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Condom Use and Related Factors among Rural and Urban Men Who Have Sex With Men in Western China: Based on Information-Motivation-Behavioral Skills Model

Ling Hu[1,†], Yetao Luo[2,†], Xiaoni Zhong[1], Rongrong Lu[3], Yang Wang[1], Manoj Sharma[4,5], and Mengliang Ye[1,6]

Abstract

This study aimed to determine the differences in condom use and related factors among rural–urban men who have sex with men (MSM) in Western China. A cross-sectional survey was conducted in Chongqing, Sichuan, and Guangxi, which recruited MSM by non-probability sampling. Data were collected through an anonymous, standardized, and self-reported questionnaire guided by an information–motivation–behavioral skills model. Structural equation model was applied to analyze the related factors. Out of the 1141 MSM included in this analysis, 856 (75%) and 285 (25%) were from urban and rural areas, respectively. The median age was 27 years for both groups. Self-reported consistent condom use for anal sex in the past 6 months was 57.58%. The rate of consistent condom use was lower in rural MSM than in urban MSM (50.88% vs. 59.81%, $p = .008$). Behavioral skills, HIV/AIDS intervention services, and response costs had direct positive and negative influences on condom use, respectively. By contrast, motivation and information exhibited indirect influence. All the factors were mediated by behavioral skills in rural and urban MSM, except for the information that had no effect among urban MSM but had an indirect effect among rural MSM. These findings suggest that service providers should pay attention to substantial rural–urban differences and design different AIDS prevention and intervention strategies targeting rural and urban MSM.

Keywords

men who have sex with men (MSM), condom use, information–motivation–behavioral skills model (IMB), structural equation model (SEM), sexual behaviors, HIV/AIDS prevention

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[1]Department of Epidemiology and Health Statistics, School of Public Health and Management, Chongqing Medical University, Chongqing, China
[2]Clinical Epidemiology and Biostatistics Department, Children's Hospital of Chongqing Medical University, Ministry of Education Key Laboratory of Child Development and Disorders, National Clinical Research Center for Child Health and Disorders, Key Laboratory of Pediatrics in Chongqing, China International Science and Technology Cooperation Center of Child Development and Critical Disorders, Chongqing, China
[3]Chongqing Center for Disease Control and Prevention, Chongqing, China
[4]Department of Behavioral and Environmental Health, Jackson State University, Jackson, MS, USA
[5]School of Health Sciences, Walden University, Minneapolis, MN, USA
[6]The Innovation Center for Social Risk Governance in Health, Chongqing Medical University, Chongqing, China

[†]These authors contributed equally to this work and should be regarded as co-first authors.

Corresponding Author:
Mengliang Ye, Department of Epidemiology and Health Statistics, School of Public Health and Management, Chongqing Medical University, No. 1 Yixueyuan Road, Yuzhong District, Chongqing 400016, China.
Email: yemengliang@cqmu.edu.cn

HIV/AIDS is one of the most severe public health problems in the world, with approximately 31.1–43.9 million peoples living with HIV by 2017 (UNAIDS, 2018). Strikingly, sexual transmission between men is a common mode of spreading HIV. Men who have sex with men (MSM) are disproportionately suffering from high HIV infection. Specifically, MSM accounted for an estimated 57% of new HIV infections in Western and Central Europe and North America in 2017, 41% in Latin America, and 25% in Asia and the Pacific and the Caribbean (UNAIDS, 2018). In China, 850,000 people living with HIV were estimated reported by the end of September 2018 (National Health Commission of the People's Republic of China, 2018). Of the newly diagnosed cases in 2017, 25.5% were infected through male homosexual transmission (National Health Commission of the People's Republic of China, 2018). HIV prevalence among MSM increased from <2.0% in 2005 to 8.0% in 2015 nationally, which is higher than that in other populations (NHFPC, 2015). And some MSM have sex with females, even marry females, due to external pressures from their parents, traditional concepts, and social discrimination, which further exacerbates the risk of HIV being transmitted from high-risk groups to the general population (Feng et al., 2010; Shang & Zhang, 2015). HIV prevalence among MSM may be the greatest challenge in AIDS control (De Cock et al., 2012).

