

Published in final edited form as:

AIDS Educ Prev. 2007 October ; 19(5): 396–407.

HIV/AIDS-related sexual risk behaviors among rural residents in China: potential role of rural-to-urban migration

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Abstract

The relationship between rural-to-urban migration and the spread of HIV is well described, although most studies focus on sexual risk behaviors among rural-to-urban migrants at the urban destination areas. Few studies have examined the sexual risk behaviors of migrants who have returned from urban areas to their rural homes (“return migrants”) in comparison with those of local rural residents who have never migrated to cities (“non-migrants”). This study examines the potential association between rural-to-urban migration and sexual risk behaviors by comparing sexual risk behaviors between 553 return migrants and 441 non-migrants from same rural communities in China. Findings reveal that, after controlling for sociodemographic characteristics, return migrants in rural areas had higher levels of sexual risk, including unprotected sex, than non-migrants. Among return migrants, sexual risk behaviors were associated with age, gender, marital status, and number of different jobs they had previously held in the cities. These findings underscore the importance for HIV/AIDS education and prevention efforts targeting the migrant population in urban destinations as well as the return migrant population in rural areas.

Keywords

China; HIV/AIDS prevention; Return migrant; Rural-to-urban migration; Sexual risk behaviors

Introduction

The relationship between population migration and the spread of HIV is well described (Parrado, Flippen, and McQuiston, 2004; Smith, 2005). However, to date, the reasons for this relationship have not been well explored. Some researchers have found no difference in sexual behaviors between migrants and non-migrants (Mundandi, Vissers, Voeten, Habbema, and Gregson, 2006), while other studies have documented a correlation between the migration experience and increased sexual risk behaviors (Brockerhoff and Biddlecom, 1999; Li et al., 2004; Lurie et al., 1997; Stack, 1994). For example, one study conducted in Uganda found that individuals who had moved within the past three years were three times more likely to be infected with HIV than residents who had not moved in the past 10 years (Nunn, Wagner, Kamali, Kengeya-Kayondo, and Mulder, 1995). While it is generally believed that migrant men acquire infections while they are away from home and subsequently transmit the virus to

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their sexual partners upon returning home (Yang, 2004), a study conducted in South Africa found that HIV infection among rural women was not associated with their migrant sexual partners but, instead, was associated with the number of their sexual partners in the rural area (Lurie et al., 2003). Based on their data, the authors argued that the direction of transmission of HIV was not only from return male migrants to women in rural areas, but could also be from women in rural areas to return migrants (Lurie et al., 2003).

Previous studies have speculated on a number of social and cultural conditions that could potentially contribute to the link between rural-to-urban migration and sexual risk (e.g., Brockerhoff and Biddlecom, 1999; Yang, 2004). For example, migrants are more likely than non-migrants to experience extended family separation, a condition that is presumably conducive to casual sex or commercial sex for coping with isolation at the destination (Brockerhoff and Biddlecom, 1999). Furthermore, migrants are more likely than non-migrants to experience weakened social and normative control over their individual sexual risk behaviors (Stack, 1994; Yang, 2004), the other condition that could potentially increase sexual risk behaviors among migrants. Migrants are identified by some researchers as the potential “bridging population” (Lau and Thomas, 2001; Smith, 2005), linking a population at higher risk of HIV infection (e.g., sex workers) to the general population. Because most migrants return to their areas of origin after working in cities, rural-to-urban migration is seasonal and circulatory (Wang and Fan 1999); such a process may facilitate the transmission of HIV from urban areas to rural areas and vice versa (Quinn, 1994).

