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Am J Mens Health 2012 6: 485 originally published online 9 July 2012
DOI: 10.1177/1557988312453479

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Same-Sex Sexual Behaviors Among Male Migrants in a Context of Male “Marriage Squeeze”: Results From an Exploratory Survey in Urban Xi’an, China

American Journal of Men's Health
6(6) 485–496
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sagepub.com/journalsPermissions.nav
DOI: 10.1177/1557988312453479
http://ajmh.sagepub.com


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Abstract

The male marriage squeeze in China may increase the prevalence of male same-sex sexual behaviors among unmarried male migrants who lack stable female sexual partners. The same-sex sexual behaviors among unmarried male migrants appear to be at high risk of transmission of human immunodeficiency virus (HIV) and sexually transmitted infections (STIs), mainly because of a lack of knowledge of these diseases. Using data from the “Survey on Reproductive Health and Family Life of Migrant Male Bachelors in Urban Areas” conducted in Xi’an City, Shaanxi Province, in December 2009 and January 2010, this study compares same-sex sexual behaviors of unmarried with that of married male migrants (including married but separated men who are migrating without their spouse or partner and cohabitating men who are migrating with their spouse or partner). It is reported that the prevalence of same-sex sexual behaviors among unmarried males reaches 11%, more than twice the 5.1% reported by married but separated men and thrice the 3.8% reported by cohabitating men. It also appears that the same-sex sexual behaviors is significantly associated with men’s attitudes toward same-sex sexual behaviors (odds ratio = 1.59, $p < .001$), toward life-long bachelorhood (odds ratio = 1.35, $p < .01$), and with marital status (odds ratio = 0.37, $p < .01$). The frequency of condom use appears to be higher among unmarried men than among men who are married, whether or not they migrated with their wives, and is significantly associated with scores on knowledge about HIV/AIDS (estimated coefficient = .12, $p < .001$) and STIs (estimated coefficient = .22, $p < .01$). It is also associated with the likelihood of same-sex sexual behaviors (estimated coefficients = .83, $p < .01$) and marital status (estimated coefficients for married but separated = $-.50$, $p < .05$; estimated coefficients for cohabitating = $-.77$, $p < .001$).

Keywords

same-sex sexual behaviors, “marriage-squeezed” male bachelors, sex imbalance, rural–urban migrants, urban China

Background

From the 1980s, paralleling socioeconomic development and the fertility decline, China’s population has experienced an increase in sex ratio at birth. This has resulted in a growing female deficit and consequently in an increasing number of males who are “marriage-squeezed” (Das Gupta & Li, 1999; Guo & Deng, 2000). It is estimated that annually, from the early 2010s, more than 10% of Chinese men of marriageable age could not find a female partner (Y. H. Chen & Ullrich, 2001; S. Z. Li, Jiang, & Feldman, 2006). These marriage-squeezed male bachelors are mostly located in remote rural areas, are older than 30 years, and are poor (S. Z. Li, Zhang, Yang, & Attané, 2010).

Nevertheless, marriage is still almost universal and the idea that “everybody should get married” is widely prevalent (Xinqin Research Institute, 2008). Although marriage remains in most cases the only socially acceptable setting for sexuality (Sun & Zhang, 2009), the female

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deficit implies that “marriage-squeezed” male bachelors can only meet their sexual needs through means other than marriage. Little information is currently available on the situation of these “marriage-squeezed” males, but some recent studies indicate, for instance, that there is a higher occurrence of masturbation and prostitution among them (S. Z. Li et al., 2010; Yang, Attané, Li, & Yuan, 2010). In parallel, it has been stated that unsafe sexual behaviors, including paid sex and unprotected sex (i.e., without condom), increase the risk of transmission of human immunodeficiency virus (HIV) and sexually transmitted infections (STIs) (Merli & Hertog, 2010; Merli, Hertog, Wang, & Li, 2006). Therefore, such unsafe behaviors may have substantial implications for prevention of HIV and STIs in this population.

At the same time, while China is experiencing economic, social, and demographic transitions, there are increasing flows of rural–urban migrations—which reached 221 million people in 2010 (State Bureau of Statistics of China, 2011)—that affect both rural and urban societies. In this context, most rural marriage-squeezed male bachelors are migrating to cities under the double pressure of marriage and economic needs. This raises two questions. In a context of female shortage on the marriage markets, how can the marriage-squeezed male migrants meet their sexual needs? Might an increase in the prevalence of same-sex sexual behaviors compensate for the absence of female sexual partners among the marriage-squeezed male migrants?

