Acceptance of Male Circumcision Among Male Rural-to-Urban Migrants in Western China

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Abstract

To describe the acceptability of male circumcision (MC) and explore potential factors associated with MC acceptability among male rural-to-urban migrants in western China, a cross-sectional survey of MC acceptability was conducted with 1,904 subjects in three western provinces with high HIV prevalence (Guangxi, Chongqing, and Xinjiang) in China between June 2009 and November 2009. Through face-to-face interviews, the participants completed a self-administered questionnaire about demographics, MC knowledge, willingness and reasons to accept or refuse MC, sexual behaviors, and other psychosocial variables. Factors associated with acceptability of MC were identified by multiple logistic regression analysis. Of the participants ($n=1,904$), 710 men were willing to accept MC (37.3%); the reasons included promotion of the partners' genital hygiene (54.9%), redundant prepuce or phimosis (43.1%), enhancement of sexual pleasure (40.6%), prevention of penile inflammation or cancer (35.5%), and protection against HIV and sexual transmitted diseases (STDs) (31.1%). A multivariable logistic regression showed that four factors were associated with acceptability of MC, including education level (OR=1.286, 95% CI=1.025~1.614), redundant prepuce or phimosis (OR=13.751, 95% CI=10.087~18.745), having one or more circumcised friends (OR=2.468, 95% CI=1.953~3.119), and having sexual intercourse with a temporary partner in the past year (OR=1.543, 95% CI=1.101~2.162). Compared with previously published data among the general population in China or worldwide, the acceptability of MC (37.3%) was low among the male rural-to-urban migrants in western China. Nevertheless, appropriate education could greatly improve the acceptability of MC. More public campaigns and health education on MC are needed to increase the rate of MC in China.

Introduction

BY THE END OF 2011, IT WAS estimated that 780,000 people were living with HIV/AIDS in China.¹ Sexual transmission accounts for more than half of the cases (63.8%), with 46.5% through heterosexual contact and 17.4% through homosexual contact.¹ Although the national prevalence remains low in China (0.058%),¹ challenges in HIV/AIDS prevention and control remain critical in certain regions. For example, six provinces with the highest cumulative number of reported HIV/AIDS cases (Yunnan, Guangxi, Henan, Sichuan, Xin-

jiang, and Guangdong) represent 75.8% of the national total.¹ Four of these provinces are located in western China. A poor economic environment, widespread high-risk sexual behavior, and a lower level of public awareness of HIV/AIDS are considered to account for the high HIV/AIDS prevalence in the western region of China.²

Traditional interventions have not been known to be very effective in HIV prevention. It is important to include new approaches for HIV prevention, such as male circumcision (MC), which is recommended by the Joint United Nations Program on HIV/AIDS (UNAIDS) and is recognized to be an

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additional and important strategy for the prevention of heterosexually acquired HIV infection in men.³ Randomized controlled trials (RCTs) in South Africa, Kenya, and Uganda have shown that MC reduces human immunodeficiency virus (HIV) acquisition in heterosexual men by 50–60%.^{4–6} Several other studies also suggested that uncircumcised men have a higher risk of acquiring sexually transmitted diseases (STDs) including syphilis, gonorrhea, and chlamydia than circumcised men.^{7,8} MC may be more effective in preventing or controlling HIV transmission in countries where the HIV prevalence is high, the MC rate is low, and the predominant transmission is through heterosexual behaviors.^{9,10}

The migrants are a high-risk group for HIV infection. The epidemiology of HIV/AIDS is closely linked to the process of migration.^{11,12} China has the largest floating population in the world. Approximately 150 million migrants who work in the cities as laborers, restaurant workers, and sex workers have acted as the “tipping point” for the HIV/STI epidemic in China.^{13,14} It was shown that rural-to-urban migration may play a crucial role in shifting the HIV/STI epidemic by broadening social and sexual mixing.^{15,16} Many HIV infections are believed to be among the nation’s rural-to-urban migrants.^{17,18} About 73% of migrants come from poor areas of the country. Among them, the perceived HIV risk, the knowledge of HIV, and the rates of condom use were low.¹⁹ Compared to general residents in urban areas, HIV/STI prevalence among rural-to-urban migrants was relatively high.²⁰

In China, rural-to-urban migrants move from rural areas to urban areas for jobs without establishing permanent urban residency. Because of the strict household registration policy in China, it is difficult for these migrants to obtain a permanent urban residence, and most of them work in the city for a period of time and go back to their home village, or they travel back and forth between the rural areas and cities seasonally.¹⁹ Separated from their spouse/family and away from the social constraints of home, migrant men have increased opportunities to engage in high-risk behaviors including paying for commercial sex,¹⁴ and migrant women who are unable to find a source of income in urban areas may engage in commercial sex work.^{21,22} Data from the Beijing Health Bureau suggest that migrants accounted for 80% of new HIV cases in Beijing in 2006.¹⁸