In China, the *hukou* system (household registration system) was established in the early 1950s to officially assign the population as to those having either an agriculture status (almost all rural residents) or a nonagricultural status (urban residents) (Wu and Treiman, 2004). The shortage of arable land and surplus laborers in rural areas (the “pushing factor”) and the large rural-urban income disparity and demand for laborers in the urban development and expansion (the “pulling factor”) have continued to motivate rural residents to migrate to cities for employment opportunities and better lives (Li, 1996; Liu, 1991). Since the start of the economic reform in the late 1970s in China, economic reforms have triggered internal migration on a large scale, with a dramatic increase in the number of temporary rural-to-urban migrants in the past decades (Chan and Zhang, 1999; Liang, 2001). According to the recent 1% National Population Sample Survey Report, there were approximately 147 million migrants in China in 2005, with two-thirds of those being rural-to-urban migrants (National Bureau of Statistics of China, 2006). Because these rural migrants still have their permanent residency registration (“*hukou*”) at their rural origin and most of them left their family (e.g., spouse, children, and parents) behind in the rural areas, they return to the rural area periodically for personal and family reasons (e.g., holiday family reunion, assisting with farming activities during harvest seasons, or temporary re-settlement in rural areas), typically returning to the urban areas after these rural sojourns. This two-way flow of population movement has caused concern for the potential spread of HIV between urban and rural areas in China (Yang, 2004).

Since the report of the first case of AIDS in 1985, there has been a steady increase of HIV/AIDS in China. While the actual number of infection remains uncertain, the current government estimates are 650,000 HIV infected individuals including 75,000 AIDS patients (Gill, 2006). Although intravenous drug use and blood/plasma donations have been the predominant modes of HIV transmission in China in the past, recent studies have indicated a sharp increase in heterosexual transmission (Yang et al., 2005). Several studies in China have reported a positive association between rural-to-urban migration and HIV-related sexual risk behaviors in China (Hu, Liu, Li, Stanton, and Chen, 2006; Li et al., 2004; Liu et al., 2005; Yang et al., 2005). Rural migrants to urban areas are vulnerable to HIV infection because they are more likely to engage in sexual risk behaviors and rural-to-urban migrants accounted for approximately one-fifth to one-third of HIV positive individuals in China from 1996–2000 (Yang, 2004). A previous

study suggested that the HIV prevalence among rural-to-urban migrants was 1.8 times higher than that among non-migrants (Xu, Wu, and Zhang, 1998). Geographical mobility appears to be highly correlated with increased sexual risk among Chinese rural-to-urban migrants (Li et al., 2004). Another recent study among couples who applied for marriage licenses in one rural county of Anhui province in China suggested that rural residents who had ever migrated to a city for a temporary job were more likely to have had premarital sex and multiple sexual partners than those who did not have a history of temporary migration (Hu et al., 2006). However, these previous studies either lacked appropriate comparison groups (e.g., Li et al., 2004) or focused on a specific sub-population (e.g., Hu et al., 2006). In addition, most previous studies have focused on the HIV/AIDS risk behaviors of migrants while they were in cities or other destinations (e.g., Hesketh et al., 2006; He, et al., 2006). There is a need to fill the gap in the literature on migrant risk behaviors upon their return home. Therefore, the current study was designed to examine this issue by comparing sexual risk behaviors between return migrants and non-migrants in rural China. In this study we have attempted to address two questions: 1) Do return migrants display higher levels of sexual risk behaviors than non-migrants, after controlling for potential confounders such as demographic characteristics (e.g., age, gender, marital status) and other key individual characteristics that differed between return migrants and rural non-migrants? and 2) Is geographic mobility (the ratio of the number of migratory cities to years of total migration) during migration associated with increased sexual risk behaviors among return migrants?

