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ORIGINAL RESEARCH

Potential HIV transmission risk among spouses: marriage intention and expected extramarital male-to-male sex among single men who have sex with men in Hunan, China

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ABSTRACT

Objective The HIV epidemic in China is shifting from the high-risk groups of men who have sex with men (MSM), injection drug users and sex workers to the general population, and sexual contact among spouses is assumed to be one route of transmission. Our objective was to determine the intention to marry and the expected extramarital male-to-male sex among single Chinese MSM, in order to estimate the potential HIV transmission risk among MSM living with HIV and their female spouses.

Methods We conducted a web-based, cross-sectional survey between May 2016 and May 2017. A questionnaire covering sociodemographic characteristics, sexual behaviours, HIV-related and homosexuality-related stigma, marriage intention, and expected extramarital sexual behaviours was completed by 556 single MSM in Hunan, China. Descriptive statistics, χ^2 test, two-sample t-test and multivariate logistic regression analysis were performed.

Results Currently 48.9% of the participants intended to marry a woman in their lifetime, and 91% of them reported that they would continue to have sex with men after getting married. Those who were living with parents (OR=2.26), self-identified as bisexual (OR=2.57), had at least one heterosexual partner in the previous 6 months (OR=0.33) and perceived a higher level of self-homosexual stigma (OR=1.78) had greater intention to marry a woman.

Conclusion Nearly half of Chinese MSM intend to marry women, which has significantly dropped from the estimated percentage more than 10 years ago for Chinese MSM. However, the expectation of extramarital homosexual behaviours was common in these men. Sexual and gender minority stresses especially from family members, homosexual identity assertiveness and related stigma were the main factors for marriage intention, which should be addressed in future studies and practices.

INTRODUCTION

According to the Chinese Centers for Disease Control (China CDC), one feature of the HIV epidemic in China is that the HIV-affected population is shifting from the high-risk groups of men

who have sex with men (MSM), injection drug users and sexual workers to the general population, and sexual contact between spouses is assumed to be one of the transmission routes.¹ It has also been reported that in China the HIV infection rate among spouses through sexual transmission was over 30%,² and that female patients with HIV were primarily infected from their male spouses.³

Another feature of Chinese HIV epidemic is that the proportion of HIV cases among MSM has increased in recent years. Statistics from China CDC have shown that the proportion of MSM among new annual HIV infections has risen from 2.5% in 2006 to 25.5% in 2017.⁴ Risk factors include high frequency of unprotected anal sex,⁵ multiple sexual partners⁶ and confined sexual networks.⁷ Studies have shown that approximately 64% of Chinese MSM reported that they have had sex with female partners in their lifetime.⁸ Behavioural evidence from a systematic review and meta-analysis suggested that 26.3% of Chinese MSM had sex with female partners in the previous 6 months and only 25.6% of them consistently used condoms.⁹

Thus, a big concern for HIV prevention in China is whether MSM living with HIV would potentially transmit HIV to their female spouses, since it is estimated that 90% of MSM would eventually marry a woman in their lifetime,¹⁰ due to the traditional Chinese culture¹⁰ and the illegality of homosexual marriage in China.¹¹ The Chinese traditional value of family, known as 'filial piety', is based on Confucianism's philosophy which emphasises the importance of getting married and giving birth to pass down the family name. Moreover, one study indicated that married MSM were more likely to engage in unprotected sexual practices with male partners than unmarried MSM,¹² which might increase the HIV risk for their female spouses. However, because of the hidden and vulnerable characteristics of these female spouses, there is less empirical evidence on the transmission risk between MSM living with HIV and their wives in China.

Similar to trends in the development of sexual culture globally, the acceptance of sexual and gender diversity has increased in China, especially among younger generations.¹³ A large survey conducted in seven universities in Beijing in 2015 showed that



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80% of college students could talk about sex-related and gender minority-related topics with others comfortably; 52% believed that homosexuality was normal; and 73% agreed that sexual and gender minority groups should be treated equally.¹⁴ A national survey on social attitudes towards sexual and gender minority groups in 2016 showed that approximately 70% of the general population did not have any prejudice against lesbian, gay, bisexual, transgender and intersex people, and nearly 85% were inclined to support legalisation of same-sex marriage.¹³ Therefore, Chinese MSM might increasingly encounter a comparatively more acceptable social environment, and it was assumed that an increasing number of young Chinese MSM might not get married to women in their lifetime. However, we do not know the current prevalence of marriage intention among young Chinese MSM.

