

A Comparison of HIV Infection and Related Risk Factors Between Money Boys and Noncommercial Men Who Have Sex With Men in Shenzhen, China

Jin Zhao, PhD,*† Wen-De Cai, MD,* Yong-Xia Gan, MD,* Yan Zhang, MD,* Zheng-Rong Yang, MD, PhD,* Jin-Quan Cheng, MD, PhD,* Si-Hao Lin, PhD,† Ming-Liang He, PhD,† Lin Chen, MD,* and Xiao-Rong Wang, PhD†

Background: HIV transmission among men who have sex with men (MSM) has become an increasing concern in China. Money boys (MBs) are a subgroup of MSM who sell sex to men. Direct comparison of HIV prevalence and related risk factors between MB and noncommercial MSM (ncMSM) has rarely been done. This study was conducted to make the comparison.

Methods: Eight hundred fifty MBs and 801 ncMSM were parallel recruited in Shenzhen by time-location sampling. Their behavioral and serologic data on HIV and syphilis were collected and compared. Multiple logistic regression analysis was performed to evaluate the determinants for HIV risk in MBs and ncMSM, respectively.

Results: The prevalence of HIV was 4.5% in MBs and 7.0% in ncMSM. Although MBs tended to have more male partners than ncMSM, they were more likely to report a consistent condom use in male anal intercourse, especially in commercial sex. Noncommercial MSM were more likely to visit parks and saunas instead of bars, massage centers, recreational centers, and home-based venues. Syphilis infection and recruitment venue were associated with HIV infection in both MBs and ncMSM. Being from a hometown with a high HIV prevalence and without a male partner from Hong Kong were found to be risk factors for HIV infection in MBs, and early sexual debut was a risk factor in ncMSM.

Conclusion: Money boys differed from ncMSM in the rate of HIV infection and some sexual characteristics and behaviors. Targeting separate interventions specifically targeting the 2 subgroups may be necessary.

Available data have shown that HIV infection is now widespread among men who have sex with men (MSM) throughout Asia.¹⁻³ The annual rate of newly diagnosed HIV cases attributed to MSM in China has also increased sharply, from 2.5% in 2006 to 10.8% in 2010.⁴ The increasingly high HIV prevalence among MSM has been reported from different parts of the country, with a national average rate of 5.1% and a range from 0.5% to 12.5%.⁵⁻⁹

Money boys (MBs), also referred to as *male sex workers*, are known as a high-risk subgroup of MSM.¹⁰ A generally high HIV prevalence, sexual risk behaviors, and social vulnerabilities of MBs were reported in some Western countries,¹⁰⁻¹² but some previous studies in China, although limited in number, reported a similar HIV prevalence in MBs and overall MSM.¹³⁻¹⁷ Most of these studies mixed MBs with noncommercial MSM (ncMSM) in either subject recruitment or data analysis and rarely separated them and compared their differences. The proportions of MB in these studies were either unknown or varied in a large range, from 5% to 28%.^{5,7,16,18,19} So far, almost no study has been available to directly compare the HIV prevalence and related risk factors between MBs and ncMSM in China. To better understand the possible differences between MBs and ncMSM in HIV infection and related risk factors, we conducted this cross-sectional comparative study by recruiting and analyzing MBs and ncMSM separately using a time-location sampling (TLS) method.

This study was conducted from April 2008 to October 2009 in Shenzhen, a developed and commercialized city in southern China, which shares a border with Hong Kong. With a huge number of young migrant population that accounts for more than 85% of the total population,²⁰ Shenzhen is an attractive place to MSM from different parts of the country, including Hong Kong, because of a better job opportunity and opening atmosphere. It was estimated that there were more than 100,000 MSM and more than 50 MSM venues in Shenzhen, the largest numbers in MSM venues and MBs (>4000) in China. These special features made the city a good site to study in MBs and ncMSM by using a powerful venue-based method.²¹

SUBJECTS AND METHODS

Study Setting

There were more than 50 active MSM venues in Shenzhen, where MSM could seek partners and MBs could solicit their clients, including bars, massage centers, saunas, parks, dorm-based venues (also called family clubs, a kind of small home-based call boy brothels providing dormitories for MBs, who were advertised through Internet), and suburb recreational centers (a kind of multifunctional venues in industrial areas located in suburb providing entertainment services including video film,

From the *Shenzhen Center for Disease Control and Prevention, Shenzhen; and †School of Public Health and Primary Care, The Chinese University of Hong Kong, Hong Kong, SAR, China

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J. Zhao and W.D. Cai contribute equally to this work.

