Published in final edited form as:

J Adolesc Health. 2012 March ; 50(3 0): S68–S74. doi:10.1016/j.jadohealth.2011.12.007.

Migration and Unprotected Sex in Shanghai, China: Correlates of Condom Use and Contraceptive Consistency across Migrant and Non-Migrant Youth

May Sudhinaraset, PhD, Nan Astone, PhD, and Robert Wm. Blum, MD, MPH, PhD

Department of Population, Family and Reproductive Health, Johns Hopkins Bloomberg School of Public Health

Abstract

Purpose—Despite the exceptionally large population of young migrants in China, as well as increasing rates of HIV and STIs in recent years, condom use and contraceptive consistency among this population remains critically under studied. This study examines the association between migration and condom use and contraceptive consistency.

Methods—A cross-sectional survey of 959 youth aged 15–24 was conducted in rural and urban Shanghai. Logistic regression was conducted to examine the association between migration status and condom use and consistent contraceptive use. Analyses are stratified by gender.

Results—Overall, only 32% reported condom use at first sex and less than 10% reported consistent contraceptive use. Compared to 63.6% of urban non-migrants, 83.1% of rural-to-urban migrants reported not using a condom at first sex. Multivariate logistic regression models indicate that patterns of migration and gender clearly impact condom use and contraceptive consistency. After adjusting for background characteristics, rural-to-urban migrant males were significantly less likely to report condom use at first sex and consistent contraceptive use with first partner compared to non-migrants and urban-to-urban migrants. Females living in rural areas who never migrate, on the other hand, are least likely to report condom use and consistent contraceptive use compared to other females.

Conclusion—Because rural men who migrate to urban areas and rural non-migrant young women are at particular risk, programs should target rural areas for both of these group that would give support to young men before they leave their hometowns, as well as focusing on females who might not have the opportunity to migrate.

Keywords

adolescence; China; condoms; contraception behavior; HIV infection; ender; migration; sexual behavior; young adult

© 2011 Society for Adolescent Medicine. Published by Elsevier Inc. All rights reserved.

Address correspondence to: May Sudhinaraset, PhD, Global Health Group, University of California, San Francisco, 50 Beale Street, Suite 1200, Box 1224, San Francisco, CA 94105 USA, Tel: 415-597-9180, Fax: 415-597-8299.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Introduction

China's rates of sexually transmitted infections (STIs), particularly HIV, have increased [1]. HIV prevalence in China is currently at 0.1%, which translates to over 700,000 infected individuals [1]. Migration is associated with increased sexual-risk behaviors in urban areas as migrants are exposed to a commercial sex industry, drugs and alcohol, and different peer networks [2–4]. China is experiencing the largest flow of labor migration in human history, with an internal migrant population, or *floating population*, of over 140 million individuals [5]. The floating population represents a high-risk group [1, 6–8], that might be the “tipping point” of the HIV/AIDS epidemic in China [9].

The majority of China's floating population are young [10, 11]. Sixty-four percent of female migrants and 47.1% of male migrants are between 15 and 24 years [10]. Youth account for a disproportionate number of HIV infections worldwide [12]. The same is true in China. In 2001, 7.5% of HIV/AIDS cases were among 16–19 year olds, and 56.0% were among 20–29 year olds [6]. Despite their HIV vulnerability, there are limited data on migrant youth.

Condom use protects against HIV and STIs [13, 14]; consistent condom users are 10 to 20 times less likely to acquire HIV compared to inconsistent or non-users [15]. Condom use is low in China [4], and most studies focus on high-risk populations such as commercial sex workers (CSW) and clients of CSWs [14, 16–18]. There are few studies of gender differences in sexual behaviors in the migration literature. While young men continue to outnumber young women among migrants (sex ratio of migration=109 /100), the numbers of female migrants are increasing in China [19]. Male and female migrants differ across a number of demographic factors that may lead to different patterns of sexual risk behaviors [10, 20–24], including unequal labor opportunities in cities [10] and higher rates of unemployment [22]. Many argue that “male surpluses” are driving the demand for commercial sex work in urban areas [24]. Therefore, a better understanding of gender differences in sexual behavior is necessary to target interventions among young people.

The current paper addresses two gaps in the literature. We focus on several types of migrants, in contrast to studies that focus on just one (e.g. rural-to-urban migrants), and we focus on gender differences in condom use. Our research questions are: 1) How do urban non-migrants, rural non-migrants, rural-to-urban migrants, and urban-to-urban migrants differ across key demographic characteristics? 2) Are rural-to-urban migrants and urban-to-urban migrants more likely to report unprotected sex compared to rural and urban non-migrants, net of these background characteristics? and 3) How does unprotected sex differ across gender?