The available relevant literature indicates that the prevalence of same-sex sexual behaviors varies much across periods, countries, and population groups, ranging from 1% to more than 20% (Bagley & Tremblay, 1998; Billy, Tanfer, Grady, & Klepinger, 1993; Chiang, 2009; Fay, Turner, Klassen, & Gagnon, 1989; Gagnon, 1977; Harry, 1990; Janus & Janus, 1993; Langstrom, Rahman, Carlstrom, & Lichtenstein, 2010; Liu & Lu, 2005; Pan & Yang, 2004; Pan & Zeng, 2000; Sell, Wells, & Wypij, 1995; Smith, 1991; Taylor, 1993; Y. H. Li, 1998). These variations are partly due to environmental factors. For example, it is suggested that the prevalence of same-sex sexual behaviors is higher among single-sex groups such as the army and only-boy or only-girl schools than among other groups (National Survey of Sexual Health and Behavior, 2010; Office of the Inspector General Department of Defense, 2000).

In the recent past (from the 1950s), social tolerance of same-sex sexuality in China used to be extremely low, with same-sex sexual behaviors viewed as a criminal activity subject to administrative or criminal punishment (Y. H. Li, 1998). However, this did not preclude the existence of same-sex sexuality, which was even more prevalent in rural areas—where behaviors are however usually more conservative—than in urban areas (Y. H.

Li, 1998). In today's China, social norms toward same-sex sexual behaviors are gradually relaxing but are still relatively more conservative than in most Western countries (X. Y. Chen, 2008; Y. H. Li, 1998). For example, a survey conducted in China in the late 1990s indicated that 80% of the people interviewed considered same-sex sexual behaviors as abnormal, and only 13% had a supportive attitude (You & Xu, 2002). A study indicates more than 90% of Chinese men aged 30 years and older who had same-sex sexual orientation were married with a woman to hide their real sexual orientation (Liu & Lu, 2005); similar behaviors were evidenced in Li Yinhe's study (Y. H. Li, 1998).

In addition, existing literature indicates that unprotected intercourse is frequent among men who have sex with other men and that such unprotected sexual intercourse is the most important vector for HIV transmission (De Wit, Storebe, De Voorme, & Sandford, 2000; Morin et al., 2005; Murphy et al., 2004). A survey on HIV infection conducted among Asian groups indicates that HIV prevalence among men who have sex with other men is high: 15% in Indonesia, 29% in Singapore, 32% in Hong Kong, 7.3% in mainland China (Jinyang, 2007). In China, in 2003, it was estimated that around 11% of people carrying HIV were infected after having experienced male same-sex sexual contacts (Zhong & Lv, 2006). These data provide evidence of the need for an improved HIV and STI prevention system to reduce their potential impact on individual and public health.

Actually, the occurrence of unprotected sexual intercourse is affected by relevant knowledge. Studies conducted among gay men, women, and college students suggest that unprotected sexual behavior is associated with knowledge of HIV/AIDS (acquired immune deficiency syndrome) and STIs and that education on HIV/AIDS combined with other intervention methods effectively reduces the occurrence of unprotected sexual behaviors (DiClemente & Wingood, 1995; Fisher, Fisher, Misovich, Kimble, & Malloy, 1996; Kelly et al., 1991). Other studies point out that condom availability has a significant positive impact on condom use (Blake et al., 2003; Guttmacher et al., 1997).

To investigate sexual behaviors of marriage-squeezed male bachelors who live in rural areas, we conducted a survey among rural residents in Anhui province, China, in 2008, in which the prevalence of same-sex sexual behaviors among rural male bachelors reached 17.2%, a level significantly higher than the 8.9% observed among married men in the same age group. Regardless of marital status and the gender of sexual partners, the occurrence of unprotected sexual behaviors was reported to be more than 60%, and the scores obtained on knowledge of HIV/AIDS and STIs among bachelors are much lower than those of the married (Yang, Attané, Li, & Zhang, 2012). However,

we still know very little about the same-sex sexual behaviors among marriage-squeezed male migrants.

The present study is designed to investigate the characteristics of same-sex sexual behaviors among marriage-squeezed male migrants and the potential impact of the male marriage-squeeze on same-sex sexual behaviors. In the present study, we try to answer in particular the following questions: Is the higher prevalence of same-sex sexual behaviors observed among male bachelors in rural areas (Yang et al., 2012) also observed among migrant bachelors? Can high-risk sexual behaviors also be evidenced among migrant male bachelors who report same-sex sexual experiences?

Data and Method

Sampling

The data used in this study are from the “Survey on Reproductive Health and Family Life of Migrant Male Bachelors in Urban Areas” conducted in Xi’an City, the capital of Shaanxi Province, in December 2009 and January 2010. The registered population in Xi’an was 8.5 million at that time, and the migrant population exceeded 2 million, making it the most populous in the province. According to the “Regulations on Family Planning among Migrants,” the migrant population refers to adult people who left their originally registered place of residence for another place in order to work. Twenty-eight years of age has been considered as a threshold age for male marriage, after which chances of marrying are significantly reduced (S. Z. Li & Li, 2008). Thus, in the present study, male migrants are defined as “rural male residents aged 28 years and older who have left their registered place of residence and are currently working in Xi’an city.”

