnes K, Haworth A, Rosensvard C, Kwapa PM. HIV counseling and testing: overemphasizing high acceptance rates a threat to confidentiality and the right not to know. AIDS. 1999; 13(17): 2469–2474. [PubMed: 10597789]

He N, Detels R, Chen Z, Jiang Q, Zhu J, Dai Y, et al. Sexual behavior among employed male rural migrants in Shanghai, China. AIDS Education and Prevention. 2006; 18(2):176–186. [PubMed: 16649962]

He N, Wong FY, Huang ZJ, Ding Y, Fu C, Smith BD, et al. HIV risks among two types of male migrants in Shanghai, China: money boys vs. general male migrants. AIDS. 2007; 21(Suppl 8):S73–S79. [PubMed: 18172395]

He N, Wong FY, Huang ZJ, Thompson EE, Fu C. Substance use and HIV risks among male heterosexual and “money boy” migrants in Shanghai, China. AIDS Care. 2007; 19(1):109–115. [PubMed: 17129865]

Hesketh T, Huang XM, Wang ZB, Xing ZW, Cubitt DW, Tomkins AM. Using the premarital examination for population-based surveillance for HIV in China: a pilot study. AIDS. 2003; 17(10): 1574–1576. [PubMed: 12824801]

Hesketh T, Duo L, Li H, Tomkins AM. Attitudes to HIV and HIV testing in high prevalence areas of China: informing the introduction of voluntary counseling and testing programs. Sexually Transmitted Infection. 2005; 81(2):108–112.

Holtgrave D, McGuire J. Impact of counseling in voluntary counseling and testing programs for persons at risk for or living with HIV infection. Clinical Infectious Disease. 2007; 45(Suppl 4):S240–S243.

Kawichai S, Beyrer C, Khamboonruang C, Celentano DD, Natpratan C, Rungru-engthanakit K, et al. HIV incidence and risk behaviours after voluntary HIV counselling and testing (VCT) among adults aged 19–35 years living in peri-urban communities around Chiang Mai city in northern Thailand, 1999. AIDS Care. 2004; 16(1):21–35. [PubMed: 14660141]

Khoshnood K, Wilson KS, Filardo G, Liu Z, Keung NH, Wu Z. Assessing the efficacy of a voluntary HIV counseling and testing intervention for pregnant women and male partners in Urumqi City, China. AIDS and Behavior. 2006; 10(6):671–681. [PubMed: 16897353]

Li L, Wu Z, Wu S, Zhaoc Y, Jia M, Yan Z. HIV-related stigma in health care settings: a survey of service providers in China. AIDS Patient Care and STDs. 2007; 21(10):753–762. [PubMed: 17949274]

Li X, Wang B, Fang X, Zhao R, Stanton B, Hong Y, et al. Short-term effect of a cultural adaptation of voluntary counseling and testing among female sex workers in China: a quasi-experimental trial. AIDS Education and Prevention. 2006; 18(5):406–419. [PubMed: 17067252]

Li X, Fang X, Lin D, Mao R, Wang J, Cottrell L, et al. HIV/STD risk behaviors and perceptions among rural-to-urban migrants in China. AIDS Education and Prevention. 2004; 16(6):538–556. [PubMed: 15585430]

Lieber E, Li L, Wu Z, Rotheram-Borus MJ, Guan J. National Institute of Mental Health (NIMH) Collaborative HIV Prevention Trial Group. HIV/STD stigmatization fears as health-seeking barriers in China. AIDS and Behavior. 2006; 10(5):463–471. [PubMed: 16374668]

Lin D, Li X, Yang H, Fang X, Stanton B, Chen X, et al. Alcohol intoxication and sexual risk behaviors among rural-to-urban migrants in China. Drug and Alcohol Dependence. 2005; 79(1):103–112. [PubMed: 15943949]

Liu H, Li X, Stanton B, Liu H, Liang G, Chen X, et al. Risk factors for sexually transmitted disease among rural-to-urban migrants in China: Implications for HIV/sexually transmitted dieseas prevention. AIDS Patient Care & STDs. 2005; 19(1):49–57. [PubMed: 15665635]

Liu JX, Choi K. Experiences of social discrimination among men who have sex with men in Shanghai, China. AIDS and Behavior. 2006; 10(4 Suppl):S25–S33. [PubMed: 16715344]