Methods

Subjects and procedure

The analysis is based on the Three-City Asian Adolescent and Youth Survey conducted in 2006. The data were collected from 17,016 young people aged 15–24 in urban and rural districts of Taiwan, Shanghai, and Hanoi. The overall goal of the study was to investigate

the impact of family, peers, community, and exposure to media and modernization on adolescent sexual and reproductive health issues. The household sampling process for Shanghai was based on a three-stage method, and participants were selected using two sampling frames including residential households and group living facilities (GLFs). Listings of all dwelling units with persons aged 15–24 years were chosen, and then dwelling units were randomly sampled from the residential groups. Both urban and rural districts were sampled within metropolitan Shanghai, and sub-districts were then chosen at random. GLFs were especially important to capture because they include dormitories for university students, and more importantly, housing facilities for factory workers, typically rural-to-urban migrants. The sampling methodology has been described in more detail in another paper [25].

These analyses, using only the 6,299 youth in Shanghai, further restrict the sample to individuals who were sexually experienced (15%). We also eliminated those whose first sexual encounter was within marriage. Due to small sample size, three groups of migrant youth were further eliminated from the sample: rural-to-rural migrants (n=37), urban-to-rural migrants (n=1), and international migrants (n=1). These selections left 959 individuals. The research study was reviewed and approved by the four relevant Institutional Review Boards.

Outcome Measures

We constructed a binary indicator for *condom use at first sex*. Participants were asked “Which method or methods did you use the last time you had sexual intercourse?” Those who indicated using a condom with their first or only partner were coded 1 and others 0.

Participants were then asked about how consistently they used any form of protection. We based an indicator of *consistent contraceptive use* on the question: “Thinking about all the times you and your first partner had sexual intercourse, how often would you say you or your partner used any method to prevent pregnancy or sexually transmitted infection?” Those who answered every time were coded as a consistent user, and all others were not.

Major Predictor

Migrants were classified by a set of questions about current and prior residence. In this paper, migration status distinguishes among urban non-migrants, rural non-migrants, rural-to-urban migrants, and urban-to-urban migrants.

Background characteristics

The data contain a number of demographic characteristics including *age*, *gender*, *marital status*, *knowledge of the Shanghainese language*, and *registration as a permanent resident of Shanghai*. We created an index of *socioeconomic status* using a set of household asset variables and principal component analysis. We classified individuals into economic tertiles. *Family structure* distinguishes among living with parents, living alone, living with other relatives, or living with others (including peers or dormitory). We coded *education* as primary school or less, junior secondary education, senior secondary education, and college/university. Participants' *activity status* indicates whether a participant was in school only,

working only, both in school and working, or neither. *Job type* distinguishes among professional, unprofessional (i.e. unskilled construction, factory worker etc.), and other types of work (i.e. artists, musicians, etc.). We defined *early sex* as a person whose sexual debut took place at age 20 years or younger [20]. Our indicator of *recency of migration* is the difference between migrants' ages and their ages of migration (continuous). The variable indicating the *reasons for migration* include moving for education, moving for labor, and other reasons (e.g. move with family, want to live on their own, married or moved with partner, or to join someone else in city etc.).

Analyses

We used STATA version 11MP to analyze the data [26]. The descriptive analyses consisted of tabulating the means, standard errors, frequency distributions, and frequency of missing data of key variables by migrant status. We used Chi-square and ANOVA to assess differences across migrant/non-migrant groups. We used bivariate analyses to identify important associations between migration status and each independent and outcome variables.

Because the outcomes of interest (condom use at first sex and consistent contraceptive use with first partner) are binary responses, we used logistic regressions to estimate the associations between our predictors and outcomes. We selected final models using likelihood ratio tests and Pearson's Goodness-of-Fit test.

We weighted all analyses to avoid biased estimates, and used robust standard errors to account for clustering of observations as a result of complex sampling [27]. In all models, urban non-migrant is the reference category for the main predictor of migrant status. In addition, estimates and p-values are calculated for each pair of migration status to assess statistical significance across different groups.

RESULTS

Descriptive Results

The percentage of unprotected sex was high across all groups; only 32% of the total sample indicated using a condom during their first sexual experience. Rural-to-urban migrants disproportionately reported the highest prevalence of unprotected sex with first partner. Among rural-to-urban migrants, 83.1% had unprotected sex compared to 71.2% of rural non-migrants, 63.6% of urban non-migrants, and 64.3% of urban-to-urban migrants ($p=0.031$).

Only 22% of the sample report consistent contraceptive use, and there was a significant disparity across the migrant groups. Only 9.6% of rural-to-urban migrants reported consistent use compared to 33% of urban-to-urban migrants, 29.1% of urban non-migrants, and 11.3% of rural non-migrants ($p=0.000$).

The mean age of sexual debut for the sample was 19.8 years for urban non-migrants, 20.5 years for rural non-migrants, 20.2 years for rural-to-urban migrants, and 20.1 years for urban-to-urban migrants (range 13–24 years) ($p=0.05$). Fifty-nine percent of the study

population experienced sex at an early age, defined as 20 years or younger. Across the different groups, urban non-migrants were most likely to report early sex, followed by urban-to-urban migrants, rural-to-urban migrants, and rural non-migrants.