Therefore, this study aimed to investigate the current intention to marry women among Chinese MSM and determine the specific characteristics of those who express greater intention to marry women. Expectations of extramarital sex with men after marriage were also explored. Results from this study can be used to develop empirically based public health strategies for reducing HIV transmission between MSM living with HIV and their female spouses.

METHODS

Study design and participants

We conducted a cross-sectional, web-based survey between May 2016 and May 2017 in Hunan Province, Central South China. Those who (1) were a single man, (2) were 18 years old or older, (3) self-reported having sex with men in the previous 6 months and (4) were living in Hunan Province during the last whole year were eligible for participation. Thus, men participating in this study could be homosexual, bisexual, transgender or cisgender.

MSM were invited to participate in the study when they came for HIV testing and counselling, or other activities, at 'Zuo An Cai Hong', a gay-friendly community-based organisation (CBO) which has been providing peer education, psychological counselling and HIV testing to MSM since 2009. Study posters were put up at the entrance of the CBO office as well as on their website and social media. Men who were interested could contact the research assistants for eligibility screening. In anticipation of conducting regression analyses with as many as 25 predictors, we determined that the optimal sample size was 15–20 respondents per predictor to ensure sufficient statistical power.¹⁵ A total of 556 eligible MSM were ultimately recruited, allowing for a 10%–15% rate of missing data due to the sensitivity of the survey topics.

Data collection

After screening, a research assistant obtained oral informed consent. Eligible MSM were invited to voluntarily and anonymously complete the questionnaire by scanning a QR code (quick response code) on their smart phones or using an iPad in the CBO office to log in to the online platform called 'sojump' (<http://www.sojump.com>). An additional informed consent appeared again on the first page. Only when participants clicked the 'Agree' button could they complete the questionnaire. Each participant could only use one IP (internet protocol) address to access the online survey, and the submission time was required to be at least 10 min to ensure that questions were carefully read and answered. To guarantee confidentiality, only researchers had access to the raw data, which were stored on a password-protected offline computer. Each participant received a free

HIV test and a gift valued at ¥50 (US\$7.5) after successfully completing the questionnaire.

Measures

Sociodemographic characteristics

Information including age, residence, education, employment status, religion, monthly income, sexual identity, counselling-seeking behaviour, attitude towards homosexuality and MSM disclosure status was collected from all participants.

Sexual behaviours

Items measuring sexual practices were adapted from a previous cross-sectional study among MSM in Changsha, the capital city of Hunan Province.¹⁶ Data on sexual practices included having regular male and/or female partners, as well as oral sex, anal sex, vaginal sex, commercial sex, occasional sex and group sex and condom use frequency with both male and female partners. All questions focused on the previous 6 months to minimise recall bias.

HIV-related and homosexuality-related stigma

Stigma was measured using the HIV and Homosexuality Related Stigma Scale,¹⁷ which covered three domains: public homosexual stigma (10 items), self-homosexual stigma (8 items) and public HIV stigma (7 items). Items were scored using a 4-point Likert scale that ranged from 1 (strongly disagree) to 4 (strongly agree). The Chinese version of this scale was brief and appropriate for this population, with acceptable reliability and validity; Cronbach's alphas in the original study were 0.85, 0.78 and 0.79 for each subscale.¹⁷ In this study, the Cronbach's alphas were 0.90, 0.90 and 0.94, respectively.

Outcome

The primary outcome was marriage intention, which was measured by one question: 'Will you get married to a woman in the future?' with possible answers of 'Yes' or 'No'. The reasons to get married were explored by one multiple-choice question: 'What are the reasons that you will get married?' Choices were selected based on previous studies.^{19 14–16} The expectation of sex with men after getting married was explored by one question: 'If you were married, would you still have sex with a male partner?' with possible answers of 'Yes' or 'No'.

Statistical analysis

Data collected by the online questionnaire system were directly imported into SPSS V.20.0. Descriptive statistics were computed, including mean, SD, frequencies and percentages. χ^2 tests and two-sample t-tests were used to examine the differences between MSM who intended or do not intended to get married. A multivariate logistic regression analysis was performed to determine the factors associated with marriage intention. To address the risk of multicollinearity, we chose to use backward stepwise procedures with a log-likelihood ratio test.¹⁸ A p value (two-sided) of 0.05 or lower was the criteria for statistical significance. Adjusted ORs were calculated and presented with 95% CIs.