Methods

Sample

Data used in this study are derived from a comparative study on mental health among Chinese populations (Li et al, submitted). Rural residents were recruited using multiple-stage cluster sampling from eight population-dense provinces (Hebei, Henan, Sichuan, Jiangsu, Anhui, Shandong, Hubei, and Hunan). These eight provinces were selected because they accounted for approximately 47% of the country's population and they are among the top provinces that have the most out-migration population in the country. Counties within each province served as the second layer of sampling. A total of 34 counties were selected from these 8 provinces (ranging from one to 11 counties per province with an average of 4.25 counties per province). The rural villages within each county served as the third layer of sampling. A total of 63 villages were selected from the 34 counties (ranging from 1 to 4 villages with an average of 1.85 villages per county). The outreach strategies employed to identify counties/villages included referrals from local government or direct personal contacts with village leaders. Once permission was granted by the village leaders to conduct the survey in their areas, the research team randomly approached rural residents in their homes. Rural residents were eligible to participate if they (1) had permanent rural residency, (2) had resided in their rural hometown during the month prior to the survey, (3) were primarily engaged in agriculture or farming-related activities, and (4) were between 18–40 years of age. To prevent over-sampling of rural residents from any one village, the number of rural residents recruited from a single village was limited to 30. If there were multiple eligible individuals within a single household who met the above selection criteria, the first person who was contacted by the interviewer and agreed to participate was recruited.

Survey procedures

After identifying an eligible rural resident, trained interviewers (psychology graduate students and faculty members at a local university in Beijing) provided the participant with a detailed description of the study design and the consenting procedure and invited her/him to participate in the survey. Gender was noted for those eligible individuals who declined to participate. Eligible individuals who agreed to participate and provided informed consent were asked to

complete a self-administered questionnaire developed through the joint efforts of investigators in both China and the United States. Questionnaires were pilot-tested for comprehension prior to administration and typically took about 45 minutes to complete. Participants completed the survey individually at their homes or at other locations of their choice. In two instances interviewers provided assistance to rural residents with limited literacy skills by reading the survey items to them. Respondents were provided with a small monetary compensation for their participation. The study protocol was approved by the Institutional Review Boards at Wayne State University in the United States and Beijing Normal University in China.

Measurements

Experience of rural-to-urban migration—Participants were asked whether they had ever migrated to cities for temporary jobs in the past. Based on their responses to this question, participants were considered as either a return migrant (i.e. those who had previously migrated to a city for employment), or non-migrants (i.e. those who had never migrated to a city). In addition, participants were asked whether their spouses were currently migrants working in cities.

Demographic characteristics—All participants were asked to provide their age, level of formal schooling, and marital status. For the purpose of data analysis in the current study, the response to the schooling question was grouped into three categories: no more than primary school or below (i.e., less than or equal 6 years of formal education); middle school (7–9 years of schooling); or at least high school (at least 10 years of formal schooling). Marital status was grouped into “never married” or “ever married”. The latter category included 1.1% of the sample that were currently either divorced or widowed.

General health condition—Participants were asked to self-rate their overall physical health status on a 5-point scale (very good, good, fair, poor, and very poor). For the purpose of data analysis in the current study, the response was grouped into three categories: good (very good/good), fair, and poor (poor/very poor).

Family socioeconomic status (SES)—To obtain a comprehensive measure of overall family SES, an index score was constructed based on six questions: (1) self perception of relative standing of family economic condition in comparison with neighbors in the village (top half or bottom half); (2) participants’ average monthly income (in Chinese currency Yuan; Approximate 8.00 Yuan= US \$1.00 during the time of the survey); (3) type of dwelling (e.g., mud flat house, brick flat house or multi-storied building); (4) whether they owned the houses they were living in; (5) average space in the house per person; (6) facilities in the dwelling (i.e., toilet, kitchen, pipe-water, gas pipe, heater, bathroom, television, or telephone). The respondents were instructed to divide their total estimated annual income by 12 as an estimate of their approximate monthly income. The responses to each of the six variables were dichotomized as to whether their family economic condition was in the top half in the village (yes=1, no=0), whether the participants’ monthly income was more than the 50th percentile among the sample (yes=1, no=0), whether they had their own house (yes=1, no=0), whether their estimated house space was above the medium number (about 25 square meters/per person) among the sample (yes=1, no=0), or there were at least 4 of the 8 listed facilities in the house (yes=1, no=0). A composite index, ranging from 0 to 6, was derived by summing the dichotomous responses to the six items, with a higher score indicating a higher family socioeconomic status.