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Correspondence: Xiao-Rong Wang, PhD, School of Public Health and Primary Care, The Chinese University of Hong Kong, Hong Kong, SAR, China. E-mail: xrwang@cuhk.edu.hk.

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TV, karaoke, mahjong, sauna, and separate bedrooms). All these identified and admitted venues by MSM communities served as candidate venues of the sampling frame in this study. Because the operation of the venues was not very stable, especially for dorm-based venues, it was common that some venues closed down and some others opened up during the survey. Thus, a total of 95 venues were included in our sampling frame, with 46 to 59 venues for selection each month.

Sampling Procedures and Recruited Subjects

A parallel recruitment of MB and ncMSM was carried out from April 2008 to November 2009. We applied the venue-day-time (VDT) sampling scheme, also known as *TLS*, to recruit participants. Detailed methods were described previously.^{13,22} In brief, formative research compiled a universe of recruitment venues, as the sampling frame. The criteria for eligible MB participants included being male 18 years or older, having lived in Shenzhen for more than 1 month at the time of survey, and ever having sold sex (oral or anal) to another man in the previous month. Eligible participants of ncMSM were those who had a homosexual contact in Shenzhen in the previous 6 months of the survey and not having been paid for male-male sex in the previous 6 months. Venue, date, and time for each sampling event (VDT) were selected under a random selection scheme. Once a potential subject was approached at the venue, his eligibility was assessed first, followed by informed consent, interview, and blood sample collection at the venue. Negative testing results were informed to participants through mobile phone calls. Syphilis-positive subjects were referred to a designated hospital for free diagnosis and treatment. Positive subjects in HIV screening test were asked to return to the clinic of Centers for Disease Control and Prevention for a second screening and HIV confirmation test. Confirmed HIV-positive subjects were provided free posttest counseling and referred to the governmental HIV care and treatment program. The study was approved by the international review boards of the Chinese University of Hong Kong and Shenzhen Center for Disease Control and Prevention.

Participants were recruited in 102 VDTs randomly selected from a total of 95 active MSM venues. There were 1015 potential MB participants identified, but 952 (94%) meeting the eligible MB criteria were approached successfully for screening. Finally, 850 (89%) of the eligible MBs participated in and completed both survey and blood sample testing. At the same time, 1629 potential ncMSM participants were identified, of whom 1270 (78%) were eligible. Finally, 801 (63%) among the eligible ncMSM participated in the study. Refusal rates varied with VDTs, ranging from 0 to 25% in MBs and 0 to 47% in ncMSM. Average refusal rate was the lowest in dorm-based venues (5% in MBs and 3% in ncMSM) and the highest in bars (21% in MBs and 47% in ncMSM).

Behavioral Measures

Self-administered questionnaires were performed to collect information on commercial and noncommercial sexual behaviors, drug and alcohol use, history of sexually transmitted infections (STIs), access to HIV-related services, HIV-related knowledge, and condom use knowledge. A hometown with high HIV prevalence was defined according to 2008 National MSM surveillance (7) as 4 provinces, that is, Sichuan, Chongqing, Yunnan, and Guizhou, all of which were located in southwest China and had a HIV prevalence of more than 10%. This variable was coded as binary (yes/no). HIV knowledge and condom use knowledge were measured as previously described.²²

HIV and Syphilis Testing

HIV and syphilis testing was performed according to standard procedures in a Shenzhen Centers for Disease Control and Prevention laboratory. HIV was tested using a rapid test (Determine HIV-1/2/O; Abbott Laboratories, IL) and enzyme-linked immunosorbent assay (Wantai Biotech Inc, Beijing, China) for screening and Western Blot (Genlabs Diagnostics, Singapore) for confirmation. Syphilis was tested with rapid plasma regain method (Rongsheng Biotech Inc, Shanghai, China) for qualitative screening and *Treponema pallidum* particle agglutination assay (Fujirebio Inc, Japan) for confirmation.