RESULTS

Sample characteristics

The average age of the participants was 25.8 years old, ranging from 18 to 46 years. The majority resided in an urban area (93.5%), had a bachelor's degree or above (64.2%) and had no religious belief (89.6%). Nearly half of them were living with parents (49.5%). Most participants self-identified as homosexual

Table 1 Descriptive statistics and χ^2 tests of sociodemographic characteristics for participants with and without marriage intention

Participant characteristics	n (%)	Without marriage intention, n (%)	With marriage intention, n (%)	P value
Age (years)				0.68
<22	100 (18.0)	55 (19.4)	45 (16.5)	
22–30	413 (74.3)	205 (72.2)	208 (76.5)	
31–40	40 (7.2)	22 (7.7)	18 (6.6)	
>40	3 (0.5)	2 (0.7)	1 (0.4)	
Residence (place)				0.00*
Urban area	520 (93.5)	275 (96.8)	245 (90.1)	
Rural area	36 (6.5)	9 (3.2)	27 (9.9)	
Living status				0.00*
Living alone	275 (49.5)	156 (54.9)	119 (43.8)	
Living with parents	103 (18.5)	32 (11.3)	71 (26.1)	
Living with gay friends	63 (11.3)	33 (11.6)	30 (11.0)	
Living with others	115 (20.7)	63 (22.2)	52 (19.1)	
Religious background				0.00*
Yes	58 (10.4)	19 (6.7)	39 (14.3)	
No	498 (89.6)	265 (93.3)	233 (85.7)	
Education				0.00*
Junior high school and below	13 (2.3)	6 (2.1)	7 (2.6)	
Senior high school	186 (33.5)	117 (41.2)	69 (25.4)	
Undergraduate or above	357 (64.2)	161 (56.7)	196 (72.0)	
Employment				0.22
Unemployed	122 (21.9)	65 (22.9)	57 (21.0)	
Short-term	35 (6.3)	13 (4.6)	22 (8.1)	
Long-term	399 (71.8)	206 (72.5)	193 (70.9)	
Monthly income (¥)				0.04*
<2000 (US\$300)	122 (21.9)	59 (20.8)	63 (23.2)	
2000–6000 (US\$300–US\$900)	370 (66.5)	201 (70.8)	169 (62.1)	
>6000 (>US\$900)	64 (11.6)	24 (8.4)	40 (14.7)	
Sexual identity				0.00*
Homosexual	458 (82.4)	253 (89.1)	205 (75.4)	
Bisexual	48 (8.6)	10 (3.5)	38 (14.0)	
Heterosexual	8 (1.4)	3 (1.1)	5 (1.8)	
Unclear	42 (7.6)	18 (6.3)	24 (8.8)	
Sought counselling				0.05
Yes	417 (75.0)	203 (71.5)	214 (78.7)	
No	139 (25.0)	81 (28.5)	58 (21.3)	
Attitude towards homosexuality				0.29
Yes	508 (91.4)	256 (90.1)	252 (92.6)	
No	48 (8.6)	28 (9.9)	20 (7.4)	
Disclosed MSM status				0.64
Yes	199 (35.8)	99 (34.9)	100 (36.8)	
No	357 (64.2)	185 (65.1)	172 (63.2)	

*P<0.05.

MSM, men who have sex with men.

(81.4%), while 8.6% identified as bisexual and 7.6% reported an unclear sexual orientation. Most participants (75%) had sought counselling services or peer support related to their sexual orientation. Just over half (52.3%) realised their sexual orientation before they were 18 years old, and 95.8% realised it before they were 22 years old (Chinese men can get married when they are at least 22 years old according to the marriage law in China¹⁹). These and other characteristics are shown in [table 1](#).

Sexual behaviours

In terms of sexual practice, 41.5% had regular male sexual partners and 49.3% reported male-to-male sexual behaviours during the last 6 months, and among them 70.5% had anal sex, 60.6%

had oral sex, 41.5% had occasional sex (one-night stand), 4% had commercial sex and 4.7% had group sex. The proportion of consistent condom use reported for each of the above types of sexual behaviour was 63.0%, 2.0%, 72.3%, 86.4% and 84.6%, respectively. Nearly 15% of the participants reported having female partners and 6% had male-to-female sex during the past 6 months, and among them only 41.2% reported consistently using condoms during sex ([table 2](#)).