Mobility—Return migrants were asked about the total years of their migratory experience and the number of cities in which they had stayed during their migration. Following the approach employed in previous research (Li et al., 2004, Li et al., 2006), the ratio of the number of

migratory cities to years of total migration was calculated as an index of mobility. The mobility index ranged from .06 to 103.33 with bigger values indicating higher levels of mobility (i.e., moving to a greater number of cities during a relatively short period of time). To minimize the effect of potential outliers (i.e., a few individuals who moved very frequently during a very short time period), the mobility index was divided into five approximately evenly distributed groups using the 20th, 40th, 60th, and 80th percentiles of its frequency distribution as thresholds.

Number of jobs in cities—Return migrants were asked to provide the number of different jobs that they had held in urban settings during their migration. This measure was treated as a continuous variable in the analysis.

Reasons for return—Return migrants were asked the reasons for their returning home from the cities. Responses were grouped into five main reasons: (1) bad personal experiences (e.g., disliked the city, could not adjust well to the city, felt discriminated against in the city); (2) job or financial reasons (e.g., had difficulty in making money or finding a job); (3) marriage (i.e., coming home to get married); (4) family needed labor at home; and (5) others.

Sexual risk behaviors—In the current study, sexual risk behaviors were measured using five items, including number of sexual partners in their sex life, number of sexual partners in the previous month, commercial sex (selling or buying sex), overall frequency of condom use, and the number of times using a condom during the three most recent sexual intercourses. To obtain a comprehensive measure of sexual risk among the participants and to facilitate multivariate data analysis in this study, a sexual risk index was constructed using the five items. The responses to each of the five items were dichotomized as to whether the participants had lifetime multiple sexual partners (yes=1, no=0), whether they had multiple sexual partners in the previous month (yes=1, no=0), whether they had engaged in commercial sex in the previous six months (yes=1, no=0), whether they had unprotected sex (e.g., did not always use a condom) in the past (yes=1, no=0), or whether they had unprotected sex during the previous three episodes of sexual intercourse (yes=1, no=0). A composite index, ranging from 0 to 5, was derived by summing the dichotomous responses to the five items, with a higher score indicating a higher sexual risk.

Analysis

Chi-square test was employed to examine differences of sociodemographic factors between return migrants and non-migrants (e.g., age, gender, education and marital status). Chi-square test was also used to examine the association of sexual risk behaviors with migration experience. ANOVA analysis was used to test the relationship between mobility and the sexual risk index among return migrants. Multiple linear regression analysis was performed to examine the association between migration experience and sexual risk behaviors, simultaneously controlling for age, gender, education, marital status, self-rated healthy status, family socioeconomic status and whether the spouse was a current migrant. Multiple linear regression analysis was also conducted among return migrants to examine the factors associated with their sexual risk, particularly migratory experience including mobility, number of different jobs they had in cities, and reasons for returning home. All statistical analyses were performed using SPSS for Windows v 11.5.

Results

Sample characteristics

Among the 1,020 sampled respondents interviewed in this study, 994 provided valid responses to the question of migration experience, with 553 (55.6%) having ever migrated to a city for temporary employment and 441 (43.2%) having never left their villages for temporary

employment in cities (Table 1). The mean age was 29.3 years for return migrants and 28.3 years for non-migrants. More males reported a history of rural-to-urban migration than females (66.4% vs. 33.6%). Compared with non-migrants, fewer return migrants had completed high school or more education (20.7% vs. 36.7%). Among return migrants, 28.2% were single, while the percentage was 34.3% among non-migrants. There was no difference regarding self-rated health status between return migrants and non-migrants. Non-migrants had higher family socioeconomic status than return migrants. More non-migrants had spouses who were currently migrants in cities. For return migrants, the average length of their past migratory experience was 3.3 years, and on average they had migrated to 2.7 cities and had held an average of 2.7 different jobs during migration. The main reasons cited for returning home from cities were: bad personal experiences in cities (26.0%); difficulty in finding jobs or making money in cities (29.1%); family's needs for labor at home (27.5%); or coming home to get married (11.1%);

HIV-related sexual risk behavior

Differences in HIV-related sexual risk behaviors between return migrants and non-migrants are presented in Table 2. About 15.3% of participants reported having ever had multiple sexual partners (i.e., \geq sexual partners) and 5% reported that they had multiple sexual partners in the month prior to the interview. About one-tenth of the participants reported that they had engaged in commercial sex. There was no difference between return migrants and non-migrants with regard to multiple sexual partners (both in lifetime and last month). Likewise, there was no difference in engaging in commercial sex between return migrants and non-migrants.