Ma W, Detels R, Feng Y, Wu Z, Shen L, Li Y, et al. Acceptance of and barriers to voluntary HIV counseling and testing among adults in Guizhou province, China. AIDS. 2007; 21(Suppl 8):S129–S135. [PubMed: 18172381]

Ma W, Wu Z, Qin Y, Detels R, Shen L, Li Y, et al. Comparison of voluntary vounseling and testing uptake between a China CARES county and a county not designated for the China CARES Program. AIDS Patient Care and STDs. 2008; 22(6):521–533. [PubMed: 18462075]

Otten MW Jr, Zaidi AA, Wroten JE, Witte JJ, Peterman TA. Changes in sexually transmitted disease rates after HIV testing and posttest counseling, Miami, 1988 to 1989. American Journal of Public Health. 1993; 83(4):529–533. [PubMed: 8460729]

Robles RR, Matos TD, Colon HM, Marrero CA, Reyes JC. Effects of HIV testing and counseling on reducing HIV risk behavior among two ethnic groups. Drugs & Society. 1996; 9(1–2):173–184. [PubMed: 12348010]

Qian HZ, Vermund SH, Wang N. Risk of HIV/AIDS in China: subpopulations of special importance. Sexually transmitted infections. 2005; 81(6):442–447. [PubMed: 16326842]

Qian HZ, Wang N, Dong S, Chen H, Zhang Y, Chamot E, et al. Association of misconceptions about HIV transmission and discriminatory attitudes in rural China. AIDS Care. 2007; 19(10):1283–1287. [PubMed: 18071972]

Voluntary HIV Counseling and Testing Efficacy Study Group. Efficacy of voluntary HIV counseling and testing in individuals and couples in Kenya, Tanzania and Trinidad: a randomised trial. The Lancet. 2000; 356(9224):103–112.

Wang B, Li X, Stanton B, McGuire J. Correlates of HIV/STD testing and willingness to test among rural-to-urban migrants in China. AIDS and Behavior. 2008 Epub ahead of print.

Weinhardt LS, Carey MP, Johnson BT, Bickham NL. Effects of HIV counseling and testing on sexual risk behavior: a meta-analytic review of published research, 1985–1997. American Journal of Public Health. 1999; 89(9):1397–1405. [PubMed: 10474559]

Wong D, Li C, Song H. Rural migrant workers in urban China: Living a marginalized life. International Journal of Social Welfare. 2007; 16(1):32–40.

World Health Organization. Report of a WHO Consultation. Geneva, Switzerland: 2002. Increasing access to HIV testing and counseling.

Wu Z, Rou K, Xu C, Lou W, Detels R. Acceptability of HIV/AIDS counseling and testing among premarital couples in China. AIDS Education and Prevention. 2005; 17(1):12–21. [PubMed: 15843107]

Wu Z, Sun X, Sullivan SG, Detels R. Public health: HIV testing in China. Science. 2006; 312(5779): 1475–1476. [PubMed: 16763133]

TABLE 1

Sociodemographic Characteristics, HIV/AIDS-Related Knowledge and Attitudes Among Study Participants