Data Analysis

A descriptive analysis was first performed to compare demographic characteristics, sexual behavioral patterns, and commercial sex status between MBs and ncMSM. Pearson χ^2 tests, Fisher exact tests, or trend tests, whenever applicable, were carried out to identify potentially associated factors with HIV infection in the 2 groups. Then, multiple logistic regression analysis was applied to evaluate the determinants for HIV risk in MBs and ncMSM, respectively. Variables included in the multivariate analysis were based on the results of univariate analysis and prior knowledge. Considered variables included syphilis infection, age, sexual orientation, type of recruitment venue, hometown with high HIV prevalence, sex of first sex partner, age of first sex, number of male anal sex partners, male sex partner from Hong Kong, condom use in male sex, condom use in female sex, HIV-related knowledge, condom use knowledge, HIV test history, access to HIV-related services, history of diagnosed STIs, and perception of HIV risk. For the MBs, 2 additional variables, that is, number of male clients and selling sex to women, were added to the models. Data were adjusted for the recruitment rate of each event through the weighting of cases using percentage of enumeration divided by percentage of actually finished questionnaires.²² All statistical analyses were performed using Statistical Product and Service Solutions (SPSS 16.0).

RESULTS

Among 1651 enrolled subjects, 94 (5.7%; 95% confidence interval [CI], 4.6–7.0) were tested to be HIV seropositive, with 4.6% (95% CI, 3.2–6.1) in MBs and 7.0% (95% CI, 5.4–9.0) in ncMSM (Table 1). The difference in the HIV infection between MBs and ncMSM was statistically significant ($P < 0.05$). In addition, 272 (16.5%; 95% CI, 15.1–18.8) were tested to be syphilis positive, with 12.9% (95% CI, 10.8–15.4) in MBs and 20.3% (95% CI, 17.5, 23.2) in ncMSM ($P < 0.001$). In addition, a significantly higher rate of HIV infection ($P < 0.001$) was found in subjects with syphilis positive (18.4%; 95% CI, 14.1–23.6) than in those with syphilis negative (3.2%; 95% CI, 2.4–4.3).

Entertainment venues such as bars, gyms, and massage centers were classified as a type of upscale MSM venues because of a higher expense per person and a larger number of MSM in the venues than others. Clients could seek MBs in these venues but hardly had sex within the venues. Entertainment venues were also provided routinely with HIV-related services by local health care providers and MSM peer workers, which was different from other venues. Accordingly, MSM showing up in the entertainment venues had the lowest rate of tested HIV positive (1.6% in MBs and 0.9% in ncMSM) when compared with MSM in other venues (Table 1).

More than a half (58.5%) of MBs was recruited from the entertainment venues, whereas most of the ncMSM (62.9%)