As shown in Table 2, 47.2% of participants (49.5% of return migrants, 43.9% of non-migrants) reported never using a condom during sexual intercourse. Two-thirds of the sample reported not using a condom in the previous three episodes of sexual intercourse. Only 7.5% of return migrants and 11.2% of non-migrants reported that they had used a condom every time they had sexual intercourse during the last three episodes. There was a significant difference between return migrants and non-migrants on the sexual risk index (1.6 for return migrants and 1.3 for non-migrants).

Table 3 shows the association between mobility and sexual risk behaviors among return migrants. Both multiple sexual partners and commercial sex were significantly associated with mobility. The association between mobility and overall sexual risk index also showed a similar pattern, with the sexual risk index increasing with mobility. However, the relationships of mobility with individual sexual risk behaviors and sexual risk index did not appear to be linear among return migrants.

Multivariate analysis

As shown in Table 4, migratory status was associated with increased sexual risk behaviors, with return migrants being more likely to demonstrate increased sexual risk than their non-migrant counterparts, after controlling for individual sociodemographic characteristics (age, gender, education, marital status, health status, social economic status of family, migrant status of spouse). In addition to migratory status, advanced age, male gender, being married, and an above-average family SES were associated with increased sexual risk.

Table 5 shows the results of multiple linear regression analysis among return migrants. Advanced age, male gender, being married, and a greater numbers of jobs held in cities during migration were significantly associated with increased sexual risk behavior. However, mobility was not associated with sexual risk behaviors in the multivariate analysis. None of the reasons for returning to the hometown of origin was associated with sexual risk behaviors among return migrants.

Discussion

In this study, return migrants in rural areas had a higher level of sexual risk than non-migrants, even after controlling for potential confounders that differed between return migrants and non-migrants (e.g., age, gender, education, marital status and family SES). This finding suggests that the rural-to-urban migration process might create a social environment that places rural migrants at a greater risk of practicing HIV-related sexual risk behaviors.

The data in the current study suggest a significant gender effect with regard to the association between migratory experience and sexual risk among rural population and the association between mobility during migration and sexual risk among return migrants. Data from South Africa suggested that HIV-infection among rural women might be not only associated with their migrant sexual partners, but also associated with their own sexual risk behaviors (Lurie et al., 2003). Given the strong gender effect found in the current study and the potential differences in cultural norms of extramarital and premarital sexual activities between South Africa and China, it would be important to determine whether the relationship between sexual risk behaviors and return migration in rural China resembles the pattern in Africa. Future study is needed to compare sexual risk behaviors between migrants and non-migrants in rural China among men and women, respectively.

In contrast to a strong linear relationship between geographic mobility and sexual risk among rural-to-urban migrants in urban destinations (Li et al., 2004), the current study found a nonlinear relationship among return migrants. Several factors may contribute to this discrepancy between findings. First, engagement in sexual risk behaviors for some of the return migrants might have occurred after their returning home. Therefore, while the sexual risk might be related to some of their past migratory experiences, it might not be a linear function of increased mobility. Second, differences in some key demographic characteristics between the migrants in urban destination ("active migrants") and return migrants might also explain the discrepancy. For example, the percentage of unmarried was lower among the return-migrants in this study than the active migrants in the previous study (28% vs. 44%). Likewise, return migrants in our sample reported a shorter duration of migratory experience (3.3 years) than that (5.5 years) of active migrants reported in the previous study. Other studies conducted in China confirm these differences. For example, a study conducted in Sichuan and Anhui provinces of China in 1999 suggested that return migrants were more likely to be married (90.67%) than active migrants (47.50%) (Wang and Fan, 2006). Further study is needed to examine the relationship between factors of migratory experience (including mobility) and sexual risk among return migrants in rural China.

