

## Preplanned Studies

## Characteristics of Migration Among HIV-Positive MSM — Guangxi Zhuang Autonomous Region, China, 2005–2021

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### Summary

#### What is already known about this topic?

Migration has a significant impact on the transmission of human immunodeficiency virus (HIV). To date, there have been few studies examining the characteristics of migration among HIV-positive men who have sex with men (MSM).

#### What is added by this report?

The prevalence of migrants among newly reported HIV-positive MSM in Guangxi Zhuang Autonomous Region increased from 2005 to 2021. Yulin Prefecture had the highest proportion of out-migrant MSM (12.6%), while Nanning Prefecture had the highest proportion of in-migrant MSM (55.9%). Risk factors associated with migration among MSM included being in the 18–24 age range, having a college education or higher, and being a student.

#### What are the implications for public health practice?

A complex prefecture-level network of HIV-positive MSM exists in Guangxi. To ensure effective follow-up management and antiretroviral therapy for migrant MSM, effective measures must be taken.

Migration is a major risk factor for the spread of human immunodeficiency virus (HIV) (1). In China, 7.8% of HIV-positive individuals moved inter-provincially after their first follow-up (2). Men who have sex with men (MSM) play a bridging role in HIV transmission, with an average prevalence of HIV among MSM in China of 5.7% [95% confidence interval (CI): 5.4%–6.1%] between 2001 and 2018 (3). Guangxi Zhuang Autonomous Region is one of the provincial-level administrative divisions (PLADs) with the largest number of HIV-positive individuals in China, and the proportion of MSM in newly confirmed HIV individuals increased from 0.93% to 6.53% between 2010 and 2017 (4). The migration

network among HIV-positive MSM has facilitated HIV transmission in Guangxi (5). However, the current migration status of HIV-positive MSM in Guangxi is unknown. In this study, HIV-positive MSM aged 18 years or older and diagnosed between 2005 and 2021 were extracted from the National Integrated HIV/AIDS Control and Prevention Data System.

Participants with follow-up addresses that differed from their baseline addresses were classified as prefecture-level migrants, while those with the same addresses were classified as non-migrants. The prefectures in the Guangxi Zhuang Autonomous Region included Nanning, Liuzhou, Guilin, Wuzhou, Beihai, Fangchenggang, Qinzhou, Guigang, Yulin, Baise, Hezhou, Hechi, Laibin, and Chongzuo. The temporal trend of the proportion was assessed using a simple linear regression model, and risk factors were analyzed using a multivariable logistic regression model. This study was approved by the Ethics Review Board of Guangxi Center for Disease Control and Prevention (Certificate No.: GXIRB2016-0047-1).

Among 5,621 HIV-positive MSM, 1,733 (30.8%) were migrants. Compared with non-migrant MSM, migrant MSM had distinct characteristics: 18–24 years of age (44.8% vs. 28.8%), unmarried status (86.4% vs. 72.2%), belonging to the Han ethnic group (69.3% vs. 62.6%), education level of college and above (63.9% vs. 39.6%), and being a student (25.8% vs. 9.8%) (Table 1).

The proportion of migrant HIV-positive MSM increased from 0% in 2005 to 33.3% in 2006 and 35.1% in 2021, with an average proportion of 27.2% (Figure 1). This showed an upward trend of the proportion of migrant HIV-positive MSM from 2009 to 2021 ( $R^2=0.608$ ,  $P=0.002$ ).

There was a complex network of migration among HIV-positive MSM in Guangxi. The prefectures with the highest number of out-migrant MSM in Guangxi

TABLE 1. Demographic characteristics of HIV-positive MSM categorized by prefecture-level migration status in Guangxi, China, 2005–2021.

Characteristic	Non-migrant MSM N (%) (n=3,888)	Migrant N (%) (n=1,733)	$\chi^2$	P
Age (years)			195.543	<0.001
18–24	1,120 (28.8)	776 (44.8)		
25–49	2,377 (61.1)	915 (52.8)		
≥50	391 (10.1)	42 (2.4)		
Marital status			138.163	<0.001
Unmarried	2,807 (72.2)	1,496 (86.4)		
Married	799 (20.5)	155 (8.9)		
Divorced	282 (7.3)	82 (4.7)		
Ethnic group			38.130	<0.001
Han	2,435 (62.6)	1,200 (69.3)		
Zhuang	1,285 (33.1)	434 (25.0)		
Other	168 (4.3)	99 (5.7)		
Education background			327.517	<0.001
College and above	1,539 (39.6)	1,107 (63.9)		
Senior high school	1,028 (26.4)	376 (21.7)		
Junior middle school	1,042 (26.8)	211 (12.2)		
Primary school and below	279 (7.2)	39 (2.2)		
Occupation			418.293	<0.001
Student	381 (9.8)	447 (25.8)		
Domestic service and unemployed	996 (25.6)	413 (23.8)		
Private company employee	536 (13.8)	295 (17.0)		
Farming or factory worker	1,146 (29.5)	174 (10.0)		
Government employee	361 (9.3)	149 (8.6)		
Other	468 (12.0)	255 (14.8)		