TABLE 1. HIV Prevalence and Demographic Characteristics in MBs and ncMSM

	MSM Participants, n (%)		<i>P</i> *	HIV Positive, n (%) [†]	
	MB (n = 850)	ncMSM (n = 801)		MB	ncMSM
Tested HIV positive	38 (4.5)	56 (7.0)	0.027		
Tested syphilis positive			<0.001		
Yes	110 (12.9)	162 (20.2)		19 (17.3) [‡]	31 (19.1) [‡]
No	740 (87.1)	639 (79.8)		19 (2.6)	25 (3.9)
Venue type of recruitment			<0.001		
Bar/massage center/gym	497 (58.5)	115 (14.4)		8 (1.6) [‡]	1 (0.9) [§]
Dorm-based venue	252 (29.6)	69 (8.6)		18 (7.1)	7 (10.1)
Park	68 (8.0)	246 (30.7)		7 (10.6)	23 (9.3)
Recreational center	33 (3.9)	113 (14.1)		5 (15.2)	4 (3.5)
Sauna	0	258 (32.2)		0	21 (8.1)
Age, y			<0.001		
18–20	183 (21.5)	43 (5.4)		4 (2.2)	5 (11.6)
21–25	501 (58.9)	251 (31.3)		23 (4.6)	10 (4.0)
26–30	133 (15.6)	219 (27.3)		7 (5.3)	19 (8.7)
>30	33 (3.9)	288 (36.0)		4 (12.1)	22 (7.6)
Education level			<0.001		
Junior high school or lower	276 (32.5)	169 (21.1)		9 (3.3)	11 (6.5)
Senior high school	448 (52.7)	337 (42.1)		21 (4.7)	25 (7.4)
College or above	126 (14.8)	295 (36.8)		8 (6.3)	20 (6.8)
Migration status			<0.001		
Local resident of Shenzhen	37 (4.4)	75 (9.4)		2 (5.4)	4 (5.3)
Migrant	813 (95.6)	726 (90.6)		36 (4.4)	52 (7.2)
Hometown with high HIV prevalence			0.110		
No	715 (84.1)	696 (86.9)		23 (3.2) [‡]	51 (7.3)
Yes	135 (15.9)	105 (13.1)		15 (11.1)	5 (4.8)
Monthly income (RMB)			0.328		
≤3000	461 (54.2)	462 (57.7)		21 (4.6)	40 (8.7)
3001–5000	227 (26.7)	204 (25.5)		8 (3.5)	10 (4.9)
>5000	162 (19.1)	135 (16.9)		9 (5.6)	6 (4.4)
Marital status			<0.001		
Unmarried	791 (93.1)	582 (72.7)		37 (4.7)	40 (6.9)
Married	59 (6.9)	219 (27.3)		1 (1.7)	16 (7.3)
Self-identified sexual orientation			<0.001		
Homosexual/gay	253 (29.8)	450 (56.2)		22 (8.7) [‡]	40 (8.9) [¶]
Bisexual	301 (35.4)	259 (32.3)		12 (4.0)	13 (5.0)
Heterosexual or unsure	296 (34.8)	92 (11.5)		4 (1.4)	3 (3.3)

*Two-sided value based on Pearson χ^2 test on proportions.[†]HIV positive rate.[‡] $P < 0.001$ and [§] $P < 0.01$ using Pearson χ^2 test on the rates of HIV infection in different categories of MBs and ncMSM.^{||} $P < 0.05$ for trend test.[¶] $P < 0.05$ using Pearson χ^2 test on the rates of HIV infection in different categories of MBs and ncMSM.

were recruited from saunas or parks (Table 1). Average age was 23.3 years in MBs and 29.5 years in ncMSM. Nearly all demographic characteristics, except for monthly income and hometown with high HIV prevalence, were significantly different between MBs and ncMSM. Money boys were younger and less educated. A bigger number in MBs was unmarried internal migrants from other parts of the country and had no fulltime job. Fewer MBs than ncMSM reported themselves to be homosexual/gay oriented; a larger proportion of MBs identified themselves as heterosexual.

There was a higher rate of HIV positive in both MBs and ncMSM who had a syphilis infection, self-identifying as gay or homosexual, and being recruited from dorm-based venues, parks, and saunas. A bigger proportion of HIV positive was observed in MBs with older age and from a hometown with high HIV prevalence.

When sexual behavior patterns and HIV infection rates were compared, more MBs than ncMSM reported an initial sex before age 20 years or sex with a woman (Table 2). A significantly larger proportion of MBs reported having sex with women in the previous 6 months or having multiple male and female

sexual partners within the same period. In addition, because MBs had a high rate of reported condom use (75.2%) in having sex with their male clients, more MBs than ncMSM practiced a consistent condom use in male sex (65.4% vs. 52.4%), but it was opposite in sex intercourse with women (65.4% vs. 84.0%). The inconsistency of condom use in male and female sex among MBs and ncMSM resulted in a similar rate of overall condom use (44.8% vs. 46.2%). In addition, 70.2% of MBs reported having sex with MSM from Hong Kong, as opposed to 17.7% in ncMSM.