Considering that migrants are dispersed through the city and consequently hard to locate, it was not possible to use random sampling or door-to-door interviewing methods. Therefore, three informal labor markets¹ and two construction sites where male migrants are concentrated were selected as locations for the survey. In the absence of any sampling basis (as no official information or statistics are available on migrants in the informal labor market), random sampling cannot be used. Considering the specific context, the only applicable sampling method was convenience sampling, which consists in directly getting in touch with individual migrants met in these informal labor markets if they would agree to participate in the survey. We used a similar method to reach migrants working on construction sites and other places where the male migrants are concentrated as construction workers. Because of the sensitivity of our research questions, we did not get support

from the companies, which refused to give us name lists of their workers. Therefore, several workers were directly contacted on the construction sites and asked if they would agree to participate in the survey and introduce other workers to us.

To guarantee anonymity to the respondents and allow them to feel free in their responses, the CAPI (computer-assisted personal interviewing) method was used. We designed a program for interviewers on the spot to input an identification number as the unique certified identity to avoid double counting. This identification number also includes individual birthday information so that we can estimate the participants’ age and exclude those aged less than 28 years.

All the interviews were arranged in a closed and quiet environment. Before starting the process, an interviewer read to each respondent the regulations concerning privacy protection and informed them of the possibility of withdrawing at any time. Then interviewers explained to participants how to manipulate the computer in order that they can fill in the questionnaire on their own. During the process, however, an interviewer was present to give technical assistance when necessary, but sat in front of the respondent so that he could not see the computer screen. In total, 979 men participated in the survey, of whom 26 withdrew for various reasons including excessive length of the questionnaire or sensitivity of the issues.² However, we reached a high response rate of 97%. Another 14 questionnaires were removed from the database because the persons interviewed could not be considered as migrants. This resulted in 939 usable questionnaires that were considered for the final data analysis.

Measures

Same-sex sexual behaviors include any physical contact between persons of the same sex for the purpose of inducing sexual arousal by practicing hug, kiss, touching, and oral or anal sex (Sell, 1996, 1997). Such behaviors are one important component of what is called “sexual orientation” (Bailey & Marlene, 2009; Langstrom et al., 2010; Sell, 1996, 1997). In this study, only one question was asked to estimate the prevalence or likelihood of same-sex sexual behaviors: “Have you ever experienced sexual behaviors with another man?” There were two possible answers: 0 = *no*, 1 = *yes*.

A 5-point item was adopted to measure attitude toward same-sex sexual behaviors by asking the question: “Do you approve the fact that a person can have sex with a same-sex partner?” The following were the possible answers: 1 = *strongly disapprove*, 2 = *disapprove*, 3 = *neither approve nor disapprove*, 4 = *approve*, 5 = *strongly approve*. Another 5-point item “Is it acceptable to you to

remain a life-long bachelor?" was used measure attitude toward life-long bachelorhood. The following were the possible answers: 1 = *ultimately unacceptable*, 2 = *unacceptable*, 3 = *neither acceptable nor unacceptable*, 4 = *acceptable*, 5 = *ultimately acceptable*. Following this classification, the higher the respective scores, the more tolerant the attitude toward same-sex sexual behaviors and the greater the acceptance of life-long bachelorhood.

Behavior toward condom use is widely used for measuring "protected sexual behaviors" (De Wit et al., 2000). Two 5-point items—1 = *never*, 2 = *seldom*, 3 = *occasionally*, 4 = *often*, 5 = *always*—were used in this study to measure the frequency of condom use among respondents who ever had a sexual experience with partners whatever the sex or male partners, respectively; the higher the score, the higher the frequency of condom use.

As stated above, the frequency of condom use is associated with individual's relevant knowledge on HIV/AIDS and STIs (DiClemente & Wingood, 1995; Fisher et al., 1996; Kelly et al., 1991). This study asked commonly used questions for measuring such knowledge, such as "Can condom use reduce the risk of HIV transmission when having sex?" or "Can mosquito bites transmit HIV?" Questions were also asked on knowledge of STIs symptoms, such as "Do you know if gonorrhea, syphilis, condyloma, herpes progenitalis, venereal ulcer, AIDS, and paradenolymphitis are STIs? Can STIs be identified only by observing sexual organs?" In our survey, Cronbach's alpha for the HIV/AIDS scale is .80, and .65 for the STIs scale,³ and the mean value and standard deviation are 4.00 and 2.75 for the HIV/AIDS scale and 1.16 and 0.85 for the STIs scale. The higher the scores, the better the level of the knowledge about HIV/AIDS and STIs.

To integrate marriage-squeeze and internal migration effects into the model analysis, three important control variables were included. The first one is "age," which is strongly associated with the possibility of getting married. We considered two age groups: 28-34 (the reference group) and 35+, as 35 years is another important threshold for rural men or rural-urban male migrants beyond which chances to get married are almost zero (S. Z. Li & Li, 2008).

The second variable is "marital status." While some migrants are single, some others are married but are migrating to Xi'an city without their spouse, mainly because of economic or housing constraints. Therefore, we classified the respondents into the three following categories: "unmarried migrants," "married but separated migrants" (i.e., who are migrating without their spouses), and "cohabitating married migrants" (i.e., who are migrating with their spouses). In addition, it appeared that 8.4% of the unmarried migrants in the total sample were actually cohabitating with a partner, so we assumed

that they have sexual behavior similar to that of married men and merged them into a one category of "cohabitating migrants" (married or unmarried).