	Male (*N* = 1,178)	Female (*N* = 1,512)	Total (*N* = 2,690)
	No. (%)	No. (%)	No. (%)
Age (years) (p < .001)			
18–24	494 (41.9)	562 (37.2)	1,056 (39.3)
25–34	378 (32.1)	617 (40.8)	998 (37.1)
35–44	232 (19.7)	302 (20.0)	531 (19.7)
45–65	74 (6.3)	31 (2.0)	105 (3.9)
Education (school) (*p* < t.001)			
Primary or lower	98 (8.3)	316 (20.9)	414 (15.4)
Middle	560 (47.5)	909 (60.1)	1,469 (54.6)
High or college	520 (44.1)	287 (19.0)	807 (30.0)
Marital status (*p* < .001)			
Single	491 (41.7)	519 (34.3)	1,010 (37.5)
Married	681 (57.8)	971 (64.2)	1,652 (61.4)
Divorced	6 (0.5)	22 (1.5)	28 (1.0)
Working venue (*p* < .001)			
Factory	403 (34.2)	440 (29.1)	843 (31.3)
Market	291 (24.7)	293 (19.4)	584 (21.7)
Construction site	217 (18.4)	11 (0.7)	228 (8.5)
Community service/clusters	240 (20.4)	456 (30.2)	696 (25.9)
Entertainment establishments	27 (2.3)	312 (20.6)	339 (12.6)
Resided in Shanghai (months) (*p* = .005)			
<6	207 (17.6)	258 (17.1)	465 (17.3)
6–11	70 (5.9)	138 (9.1)	208 (7.7)
12–35	268 (22.8)	374 (24.7)	642 (23.9)
36-	633 (53.7)	742 (49.1)	1,375 (51.1)
Living with spouse or a sexual partner (*p* < .001)			
Yes	394 (33.4)	733 (48.5)	1,563 (58.1)
No	784 (66.6)	779 (51.5)	1,127 (41.9)
Number of cities migrated to before Shanghai (*p* < .001)			
0	496 (42.2)	905 (59.9)	1,401 (52.2)
1	247 (21.0)	378 (25.0)	625 (23.3)
2	185 (15.7)	160 (10.6)	345 (12.8)
≥ 3	247 (21.0)	68 (4.5)	315 (11.7)
HIV/AIDS knowledge (score) (*p* < .001)			
0–5	154 (13.1)	249 (16.5)	403 (15.0)
–8	556 (47.2)	763 (50.6)	1,319 (49.1)
9–11	467 (39.7)	497 (32.9)	964 (35.9)
Willing to work with an HIV-positive individual (*p* < .001)			
Yes	656 (55.7)	725 (48.0)	1,381 (51.3)

	Male (*N* = 1,178) No. (%)	Female (*N* = 1,512) No. (%)	Total (*N* = 2,690) No. (%)
No	522 (44.3)	787 (52.0)	1,309 (48.7)

TABLE 2

Sexual Behavior Among Study Participants

	Single (*N* = 1,010) No. (%)	Ever married (*N* = 1,680) No. (%)	Total (*N* = 2,690) No. (%)
Ever had sexual intercourse ($p < .001$)			
Yes	417 (41.3)	1,680 (100.0)	2,097 (78.0)
No	593 (58.7)	0 (100.0)	593 (22.0)
Had sex in the past month ($p < .001$)			
Yes	316 (75.8)	1,440 (86.0)	1,756 (84.0)
No	101 (24.2)	234 (14.0)	335 (16.0)
Condoms use among those having had sex in the past month (No = 1,756, $p < .001$)			
Always	121 (38.3)	213 (14.8)	334 (19.0)
Sometimes	99 (31.3)	242 (16.8)	341 (19.4)
Never	96 (30.4)	985 (68.4)	1,081 (61.6)
Purpose of using condoms among those having ever used a condom in the past month (No = 675)			
To prevent pregnancy ($p = .024$)	184 (83.6)	345 (76.0)	529 (78.5)
To prevent diseases ($p = .004$)	94 (42.7)	142 (31.3)	236 (35.0)
Number of sex partners in the past year among those who reported having had sex in the past year ($N = 2051$, $p < .001$)			
1	309 (76.7)	1,549 (94.0)	1,858 (90.6)
2	36 (8.9)	47 (2.8)	83 (4.0)
3	18 (4.5)	22 (1.3)	40 (2.0)
≥ 4	40 (9.9)	30 (1.8)	70 (3.4)

TABLE 3

Knowledge, Attitudes, and Practice of Voluntary HIV Counseling and Testing and Acceptance of Alternative Testing Approaches Among Study Participants