HIV infection rates were different among the categories of sexual behaviors in both MBs and ncMSM (Table 2). Significantly higher HIV infection rates were found in ncMSM who were young in the first sex (≤ 20 years old) and had exclusively receptive anal intercourse in male-male sex. In MBs, a higher HIV infection rate was seen in those who reported first sex partner as male, fewer male partners from Hong Kong, and without or with only 1 female sex partner. In addition, there was a higher HIV infection rate in MBs who had more than 4 male clients in the previous month and had no female client. Overall, MSM reporting to have an unprotected anal intercourse with

TABLE 2. HIV Infection and Sexual Behavioral Factors in MBs and ncMSM

	MSM Participants, n (%)		<i>P</i> *	HIV Positive, n (%) [†]	
	MB (n = 850)	ncMSM (n = 801)		MB	ncMSM
Sex of first sex partner			<0.001		
Male	252 (29.6)	445 (55.6)		19 (7.5) [‡]	36 (8.1)
Female	598 (70.4)	356 (44.4)		19 (3.2)	20 (5.6)
Age of first sex experience			<0.001		
≤20	655 (77.1)	416 (51.9)		28 (4.3)	37 (8.9) [§]
>20	195 (22.9)	385 (48.1)		10 (5.1)	19 (4.9)
No. [in tables] anal sex partners			<0.001		
0	19 (2.2)	43 (5.4)		1 (5.3)	0 (0.0)
1	108 (12.7)	335 (41.8)		4 (3.7)	23 (6.9)
>1	723 (85.1)	423 (52.8)		33 (4.6)	33 (7.8)
Hong Kong male sex partner			<0.001		
Yes	597 (70.2)	142 (17.7)		22 (3.7)	9 (6.3)
No	174 (20.5)	572 (71.4)		16 (9.2)	40 (7.0)
Unknown	79 (9.3)	87 (10.9)		0 (0.0)	7 (8.0)
Sex role in male AI			<0.001		
Insertive only	220 (26.5)	309 (42.4)		10 (4.5)	17 (5.5) [§]
Both	467 (56.3)	322 (44.2)		22 (4.7)	23 (7.1)
Receptive only	142 (17.2)	98 (13.4)		6 (4.2)	13 (13.3)
Female sex partner			<0.001		
0	352 (41.4)	601 (75.0)		27 (7.7) [#]	44 (7.3)
1	131 (15.4)	155 (19.4)		8 (6.1)	10 (6.5)
>1	367 (43.2)	45 (5.6)		3 (0.8)	2 (4.4)
No. [in tables] commercial male partners					
≤4	445 (52.4)	—		12 (2.7) [‡]	
>4	405 (47.6)			26 (6.4)	
Sold sex to women					
Yes	254 (29.9)	—		4 (1.6) [‡]	
No	596 (70.1)			34 (5.7)	
UAI in male sex			<0.001		
Yes	294 (34.6)	381 (47.6)		17 (5.8)	33 (8.7)
No	556 (65.4)	420 (52.4)		21 (3.8)	23 (5.5)
UAVI with female partners			<0.001		
Yes	294 (34.6)	128 (16.0)		8 (2.7)	7 (5.5)
No	556 (65.4)	673 (84.0)		30 (5.4)	49 (7.3)

*Two-sided value based on Pearson χ^2 test on proportions.[†]HIV positive rate.[‡] $P < 0.01$ and [§] $P < 0.05$ using Pearson χ^2 test on the rates of HIV infection in different categories of MB and ncMSM.^{||}In the previous 6 months.[#] $P < 0.001$ using Pearson χ^2 test on the rates of HIV infection in different categories of MB and ncMSM[¶] $P < 0.05$ for trend test.