Migrants and non-migrants differed across a number of key demographic characteristics (refer to Table I). As expected in this sexually active sample, there are more participants in the older age cohorts (80.7%) compared to younger cohorts (19.3%). The age differences are marginally statistically significant across the four groups ($p=0.057$). There are slightly fewer females compared to males, with 43% of the sample female. Across the board, rural-to-urban migrants are more economically disadvantaged than other groups, followed by urban-to-urban migrants. Not surprisingly, urban non-migrants are the most advantaged of any group. Over 87% of rural-to-urban migrants are in the lowest wealth tertile, compared to only 13.6% of urban non-migrant youth ($p<0.001$). The majority of rural-to-urban migrants only finished junior secondary education. On the other hand, urban non-migrants are more likely to complete senior secondary school and college/university compared to rural-to-urban migrants, of whom only 3.8% go on to college or beyond. In addition, rural-to-urban migrant workers were predominantly employed in unskilled work.

Overall, nearly 56% of the sample was only working. Surprisingly, over one in six youth were neither attending school nor employed in the sample, with rural non-migrants nearly six times more likely to fall into this category than urban-to-urban migrants (34.7% vs. 6.0%, respectively). A higher percentage of migrants were working full-time compared to non-migrants – 87.6% of rural-to-urban migrants were working only, compared to approximately half of urban non-migrants. No rural-to-urban migrants lived with their parents, compared to 79.7% of urban non-migrants. Migrants were more likely than their non-migrant peers to live in dormitories or with friends ($p<0.001$).

Because official household registration, or hukou, is tied to an individual's place of birth, it is not surprising that rural-to-urban migrants were universally not registered in urban Shanghai (where they are currently living). Only 0.6% of urban non-migrants were not officially registered to live in Shanghai, compared with 98.4% of rural-to-urban migrants. Moreover, 97.7% of urban non-migrants spoke the local language of Shanghaiese, compared to only 42.1% of rural-to-urban migrants ($p<0.001$). Turning to migrant-specific characteristics, the mean number of years living in Shanghai was 3.0 years for rural-to-urban and 5.1 years for urban-to-urban migrants. The vast majority of rural-to-urban migrants (90.7%) moved for job opportunities, and this was nearly 2.5 times that of urban-to-urban migrants.

Multivariate Results

Multivariate models indicate that rural-to-urban migrants were 71% less likely to use condoms at first sex compared to urban non-migrants (CI: 0.11–0.80), and 68% less likely to use condoms compared to urban-to-urban migrants (CI: 0.14–0.75). Rural-to-urban migrants were also half as likely to use condoms compared to rural non-migrants (CI: 0.78–5.32). Rural non-migrants were also 40% less likely to use condoms at first sex compared to urban non-migrants (CI: 0.43–0.83) [see Table 2].

In gender-stratified models, both male and female rural-to-urban migrants were less likely to report condom use at first sex compared to urban non-migrants, although this was statistically significant for men (OR=0.27, CI: 0.09–0.78) and not women (OR=0.31, CI: 0.09–1.09). Rural-to-urban migrants of both sexes were also less likely to report condom use at first sex compared to urban-to-urban migrants, and the estimate of the association was significantly different than 0 for both groups (men: OR=0.26, CI: 0.08–0.79; women: OR=0.32, CI: 0.11–0.96). Male rural non-migrants were 3.7 times more likely to use a condom during their first sexual experience compared to rural-to-urban migrants (CI: 1.27–11.05). Among young women born in rural areas the estimate of the difference between migrants and non-migrants was not significantly different from 0. Compared to female urban non-migrants, rural non-migrant girls were 64% less likely to use condoms at first sex (CI: 0.24–0.55).

As to correlates of condom use, early sexual debut was a risk factor for both men (OR=0.45, CI: 0.28–0.73) and women (OR=0.45, CI: 0.26–0.77). For men, those in the highest wealth tertiles were much more likely to use condoms at first sex compared to lowest wealth tertiles (CI: 1.00–3.35). For women, older cohorts were less likely to have used condoms at first sex compared to younger age cohorts; individuals aged 20–24 years were 65% less likely to use condoms the first time they had sex compared to 15–19 year olds (CI: 0.19–0.65), indicating some change over time.

In models that adjusted for age, gender, activity status, family structure, and early age of sex, rural non-migrants have a lower likelihood of consistent contraceptive use compared to urban non-migrants (OR=0.30, CI:0.17–0.52). Other factors associated with consistent contraceptive use included having only a job compared to being in school only (OR=0.56, CI: 0.31–0.99) and reporting early sex (OR=0.42, CI: 0.25–0.72) [see Table 3].