To control the AIDS epidemic among MSM, the Chinese government has carried out promotions and a combination of interventions in various forms such as publicity materials, health consultation, and new media (NHFPC, 2015; Sun et al., 2018; Tang et al., 2016). Promotion of using condoms is a vital measure in the combination of interventions, given that they are easy to use, affordable, and effective in preventing HIV (Lou et al., 2014; Musinguzi et al., 2015; Wang et al., 2018). However, the majority of Chinese MSM are not consistent with using condoms (Jin et al., 2013; Liu et al., 2012; Qin et al., 2016). This inconsistency may compromise the effectiveness of condom use within the high-risk population (Smith et al., 2015).

There are reasons to suspect that the rate of condomless anal sex is considerably higher among MSM in rural areas than in urban areas. For example, rural MSM often have low educational attainment and little access to condoms (Papo et al., 2011). Research on AIDS or AIDS prevention programs for MSM have been frequently conducted in cities but not in rural areas (Maleke et al., 2017; McKenney et al., 2018; Rosenberger et al., 2014). Rural MSM have less access to AIDS intervention services and less knowledge of AIDS and AIDS prevention practices (Colby et al., 2008). Rural MSM are likely to face more stigma and discrimination against homosexuality, receive less social support, and conceal their sexual orientation than urban MSM; these constraints may affect the sexual behaviors of rural MSM and their perception on condom use (Lyons et al., 2014; Philbin et al., 2018).

Little is understood on the differences of condom use between rural MSM and urban MSM. Out of the existing studies, one similar study has identified that substantial differences in condom use, sexual behaviors, and HIV knowledge were observed between urban and rural residents, and to design different AIDS intervention programs for residents in urban and rural areas were suggested (Folayan et al., 2015). However, further research on developing targeted interventions remains limited. Another study on African American men in Mississippi reported that although the level of HIV/AIDS knowledge and education was lower among urban than rural respondents, their attitude/feelings, behaviors, and potentials for behavioral change did not differ (Williams & Sallar, 2010). The results are contradictory, and they do not identify the differences in condom use between urban and rural MSM.

The information–motivation–behavioral skills model (IMB) proposed by Fisher is based on the assumption that information and motivation, the fundamental determinants of HIV preventive behavior or behavioral change, can indirectly affect preventive behavior through activating behavioral skills; and information and motivation may also have a direct effect on the preventive behavior when complicated or novel behavioral skills are unnecessary to effect prevention (Fisher & Fisher, 1992). IMB is a comprehensive, parsimonious, and well-specified theoretical model for AIDS-preventive behavior, and it has been widely applied to considerable research or interventions on sexual behaviors among college students (Fisher et al., 1996), sexual minority youth (Fisher, 2012), and truck drivers (Cornman et al., 2007). Apart from the facilitators of condom use, several factors like response costs may hinder the occurrence and maintenance of preventive behavior. Response costs, that is, barriers to the use of condoms, refer to the socioeconomic loses of individuals or the unfavorable consequences of using condoms (Rintamaki & Yang, 2014; Rogers, 1983). For example, using condoms wastes time and money. In addition, AIDS intervention services should have an impact on condom use. However, access and utilization of prevention services may differ between rural MSM and urban MSM (McKenney et al., 2018).

Therefore, AIDS intervention services and response costs were taken into account to create an extended version of the IMB model. Based on the extended IMB model, this study aimed to explore the differences in condom use and differences in condom use-related factors between rural and urban MSM in Western China. Moreover, this study aimed to assess the impact of AIDS intervention services and response costs on condom use and to give insight for targeted intervention programs.