The third variable is "migration duration." Indeed, existing literature indicates that migration duration might affect migrants' attitudes toward marriage, fertility, and sexual behaviors (Wu & Li, 2008). Here, migration duration was calculated by asking "What is the year of your first migration?" and was included into the analyses as a discrete variable ranging from 0 to 38 years.

Two other socioeconomic variables, "education" and "monthly income," were also included. Education was measured by asking the highest level of education attained, with the following possible responses: 1 = *primary school and below* (the reference group) and 2 = *high school and above*. Monthly income was measured by letting the respondents select one of two categories: 1 = *less than 1,000 Yuan* (the reference group) and 2 = *1,000 Yuan and above*. A preliminary analysis of our survey data indicated that educational and monthly income levels of unmarried male migrants are significantly lower than those of married male migrants, suggesting that singlehood among rural-urban migrants is strongly associated with poor socioeconomic conditions, as demonstrated for Chinese rural bachelors (S. Z. Li et al., 2010).

Data Processing and Analyses

The present study adopted crosstabs and one-way ANOVA to compare the prevalence of same-sex sexual behaviors and the level of knowledge on HIV/AIDS and STIs between our three categories of male migrants: "unmarried," "separated but married," and "cohabitating."

Some existing research suggests that there is a correlation between a given behavior and the attitudes toward such a behavior (Penner, 1986). Considering this, our first research hypothesis is that same-sex sexual behaviors are associated with attitudes toward such behaviors and life-long bachelorhood. To validate this hypothesis, the binary logistic method was adopted, and three models were constructed with likelihood of same-sex sexual behaviors as the dependent variable. Model 1 used "attitude toward same-sex sexual behaviors" and "attitude toward life-long bachelorhood" as independent variables, Model 2 added "marital status" as a control variable to Model 1, and Model 3 added "age," "migration duration," "education," and "monthly income" as other control variables to Model 2.

Our second research hypothesis is based on the statement that there is a correlation between condom use and the knowledge of HIV/AIDS and STIs (DiClemente & Wingood, 1995; Fisher et al., 1996; Kelly et al., 1991) and therefore assumes that among Chinese male migrants, the frequency of condom use is positively associated with

their knowledge of HIV/AIDS and STIs. To validate this second hypothesis, we used an ordinal regression model. Considering the very high number of missing data on the “frequency of condom use with male partners” (94.3%), we only presented the descriptive information on this variable and used the “frequency of condom use with partners whatever the sex” for the regression analysis (with a percentage of missing data now reaching only 14.9%). Therefore, the three models were constructed by using the “frequency of condom use with partners whatever the sex” as the dependent variable. Model 4 adopted “knowledge about HIV/AIDS” and “knowledge about STIs” as independent variables, Model 5 added “the likelihood of same-sex sexual behaviors” and “marital status” as control variables to Model 4, and Model 6 added “age,” “migration duration,” “education,” and “monthly income” as control variables to Model 5.

The block regression models adopted above give a better description of the different roles played by the dependent and control variables than the single multivariate regression. In this case, the odds ratios and the estimated coefficients of the dependent variables (when control variables are not included) indicate a rough impact of the dependent variables on the independent variable. But when new control variables are included, the adjusted odds ratios or estimated coefficients of the dependent variables indicate a net impact of the dependent variables on the independent variable. Such an analytical strategy is commonly adopted in sociological studies (see, for instance, Selim et al., 2004).

Results

Descriptive Analysis

The descriptive analysis indicates that among unmarried male migrants, the prevalence of same-sex sexual behaviors is 11.0%, which is significantly higher than the 5.1% observed among married but separated and 3.8% among cohabitating male migrants ($\chi^2 = 15.14$, $p = .001$).

Regarding knowledge about HIV/AIDS, attitudes toward same-sex sexual behaviors and frequency of condom use with male partners, there is no significant difference between the three groups of male migrants. However, a greater acceptance of lifelong bachelorhood is observed among unmarried (2.64) than among married but separated (2.36) and cohabitating male migrants (2.30), $F = 4.93$, $P = .007$, $df = 937$. Also, significantly lower scores for knowledge of STIs were reported by unmarried male migrants (1.01) than among the married but separated (1.23) and cohabitating male migrants (1.20), $F = 4.50$, $p = .011$, $df = 935$. However, a higher frequency of condom use with partners whatever the sex was found among unmarried (2.78) as compared with the

married but separated (2.47) and cohabitating male migrants (2.26), $F = 12.00$, $p = .000$, $df = 798$, all of them being however between 2 = *seldom* and 3 = *occasionally* (see Table 1).