We performed a subset analysis comparing rural migrants to urban migrants using multivariate logistic regression and controlling for recency of migration and background characteristics. Urban-to-urban migrants continued to demonstrate an advantage for consistency of contraception, while recency of migration did not predict consistent use [results not shown]. These analyses were not replicated by gender due to power issues.

Gender differences in the associations with consistency of use were similar to those for condom use. Adjusting for background characteristics, male rural-urban migrants were less likely to report consistent use compared to male urban non-migrants (OR=0.14, CI: 0.03–0.75) and male urban migrants (OR=0.09, CI: 0.02–0.39). While female rural-to-urban migrants also demonstrated lower likelihood of consistent use with their first partner compared to urban non-migrants, the female estimate was not significantly different from 0. On the other hand, female migrants were more advantaged compared to young women in rural areas who never migrated. Female rural non-migrants were 82% less likely to report consistent use compared to rural-to-urban female migrants (CI: 0.04–0.88), and 95% less likely to report consistent use compared to urban-to-urban female migrants (CI: 0.02–0.14).

As to correlates of contraceptive consistency, no associations were found for women; among men, risk factors included only working compared to being in school (OR=0.41, CI: 0.17–

0.97), living alone compared to living with parents (OR=0.07, CI: 0.01–0.46), and experiencing sex at an early age (OR=0.35, CI: 0.17–0.71).

Discussion

Despite China's exceptionally large migrant population and increasing STI trends, to the best of our knowledge, this is the first report that has evaluated condom use among 15–24 year olds by migration status. These findings suggest that rural-to-urban migrants, in particular, are at a greater disadvantage compared to other groups. They are most likely to be in the lowest wealth group, have less education, more likely to live alone or in work dormitories, and migrate for employment opportunities. Migration may place youth at particular risk for a number of reasons. Adoption of risky sexual behaviors in urban areas is heightened with increased exposures to the commercial sex industry, drugs and alcohol, and different peer networks [4].

The results from this study indicate that patterns of migration and gender clearly impact condom use and contraceptive consistency. First, the low rates of condom use and contraceptive consistency is of particular concern. Youth in our sample showed an even larger disparity in unprotected sex between migrant/non migrant groups compared to previous studies [2]. This may be due to the fact that the majority of migrants in this study are living away from their parents and working themselves, which may place them at even greater risk than school-going youth. Migrant youth were less likely to report consistent contraceptive use compared to non-migrants. Other qualitative studies have suggested that lack of sexual knowledge and sex education explain the low condom use among migrant populations [28]. Young men who migrate from rural areas to urban areas showed greater sexual risk behaviors. This is cause for concern given that migrant males are more likely to report visiting female sex workers [17, 29], and male clients are more likely to be at risk for HIV [17]. Other studies have found lower levels of education, socioeconomic factors, and separation from spouses as risk factors for unprotected sex among male migrants [29, 30].

On the other hand, non-migrant rural women are at particular risk for poor sexual behaviors. This is corroborated by other studies, which demonstrate that young women in rural areas are most likely to experience earlier age of sexual initiation, lower HIV/AIDS knowledge, and higher sexual risk behaviors [30]. Furthermore, as migration patterns in China are characterized as 'temporary and circular,' the highest risk groups in this study (rural-to-urban male migrants and rural female non-migrants) may further fuel concerns that young men returning home to girlfriends and wives may serve as agents for the spread of infectious diseases [5, 24, 31].

There are a number of covariates associated with unprotected sex. Older cohorts were at greater risk of unprotected sex at first sexual experience compared to younger cohorts, suggesting a change in knowledge and attitudes over time. In addition, early age of sexual debut was a risk factor for both unprotected sex and inconsistent condom use with first sexual partner, highlighting the importance of promoting delay in sexual initiation among young populations.

The majority of migration studies in China have focused on rural-to-urban migrants, but it is clear that urban-to-urban migration makes up a substantial proportion of the migrant population. Urban-to-urban migrants should be analyzed separately from rural-to-urban migrants, since their behavior appears to be more similar to urban non-migrants. Urban-to-urban migrants are advantaged along a number of demographic factors compared to rural-to-urban migrants; they are more likely than rural migrants to be in the mid and upper wealth tertiles, be students, have higher educational levels, work in professional sectors, live with parents, be registered in Shanghai as an official migrant, and move for school or to be with family. Moreover, rural migrants are more likely to be “recent” migrants compared to urban migrants. This is counter to other findings in the United States that suggest recent migration (6 years or less) is associated with lower health risk behaviors among youth compared to migrants who have lived in an area for more than six years [32]. In the subset analyses performed only on migrants, however, urban-to-urban migrants continued to demonstrate an advantage for consistency of contraceptive use, controlling for recency of migration. Urban-to-urban migrants should be carefully monitored in the coming years given China’s rapid urbanization and other literature suggesting higher risk among urban-to-urban migrant men [30].