HIV-related and homosexuality-related stigma

Participants perceived the highest level of homosexual stigma from the public (2.73 ± 0.55), followed by internal stigma

Table 2 Descriptive statistics and χ^2 tests of sexual behaviours for participants with and without marriage intention

Sexual behaviours	n (%)	Without marriage intention, n (%)	With marriage intention, n (%)	P value
Regular male partner				0.49
Yes	231 (41.5)	114 (4.1)	117 (43.0)	
No	325 (58.5)	170 (59.9)	155 (57.0)	
Sex with a male partner in the past 6 months				0.00*
Yes	274 (49.3)	117 (41.2)	157 (57.7)	
No	282 (5.7)	167 (58.8)	115 (42.3)	
Anal sex				0.25
Yes	392 (7.5)	194 (68.3)	198 (72.8)	
No	164 (29.5)	90 (31.7)	74 (27.2)	
Oral sex				0.01*
Yes	337 (6.6)	158 (55.6)	179 (65.8)	
No	219 (39.4)	126 (44.4)	93 (34.2)	
Occasional sex				0.09
Yes	231 (41.5)	108 (38.0)	123 (45.2)	
No	325 (58.5)	176 (62.0)	149 (54.8)	
Commercial sex				0.92
Yes	22 (4)	11 (3.9)	11 (4)	
No	534 (96)	273 (96.1)	261 (96)	
Group intercourse				0.91
Yes	26 (4.7)	13 (4.6)	13 (4.8)	
No	530 (95.3)	271 (95.4)	259 (95.2)	
Regular female partner				0.00*
Yes	82 (14.7)	29 (1.2)	53 (19.5)	
No	474 (85.3)	255 (89.8)	219 (8.5)	

*P<0.05.

(2.31±0.62). HIV stigma from the public received the lowest score (1.82±0.65) (table 3).

Marriage intention

Nearly half of participants (48.9%) reported that they intended to marry a woman, but only 9.0% of them reported that they would not engage in extramarital homosexual behaviour. The main reported reasons to get married included pressure from family (74.2%) and society (56.6%), desire to have their own children (63%), intention to conceal sexual orientation (26.3%), and bisexuality or unclear sexual orientation (13.7%).

Regression

Multivariate logistic regression results are shown in table 4. Those participants who were living with parents (OR=2.26, 95% CI 1.36 to 3.74, p<0.01), were bisexual (OR=2.57, 95% CI 1.19 to 5.54, p<0.05), had heterosexual partners in the previous 6 months

Table 4 Multivariate logistic regression results of the independent and dependent variables

Variables	B	SE	P value	OR	95% CI	
					Lower	Upper
Living status						
Alone (reference)			0.01			
Parents (1)	0.81	0.26	0.00**	2.26	1.36	3.74
Gay friends (2)	0.27	0.30	0.37	1.31	0.73	2.35
Others (3)	0.00	0.24	0.99	1.00	0.63	1.60
Sexual orientation						
Homosexual (reference)			0.11			
Bisexual (1)	0.95	0.40	0.02*	2.57	1.19	5.54
Heterosexual (2)	−0.05	0.80	0.95	0.95	0.20	4.58
Unclear (3)	0.24	0.36	0.50	1.28	0.63	2.58
Heterosexual partner in the previous 6 months	−1.12	0.48	0.02*	0.33	0.13	0.84
Self-homosexual stigma	0.58	0.17	0.00**	1.78	1.29	2.47
Constant	0.58	1.18	0.63	1.78		

The probability for stepwise: entry: 0.10, removal: 0.15.

*P<0.05, **p<0.01.

(OR=0.33, 95% CI 0.13 to 0.84, p<0.05) and perceived greater homosexual self-stigma (OR=1.78, 95% CI 1.29 to 2.47, p<0.05) were found to have a greater intention to marry.

DISCUSSION

Current marriage intention of MSM

This study revealed that 48.9% of single MSM participants intended to marry women, which is significantly lower than the 90% estimated more than 10 years ago for Chinese MSM.¹⁰ This was consistent with our previous hypothesis that more MSM would remain single or live with a homosexual partner since attitudes towards sexuality and gender diversity have become more tolerant in China.¹³ However, still nearly half of MSM intended to get married during their lifetime. According to their own stated reasons, pressure from family and desire for a blood-related child were the main reasons to get married. Similarly, our logistic regression analysis showed that compared with those MSM living alone, living with parents, which might mean experiencing greater pressure, was associated with greater marriage intention. These results were in line with a qualitative study in Beijing which reported that MSM often struggled with the persistence of traditional 'filial piety' and worried that not getting married would bring shame and disappointment to their parents.²⁰

Perceived extramarital homosexual behaviours of MSM

Surprisingly, around 91% of MSM who were intending to get married stated that they might continue to engage in male-to-male sexual practices after getting married, which could potentially increase the likelihood of HIV transmission between

Table 3 Descriptive statistics and two-sample t-test of HIV-related and homosexuality-related stigma for participants with and without marriage intention

Dimensions	M±SD	Without marriage intention	With marriage intention	t	P value
HIV-related and homosexuality-related stigma					
Public homosexual stigma	2.73±0.55	2.65±0.52	2.82±0.56	-3.82	0.00*
Self-homosexual stigma	2.31±0.62	2.16±0.58	2.47±0.61	-6.06	0.00*
Public HIV stigma	1.82±0.65	1.71±0.66	1.95±0.62	-4.48	0.00*