Materials and Methods

Study Design and Sample

This study was a secondary analysis of a cross-sectional survey conducted in Western China (Chongqing, Sichuan, and Guangxi) to evaluate the attitudes toward the use of HIV pre-exposure prophylaxis among MSM. The detailed procedure of data collection has been published elsewhere (Zhang et al., 2013). Briefly, given that MSM are still sensitive and hard to reach in China (Shang & Zhang, 2015), non-probability sampling methods, including cooperating with non-government organizations (NGOs), publishing information on gay websites, and peer referral, were adopted to recruit people who meet inclusion criteria. From July 2009 to April 2010, a total of 1407 MSM were recruited. After giving informed consent, participants completed an anonymous, standardized, and self-reported questionnaire. Individuals were eligible for this analysis if (1) they are males; (2) are of age group ≥18 years and ≤65 years; (3) had sex with men in the past 6 months (P6M); and (4) scores of each constructs in the extended IMB model can be calculated. A total of 1141 valid questionnaires were included in this analysis.

Measures

Demographic Variables. Sociodemographic characteristics, including age (years), ethnicity (Han/Minority), educational level (junior high school or below/senior high school, technical secondary school/junior college or above), the type of census register (rural/urban), marital status (never married/ever married), and monthly income (≤1000/1001 to 3000/>3000), were collected.

Prevention Information. A total of 12 questions with "yes," "no," or "don't know" as answers were adapted from the brief HIV knowledge questionnaire (HIV-KQ-18; Carey & Schroder, 2002). These questions were utilized to assess the participants' knowledge on ways of HIV transmission (e.g., "coughing and sneezing do not spread HIV") and means of AIDS prevention (e.g., "showering or washing the genital area before and after sexual intercourse keeps a person from getting HIV"). Correct responses were scored as 1 point, whereas incorrect responses and "don't know" responses did not earn any points (Cronbach's $\alpha = 0.66$; range 0–12) (Table 1).

Prevention Motivation. Prevention motivation consists of social motivation (e.g., peers' perception about preventive behavior) and personal motivation to practice safe sex (e.g., perceived susceptibility to HIV infection, attitudes toward condom use,) (Bahrami & Zarani, 2015). Five Likert-type items, such as the perception of severity/vulnerability to HIV infection, were used to measure participants' prevention motivation. The answers ranged from 1 (completely disagree) to 5 (completely agree) points. Higher scores represented higher motivation (Cronbach's $\alpha = 0.66$; range 5–25) (Table 1).

Behavioral Skills. Behavioral skills refer to one's self-efficacy and ability to perform AIDS-preventive behavior effectively (Bahrami & Zarani, 2015; Fisher & Fisher, 1992; Fisher et al., 1994). The participants' behavioral skills were assessed through five Likert-type items with answers scored from 1 (complete disagree) to 5 (complete agree); these items were adapted from the condom use self-efficacy scale (CUSES; Brafford & Beck, 1991). The contents included refusing to have unsafe sex and persuading partners to use a condom (Cronbach's $\alpha = 0.71$; range 5–25) (Table 1).

Response Costs. Participants completed four items, which were adapted from previous studies to measure response costs (Li et al., 2004; Rintamaki & Yang, 2014; Zhang et al., 2015). These items regarding money or time loss and social costs had response options ranging from 1 (completely disagree) to 5 (completely agree) (Cronbach's $\alpha = 0.60$; range 4–20) (Table 1).

AIDS Intervention Services. The most common preventive intervention services in China are as follows: (1) health education: publicity, information materials, lectures, and other educational activities on AIDS; (2) peer education; (3) lubricant distribution; (4) condom distribution; (5) free HIV counseling services; and (6) free HIV testing. AIDS intervention services were measured by asking participants whether they received these AIDS services in P6M (Cronbach's $\alpha = 0.79$; range 0–6) (Table 1).

Condom Use. Preventive behavior was measured by asking participants how often they used a condom when they had anal sex/vaginal sex, and whether they used condoms completely (put the condom on before sexual intercourse and did not remove it until intercourse had ended) in P6M. The answers to the first question ranged from 1 (never) to 7 (always). Responding "7 (always)" was considered as consistent condom use while responding "1"–"6" was considered as inconsistent condom use. Not every MSM had vaginal sex in P6M; thus, the model analysis did not contain information on the frequency of condom use during vaginal sex (Cronbach's $\alpha = 0.79$; range 2–14) (Table 1).