This study has a number of limitations. First, because the data are from a cross-sectional survey, causality between migration and unprotected sex behaviors cannot be established. Second, all data are self-reported. Therefore, responses may be subject to social desirability bias, since sexual behaviors remain stigmatized in China. However, the use of ACASI has been shown to demonstrate improved reliability and internal consistency, reduced missed questions, and to encourage honest reporting to sensitive questions among similar populations [33–36]. Results are also subject to recall bias as participants are asked to recall their first sexual partner; however, over 80% of the study population had experienced their first sexual encounter within the past three years. Third, these data are taken from rural and urban areas of Shanghai; because Shanghai is the most modern of Chinese cities, these results may not be generalizable to other young migrant populations elsewhere in China. Moreover, estimates comparing different groups once the data are stratified by gender may be unreliable due to sample size issues; however, there are sufficient numbers to compare each population to urban non-migrants, the reference category with the largest sample size. Fourth, the study’s measure of “consistent contraceptive use” does not directly measure consistency of condom use, but rather, any form of contraception including withdrawal, contraceptive pills, and other methods. Lastly, future studies would benefit from richer migration data. Due to limitations in the study measures, the effects of migration history on unprotected sex cannot be established, including circular migration and multiple migrations.

Despite these limitations, the study adds to existing literature on migration in China, with a better understanding of young migrants, their sexual behaviors and sexual health risks. While it is beyond the scope of this paper to discuss specific strategies and interventions, two groups of migrants are notably at risk for adverse health outcomes: 1) rural-to-urban migrants, particularly young men, and 2) young women in rural areas. One potential strategy is to target rural areas for both of these groups by targeting young men before they leave their hometowns as well as women who might not have the opportunity to migrate. In addition, because many migrants are living alone or in work dormitories, collaboration

between work-sites and local health departments should be promoted, including work-based sex education and condom distribution programs.

Acknowledgments

The authors would like to thank Laurie Schwab Zabin – Principal Investigator of this study, David Bishai, and Mark Emerson for their assistance with data collection and editing.

References

1. China Ministry of Health. 2002 HIV/AIDS epidemic and prevention efforts in China [News Release]. Beijing: China Ministry of Health Office of News Press; 2003.
2. Li S, Huang H, Cai Y, et al. Characteristics and determinants of sexual behavior among adolescents of migrant workers in Shanghai (China). *BMC Public Health*. 2009; 9:195. [PubMed: 19538756]
3. Camlin CS, Hosegood V, Newell ML, et al. Gender, migration and HIV in rural KwaZulu-Natal, South Africa. *PLoS One*. 5(7):e11539. [PubMed: 20634965]
4. Merli, MG.; DeWaard, J.; Tian, F., et al. Migration and Gender in China's HIV/AIDS Epidemic in Gender Policy and HIV. China: Springer Science+Business Media B.V.; 2009.
5. Hu X, Cook S, Salazar MA. Internal migration and health in China. *Lancet*. 2008 Nov 15; 372(9651):1717–1719. [PubMed: 18930533]
6. Grusky O, Liu H, Johnston M. HIV/AIDS in China: 1990–2001. *AIDS and Behavior*. 2002; 6(4): 381–393.
7. Qian HZ, Vermund SH, Wang N. Risk of HIV/AIDS in China: subpopulations of special importance. *Sex Transm Infect*. 2005 Dec; 81(6):442–447. [PubMed: 16326842]
8. Zhang KL, Ma SJ. Epidemiology of HIV in China. *British Medical Journal*. 2002; 324:803–804. [PubMed: 11934762]
9. Anderson AF, Qingsi Z, Hua X, et al. China's floating population and the potential for HIV transmission: a social-behavioural perspective. *AIDS Care*. 2003 Apr; 15(2):177–185. [PubMed: 12856339]
10. Fan C. Rural-urban migration and gender division of labor in transitional China. *International Journal of Urban and Regional Research*. 2003; 27(1):24–47.
11. Goodkind D, West LA. China's Floating Population: Definitions, Data and Recent Findings. *Urban Studies*. 2002; 39(12):2237–2250.
12. World Health Organization. Geneva: World Health Organization; 2006. Preventing HIV/AIDS in young people: a systematic review of the evidence from developing countries.
13. Ahmed S, Lutalo T, Wawer M, et al. HIV incidence and sexually transmitted disease prevalence associated with condom use: a population study in Rakai, Uganda. *AIDS*. 2001 Nov 9; 15(16): 2171–2179. [PubMed: 11684937]
14. van den Hoek A, Yuliang F, Dukers NH, et al. High prevalence of syphilis and other sexually transmitted diseases among sex workers in China: potential for fast spread of HIV. *AIDS*. 2001 Apr 13; 15(6):753–759. [PubMed: 11371690]
15. Pinkerton SD, Abramson PR. Effectiveness of condoms in preventing HIV transmission. *Soc Sci Med*. 1997 May; 44(9):1303–1312. [PubMed: 9141163]
16. Hesketh T, Zhang J, Qiang DJ. HIV knowledge and risk behaviour of female sex workers in Yunnan Province, China: potential as bridging groups to the general population. *AIDS Care*. 2005 Nov; 17(8):958–966. [PubMed: 16176892]
17. Wang B, Li X, Stanton B, et al. HIV-related risk behaviors and history of sexually transmitted diseases among male migrants who patronize commercial sex in China. *Sex Transm Dis*. 2007 Jan; 34(1):1–8. [PubMed: 16755272]
18. Yang C, Latkin CA, Liu P, et al. A qualitative study on commercial sex behaviors among male clients in Sichuan Province, China. *AIDS Care*. 2010 Feb; 22(2):246–252. [PubMed: 20390503]
19. Fan, CC. Migration and gender in China. In: Lau, CM.; Shen, J., editors. *China Review*. Hong Kong: Chinese University Press; 2000.