Overall, the average MC rate worldwide was estimated at 30–34%. MC is very common in western Africa, parts of areas in central and eastern Africa, the United States, and the Republic of Korea.²³ However, in China MC is not a common practice. Less than 5% of males were circumcised and many of these were performed just for medical reasons such as a tight foreskin.²⁴ Limited information is available about MC among Chinese male migrants. To date, no investigations have yet been conducted on understanding MC acceptability and related factors, such as socioeconomic status, family environments, and frequency of migration among this population in China. In this study, we carried out an investigation to explore the acceptability of MC and documented the factors associated with MC among male rural-to-urban migrants in western China.

Materials and Methods

Study design and subjects

A cross-sectional study was conducted in three western provinces of China (Guangxi, Chongqing, and Xinjiang) via

face-to-face structured interviews between June 2009 and November 2010. Participants were recruited from male rural-to-urban migrants aged 18–50 years and resided in the cities for at least 1 year. Subjects who were unable to provide voluntary informed consent, who were suffering from severe mental illness, mental retardation, or language disorder, and who have undergone MC before were excluded. The study was approved by the Ethics and Human Subjects Committee (EHSC) of the Guangxi Medical University.

Questionnaires and data management

A 67-item questionnaire was designed with the primary aim of obtaining information on the acceptability of MC as an effective strategy to prevent HIV infection (i.e., “willingness to be circumcised”). The questionnaire had five subsections: demographic characteristics, general knowledge about AIDS, general knowledge about MC, willingness and reasons to accept or refuse MC, and sexual behaviors. Few open-ended questions were asked, and most primary outcome variables were assessed by asking close-ended questions, such as “Do you know what MC is?” with response categories of “Yes/No.”

To assess knowledge about AIDS and MC, we designed 21 questions, including 10 questions about general knowledge of AIDS such as the pathway of HIV transmission and infection, and 11 questions about MC, for example, the most suitable period and targeted population, and the advantages or adverse effects after surgery.²⁵ For knowledge concerning AIDS we computed the average score among all interviewed subjects; each correct answer was given a score. Willingness to accept MC was assessed with the question “Do you want to be circumcised to prevent HIV?” and the response categories were “definitely willing,” “probably willing,” “definitely not willing,” and “probably not willing.” For analysis, we dichotomized the groups of “definitely willing” and “probably willing” into a single variable of “willingness to be circumcised (WTC)” group, and the groups of “definitely not willing” and “probably not willing” into “non-willingness to be circumcised (non-WTC)” group. To assess the reasons for accepting or refusing MC, we asked 12 close-ended or open-ended questions about the advantages and disadvantages of MC, the cost of surgery, etc. Data were collected by trained Research Assistants (RAs). After the subjects provided their written informed consent to participate in the study, RAs conducted the detailed interviews following the structured guidelines.

Analysis

All the data were entered into EpiData software (EpiData 3.1 for Windows; The EpiData Association, Odense, Denmark) and analyzed using SPSS for windows Version 16.0 (SPSS, Chicago, IL). Descriptive statistics were generated for each of the variables corresponding to specific questions in the survey, including general characteristics and reasons to accept or refuse MC. To compare the basic characteristics between the two groups, we used the chi-squared test. Multivariate logistic regression analysis was performed to identify factors associated with the acceptability of MC. Variables that showed a statistically significant association ($p < 0.05$) with the willingness to be circumcised were included in univariate analyses. All statistical tests were two-sided with a significant level of $p < 0.05$.

Results

Demographic characteristics

A total of 2,002 subjects were interviewed and 1,904 completed questionnaires (response rate: 95.1%). As shown in Table 1, of the respondents ($n=1904$), 30.2% ($n=575$) were from Guangxi, 39.4% ($n=750$) from Chongqing, and 30.4% ($n=579$) from Xinjiang. Of the respondents, 63.9% were aged 36 or below, 71.8% were Han ethnicity, 64.8% were married, 63.9% had a junior high school or below education, and 43.9% were employed. Of the respondents, 10.8% (206/1,904) had sexual intercourse with a temporary partner in the past year. Of those, only 28.6% ($n=59$) used condoms consistently and 31.1% ($n=64$) had never used a condom. In addition, 7.4% of respondents ($n=140$) had commercial sexual intercourse in the past year. Among them, only 31.4% ($n=44$) used condoms consistently and 31.4% had never used a condom (Table 1).