There are several potential limitations in this study. First, the data were based upon self-report and therefore were subject to self-report bias. Second, convenience sampling rather than random sampling was employed in recruitment. Although multiple efforts were made to increase the representativeness of the samples, it is possible that our samples were not representative of the rural populations in other areas of China. However, the fact that the data were obtained from 63 villages in 34 counties of eight most populous provinces in China provides a strong indication of the potential role of rural-to-urban migration in sexual risk among return migrants in China. Third, because the original comparative study was not specifically designed to study the sexual risk among return migrants, some important information such as time of return for return migrants was not available in the current study. Although we purposefully measured some recent sexual risk behaviors among participants (e.g., multiple sexual partners during last month and unprotected sex during recent three sexual encounters), we were still unable to accurately determine whether these migrants engaged in these risk behaviors before or after their return. Finally, data on perceptions and attitudes towards sexual risk were not available in this study.

Even with these potential limitations, the current study is one of few efforts to examine the sexual risk among return migrants in rural China. This study may help us to better understand the relationship between rural-to-urban migration and sexual risk. The current study underscores the need for HIV/AIDS prevention efforts among both rural-to-urban migrants in urban settings and return migrants in rural areas. Because of the circular and seasonal nature of rural-to-urban migration, it is expected that a large number of rural migrants will return to rural areas periodically and/or permanently. HIV/AIDS intervention efforts in rural areas should specifically target return migrants and/or their non-migratory spouses, who may constitute a high risk rural population for HIV infection and transmission in China.

Acknowledgements

This research was supported by NIH Research Grant #R21TW006375 funded by the Fogarty International Center and the National Institute of Mental Health. The authors wish to thank dedicated students and faculty members from Beijing Normal University for their assistance in field data collection. The authors also want to thank Dr. Ambika Mathur and Ms. Joanne Zwemer for assistance in manuscript preparation.

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Table 1
Demographic characteristic of return migrants and non-migrants

| | Overall | Return migrants | Non-migrants | |
|------------------------------------|-------------|-----------------|--------------|----|
| N (%) | 994 (100.0) | 553 (55.6) | 441 (44.4) | |
| Mean age (SD) | 28.8 (6.4) | 29.3 (6.0) | 28.3 (6.7) | * |
| Gender | | | | ** |
| Female | 384 (38.7) | 185 (33.6) | 199 (45.2) | |
| Male | 607 (61.3) | 366 (66.4) | 241 (54.8) | |
| Education | | | | ** |
| ≤ Primary school | 197 (19.9) | 123 (22.4) | 74 (16.9) | |
| Middle school | 517 (52.3) | 313 (56.9) | 204 (46.5) | |
| ≥ High school | 275 (27.8) | 114 (20.7) | 161 (36.7) | |
| Marital status | | | | * |
| Never married | 306 (30.9) | 155 (28.2) | 151 (34.3) | |
| Ever Married | 683 (69.1) | 394 (71.8) | 289 (65.7) | |
| Self-rated health | | | | |
| Good | 372 (67.8) | 314 (71.5) | 686 (69.4) | |
| Fair | 153 (27.9) | 113 (25.7) | 266 (26.9) | |
| Poor | 24 (4.4) | 12 (2.7) | 36 (3.6) | ** |
| Family socioeconomic status | 2.2 (1.4) | 2.1(1.4) | 2.4(1.5) | |
| Migrant spouse | | | | * |
| Yes | 111(24.0) | 64 (17.5) | 117 (21.2) | |
| No | 358 (76.0) | 301 (82.5) | 659 (78.8) | |
| Migration experience | | | | |
| Years of migration (SD) | n/a | 3.3 (3.3) | n/a | |
| Number of cities migrated (SD) | n/a | 2.7 (2.7) | n/a | |
| Number of jobs in cities (SD) | n/a | 2.7 (3.0) | n/a | |
| Reasons for return migration | | | | |
| Bad personal experiences in cities | n/a | 213 (26.0) | n/a | |
| Difficulty finding a job in cities | n/a | 239 (29.1) | n/a | |
| Family needed labor | n/a | 226 (27.5) | n/a | |
| Coming home to get married | n/a | 91 (11.1) | n/a | |
| Others | n/a | 52 (6.3) | n/a | |