Abbreviation: HIV=human immunodeficiency virus; MSM=men who have sex with men.

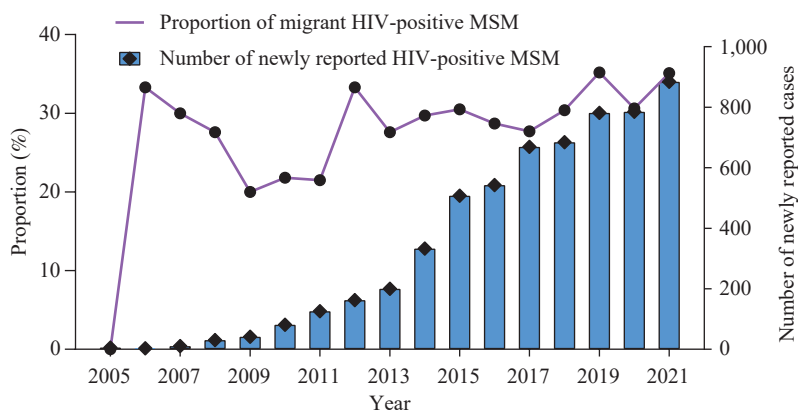


FIGURE 1. Temporal trend of the number of newly reported HIV-positive MSM and the proportion of migration in Guangxi from 2005 to 2021.

Abbreviation: HIV=human immunodeficiency virus; MSM=men who have sex with men.

were Yulin (219, 12.6%), followed by Baise (123, 7.1%), Guilin (116, 6.7%), Hechi (107, 6.2%), and Guigang (105, 6.1%). The total number of out-migrants from Guangxi to other regions of China was 468, accounting for 27%. The top five prefectures with the highest number of in-migrant MSM populations in Guangxi were Nanning (968, 55.9%), followed by Liuzhou (138, 8%), Guilin (125, 7.2%), Beihai (68, 3.9%), and Baise (26, 1.5%). The total number of in-migrants from other regions of China to Guangxi was 288, accounting for 16.6%. The risk factors of prefecture-level migration included those aged 18–24 years [compared with those aged  $\geq 50$  years, adjusted odds ratio (aOR)=2.718, 95% confidence interval (CI): 1.851–3.991], those aged 25–49 years (compared with those aged  $\geq 50$  years, aOR=2.292, 95% CI: 1.605–3.273), having college education level and above (compared with primary school education level

and below, aOR=2.176, 95% CI: 1.499–3.159), and being a student (compared with other occupations, aOR=1.545, 95% CI: 1.231–1.939) (Table 2).

## DISCUSSION

The two primary findings of the study were that the proportion of HIV-positive MSM who had migrated was increasing, and that the risk factors associated with migration were age, educational background, and occupation.

This study found that young adults were the dominant subgroup in Guangxi (33.7%), which was lower than the national data findings from 2006 to 2010 (54.6%) (6). Unmarried individuals with a high level of education were in a sexually active period, with an open sexual attitude, and their frequent migration facilitated the spread and transmission of HIV.

TABLE 2. Logistic regression analysis of associated factors influencing prefecture-level migration among HIV-positive MSM in Guangxi, China, 2005–2021.