The Extended IMB model

The original IMB model is presented in Figure 1 with a solid line. The current study added six paths to the model, as shown by the dotted lines in Figure 1. The first four

Table 1. Constructs of the Extended Information–Motivation–Behavioral Skills Model for Urban-Rural MSM.

Constructs	Items
Information	If I eat with HIV-infected people, I will be infected with AIDS.
	A person can get HIV by sharing an injection needle with someone who has HIV.
	All pregnant women infected with HIV will have babies born with AIDS.
	HIV can be spread by mosquitoes.
	Coughing and sneezing DO NOT spread HIV.
	Receiving blood transfusions and blood products may transmit HIV.
	Using surgical acupuncture and extraction equipment without strictly sterilized.
	Using condom correctly and consistently at each insertion is a way to avoid HIV infection.
	Showering or washing one's genitals/private parts, before and after sex keeps a person from getting HIV.
	Being with only one uninfected loyal partner can prevent HIV infection.
	Using disposable needles can prevent HIV.
	HIV can be prevented by regular use of anti-HIV drugs.
Motivation	Using condoms make me uncomfortable[a]
	I am very afraid of contracting HIV.
	I think the prevalence of HIV infection in the city/district/county I lived is very high.
	I think AIDS is a very serious disease.
	My partner prefers to use condoms during sex.
Behavioral skills	I could get condoms if I wanted to.
	I know how to use condom correctly.
	I will suggest using a condom if my partner does not propose condom use.
	I can persuade my partner to accept using a condom when he or she is unwilling to use condoms.
	I will refuse to have sex with my partner if he or she refuses to use condoms.
Response costs	If I insist on using condoms, my partner will be angry.
	If I insist on using condoms, my partner will think I have sexually transmitted disease.
	Few men use condoms.
	Not use condoms can save time and money.
AIDS intervention services	In the past 6 months, did you receive:
	Health education: publicity, information materials, lectures and other education activities on AIDS
	Peer education
	Free lubricant distribution
	Free condom distribution
	Free HIV counseling services
	Free HIV testing
Condom use	The frequency of condom use when you:
	had vaginal sex in the past 6 months
	had anal sex in the past 6 months
	Did you use condoms completely

[a]Item reverse scored.

paths were used to evaluate the effect of AIDS intervention services on condom use, and the latter two paths were used to estimate the impact of response costs.

Data Analysis

EpiData3.1 software (Epi Data Association, Odense, Denmark, version 3.1) was used for a double manual data entry procedure. Data cleaning and preliminary analysis were carried out by using Statistical Analysis Software, version 9.4. Qualitative data were expressed by rates, whereas quantitative skewed data were presented by median and interquartile range. The differences of each variable between groups were tested by the chi-square test or the Mann–Whitney U test. The associations between variables were estimated by Spearman correlation analysis. Logistic regression was used to investigate the associations between household registration (rural/urban) and the dependent variables (e.g., consistent condom use for anal sex). OR and 95% confidence intervals (CIs) were calculated and adjusted for background variables (i.e., age, ethnicity, educational level, marital status, and monthly income).

Model testing was done by using AMOS, version 17.0. The maximum likelihood method was used to estimate parameters. The model was considered to have a good

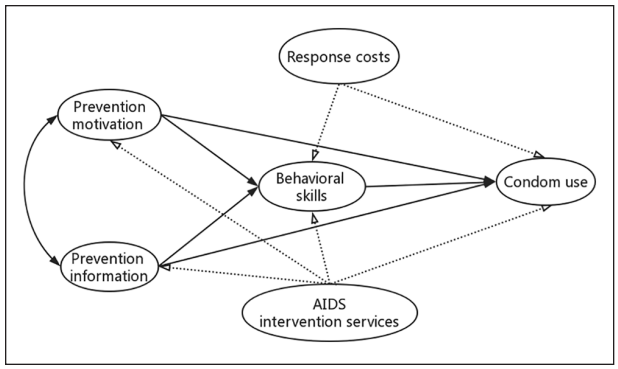

Figure 1. The Extended IMB Model in Present Study.

data fit if the ratio of chi-square to degrees of freedom <3.0, root mean square error of approximation (RMSEA) <0.06, goodness-of-fit index (GFI) ≥0.90, Tucker–Lewis index (TLI) ≥0.90, and confirmatory fit index (CFI) ≥0.90 (Hooper et al., 2008).