20. Yang H, Li X, Stanton B, et al. Workplace and HIV-related sexual behaviours and perceptions among female migrant workers. *AIDS Care*. 2005 Oct; 17(7):819–833. [PubMed: 16120499]
21. Feng W, Ren P, Shaokang Z, et al. Reproductive health status, knowledge, and access to health care among female migrants in Shanghai, China. *J Biosoc Sci*. 2005 Sep; 37(5):603–622. [PubMed: 16174349]
22. Yang X, Xia G. Gender, migration, risky sex, and HIV infection in China. *Stud Fam Plann*. 2006 Dec; 37(4):241–250. [PubMed: 17209282]
23. Yang X, Xia G. Gender, work, and HIV risk: determinants of risky sexual behavior among female entertainment workers in China. *AIDS Educ Prev*. 2006 Aug; 18(4):333–347. [PubMed: 16961450]
24. Tucker JD, Henderson GE, Wang TF, et al. Surplus men, sex work, and the spread of HIV in China. *AIDS*. 2005 Mar 24; 19(6):539–547. [PubMed: 15802971]
25. Zabin LS, Emerson MR, Nan L, et al. Levels of change in adolescent sexual behavior in three Asian cities. *Stud Fam Plann*. 2009 Mar; 40(1):1–12. [PubMed: 19397181]
26. StataCorp: Stata Statistical Software: Release 9.0. Stata Corporation. College Station, TX: Stata Corporation; 2005.
27. Vittinghoff, E.; Glidden, DV.; Shiboski, SC., et al. *Regression Methods in Biostatistics: Linear, Logistic, Survival, and Repeated Measures Models*. New York, New York: Springer Science; 2005.
28. Zhao S, Gao E, Zabin LS. Unmet needs for reproductive health knowledge among unmarried migrant youth. *Journal of Reproduction and Contraception*. 2008; 19(4):227–238.
29. Li L, Morrow M, Kermode M. Vulnerable but feeling safe: HIV risk among male rural-to-urban migrant workers in Chengdu, China. *AIDS Care*. 2007 Nov; 19(10):1288–1295. [PubMed: 18071973]
30. Brockert AM, Biddlecom A. Migration, sexual behavior and the risk of HIV in Kenya. *International Migration Review*. 1999; 33(4):833–856.
31. Hong Y, Stanton B, Li X, et al. Rural-to-urban migrants and the HIV epidemic in China. *AIDS Behav*. 2006 Jul; 10(4):421–430. [PubMed: 16421651]
32. Blake SM, Ledsky R, Goodenow C, et al. Recency of immigration, substance use, and sexual behavior among Massachusetts adolescents. *Am J Public Health*. 2001 May; 91(5):794–798. [PubMed: 11344890]
33. Jaya, Hindin MJ, Ahmed S. Differences in young people's reports of sexual behaviors according to interview methodology: a randomized trial in India. *Am J Public Health*. 2008 Jan; 98(1):169–174. [PubMed: 18160677]
34. Webb PM, Zimet GD, Fortenberry JD, et al. Comparability of a computer-assisted versus written method for collecting health behavior information from adolescent patients. *J Adolesc Health*. 1999 Jun; 24(6):383–388. [PubMed: 10401965]
35. Williams ML, Freeman RC, Bowen AM, et al. A comparison of the reliability of self-reported drug use and sexual behaviors using computer-assisted versus face-to-face interviewing. *AIDS Educ Prev*. 2000 Jun; 12(3):199–213. [PubMed: 10926124]
36. Johnson AM, Copas AJ, Erens B, et al. Effect of computer-assisted self-interviews on reporting of sexual HIV risk behaviours in a general population sample: a methodological experiment. *AIDS*. 2001 Jan 5; 15(1):111–115. [PubMed: 11192852]

Implications and Contribution

Despite China's exceptionally large migrant population and increasing STI trends, condom use and contraceptive consistency among this population remains critically understudied. This study suggests that rural-to-urban migrant young men, and young women in rural areas who never migrate are both at a greater disadvantage compared to other groups.