Characteristic	OR (95% CI)	P	aOR (95% CI)	P
Age (years)				
18–24	6.444 (4.628–8.974)	<0.001	2.718 (1.851–3.991)	<0.001
25–49	3.581 (2.581–4.967)	<0.001	2.292 (1.605–3.273)	<0.001
$\geq 50$	1		1	
Marital status				
Unmarried	2.744 (2.285–3.296)	<0.001	1.187 (0.959–1.469)	0.115
Divorced	1.499 (1.110–2.024)	0.008	1.299 (0.949–1.778)	0.103
Married	1		1	
Ethnic group				
Han	0.836 (0.646–1.082)	0.174	0.887 (0.675–1.166)	0.391
Zhuang	0.572 (0.436–0.750)	<0.001	0.626 (0.469–0.834)	0.001
Other	1		1	
Education background				
College and above	5.161 (3.659–7.278)	<0.001	2.176 (1.499–3.159)	<0.01
Senior high school	2.626 (1.841–3.746)	<0.001	1.346 (0.923–1.963)	0.123
Junior middle school	1.452 (1.007–2.095)	0.046	1.028 (0.704–1.502)	0.885
Primary school and below	1		1	
Occupation				
Student	2.132 (1.750–2.596)	<0.001	1.545 (1.231–1.939)	<0.001
Farming or factory worker	0.276 (0.223–0.342)	<0.001	0.419 (0.333–0.525)	<0.001
Government employee	0.750 (0.591–0.951)	0.018	0.699 (0.546–0.895)	0.004
Domestic service and unemployed	0.752 (0.626–0.903)	0.002	0.775 (0.643–0.935)	0.008
Other	0.988 (0.802–1.217)	0.909	1.033 (0.835–1.278)	0.765
Private company employee	1		1	

Abbreviation: MSM=men who have sex with men; OR=odd ratio; aOR=adjusted odds ratio; CI=confidence interval.

Sexually active MSM moved to other prefectures of the country, creating a bridging role in the spread of HIV to their male and female partners, making HIV prevention and control difficult (7). College students should be a target population for HIV prevention and control in MSM (8). HIV/AIDS-related education and intervention services should be promoted on campus, increasing the uptake of antiretroviral therapy and the proportion of condom use among younger MSM (9). The number and migration proportion of newly reported HIV-positive MSM in Guangxi have been increasing, and migration at the prefecture level is complicated. The dominant in-migration prefectures were Nanning, the provincial capital of Guangxi, followed by Liuzhou and Guilin, all of which have strong economies and convenient transportation. The dominant out-migration prefectures were Yulin and Baise. The migrations of MSM were mainly within the prefectures as internal migration. Therefore, there is an urgent need for Nanning and Liuzhou to implement preventive measures among prefecture-level migrant MSM. Additionally, a considerable proportion of MSM migrate between prefectures in other PLADs and Guangxi. Outside Guangxi, the migration was mainly concentrated in Guangdong, Zhejiang, and Beijing. MSM from southwest China mainly traveled to eastern coastal prefectures, where China's coastal economy is more developed. The web of social interactions is becoming increasingly intricate. Therefore, inter-provincial follow-up management and antiretroviral therapy referral services should be considered. Enhancing community participation in the supervision of the prefecture-level migration and dissemination of comprehensive HIV/AIDS information is essential to ensure the prevention and adequate management of HIV spread. In addition, it is necessary to enhance HIV programs, such as local medical insurance policies, and access to comprehensive antiretroviral therapy services in medical institutions.

A cross-sectional survey of 61 prefectures in China reported that the characteristics of the migrant population among MSM were unmarried (77.5%), aged 18–24 (47.5%), and having a college education or higher (41.1%) (10). This is similar to the results of this study. According to Li YZ et al.'s previous studies, the prevalence of HIV among MSM students increased from 1.1% to 26.9% between 2003 and 2010 (7), which is also consistent with the trend reported in this study. A study conducted in Kenya showed that there was an association between past two-year internal

migration and having higher-risk sexual partners and baseline HIV infection (5). Thus, the migrant population of MSM is a bridge for HIV transmission and a key population for HIV prevention and universal treatment.

Although the initial findings showed the characteristics of the migration network among MSM, some limitations remain. For example, the National Integrated HIV/AIDS Control and Prevention Data System only collects baseline address codes and follow-up codes, and the definition of migration according to these codes may overlook the fact that some people have migrated from their place of birth to their place of residence. As a result, the proportion of migration may have been overestimated, as they may have acquired HIV at their residence. Further research could use a questionnaire based on this study to obtain more accurate results.

In conclusion, a complex migration network exists among HIV-positive MSM in Guangxi. Thus, relevant departments are recommended to take the following measures to reduce the infection rate of immigrant MSM: first, strengthening the communication among follow-up departments in different prefectures and improving the information system for the migrant population. Second, timely follow-up management and antiretroviral therapy services should be provided for the prefecture-level migrant population by local medical institutions. Third, schools and communities should strengthen HIV education awareness among MSM and their partners to reduce the secondary transmission of HIV.

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