	Male (*N* = 1,178) No. (%)	Female (*N* = 1,512) No. (%)	Total (*N* = 2,690) No. (%)
Having heard of free VCT service ($p = .045$)			
Yes	574 (48.7)	678 (44.8)	1,252 (46.5)
No	604 (51.3)	834 (55.2)	1438 (53.5)
Intention to take VCT if perceiving risk of HIV infection ($p = .008$)			
Yes	1,105 (93.8)	1,372 (90.7)	2,477 (92.1)
No	73 (6.2)	140 (9.2)	213 (7.9)
Most preferred place to take VCT ($p < .001$)			
Local CDC	692 (62.6)	713 (52.0)	1405 (56.7)
General hospital	357 (32.3)	553 (40.3)	910 (36.7)
Family planning clinic	8 (0.7)	24 (1.8)	32 (1.3)
Home	40 (3.6)	70 (5.1)	110 (4.4)
Other places	8 (0.7)	12 (0.9)	20 (0.8)
Ever had HIV test ($p = .632$)			
Yes	29 (2.5)	33 (2.2)	62 (2.3)
No	1,149 (97.5)	1,479 (97.8)	2,628 (97.7)
Ever had HIV test in a VCT site ($p = .123$)			
Yes	5 (0.4)	14 (0.9)	19 (0.7)
No	1,173 (99.6)	1,498 (99.1)	2,671 (99.3)
Acceptance of “opt-out” HIV testing in various clinical settings such as antenatal clinics, physical examinations for employment or marriage license ($p = .069$)			
Yes	1,068 (90.7)	1,338 (88.5)	2,406 (89.4)
No	110 (9.3)	174 (11.5)	284 (10.6)
Acceptance of community-based, confidential and free mass HIV screening ($p < .001$)			
Yes	1,027 (87.2)	1,196 (79.1)	2,223 (82.6)
No	151 (12.8)	316 (20.9)	467 (17.4)

Note. VCT – voluntary counseling and testing; CDC – Centers for Disease Control and Prevention.

TABLE 4

Proportions and Correlates of Having Ever Had HIV Testing Among Study Participants

	Proportion of Getting HIV Tested (%)	OR (95%CI)[a]	*p* Value
Gender			
Male	29/1178 (2.5)	2.09 (1.04–4.18)	.037
Female	33/1512 (2.2)	1.00	
Age (years)			
15–24	24/1056 (2.3)	1.31 (0.25–6.88)	.749
25–34	29/995 (2.9)	1.47 (0.32–6.79)	.622
35–44	7/534 (1.3)	0.76 (0.15–3.81)	.734
45–65	2/105 (1.9)	1.00	
Education (school)			
Primary or lower	11/414 (2.7)	0.97 (0.41–2.26)	.938
Middle	28/1469 (1.9)	0.63 (0.34–1.17)	.144
High or college	23/807 (2.8)	1.00	
Marital status			
Single	26/1010 (2.6)	1.00	
Ever married	36/1680 (2.1)	0.76 (0.35–1.65)	.480
Working venue			
Factory	16/843 (1.9)	1.00	
Market	6/584 (1.0)	0.51 (0.19–1.33)	.166
Construction site	5/228 (2.2)	0.85 (0.27–2.64)	.774
Community service/clusters	13/696 (1.9)	1.24 (0.57–2.68)	.583
Entertainment establishments	22/339 (6.5)	3.81 (1.54–9.44)	.004
Resided in Shanghai (months)			
<6	15/465 (3.2)	1.00	
6–11	8/208 (3.8)	1.26 (0.51–3.13)	.611
12–35	10/642 (1.6)	0.65 (0.28–1.51)	.313
36-	29/1375 (2.1)	1.14 (0.52–2.50)	.752
Living with spouse or a sexual partner			
Yes	22/1127 (2.0)	1.06 (0.54–2.08)	.875
No	40/1563 (2.6)	1.00	
Number of cities migrated to before Shanghai			
0	31/1401 (2.2)	1.00	
1	16/625 (2.6)	0.95 (0.50–1.79)	.874
2	7/345 (2.0)	0.82 (0.35–1.94)	.650
3	8/315 (2.5)	1.00 (0.42–2.36)	.991
HIV/AIDS knowledge (score)			
0–5	10/403 (2.5)	1.00	
6–8	25/1319 (1.9)	0.63 (0.29–1.37)	.247
9–11	27/964 (2.8)	0.70 (0.31–1.55)	.376

	Proportion of Getting HIV Tested (%)	OR (95%CI)[a]	*p* Value
Aware of possible HIV infection			
Yes	1/95 (1.0)	0.36 (0.05–2.69)	.319
No	61/2595 (2.4)	1.00	
Sexual partners in the past year			
Never had sex in life	6/593 (1.0)	1.00	
One partner or no sex in the past year	42/1886 (2.2)	2.72 (0.96–7.75)	.061
Two or more partners	14/193 (7.2)	4.67 (1.50–14.49)	.008
Having heard of VCT			
Yes	40/1252 (3.2)	1.92 (1.11–3.32)	.020
No	22/1438 (1.5)	1.00	

Note. OR – odds ration. CI – confidence interval.

[a]OR adjusted for other variables listed in this table by a logistic regression analysis.