Binary Logistic Analysis

Model 1 (presented in Table 2) indicates that attitudes toward same-sex sexual behaviors and lifelong bachelorhood are significantly correlated with the likelihood of same-sex sexual behaviors, with odds ratios of 1.59 ($p < .001$, 95% confidence interval [CI] = 1.26, 1.98) and 1.35 ($p < .01$, 95% CI = 1.04, 1.63). This indicates that the more tolerant the attitudes toward same-sex sexual behaviors and the more accepting the attitude toward life-long bachelorhood, the higher likelihood to conduct same-sex sexual behaviors.

When the control variable “marital status” is included in Model 2, the odds ratio for attitudes toward same-sex sexual behaviors remains almost unchanged, but for attitudes toward lifelong bachelorhood, it becomes smaller, decreasing from 1.35 ($p < .01$) to 1.27 ($p < .05$, 95% CI = 0.96, 1.53), while marital status is significantly correlated with the likelihood of same-sex sexual behaviors with an odds ratio of 0.37 ($p < .01$, 95% CI = 0.20, 0.68) for cohabitating male migrants. It then appears that the impact of attitudes toward life-long bachelorhood on same-sex sexual behaviors is partly adjusted by marital status. Also, unmarried male migrants appear to be more likely to have same-sex sexual behaviors than cohabitating male migrants.

When including control variables such as “age,” “migration duration,” “educational level,” and “annual income” in Model 3, the odd ratio for attitudes toward same-sex sexual behaviors becomes a little smaller, from 1.58 ($p < .001$, 95% CI = 1.26, 1.98) to 1.54 ($p < .01$, 95% CI = 1.25, 2.02); for attitudes toward life-long bachelorhood, it becomes smaller, from 1.27 ($p < .05$, 95% CI = 0.96, 1.53) to 1.23 ($p > .1$, 95% CI = 0.96, 1.58); for marital status, it increases with the odds ratios going from 0.44 ($p < .1$, 95% CI = 0.17, 1.09) to 0.60 ($p > .1$, 95% CI = 0.21, 1.56) for married but separated men and from 0.37 ($p < .01$, 95% CI = 0.20, 0.68) to 0.49 ($p < .05$, 95% CI = 0.24, 0.97) for cohabitating men. However, none of the three newly added control variables has an impact on the likelihood of same-sex sexual behaviors.

When the independent and control variables are integrated step by step into the regression models, the value of Cox and Snell R^2 and Nagelkerke R^2 become higher with .028 and .080, respectively, for Model 1, .038 and .109 for Model 2, and .04 and .12 for Model 3, indicating an increase in the explanatory power of the models; however, it remains at a relatively low level.

Table 1. Comparison of Same-Sex Sexual Behaviors, Relevant Attitudes, and Knowledge

	Unmarried (%)		Married but separated (%)		Cohabiting (%)	
	No	Yes	No	Yes	No	Yes
Ever had sexual behaviors with men χ^2 (marital status)	89.0	11.0	94.9	5.1	96.2	3.8
	***; $\chi^2 = 15.14$ ($p = .001$); $df = 2$					
	Unmarried		Married but separated		Cohabiting	
	Mean	SD	Mean	SD	Mean	SD
Attitude toward same-sex sexual behaviors <i>F</i> test	2.24	1.17	2.37	1.07	2.14	1.04
	+; $F = 2.56$ ($p = .075$, $df = 934$)					
Attitude toward being single for life <i>F</i> test	2.64	1.31	2.36	1.11	2.30	1.00
	***; $F = 4.93$ ($p = .007$, $df = 937$)					
Knowledge of AIDS <i>F</i> test	3.85	2.74	4.07	2.75	4.05	2.76
	NS; $F = 0.45$ ($p = .638$, $df = 935$)					
Knowledge of STIs <i>F</i> test	1.01	0.82	1.23	0.88	1.20	0.86
	*; $F = 4.50$ ($p = .011$, $df = 935$)					
Frequency of condom use with partners whatever the sex <i>F</i> test	2.78	1.35	2.47	1.26	2.26	1.12
	***; $F = 12.00$ ($p = .000$, $df = 798$)					
Frequency of condom-use with male partners	3.22	1.78	2.17	1.83	2.30	1.52
	NS; $F = 1.884$ ($p = .16$, $df = 51$)					

+ $p < .1$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Ordinal Analysis

Results in Model 4 (Table 3) indicate that knowledge about both HIV/AIDS and STIs has a significant and positive impact on the frequency of condom use with partners whatever the sex, with estimated coefficients of 0.12 ($p < .001$, 95% CI = 0.06, 0.17) and 0.22 ($p < .01$, 95% CI = 0.07, 0.39), respectively. This suggests that male migrants with higher scores on knowledge about HIV/AIDS and STIs use condoms more frequently.