UAI indicates unprotected anal intercourse; UAVI, unprotected anal or vaginal intercourse.

another man in the previous 6 months tended to have a higher rate of HIV infection, whereas those who had an unprotected anal or vaginal intercourse with women had a lower HIV rate in either MBs or ncMSM.

Comparisons of self-reported STIs, drug use, accessible services, and HIV-related knowledge between MBs and ncMSM are shown in Table 3. A significantly bigger proportion of MBs reported ever using illegal drugs or drinking alcohol before having sex. Money boys had a lower level of both HIV-related knowledge and condom use knowledge, although they reported a slightly higher access to HIV-related education and services than ncMSM.

Money boys who received an HIV test more recently tended to have a higher HIV infection rate, but such a trend was not observed in ncMSM. Noncommercial MSM with an increased self-perception of HIV risk or being diagnosed as having STIs had a higher HIV infection rate.

In multiple logistic regression analyses determining the risk factors for HIV infection (Table 4), syphilis infection; type of recruitment venues such as dorm-based venue, park, and recreational center; hometown with high HIV prevalence; without

a male partner from Hong Kong; and having 4 or more male clients in the previous month were associated with an increased HIV infection in MBs. Young age (before age 20 years) of initial sexual intercourse, syphilis infection, and type of recruitment venues such as dorm-based venue, park, and sauna were predictive factors for HIV infection in ncMSM.

DISCUSSION

To the best of our knowledge, this is the first study that compares the HIV prevalence and related risk factors between MBs and ncMSM with a parallel recruitment by TLS in China. A few previous studies attempted to compare preknown risk factors between MBs and MSM, but none of them reported a result of HIV test.^{14,23,24} A few other studies reported HIV infection rates in MBs and MSM, but no significant difference was found between the groups because of small sample sizes of MBs and a mixed recruitment of MBs with MSM.^{16–18} In this study, blood samples from MBs and ncMSM were collected separately to test HIV and syphilis infections. A notable finding was that an infection rate of either HIV or syphilis was significantly lower in MBs (5% and 13%, respectively) than in ncMSM

TABLE 3. HIV Infection and STIs, Drug Use, HIV Knowledge, and Services in MBs and ncMSMs

	MSM Participant, n (%)		<i>P</i> *	HIV Positive, n (%) [†]	
	MB (n = 850)	ncMSM (n = 801)		MB	ncMSM
Diagnosed with STIs			0.498		
Yes	101 (11.9)	104 (13.0)		6 (5.9)	15 (14.4) [‡]
No	749 (88.1)	697 (87.0)		32 (4.3)	41 (5.9)
Ever took drugs			<0.001		
Yes	248 (29.2)	97 (12.1)		10 (4.0)	8 (8.2)
No	602 (70.8)	704 (87.9)		28 (4.7)	48 (6.8)
Alcohol use before sex			<0.001		
Never	355 (41.8)	522 (65.2)		15 (4.2)	35 (6.7)
Ever	495 (58.2)	279 (34.8)		23 (4.6)	21 (7.5)
History of HIV test			0.001		
Within 6 mo	242 (28.5)	178 (22.2)		19 (7.9) [§]	11 (6.2)
Before 6 mo	193 (22.7)	239 (29.8)		8 (4.1)	19 (7.9)
No	410 (48.2)	382 (47.7)		11 (2.7)	26 (6.8)
Assess to HIV-related services			0.073		
Yes	720 (84.7)	652 (81.4)		33 (4.6)	47 (7.2)
No	130 (15.3)	149 (18.6)		5 (3.8)	9 (6.0)
HIV-related knowledge			0.001		
Low	235 (27.6)	167 (20.8)		9 (3.8)	7 (4.2)
High	615 (72.4)	634 (79.2)		29 (4.7)	49 (7.7)
Condom use knowledge			0.016		
Low	293 (34.5)	232 (29.0)		11 (3.8)	14 (6.0)
High	557 (65.5)	569 (71.0)		27 (4.8)	42 (7.4)
Self-perceived HIV risk			0.531		
No risk	741 (87.2)	690 (86.1)		33 (4.5)	42 (6.1) [‡]
Low risk	92 (10.8)	101 (12.6)		5 (5.4)	11 (10.9)
High risk	9 (1.1)	10 (1.2)		0 (0.0)	3 (30.0)