TABLE 1. DEMOGRAPHIC CHARACTERISTICS OF SUBJECTS ($n=1,904$)

Variables	No.	Percent (%)
Total samples	1904	100.0
Provinces		
Guangxi	575	30.2
Chongqing	750	39.4
Xinjiang	579	30.4
Age		
18–25	580	30.5
25–35	636	33.4
Over 35	688	36.1
Ethnic group		
Han	1,367	71.8
Zhuang	487	25.6
Other minorities	50	2.6
Marital status		
Married	1,233	64.8
Never married	645	33.9
Divorced/separated/widowed	26	1.4
Education level		
Junior high school or below	1,217	63.9
High school or above	687	36.1
Grades of AIDS knowledge		
Less than average grades	938	49.3
Average grades or more	966	50.7
Had sexual intercourse with temporary partners in the past year		
Yes	206	10.8
No	1,698	89.2
Condom use		
Consistent use	59	28.6
Inconsistent use	83	40.3
Never use	64	31.1
Had commercial sexual intercourse in the past year		
Yes	140	7.4
No	1,764	92.6
Condom use		
Consistent use	44	31.4
Inconsistent use	52	37.2
Never use	44	31.4

Acceptability of MC and reasons to accept or refuse MC

Of the respondents ($n=1904$), 37.3% ($n=710$) were willing to accept MC as an HIV/STD prevention method. In Guangxi, 25.6% (147/575) of respondents were willing to accept MC. In Chongqing and Xinjiang, the acceptance rate was 41.1% (308/750) and 44.0% (255/579), respectively. The difference among the three provinces has statistical significance ($p<0.001$). As shown in Table 2, of those who were willing to accept MC, 54.9% thought that MC could improve their sexual partners' hygiene, 43.1% had self-reported redundant foreskin, 40.6% felt that MC could enhance sexual pleasure, 35.5% thought that MC could help prevent penile cancer, and 31.3% believed that HIV and STDs could be partially prevented by MC. Of those who refused MC ($n=1194$), more than half (62.2%, $n=743$) believed that MC would not be necessary or effective for them, 18.5% were concerned about the potential danger associated with surgery, 13.2% were worried about the reduction of sexual ability, and 10.7% feared the expensive cost of MC surgery.

To explore the reasons for refusing MC and estimate the effect of health education, we explained the benefits of MC to 1,194 subjects who were not willing to be circumcised. When they were told that MC could reduce HIV and STDs, 44.1% (526/1,194) of the subjects changed their mind and were willing to accept MC. When we explained that MC had very low surgery-related complications, another 25.5% (305/1,194) expressed their willingness to accept MC. When we explained that MC could be arranged free of charge, 27.6% (330/1,194) indicated they would accept MC.

Knowledge about AIDS and MC

Overall, the respondents received very high grades concerning knowledge of AIDS, with an average score of 6.1 (out of 10). Of the respondents, 50.7% ($n=966$) received above-average grades (Table 1). However, for those with above-average grades, the difference between the non-WTC group (52.7%) and the WTC group (49.6%) had no statistical significance.

Compared to the non-WTC group, the WTC group possessed better knowledge about MC (Table 3). In the WTC group, 80.4% knew what MC is, compared to 64.0% in the

TABLE 2. REASONS TO ACCEPT OR REFUSE MALE CIRCUMCISION AMONG THE RURAL-TO-URBAN MIGRANTS

Reasons	No.	Percent (%)
Willing to accept MC	710	100.0
Improve partners' hygiene	390	54.9
Redundant foreskin	306	43.1
Enhance sexual pleasure	288	40.6
Prevention of penile cancer	252	35.5
Protection against HIV and STDs	221	31.3
Better penile appearance	96	13.5
Traditional or religious reason	26	3.7
Refuse MC	1,194	100.0
Not necessary or not effective	743	62.2
Concern about potential danger associated with surgery	221	18.5
Concern about reducing sexual ability	158	13.2
Concern about expensive surgery cost	128	10.7

MC, male circumcision; STDs, sexually transmitted diseases.