*P<0.05.

spouses, since most of these couples would also likely have children in order to pass down their family names. Moreover, consistent with prior studies,²¹ our study also indicated that men who have sex with both men and women engaged in more unprotected sexual behaviours than men who have sex only with men (consistent condom usage rate in these groups was 41.2% vs 63% in this study). In addition, most married MSM do not disclose their sexual orientation to their spouses.²² Thus, concealment of sexual orientation could result in significant sexual and gender minority stress, which has been associated with HIV-related high-risk behaviours.²³

Characteristics of MSM with greater marriage intention

It may be expected that bisexual men would have greater intentions to marry women due to their sexual attraction to women. As for homosexual men, those who were experiencing higher sexual and gender minority stress, such as receiving pressure from parents to get married and give birth to children, as well as self-homosexuality stigma might also be expected to show a greater intention to marry women. Generally, Chinese MSM experience high levels of sexual and gender minority stress. Our study indicated that the average score of internalised homophobia among our participants was significantly higher than the average scores seen in studies outside of China.^{24,25} Those men with internalised homophobia might believe that homosexuality is ethically wrong or psychologically abnormal, that homosexual behaviours are shameful, or that gay relationships are more likely to be unsuccessful.²⁶ Thus, getting married may seem to be the only way to relieve this sexual and gender minority stress.

Regarding sociodemographic characteristics, some significant differences were found. First, MSM who resided in rural areas had a greater intention to marry. This might indicate that people living in rural areas were more conservative in relation to homosexual orientation and had higher homosexuality-related and HIV-related stigma.²⁷ Second, those MSM with bachelor's degrees or above and those with higher income were more likely to get married. This might suggest that higher social economic status usually goes with higher social expectations to get married, and those men might find it easier to maintain a marriage since they could provide better financial support for their wives, especially for economically vulnerable women.²⁸ Third, in the present study, 52.3% of the participants realised their sexual orientation before 18 years old and 95.8% before 22. In China, the legal age of marriage for a man is 22 years old or older.¹⁹ Therefore, if these results are representative, they suggest that the majority of married MSM realised their sexual orientation before getting married. Thus, interventions focused on reducing the risk of HIV transmission between MSM and their wives, including interventions focused on safe sexual behaviours, should most likely be integrated into the college curriculum in China.

Interestingly, those MSM who have had sex with a female partner in the past 6 months had lower intentions to marry a woman. One explanation for this result might be that the experience for MSM of having sex with women may be regarded as an attempt to determine how compatible they are with women,²⁹ which might help them to determine whether they could handle this type of relationship; thus, the experience of having sex with a woman might prevent a difficult homosexual-heterosexual marriage.

Limitations

The present study has several limitations. First, participants were not representative of MSM in China, and likely not

representative of MSM in Hunan, due to recruitment biases. Second, the answers related to outcome variables only included binary yes/no choices, which might lead to a potential misclassification bias. Further studies should consider including a 'Don't know' response for the outcome and/or allowing respondents to rate their agreement/disagreement with these statements. Moreover, this study explored the intention to marry women, but did not differentiate whether participants would prefer to marry heterosexual or homosexual women, the latter known as a 'marriage of convenience' (a marriage contracted for reasons other than the relationship, family or love).³⁰ More research is needed to examine the proportion of 'marriage of convenience' among MSM in China.

CONCLUSION

Currently nearly half of Chinese MSM intend to marry women, which has significantly dropped from the 90% estimated more than 10 years ago. However, the expectation of extramarital homosexual behaviours was common in these men. Sexual and gender minority stress, especially from family expectation, homosexual identity assertiveness and related stigma were the main factors associated with marriage intention, and these areas should be addressed in future studies and interventions in order to reduce the potential transmission risk between MSM living with HIV and their female spouses.

Key messages

- ▶ The HIV epidemic in China is shifting from high-risk groups to the general population through sexual transmission.
- ▶ Nearly half (48.9%) of men who have sex with men (MSM) participants intended to marry a woman, and 91% of them reported that they would practise homosexual behaviours after getting married.
- ▶ Sexual minority stress is high among Chinese MSM and contributes to the HIV transmission risk between MSM living with HIV and their female spouses.

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Contributors WW conducted the literature review and data collection, and analysed and interpreted the data in this manuscript. XY designed the questionnaire and collected the data. XZ, YC and DH assisted in data collection and revised the manuscript. XL designed and supervised the study. LG assisted in study design and manuscript writing. All authors have read and approved the final version of the manuscript.

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