When the two control variables "same-sex sexual behaviors" and "marital status" are included in Model 5, the odds ratios and correlation directions of relevant knowledge on condom use frequency remain almost unchanged with estimated coefficients of 0.11 ($p < .001$, 95% CI = 0.06, 0.16) and 0.26 ($p < .01$, 95% CI = 0.10, 0.43). The newly included control variable "same-sex sexual behaviors" is positively correlated with condom use frequency with an estimated coefficient of 0.83 ($p < .01$, 95% CI = 0.19, 1.22), which means that male migrants who ever experienced same-sex sexual behaviors use condoms more frequently than those who have not. The newly included control variable "marital status" is negatively correlated with condom use frequency, with estimated coefficients of -0.50 ($p < .05$, 95% CI = -0.96 , -0.05) for the married but separated men and -0.77 ($p < .001$,

95% CI = -1.13 , -0.47) for cohabitating men, indicating that unmarried male migrants are more likely to use condoms.

When the control variables "age," "migration duration," "education," and "monthly income" are included in Model 6, the estimated coefficients of relevant knowledge about condom use frequency remain almost unchanged, with estimated coefficients of 0.13 ($p < .001$, 95% CI = 0.07, 0.17) and 0.23 ($p < .01$, 95% CI = 0.08, 0.41). This is also true of "same-sex sexual behaviors" with an estimated coefficient of 0.79 ($p < .05$, 95% CI = 0.09, 1.30) and of "marital status" with estimated coefficients of -0.47 ($p < .1$, 95% CI = -0.96 , -0.03) for married but separated men and -0.70 ($p < .001$, 95% CI = -1.12 , -0.42) for cohabitating men. The newly included control variable "age" has a negative impact on condom use frequency, with an estimated coefficient of -0.74 ($p < .001$, 95% CI = -1.01 , -0.38), meaning that younger male migrants (aged 28-34 years) use condoms more frequently than the older. When included, the last control variable "migration duration" has a positive impact on condom use frequency with an estimated coefficient of 0.02 ($p < .05$, 95% CI = 0.003, 0.04), indicating that the longer this duration, the more frequent is condom use.

When the independent and control variables are integrated step by step into the regression models, the value

Table 2. Impact of Attitudes on Same-Sex Sexual Behaviors

Dependent variable (if having sexual behaviors with men, reference: no)	Model 1			Model 2			Model 3		
	Estimate	95% CI		Estimate	95% CI		Estimate	95% CI	
Independent Variables		Lower	Upper		Lower	Upper		Lower	Upper
Attitude toward same-sex sexual behaviors	1.59***	1.26	1.98	1.58***	1.26	1.98	1.54**	1.25	2.02
Attitude toward being single for life	1.35**	1.04	1.63	1.27*	0.96	1.53	1.23	0.96	1.58
Control variables									
Marital status (Reference: Unmarried)									
Married but separated				0.44+	0.17	1.09	0.60	0.21	1.56
Cohabiting				0.37**	0.20	0.68	0.49*	0.24	0.97
Age (Reference: 28-35 years)									
Above 35							1.34	0.64	2.62
Migration duration							0.97	0.93	1.01
Education (Reference: Primary school and below)									
High school and above							0.51 ⁺	0.43	1.08
Monthly income (Reference: Less than 1,000 Yuan)									
1,000 Yuan and above							0.87	0.73	1.55
2 Log likelihood		374.49***			364.94***			326.00***	
Cox and Snell R ²		.028			.038			.04	
Nagelkerke R ²		.080			.109			.12	

Note. CI = confidence interval.

⁺ $p < .1$. * $p < .05$. ** $p < .01$. *** $p < .001$.

of Cox and Snell R^2 and Nagelkerke R^2 become higher with .049 and .052, respectively, for Model 4, .082 and .088 for Model 5, and .105 and .112 for Model 6, indicating an increase in the explanatory power of the models; however, it remains at a relatively low level.

Discussion and Conclusions

Same-Sex Sexual Behaviors and the Male Marriage-Squeeze

These results give evidence of a greater prevalence of same-sex sexual behaviors among unmarried male migrants; as stated above, their prevalence rate reaches 11.0%, which is twice the level reported by married men who have migrated without their spouse or partner (5.1%) and thrice that of men who have migrated with their spouse or partner (3.8%). The prevalence of same-sex sexual behaviors among migrants in our survey is rather consistent with levels observed among other population groups in China. For instance, Pan's study among male college students suggests that 4.2% of them had both same-sex sexual orientation and same-sex sexual behaviors,

about 4.0% reported having same-sex sexual orientations but no same-sex sexual contacts, and 12.6% had only same-sex sexual contacts (Pan & Yang, 2004; Pan & Zeng, 2000). Liu and Lu's study indicates a lower prevalence of same-sex sexual behaviors, with about 0.5% of urban married males, 2.3% of rural married males, and 7.5% of male college students having had same-sex sexual experiences (Liu & Lu, 2005). However, the prevalence of same-sex sexual behaviors in the present study is much lower than that in our previous survey conducted among rural residents in rural Anhui in 2008, where it reached 17.1% among unmarried men and 8.9% among the married (Yang et al., 2012). A possible explanation could be that male migrants, who now live in urban areas, have access to more diverse ways of meeting their sexual needs than rural residents, namely, paid sex with prostitutes or casual sex (S. J. Chen, Dai, Li, & Ji, 2008; X. Y. Lin, Fang, Lin, Li, & Su, 2006), which should result in a lower frequency of same-sex sexual behaviors.