Table 1

Demographic Characteristics of Study Participants, by Migrant Status

	Migrant Status				Total	P-value
	Urban non-migrant n=443	Rural non-migrant n=274	Rural-to-urban migrant n=123	Urban-to-urban migrant n=119		
Age cohort						0.059
15–19 years	23.3	16.1	10.4	17.0	19.3	
20–24 years	76.7	83.9	89.6	83.0	80.7	
Female	38.7	49.1	45.7	38.1	42.5	0.044
Wealth tertile						<0.001
Low	13.6	37.5	87.6	59.4	32.5	
Mid	65.5	48.4	8.6	33.3	51.7	
High	20.9	14.0	3.7	7.4	15.8	
Current in job/school						<0.001
In School but no Job	26.7	11.2	1.2	19.1	18.8	
Neither job nor school	10.8	34.7	11.2	6.0	17.6	
Both Job and School	11.7	1.8	0.0	12.2	7.7	
Job but no school	50.8	52.3	87.6	62.6	55.9	
Highest Educational Level						<0.001
Primary or less	0.1	0.4	0.8	0.7	0.3	
Junior Secondary	14.8	47.7	84.4	28.7	32.7	
Senior Secondary	51.9	46.0	11.0	38.6	44.9	
College/University/Graduate	33.3	6.0	3.8	32.0	22.1	
Type of Work						<0.001
Professional	32.9	13.1	4.6	23.4	23.0	
Unprofessional	65.1	85.7	95.4	62.6	74.1	
Other	1.9	1.2	0.0	14.0	2.9	
Family Structure						<0.001
Parents	79.7	51.6	0.0	19.4	57.5	

	Migrant Status					P-value
	Urban non-migrant	Rural non-migrant	Rural-to-urban migrant	Urban-to-urban migrant	Total	
	n=443	n=274	n=123	n=119	N=959	
Alone	1.6	3.9	0.8	6.4	2.7	
Other Relatives	6.4	24.6	11.9	10.6	12.8	
Friends/Dorm	12.4	20.0	87.3	63.6	27.0	
Speak Shanghaiese dialect	97.7	89.5	42.1	47.4	84.8	<0.001
No household registration (no hukou)	0.6	1.4	98.4	66.4	16.8	<0.001
Reason for Migration						<0.001
School/university	N/A	N/A	1.2	26.0	14.3	
Activity	N/A	N/A	90.7	37.7	62.8	
Other	N/A	N/A	8.0	36.3	22.9	
Recency of migration (years)	N/A	N/A	3.0	5.1	4.1	0.008
Early sex (20 years or younger)	66.1	47.4	53.3	61.9	59.0	0.001
Mean age of sex (years)	19.8	20.5	20.2	20.1	20.1	0.004
Condom use at first sex	36.4	28.8	16.9	35.7	32.3	0.031
Consistent use with first partner	29.1	11.3	9.6	33.0	22.4	0.000

Table 2

Bivariate and Multivariate Correlates of Condom Use at First Sex, by gender

	All (N=959)		Male (n=560)		Female (n=399)	
	OR [CI]	AOR [CI]	OR [CI]	AOR [CI]	OR [CI]	AOR [CI]
Urban Non-migrants	1.00	1.00	1.00	1.00	1.00	1.00
Rural Non-migrants	0.71 *	0.60 **	1.03	1.01	0.40 ***	0.36 ***
	[0.51, 0.98]	[0.43, 0.83]	[0.65, 1.65]	[0.64, 1.59]	[0.27, 0.58]	[0.24, 0.55]
Rural-to-Urban						
Migrants	0.36 *	0.29 *	0.27 *	0.27 *	0.34 *	0.31
	[0.14, 0.90]	[0.11, 0.80]	[0.09, 0.78]	[0.09, 0.80]	[0.12, 0.98]	[0.09, 1.09]
Urban-to-Urban						
Migrants	0.97	0.91	0.98	1.05	0.95	0.97
	[0.57, 1.66]	[0.52, 1.60]	[0.42, 2.28]	[0.46, 2.39]	[0.62, 1.47]	[0.55, 1.70]
Younger (15,19 years)		1.00		1.00		1.00
Older (20,24 years)		0.57 *		0.80		0.35 ***
		[0.36, 0.89]		[0.47, 1.35]		[0.19, 0.65]
Male		1.00		-----		-----
Female		1.04		-----		-----
		[0.78, 1.38]		-----		-----
Lowest Wealth		1.00		1.00		1.00
Mid Wealth		0.75		1.02		0.73
		[0.49, 1.15]		[0.65, 1.60]		[0.36, 1.49]
Highest Wealth		1.23		1.83 *		1.01
		[0.74, 2.03]		[1.00, 3.35]		[0.40, 2.55]
Early sex: >20 years		1.00		1.00		1.00
20 and less		0.44 ***		0.45 ***		0.45 **
		[0.30, 0.62]		[0.28, 0.73]		[0.26, 0.77]
Odds Ratios and Confidence Intervals comparing migrant status groups (second group as reference)						
R-RU OR	1.99	2.04	3.83 *	3.74 *	1.16	1.18