Multiple-group structural equation modeling (MSEM) was used to test whether the relationship among constructs in the extended model was invariant between rural MSM and urban MSM. Detailed procedures were as follows. First, the unconstrained model was compared with the constrained model by using the structural weight that is set equal between the two groups. If $p < .05$, the unconstrained model was preferred, and there were differences in the path coefficients of the extended IMB model for both groups. Second, the *t*-test was used to test the differences among the parameters. The *t* values >1.96 suggested significant differences existed between the two groups. Alpha = 0.05.

Results

Sociodemographic Characteristic

This survey included 1,141valid participants ($n = 856$, 75% urban MSM and $n = 285$, 25% rural MSM). Table 2 presents the sociodemographic characteristics of rural and urban participants in this study. The median age of both groups was 27 years. Most participants (81.68%) belonged to the Han group, but a larger percentage of urban MSM were Han compared with rural MSM ($p < .001$). Most participants (86.15%) were single, and over half (59.23%) of the total participants received senior high school/technical secondary school education. In addition, rural MSM had lower incomes ($p = .010$) and lower educational level ($p < .001$) compared with urban MSM.

Condom Use

The differences in condom use between rural MSM and urban MSM are displayed in Table 3. Only 57.58% MSM reported consistent condom use when they had anal sex in P6M. Rural MSM who reported using condoms consistently accounted for 50.88%, which was significantly lower than that in urban MSM (59.81%, $p = .008$). Approximately, 12.09% (138/1141) MSM reported engaging in vaginal sex in P6M, and only 31.88% (44/138) of them used condoms consistently. The proportion of rural

Table 2. Socio-demographic Characteristics Differences between Urban and Rural Participants.

Variables	Total (%)	Urban	Rural	*p* Value
N	1141	856	285	
Age (years)[a],*,M (P25, P75)	27 (24–34)	27 (24–32)	27 (25–34)	.209
Ethnicity[b], ***n* (%)**				
Han	932 (81.68)	730 (85.28)	202 (70.88)	<.001
Minority	209 (18.32)	126 (14.72)	83 (29.12)	
Educational level[a],*, ***n* (%)**				
Junior high school or below	135 (11.86)	52 (6.10)	83 (29.12)	<.001
Senior high school/ technical secondary school	674 (59.23)	509 (59.67)	165 (57.89)	
Junior college or above	329 (28.91)	292 (34.23)	37 (12.98)	
Marital status[b], ***n* (%)**				
Never married	983 (86.15)	751 (87.73)	232 (81.40)	.007
Ever married	158 (13.85)	105 (12.27)	53 (18.60)	
Monthly income (RMB)[a],*, ***n* (%)**				
≤1000	496 (43.51)	355 (41.52)	141 (49.47)	<.010
1001–3000	492 (43.16)	366 (42.81)	126 (44.21)	
>3000	152 (13.33)	134 (15.67)	18 (6.32)	

[a]Tested by the Mann–Whitney *U* test.
[b]Tested by the chi-square test.
Note. *Variables have missing data.

Table 3. Rural-Urban Differences in Condom Use Among MSM.

Items	Urban *n* (%)	Rural *n* (%)	*p* Value	OR (95% CI)	Adjusted *p* value[a]	Adjusted OR (95% CI)
Had vaginal sex in P6M	88 (10.28)	50 (17.54)	.001	1.86 (1.17, 2.71)	.022	1.70 (1.08, 2.67)
Consistent condom use for vaginal sex[b] in P6M	32 (36.36)	12 (24.00)	.134	1.81 (0.83, 3.95)	.094	2.16 (0.88, 5.32)
Consistent condom use for anal sex in P6M	512 (59.81)	145 (50.88)	.008	1.44 (1.10, 1.88)	.006	1.50 (1.12, 2.01)
Complete condom use in P6M	508 (59.35)	146 (51.23)	.016	1.39 (1.06, 1.82)	.099	1.28 (1.00, 1.71)

Note. P6M = the past 6 months.
[a]Adjusted for general demographics differences between urban and rural MSM; that is, age, ethnicity, educational level, marital status, and monthly income.
[b]138 MSM had sex with women.