The above comparison on the prevalence of same-sex sexual behaviors by marital status suggests that the female shortage in China's adult population could to some extent be a factor favoring same-sex sexual behaviors among

Table 3. Impacts of Knowledge on Condom Use Frequency

Dependent variable (Frequency of condom use with partners whatever the sex)	Model 4			Model 5			Model 6		
	95% CI			95% CI			95% CI		
	Estimate	Lower	Upper	Estimate	Lower	Upper	Estimate	Lower	Upper
Independent variables									
Knowledge of AIDS	0.12***	0.06	0.17	0.11***	0.06	0.16	0.13***	0.07	0.17
Knowledge of STIs	0.22**	0.07	0.39	0.26**	0.10	0.43	0.23**	0.08	0.41
Control variables									
Ever had sexual behaviors with men (Reference: No) Yes				0.83**	0.19	1.22	0.79*	0.09	1.30
Marital status (Reference: Unmarried)									
Married but separated				-0.50*	-0.96	-0.05	-0.47 ⁺	-0.96	-0.03
Cohabiting				-0.77***	-1.13	-0.47	-0.70***	-1.12	-0.42
Age (Reference: 28-35 years)									
Above 35							-0.74***	-1.01	-0.38
Migrating duration							0.02*	0.003	0.04
Education (Reference: Primary school and below)									
High school and above							-0.05	-0.23	0.20
Monthly income (Reference: Less than 1,000 Yuan)									
1,000 Yuan and above							-0.13	-0.20	0.13
2 Log likelihood	1316.81***			1637.88***			2072.66***		
Cox and Snell R ²	.049			.082			.105		
Nagelkerke R ²	.052			.088			.112		

Note. CI = confidence interval.

+ $p < .1$. * $p < .05$. ** $p < .01$. *** $p < .001$.

male bachelors in rural areas and among migrants in urban areas as well. This phenomenon has also been noted in other cultures and societies. For example, there was an increase in male same-sex sexual behaviors due to sex imbalance in northeast Siberia and during the Ming and Qing dynasties in China following the banning of prostitution (Y. H. Li, 1998). Actually, the female deficit in the marriage market may lead to an increase in openly expressed same-sex sexuality, as a proportion of males will no longer be forced to stay within heterosexual marriage.

Our results also indicate that the likelihood of experiencing same-sex sexual behaviors is strongly associated with a tolerant attitude toward such behaviors, which is consistent with other more general behavioral studies (Penner, 1986). Moreover, our survey indicates that there is a greater acceptance of singlehood among the unmarried male migrants than the others. The impact of this higher acceptance of singlehood on the likelihood of same-sex sexual behaviors is confirmed by the regression analysis but is mainly adjusted by marital status, suggesting that their more tolerant attitude could be influenced by their singlehood.

However, it is worth mentioning that, since same-sex sexuality remains highly stigmatized in today's China, societal tolerance over such behaviors is low (X. Y. Chen, 2008; Y. H. Li, 1998; Liu & Lu, 2005; You & Xu, 2002). As a consequence, most of the available data among ordinary Chinese people reveals that the prevalence of same-sex sexual behaviors is higher among married people (which is different from the findings in this present study), indicating that most of the people with same-sex sexual orientation are however still forced to heterosexual marriage: they get married but continue to practice their same-sex sexuality in a clandestine manner (Y. H. Li, 1998; Liu & Lu, 2005). This is also different from the situation in Western societies, where higher percentages of same-sex sexual behaviors are observed among unmarried people (Chiang, 2009). In such a context in China, we therefore may conclude that among unmarried marriage-squeezed male migrants who are short of stable female sexual partners, there might be a possibility of an increase in male same-sex sexual behaviors. At the same time, considering the prevailing universal marriage system in China and in the absence of a legitimate female partner within marriage, a possibility is that some of the

bachelors may try to find—or will express more openly—alternative sexual behaviors, among them same-sex sexuality.

Same-Sex Sexual Behaviors and Condom Use Frequency

Another result evidenced by our survey is that the frequency of condom use with partners whatever the sex is higher among the unmarried migrants than among those who have migrated either with their spouse or partner or not. However, male migrants are far from systematically using condoms (with an average frequency of condom use with partners whatever the sex being between “seldom” and “occasionally”). This indicates their high level of exposure to HIV and STIs, regardless of marital status. But it also appears that for migrants who are cohabitating with a spouse or a partner, condom use is more likely to be viewed as a birth control method, whereas for the unmarried and those who have migrated without their spouse or partner, it is actually used as a protective method against HIV and STIs.