	All (N=959)		Male (n=560)		Female (n=399)	
	OR [CI]	AOR [CI]	OR [CI]	AOR [CI]	OR [CI]	AOR [CI]
R-RU [CI]	[0.80, 4.92]	[0.78, 5.32]	[1.37, 10.71]	[1.27, 11.05]	[0.39, 3.42]	[0.35, 3.99]
R-UU OR	0.73	0.66	1.05	0.96	0.42***	0.37***
R-UU [CI]	[0.44, 1.21]	[0.39, 1.13]	[0.50, 2.19]	[0.46, 2.03]	[0.25, 0.69]	[0.21, 0.66]
RU-UU OR	0.37*	0.32*	0.27*	0.26*	0.36**	0.32*
RU-UU [CI]	[0.16, 0.83]	[0.14, 0.75]	[0.09, 0.81]	[0.08, 0.79]	[0.13, 0.99]	[0.11, 0.96]

*
p 0.05,

**
p 0.01,

p 0.001

note: R=Rural non-migrants, RU=rural-to-urban migrant, UU=urban-to-urban migrant

Table 3
Bivariate and Multivariate Correlates of Consistency of Contraception with First Partner, by gender

	All (N=959)		Male (n=560)		Female (n=399)	
	OR [CI]	AOR [CI]	OR [CI]	AOR [CI]	OR [CI]	AOR [CI]
Urban Non-migrants	1.00	1.00	1.00	1.00	1.00	1.00
Rural Non-migrants	0.31*** [0.20,0.47]	0.30 [0.17, 0.52]	0.63 [0.37, 1.08]	0.65 [0.35, 1.22]	0.08*** [0.04,0.16]	0.08*** [0.03,0.21]
Rural-to-Urban Migrants	0.26* [0.09, 0.72]	0.39 [0.11, 1.36]	0.10** [0.02, 0.45]	0.14* [0.03, 0.75]	0.32 [0.09,1.10]	0.48 [0.11,2.01]
Urban-to-Urban Migrants	1.20 [0.75, 1.93]	1.71 [0.91, 3.23]	1.10 [0.58,2.10]	1.56 [0.67, 3.64]	1.44 [0.87,2.39]	1.77 [0.83,3.75]
Younger (15,19 years)		1.00		1.00		1.00
Older (20,24 years)		0.70 [0.36, 1.34]		0.90 [0.43, 1.86]		0.49 [0.24,1.01]
Male		1.00		----		----
Female		1.11 [0.74, 1.66]		----		----
School only		1.00		1.00		1.00
Neither School/job		1.01 [0.53, 1.94]		1.10 [0.53, 2.26]		0.60 [0.20,1.79]
Both school/job		0.96 [0.49, 1.90]		0.62 [0.22, 1.77]		0.69 [0.37,1.30]
Job only		0.56* [0.31, 0.99]		0.41* [0.17, 0.97]		0.51 [0.23,1.15]
Live with Parents		1.00		1.00		1.00
Alone		0.29 [0.08, 1.11]		0.07** [0.01, 0.46]		0.86 [0.25,2.99]
Relatives		0.51 [0.23, 1.09]		0.44 [0.15, 1.31]		0.86 [0.29,2.54]

All (N=959)			Male (n=560)		Female (n=399)	
	OR [CI]	AOR [CI]	OR [CI]	AOR [CI]	OR [CI]	AOR [CI]
Friends/Dorm		0.69 [0.35, 1.35]		0.71 [0.33, 1.55]		0.92 [0.43, 2.01]
Early sex: >20 years		1.00		1.00		1.00
20 and less		0.42** [0.25, 0.72]		0.35** [0.17, 0.71]		0.52 [0.25, 1.08]
Odds Ratios and Confidence Intervals comparing migrant status groups (second group as reference)						
R-RU	OR	1.21	0.77	6.12* [1.41, 26.49]	4.53 [0.93, 21.95]	0.24* [0.06, 1.01]
R-RU	[CI]	[0.412, 3.54]	[0.21, 2.82]			[0.04, 0.88]
R-UU	OR	0.26***	0.18***	0.58	0.42* [0.18, 0.96]	0.05*** [0.02, 0.13]
R-UU	[CI]	[0.15, 0.44]	[0.00, 0.36]	[0.28, 1.18]		[0.02, 0.14]
RU-UU	OR	0.21**	0.23**	0.09***	0.09** [0.02, 0.39]	0.22* [0.06, 0.79]
RU-UU	[CI]	[0.08, 0.57]	[0.08, 0.64]	[0.02, 0.39]		[0.07, 1.01]

* p 0.05,

** p 0.01,

*** p 0.001

note: R=Rural non-migrants, RU=rural-to-urban migrant, UU=urban-to-urban migrant