TABLE 3. FACTORS ASSOCIATED WITH THE WILLINGNESS TO BE CIRCUMCISED

<i>Variables</i>	<i>WTC group n (%)</i>	<i>Non-WTC group n (%)</i>	χ^2	<i>p value</i>
Total	710 (100.0)	1,194 (100.0)		
Province			49.66	0.000
Guangxi	147 (20.7)	428 (35.8)		
Chongqing	308 (43.4)	442 (37.1)		
Xinjiang	255 (35.9)	324 (27.1)		
Age			28.22	0.000
18–25	264 (37.2)	316 (26.5)		
25–35	232 (32.7)	404 (33.8)		
Over 35	214 (30.1)	474 (39.7)		
Ethnic group			37.84	0.000
Han	565 (79.6)	802 (67.2)		
Zhuang	125 (17.6)	362 (30.3)		
Other minorities	20 (2.8)	30 (2.5)		
Marital status			28.38	0.000
Married	404 (56.9)	829 (69.4)		
Never married	299 (42.1)	346 (29.0)		
Divorced/separated/widowed	7 (1.0)	19 (1.6)		
Education level			31.44	0.000
Junior high school or below	397 (55.9)	820 (68.7)		
High school or above	313 (44.1)	374 (31.3)		
Grades of AIDS knowledge			1.706	0.104
Less than average grades	336 (47.3)	602 (50.4)		
Average grades or more	374 (52.7)	592 (49.6)		
Do you know what MC is?			57.40	0.000
Yes	571 (80.4)	764 (64.0)		
No	139 (19.6)	430 (36.0)		
Do you know that MC can prevent penile inflammation and cancer?			16.39	0.000
Yes	188 (26.5)	222 (18.6)		
No	522 (73.5)	972 (81.4)		
Do you know that MC can prevent AIDS and STDs?			14.47	0.000
Yes	144 (20.3)	163 (13.7)		
No	566 (79.7)	1,031 (86.3)		
Do you know that MC can improve sexual partners' hygiene?			44.86	0.000
Yes	309 (43.5)	340 (28.5)		
No	401 (56.5)	854 (71.5)		
Do you know that MC can enhance sexual pleasure in the future?			33.64	0.000
Yes	235 (33.1)	252 (21.1)		
No	475 (66.9)	919 (78.9)		
Do you know that MC can improve penile appearance?			9.04	0.003
Yes	76 (10.7)	81 (6.8)		
No	634 (89.3)	1,113 (93.2)		
Do you know the hazard of redundant foreskin?			28.69	0.000
Yes	512 (72.1)	716 (60.0)		
No	198 (27.9)	478 (40.0)		
Whether or not your friends undergo MC			147.28	0.000
Yes	335 (47.2)	247 (20.7)		
No	375 (52.8)	947 (79.3)		
Do you believe that your foreskin is redundant or too long?			450.75	0.000
Yes	318 (44.8)	57 (4.8)		
No	392 (55.2)	1,137 (95.2)		
Did you have sexual intercourse in the past year?			14.76	0.000
Yes	102 (14.4)	104 (8.7)		
No	608 (85.6)	1,090 (91.3)		
Did you have commercial sexual intercourse in the past year?			3.16	0.075
Yes	62 (8.7)	78 (6.5)		
No	648 (91.3)	1,116 (93.5)		

WTC, willingness to be circumcised; Non-WTC, no willingness to be circumcised.

non-WTC group ($p < 0.05$), and 26.5% knew that MC could prevent penile inflammation and cancer, compared to 18.6% in the non-WTC group ($p < 0.05$). Overall, 16.1% ($n = 307$) knew that MC could prevent AIDS and STDs, with more subjects in the WTC group than in the non-WTC group (20.3% versus 13.7%, $p < 0.05$). In the WTC group, more subjects knew that MC could improve their sexual partners' hygiene than those in the non-WTC group (43.5% versus 28.5%, $p < 0.05$), more knew about the hazards of redundant foreskin (72.1% versus 60.0%, $p < 0.05$), and more had friends who had MC performed (47.2% versus 20.7%, $p < 0.05$) (Table 3).

Factors associated with acceptability of MC

The univariate analysis was carried out to explore potential factors associated with MC preferences. Sixteen potential factors were significantly associated with the willingness to have MC ($p < 0.05$) (Table 3) and were included into a multivariable logistic regression model. The analysis indicates that the acceptability of MC was associated with the following four factors: education level (high school or above versus junior school or below, OR = 1.286, 95% CI = 1.025 ~ 1.614), redundant foreskin (yes versus no, OR = 13.751, 95% CI = 10.087 ~ 18.745), having one or more circumcised friends (yes versus no, OR = 2.468, 95% CI = 1.953 ~ 3.119), and having had sexual intercourse with a temporary partner in the past year (yes versus no, OR = 1.543, 95% CI = 1.101 ~ 2.162) (Table 4).