Note: Frequency count (N) and percent were presented in the table unless noted otherwise

*
 $p < 0.05$;

**
 $p < 0.01$.

Table 2
Association between sexual risk behaviors and rural-to-urban migration experience of rural residents

| | Return migrants | Non-migrants | Overall |
|---|-----------------|---------------|------------|
| Ever had sexual intercourse | 425 (79.9) | 303 (70.0) ** | 728 (75.4) |
| ≥2 sexual partners in lifetime | 72 (17.1) | 38 (12.8) | 110 (15.3) |
| ≥2 sexual partners in last month | 22 (6.0) | 10 (3.7) | 32 (5.0) |
| Commercial sex | 62 (11.4) | 38 (8.7) | 100 (10.2) |
| Frequency of condom use | | | |
| Never | 208 (49.5) | 130 (43.9) | 338 (47.2) |
| Occasionally | 94 (22.4) | 65 (22.0) | 159 (22.2) |
| Sometimes | 77 (18.3) | 49 (16.6) | 126 (17.6) |
| Often | 34 (8.1) | 38 (12.8) * | 72 (10.1) |
| Always | 7 (1.7) | 14 (4.7) * | 21 (2.9) |
| Condom use in the previous 3 intercourses | | | |
| None | 290 (69.9) | 191 (65.0) | 481 (67.8) |
| Once | 65 (15.7) | 37 (12.6) | 102 (14.4) |
| Twice | 29 (7.0) | 33 (11.2) * | 62 (8.7) |
| All three times | 31 (7.5) | 33 (11.2) | 64 (9.0) |
| Sexual risk index ¹ | | | |
| Mean (SD) | 1.6 (1.2) | 1.3 (1.1) ** | 1.5 (1.2) |

Note: 1. Sexual risk index is defined here as a comprehensive measure of sexual risk and it was constructed using the five items: lifetime multiple sexual partners, multiple sexual partners in the previous month, commercial sex, overall frequency of condom use, and the number of times using a condom during the previous three sexual intercourses.

* $p < 0.05$;

** $p < 0.01$.

Table 3
Association between mobility index and sexual risk behaviors among return migrants

| Sexual risk behaviors | Mobility index | | | | |
|---|----------------|-----------|-----------|-----------|-------------|
| | 1 | 2 | 3 | 4 | 5 |
| ≥2 sexual partners in lifetime | 12 (10.8) | 16 (27.6) | 21 (22.1) | 17 (18.7) | 4 (7.8) * |
| ≥2 sexual partners in last month | 3 (3.1) | 4 (7.7) | 9 (10.8) | 4 (4.8) | 1 (2.5) |
| Commercial sex | 8 (5.6) | 15 (21.7) | 19 (15.3) | 13 (10.8) | 6 (8.7) ** |
| Frequency of condom use | | | | | |
| Never | 46 (40.7) | 33 (56.9) | 52 (55.3) | 44 (48.4) | 25 (50.0) |
| Occasionally | 26 (23.0) | 14 (24.1) | 17 (18.1) | 24 (26.4) | 9 (18.0) |
| Sometimes | 29 (25.7) | 6 (10.3) | 19 (20.2) | 14 (15.4) | 8 (16.0) |
| Often | 10 (8.8) | 3 (5.2) | 6 (6.4) | 7 (7.7) | 7 (14.0) |
| Always | 2 (1.8) | 2 (3.4) | 0 (0.0) | 2 (2.2) | 1 (2.0) |
| Condom use in the previous 3 intercourses | | | | | |
| None | 73 (67.6) | 38 (66.7) | 68 (71.6) | 70 (76.1) | 31 (63.3) |
| Once | 19 (17.6) | 10 (17.5) | 17 (17.9) | 10 (10.9) | 7 (14.3) |
| Twice | 10 (9.3) | 5 (8.8) | 6 (6.3) | 3 (3.3) | 5 (10.2) |
| All three times | 6 (5.6) | 4 (7.0) | 4 (4.2) | 9 (9.8) | 6 (12.2) |
| Sexual risk index | | | | | |
| Mean (SD) | 1.5 (1.0) | 1.9 (1.3) | 1.8 (1.2) | 1.6 (1.2) | 1.3 (1.2) * |