*Two-sided value based on Pearson χ^2 test on proportions.[†]HIV positive rate.[‡]*P* < 0.05 using Pearson χ^2 test on the rates of HIV infection in different categories of MB and ncMSM.[§]*P* < 0.05 for trend test.

(7% and 20%, respectively). The result was similar to recent data from some other Chinese cities.^{25,26} Moreover, some studies from other countries also reported that the HIV prevalence in MBs, especially agency-based MBs, was similar or lower than in other MSM,^{11,27,28} although some others reported a higher HIV rate in MBs.^{5,10}

The difference in the rate of HIV infection between the MBs and the ncMSM in this study may be explained partially by the differences in age and their sexual behaviors. The MBs were 6 years younger than the ncMSM. An older age was found

to be a risk factor for HIV infection.²⁹ For sexual behaviors, although MBs had more male sex partners, they were more likely to use condoms in male anal sex, which might have protected them from getting infected. In the United States, agency-based MBs with comparatively higher income were found to have less HIV-related risk behaviors with clients than those working on the street (with lower income).^{11,30} Survival sex was found to be a risk factor for practicing risk behaviors and, consequently, contracting HIV.³¹ The MBs in Shenzhen had a slightly higher monthly income than did ncMSM, and the income in

TABLE 4. Estimated Risk Factors for HIV Infection in MBs and ncMSM

	MB (n = 850)		ncMSM (n = 801)	
	AOR	<i>P</i>	AOR	<i>P</i>
Syphilis infection	5.22 (2.48–10.98)	<0.001	4.93 (2.77–8.79)	<0.001
Venue type for recruitment				
Bars and massage centers	1		1	
Dorm-based venue	3.36 (1.38–8.17)	0.007	13.39 (1.57–114.10)	0.018
Parks	3.57 (1.13–11.17)	0.030	8.98 (1.18–68.38)	0.034
Recreational center in suburb	5.33 (1.45–19.52)	0.012	3.31 (0.36–30.79)	0.293
Sauna	—		8.04 (1.05–61.75)	0.045
Hometown with high HIV prevalence	2.77 (1.29–5.95)	0.009	—	
No male partner from Hong Kong	2.40 (1.15–5.00)	0.019	—	
>4 clients in previous 1 mo	2.19 (1.02–4.73)	0.046	—	
Early age of first sex	—		1.82 (1.00–3.32)	0.049

AOR indicates adjusted odds ratio.

Bold values indicate *P* < 0.05.

both groups was much higher than ordinary migrant workers (about RMB 600–1000 per month). The higher income might empower the MBs to negotiate condom use or reject unprotected anal intercourse with their clients, therefore leading to a lower rate of STIs. Meanwhile, the difference in HIV/syphilis prevalence among MSM and MBs may be related to who they were having unprotected sex with. For the MBs, it seems that more of them were having unprotected sex with women (a lower-risk sex behavior and lower-risk group); although the ncMSM were having more unprotected sex with other MSM (anal sex [a higher risk for STI transmission] and MSM [a group with higher HIV/syphilis prevalence than among general population of women]). However, because the MB had a significantly lower rate of using condoms in female sex, they might serve as a bridge group to transmit HIV to the low-risk heterosexual community.