Table 4. Descriptive Statistics, Tests of Group Differences and Spearman Correlations among Model Constructs.

Model Constructs	Urban M(P25,P75)	Rural M(P25,P75)	*p* Value	1	2	3	4	5
1. Information	11 (10–11)	10 (9–11)	<.001***	1				
2. Motivation	19 (17–22)	19 (16–21)	.037*	−0.13*	1			
3. Behavioral skills	21 (18–24)	21 (18–23)	.244	−0.17*	0.21*	1		
4. Interventions	5 (3–6)	5 (2–6)	.623	−0.16*	0.19*	0.22*	1	
5. Response costs	6 (5–8)	7 (5–8)	.029*	−0.46*	0.26*	0.19*	0.28*	1
6. Condom use	13 (9–14)	12 (9–14)	.072	−0.29*	0.20*	0.13*	0.11*	0.42*

Note. *$p < .05$; ***$p < .001$.

MSM with vaginal sex was higher than that of urban MSM (17.54% vs. 10.28%, $p = .001$). Only 57.32% (654/1141) MSM had complete condom use in P6M. A significantly higher percentage of rural MSM reported using condoms incompletely (48.77% vs. 40.65%, $p = .016$).

Correlation Analysis

The medians, interquartile range, tests of group differences, and the Spearman correlation coefficients among all constructs are presented in Table 4. Urban MSM had a significantly higher level of information ($p < .001$) and motivation ($p = .037$) compared with rural MSM. However, the score of response costs of rural MSM were higher than that of urban MSM ($p = .029$). There were no significant rural-urban differences for any other constructs.

A correlation among all constructs was observed ($p < .05$). Condom use was most highly correlated with behavioral skills, followed by correlation with the response costs. There was also a strong connection between behavioral skills and response costs.

Path Analysis

In the analysis, two paths with no statistical significance, that is, "prevention motivation → condom use" and "prevention information → condom use," were dropped. The final model (depicted in Figure 2) fit the observed data well, as assessed by χ^2/df ratio = 2.95, GFI = 0.95, CFI = 0.94, TLI = 0.93, RMSEA = 0.04 (95% CI: 0.04, 0.05).

In the model, three factors had significant direct effects on condom use, namely, behavioral skills ($\beta = 0.46$, $t = 7.140$, $p < .001$), response costs ($\beta = -0.14$, $t = -2.55$, $p = .026$), and AIDS intervention services ($\beta = 0.12$, $t = 3.485$, $p < .001$). Response costs and AIDS intervention services also exerted indirect impacts on condom use through behavioral skills.

But for information and motivation, there was only an indirect relationship with condom use. In summary, the total effect coefficients of AIDS intervention services, response costs, information, motivation, and behavioral skills on condom use were 0.20, −0.38, 0.05, 0.12, and 0.46, respectively. All variables accounted for 30% of MSM condom use.

MSEM Analysis

Model fit indices results, χ^2/df ratio = 2.24, GFI = 0.93, CFI = 0.92, TLI = 0.91, and RMSEA = 0.03 (95% CI 0.03, 0.04), indicated that the final model had a good fit with the data for both groups. Then structural weight was

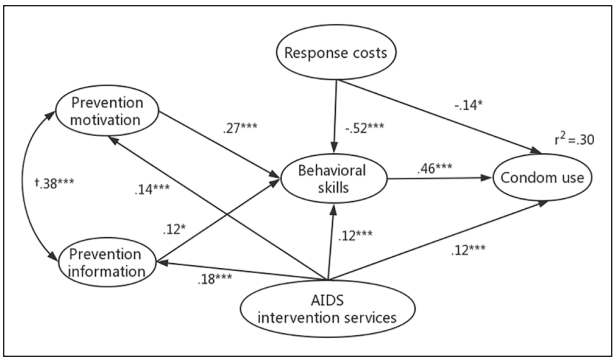

Figure 2. The Final Extended IMB Model and Its Standardized Path Coefficients Among MSM ($N = 1141$).
Note. *$p < .05$; ***$p < .001$; † is the correlation coefficient of residual of latent variables.