Scores on knowledge about HIV/AIDS do not differ significantly between unmarried and married male migrants (including married but separated and cohabitating men), whereas those on knowledge of STIs are significantly lower among unmarried than married male migrants (including married but separated and cohabitating men). A possible explanation is the vigorous promotion by the Chinese government of information, education, and communication (IEC) on HIV/AIDS targeting various population groups including rural–urban migrants since the 1990s, which might have increased knowledge about HIV/AIDS among migrants regardless of their marital status (Kaufman & Jing, 2002; Wang, 2004). Actually, the regression analysis indicates that the frequency of condom use is significantly correlated with knowledge about HIV/AIDS and STIs, which is consistent with the existing literature (De Wit et al., 2000; D. H. Lin et al., 2010; Mansergh et al., 2006; Matteson, 1997; Morin et al., 2005; Zeng et al., 2008).

Whatever the marital status, having experienced same-sex sexual behaviors is significantly and positively correlated with the frequency of condom use, male migrants having experienced same-sex sexual behavior using condoms more frequently. As stated above, however, the lower knowledge about HIV/AIDS and STIs among unmarried migrants and the low frequency of condom use in the total sample both suggest a high frequency of unprotected and overall high-risk sexual behaviors among migrants.

It is also observed that, whatever the age group and marital status, male migrants with a longer migrating duration use condoms more frequently than the others. A possible explanation could be that this longer duration

implies an increased potential exposure to STIs, which may result in a higher frequency of condom use for reducing risk. It could also be a consequence of the greater knowledge of the risks induced by STIs obtained from the IEC campaigns by China’s government targeting rural–urban migrants.

Therefore, another conclusion is that most unmarried male migrants have unprotected same-sex sexual behaviors and that these risky sexual behaviors appear to be strongly associated with the lack of knowledge about HIV/AIDS and STIs.

Implications for Public Health

Male unprotected same-sex sexual behaviors are a significant cause of HIV transmission (De Wit et al., 2000; Mansergh et al., 2006; Morin et al., 2005; Murphy et al., 2004). As a consequence, a possible increase in the prevalence of same-sex sexual behaviors combined with the high frequency of unprotected sexual behaviors among unmarried male migrants in China has potential negative impacts on men’s health, and even on public health. Considering that the total number of marriage-squeezed male bachelors is more than 30 million and will continue to increase in the coming decades, risks resulting from the high prevalence of unprotected same-sex sexual behaviors among male migrants deserve attention. As our study suggests that condom use frequency is strongly associated with the level of relevant knowledge, countermeasures such as education and free supply of booklets and condoms to unmarried male migrants should be undertaken to prevent HIV and STIs transmission among migrants and hence reduce the occurrence of unprotected sexual behaviors.

Limitations

Although this study provides interesting information on the possible impact of the male marriage-squeeze on male migrants and their health, it has some limitations. What could be seen as a limitation in methodology concerns the rather low explanatory power of the models, with pseudo- R^2 such as Cox and Snell R^2 and Nagelkerke R^2 reaching only low values. However, some studies indicate that even if R^2 or pseudo- R^2 have very low values, their explanatory power is acceptable when the regression model is built at the individual level (the low values being the result of the high level of variation among individual cases). Therefore, even if R^2 or pseudo- R^2 is low, significant relationships can be evidenced (Colton & Bower, 2002; Guo, 2003). Nevertheless, limitations about this present study are given below.

A first limitation concerns possible selection bias. Actually, men who migrate from rural to urban areas in

order to find employment opportunities are comparatively young and in good health, whereas older men and those who are disabled or ill do not migrate. Furthermore, due to the difficulties in locating and reaching migrants, we used the convenience sampling method to conduct the survey rather than a probability sampling method. Both may lead to a systematic bias on sampling and results.

A second limitation is about the measures adopted in this article. The likelihood of same-sex sexual behaviors in the survey is based on an experience of same-sex sexual behavior not limited in time ("at least once in life"). Such a measure in an open time frame may be somewhat biased as respondents' own perception may have been altered over time. Additionally, the various same-sex sexual practices were not detailed, but in fact, anal sex is considered as more risky than the others.

A third limitation is inherent to the self-reporting method adopted for the survey and to its cross-sectional nature: Self-reporting may to some extent alter the reliability of the responses, whereas cross-sectional data do not always prove effective in describing the causal relationship between dependent and independent variables.

Finally, an obvious limitation is related to the small sample size, due both to the difficulty of collecting data on the sensitive issue of sexuality and to a large amount of missing data, as only 5.6% of the total sample have reported same-sex sexual behaviors and 95.4% of the sample on frequency of condom use when having sex with a male partner are missing. The small size of the valid sample may produce some instability in the results.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work is jointly supported by grants from the INED (French National Institute for Demographic Studies; Grant No. 2010-CV-0044); the Programs for Changjiang Scholars and Innovative Research Team in Universities of the Ministry of Education of China (Grant No. IRT0855); and the 985-3 Project of Xi'an Jiaotong University.

Notes

1. Informal labor markets are outdoor places where migrants gather and wait for employment opportunities and where employers look for workers.
2. In such cases, a kind of exit survey was conducted: when a participant decided to withdraw from the survey, the interviewer was required to ask for the reasons and write them down.

3. We deleted two items from the original STIs scale for improving the Cronbach's alpha from .48 to .65.

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