There were both similarities and differences in risk factors for HIV infection in the 2 compared groups. Two well-known HIV-related risk factors, that is, syphilis infection and type of recruitment venues, were confirmed to be associated with HIV infection in both MBs and ncMSM. Early age of first sex, however, was a risk factor only in the ncMSM, and coming from a hometown with high HIV prevalence and being without a self-reported Hong Kong male partner were risk factors only in the MBs. Most (70%) of the MBs reported to have encountered male sex partners from Hong Kong, as opposed to only 18% in the ncMSM, and a lower rate of HIV infection was observed in the MBs. This could imply that cross-border Hong Kong MSM in Shenzhen mainly contacted with MBs. In addition, MBs who worked in entertainment venues were found to be 2 to 4 times more frequently to sell sex to a Hong Kong MSM than other MBs, and the former had the lowest HIV infection rate (1.6%) and highest condom use rate (74%) in all MBs.²² The reasons for a lower HIV infection rate in those having Hong Kong sex partners were not clear yet. A slightly higher rate of condom use in this subgroup than others (60% vs. 56%, $P < 0.05$) might be one of the explanations. A further study is needed to address the issue.

Based on the findings indicating the differences between the MBs and the ncMSM in the rate of HIV infection and related risk factors, separating the 2 subgroups in data analysis could be more appropriate to identify key risk factors for HIV infection and formulating specifically effective interventions. Because MBs tended to strategically maintain divisions between their professional and personal lives,¹¹ the behavior patterns could be different in their commercial and noncommercial sex. However, in most previous studies, MBs and ncMSM were mixed in subject recruitment and data analysis; selling sex was treated only as one of the predicting risk factors for HIV infection, and the proportion of MB in a mixed sample either was unknown^{9,32} or could be underreported or overreported.^{8,10,23} In general, it was more acceptable in the MSM community to disclose a homosexual identity rather than to disclose an illegal sex-trade practice.¹³ Money boys recruited in working venues were more willing to report their paid sex behaviors, but probably concealed their experiences of selling sex when they were asked in a clinic or a general survey (information from key informants). This was confirmed when we compared the data of this TLS study with another parallel study that recruited a mixed sample of MSM by respondent-driven sampling (RDS): 42% (14/33) of MBs participating in both studies concealed their sex-trade behaviors in the RDS survey, whereas they disclosed that behavior in TLS (data will be published elsewhere). This suggested that self-reporting information on paid sex was less reliable in the survey that recruits a mixed sample of MSM including both

MBs and ncMSM than a survey separately recruited and analyzed them.

Our findings imply that the HIV prevention programs targeted at MSM should adapt to the specific characteristics of MBs and ncMSM as different groups. Programs for MBs need to include preentry HIV test and education services given their high mobility and low awareness. For ncMSM, preventive interventions should aim at promoting condom use and behavioral change in reducing concurrent partners. In addition, specific venue-based intervention strategies focusing on the characteristics of MBs and ncMSM in different types of venues should be recommended.

The study used TLS, a powerful approximate probability sampling method in reaching hard-to-reach populations. There are several limitations in this study. First, MSM who did not go to any physically existing venues were not able to be recruited. We conducted a separate survey using RDS method to include those MSM. The result showed a similar rate of HIV infection in venue-based MSM and non-venue-based MSM, indicating no substantial difference in the rate of HIV infection between the venue-based MSM and non-venue-based MSM. Second, despite that we made a great effort to attempt to reach all MSM venues in Shenzhen, some venues possibly were unidentified or inaccessible. However, the unidentified or inaccessible venues were estimated to be less than 10% of all venues and, thus, might not influence substantially the results. Then, varied refusal rates were found in different venues or sample groups, which might influence the representative of the MSM population under study. The reason that MBs had a higher recruitment success than did ncMSM (89% vs. 63%) might be related to their willingness to participate. Noncommercial MSM participated in the survey and had their blood test at their pastime, whereas MBs did the survey during their working hours. In our survey, we recorded the number of enumerated, intercepted, eligible, and participated subjects, respectively, in each VDT and used a weighting scheme. The weighting considered the probability of the inclusion of homogeneity of individuals sampled in each VDT and therefore allowed for less biased estimation in the targeting population. In summary, the study made a comparison between MBs and ncMSM in China and found some differences in HIV infection and related risk factors. The results suggested that different intervention strategies should be formulated and provided to target their different characteristics, specific risky behaviors, and medical needs.

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