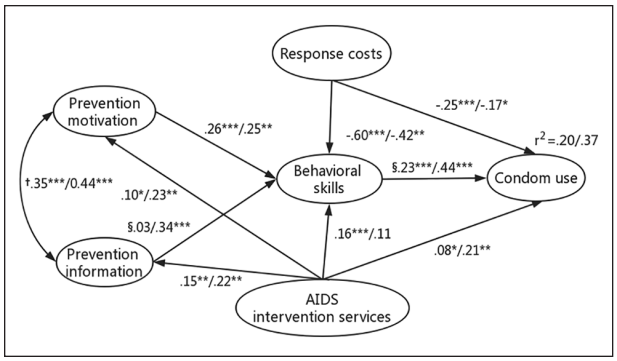

Figure 3. Multigroup Comparison of the Extended IMB Model Applied to Urban and Rural MSM (Urban MSM ($N = 856$)/Rural MSM ($N = 285$)).
Note. Parameters are standardized estimates. Values reported first (or above the line) refer to parameter estimates for urban MSM, and values reported second (or below the line) for rural MSM. *$p < .05$; **$p < .01$; ***$p < .001$. † indicates the correlation coefficient of residual of latent variables and § indicates the difference of standardized path coefficients is statistically significant between urban MSM and rural MSM.

set equal between two groups to construct the constrained model. The chi-square difference between the constrained model and the unconstrained model was 21.40, and the degree of freedom difference was 9, $p = .011$, indicating the path coefficients of the extended IMB model for urban MSM and rural MSM had differences.

The *t* values between both groups among all parameter estimates were calculated. Two path coefficients had a statistically significant difference. For the first path, "information → behavioral skills" ($t = 2.23$, $p < .05$), the path coefficient of urban MSM was significantly smaller than that of the rural MSM (0.03 vs. 0.34). For the remaining path, "behavioral skills → condom use" ($t = 2.04$, $p < .05$), the path coefficient of urban MSM was much smaller than that in rural MSM (0.23 vs. 0.44).

In the urban extended IMB model, the total effect coefficients of AIDS intervention services, response costs, motivation, and behavioral skills on condom use were 0.13, −0.39, 0.06, and 0.23, respectively. The information did not affect behavioral skills and condom use. In rural MSM, the total effect coefficients of AIDS intervention services, response costs, information, motivation, and behavioral skills on the use of condoms were 0.26, −0.35, 0.15, 0.11, and 0.44, respectively. Finally, the modified IMB model explained 20% of condom use for urban MSM and 37% of condom use for rural MSM (Figure 3).

Discussion

MSM are one of the most vulnerable groups at high risk for HIV infection. Consistent condom use is the most effective means of preventing HIV infection among MSM. However, results suggest that the rate of consistent condom use among MSM remains low in Western China. Nearly half of the MSM participants in this study use condoms for anal sex inconsistently, and this observation is similar to a nationwide study (Qin et al., 2016). Rural MSM are considerably worse off on a range of indicators of condom use than urban MSM. Even after adjusting for general demographic differences between urban and rural MSM, a significantly larger percentage of rural MSM than urban MSM has reported having vaginal sex, and using condoms inconsistently in P6M.

These rural–urban differences in condom use are essentially due to differences between rural and urban areas. The implementation of effective AIDS prevention and intervention services in rural areas faces more challenges than in cities, including geographic isolation, economic conditions, population density, and lack of access to health services (Preston et al., 2002). Thus, there are less intervention services in rural areas and fewer ways to obtain condoms. People in rural areas tend to be more conservative and rural MSM may receive more stigmas attached to homosexual behaviors and AIDS, whether externalized or internalized stigma, which may hinder them from receiving AIDS prevention programs and acting safe sexual behavior (Chow et al., 2013; McKenney et al., 2018). So rural MSM in this study reported less preventive motivation, less preventive information, and higher response costs than urban MSM. In addition, rural MSM may be more affected by traditional concepts of having offspring, thus they have more sexual behaviors with women than urban MSM (Chow et al., 2013; Guo et al., 2012).