* $p < 0.05$,

** $p < 0.01$.

Multiple linear regression analysis for association between sexual risk behavior and migration experience of rural residents in China

| Model ^a | B | Unstandardized Coefficients | | Beta | Standardized Coefficients | |
|-----------------------------|--------|-----------------------------|--------|--------|---------------------------|--|
| | | Std. Error | t | | Sig. | |
| (Constant) | -0.643 | 0.361 | -1.782 | | 0.075 | |
| Age | 0.030 | 0.008 | 3.648 | 0.149 | 0.000 | |
| Gender | 0.192 | 0.082 | 2.333 | 0.074 | 0.020 | |
| Education | -0.044 | 0.044 | -1.000 | -0.032 | 0.318 | |
| Marital status | 0.977 | 0.113 | 8.609 | 0.360 | 0.000 | |
| Self-rated health | 0.000 | 0.000 | 0.732 | 0.022 | 0.464 | |
| Family socioeconomic status | 0.056 | 0.028 | 2.011 | 0.063 | 0.045 | |
| Migrant spouse | -0.096 | 0.104 | -0.931 | -0.031 | 0.352 | |
| Migration experience | -0.291 | 0.078 | -3.710 | -0.113 | 0.000 | |

^aDependent Variable: Sexual risk behavior index.

Table 5
Multiple linear regression analysis for association between mobility and sexual risk behavior among return migrants in China

| Model ^a | B | Unstandardized Coefficients Std. Error | Beta | t | Standardized Coefficients | Sig. |
|---------------------------------------|--------|---|--------|--------|---------------------------|-------|
| (Constant) | -0.683 | 0.522 | | -1.308 | | 0.192 |
| Age | 0.039 | 0.012 | 0.180 | 3.147 | | 0.002 |
| Gender | 0.366 | 0.133 | 0.134 | 2.742 | | 0.006 |
| Education | -0.085 | 0.068 | -0.059 | -1.241 | | 0.215 |
| Marital status | 0.795 | 0.166 | 0.277 | 4.797 | | 0.000 |
| Self-rated health | 0.000 | 0.001 | 0.029 | 0.665 | | 0.507 |
| Family economic status | 0.041 | 0.045 | 0.043 | 0.926 | | 0.355 |
| Migrant spouse | -0.275 | 0.152 | -0.089 | -1.807 | | 0.072 |
| Mobility index | -0.018 | 0.010 | -0.085 | -1.833 | | 0.068 |
| Number of jobs in cities | 0.056 | 0.021 | 0.126 | 2.711 | | 0.007 |
| <i>Reasons of Returning</i> | | | | | | |
| Bad personal experience in cities | 0.042 | 0.119 | 0.016 | 0.357 | | 0.721 |
| Difficulty of finding a job in cities | -0.027 | 0.117 | -0.010 | -0.230 | | 0.819 |
| Coming home to get married | -0.110 | 0.161 | -0.032 | -0.683 | | 0.495 |
| Family needed labor | -0.207 | 0.123 | -0.078 | -1.682 | | 0.093 |

^aDependent Variable: Sexual risk behavior index