Discussion

In this study, for the first time we investigated the acceptance of MC and related factors among a special population in China, the male rural-to-urban migrants. The investigation indicates that the overall MC acceptance rate is 37.1%, which is lower than the acceptance rate from sub-Saharan Africa (65%),²⁶ men who have sex with men (MSM) in the United States (87.7%),²⁷ heterosexual men in Thailand (39.2%),²⁸ and other Chinese populations, such as the general population (44.6%)²⁹ and the MSM population (46.3%).²⁵ Our study shows that residents in Xinjiang, where many Muslims were centralized, had a higher acceptability of MC (44.0%) than those in Chongqing (41.0%) and Guangxi (25.6%). As a religious tradition, Muslims were circumcised when they were infants, which may influence the opinion of non-Muslim

residents in the same area and contribute to the greater MC acceptability in Xinjiang.

Westercamp and Bailey reviewed 13 studies on MC acceptability and concluded that the identified factors associated with MC acceptability included beliefs that MC leads to improved hygiene; protection from sexually transmitted infections (STIs) and HIV infection; improved sexual pleasure and performance; ethnic, pain, culture and religion, cost, and possible adverse events (AEs); and the potential for risk compensation (i.e., an increase in risky sexual behavior following MC).²⁶ Because of differences in their conclusions, we found that the associated factors among male rural-to-urban migrants included education level, redundant foreskin, having one or more circumcised friends, and having had sexual intercourse with temporary partners in the past year.

Our investigation indicates that the acceptability of MC depends on education level. Consistent with previous studies,^{26,30} we found the people with a higher education level had better knowledge of MC/HIV and were more likely to accept MC. We also found that targeted education could effectively improve the acceptability of MC. In the non-WTC group, more than half of the subjects (62.2%) considered that MC was not necessary or not effective. However, after being provided with information about the benefits of MC, 44.1% of non-WTC subjects changed their mind and said they were willing to accept MC.

Our investigation also shows that subjects who had sexual intercourse with temporary partners in the past year were more likely to accept MC. The possible reason is that they knew this risky sexual behavior was dangerous and made them vulnerable to HIV/STD infection. Paradoxically, these people had a low rate (31.4%) of consistently using condoms, indicating a sign of "separation between knowledge and practice." Another finding of our study is the effect on the acceptability of MC based on participants' friends. If people have one or more circumcised friends, they might know more about MC, which might decrease their fear of MC and make them more comfortable with MC. In addition, our study shows that the common reasons for rejecting MC were that it was not necessary or effective, fear of infection, the cost and potential danger of MC surgery, and the fear of reduced penile sensitivity. These results are consistent with previous studies.^{31,32} Furthermore, we found that there was no significant difference in MC acceptability between different age groups, which differs from the

TABLE 4. MULTIVARIATE ANALYSIS OF WILLINGNESS TO BE CIRCUMCISED AMONG 1,904 SUBJECTS WHO HAD FACE-TO-FACE INTERVIEWS

Variables	Crude OR (95% CI)	p value	Adjusted OR (95% CI)	p value
Education level				
Junior high school or below	1.00		1.00	
High school or above	1.729 (1.426 ~ 2.095)	0.000	1.286 (1.025 ~ 1.614)	0.030
Whether or not your friends undergo MC				
No	1.00		1.00	
Yes	3.425 (2.795 ~ 4.197)	0.000	2.468 (1.953 ~ 3.119)	0.000
Do you feel that your foreskin is redundant or too long?				
No	1.00		1.00	
Yes	16.182 (11.935 ~ 21.939)	0.000	13.751 (10.087 ~ 18.745)	0.000
Did you have sexual intercourse with a temporary partner in the past year?				
No	1.00		1.00	
Yes	1.758 (1.315 ~ 2.351)	0.000	1.543 (1.101 ~ 2.162)	0.012

results of previous studies conducted in other countries or other populations in China.^{29,33,34}

Several limitations of our study need to be acknowledged. First, we used convenience sampling to extrapolate results to the rural-to-urban migrant population in the three western provinces in China, which may lead to selection bias. Those who participated in the study were perhaps more concerned about their health and more interested in the topic. Second, the collected information was mainly based on reported behaviors or characteristics such as the self-reported long foreskin without any clinical examination or other confirmation.

In summary, for the first time in China we investigated the acceptance of MC in rural-to-urban migrants. This provided evidence concerning MC acceptance among this population and identified factors that can be used for future programs to promote MC. The acceptability of MC among the rural-to-urban migrants is lower than among other populations in China and worldwide. However, appropriate education could greatly improve the acceptability of MC, suggesting that targeted public programs are necessary to promote MC for HIV prevention among this population in China.

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