These findings indicate that perhaps MSM from rural areas have a higher risk of AIDS and that they play a greater role in spreading AIDS to the general population compared with MSM from urban areas. Thus, preventive

interventions among MSM must be strengthened, particularly among rural MSM.

According to the SEM results, AIDS prevention information and prevention motivation indirectly influence condom use by activating behavioral skills, which is consistent with previous studies (Liu et al., 2014; Macapagal et al., 2016; Zhang et al., 2011). The final model verified by data fitting also reveals that intervention services not only directly promoted the use of condoms by MSM but also indirectly affects condom use via preventive information, preventive motivation, and behavioral skills. It suggests that the AIDS intervention services we surveyed have a positive effect on the protective behavior of MSM, which has also been reported by other studies (Qin et al., 2016). A recent study reported that HIV prevalence among MSM in Chongqing had a decreasing trend from 2013 to 2017, which should be inseparable from AIDS intervention services (Zhang et al., 2019). All the factors investigated in this study have positive influences on condom use except for response cost which has a negative influence on condom use. These factors are the considerable intervening mechanism for condom use and future intervention programs should pay attention to them.

MSEM results reveal that the model was not constant in urban MSM and rural MSM. First, information can affect condom use through behavioral skills among rural MSM, but it has no substantial direct or indirect impact on condom use among urban participants. Information/knowledge on disease transmission and self-protective behaviors is identified as one of the determinants of behavior change and is maintained in most models of behavioral intervention. Previous studies have suggested that information is considered a prerequisite for the adoption of safer sexual behaviors, but the information is usually insufficient in changing risk behaviors especially when the behavior is complicated (Fisher et al., 1996; Zhang et al., 2011). When information has already reached a high level, its effect on other factors is weakened (Liu et al., 2014). Thus, information may have little influence on the use of condoms by urban MSM. Rural MSM usually has low education attainment, limited access to AIDS information, and lower information. Increasing their information on HIV prevention and transmission through proper knowledge and education can encourage rural MSM to use condoms.

Second, the path coefficient of behavioral skills to condom use in rural MSM was higher than that in urban MSM (0.44 vs. 0.23, $p < .05$). This seems to imply that behavioral skills affect rural MSM more deeply than urban MSM. But in the model of rural MSM, intervention services do not have a direct impact on behavioral skills as that in urban MSM. It seems that interventions that can effectively improve the behavioral skills of rural MSM may be a breach of promotion of condom use among rural MSM.

Several limitations of this study are discussed as follows. First, the data used in this study are cross-sectional. Therefore, causality cannot be determined. Second, household registration was used to divide the participants; however, since China's reform and opening up, numerous people have left their rural homes to earn money in urban areas. Some studies believe that those rural-to-urban migrants are considered to be at high risk of HIV infection, whereas other studies report that these migrants' risk behaviors are not higher than those of nonimmigrant rural population. Therefore, this study uses household registration as the basis for division, which may bias the results. Finally, the study was retrospective and self-reported, especially with participants reporting condom use by recollection, which may cause recall bias, reporting bias, thus affecting research results.

Conclusions

In addition to confirming the IMB model, this study also identified that response costs and intervention services were related to condom use among MSM. And differences in condom use and related factors among rural and urban MSM in Western China are observed. Specifically, rural MSM use condoms more inconsistently than urban MSM. Furthermore, information and behavioral skills seem to have a greater influence on condom use in rural MSM than in urban MSM. This study provides possible evidence to support the need for designing different AIDS prevention and intervention strategies targeting rural and urban MSM. In particular, policymakers must pay more attention to rural MSM and strengthen the intervention on them, who are often overlooked.

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ORCID iD

Mengliang Ye https://orcid.org/0000-0001-9394-8682

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