ORIGINAL RESEARCH ARTICLE

Risk behaviour and HIV prevalence among men who have sex with men in a multiethnic society: a venue-based study in Kuala Lumpur, Malaysia

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Summary: This research aimed to determine HIV prevalence, risk behaviour and knowledge of transmission methods among men who have sex with men (MSM) in Kuala Lumpur, Malaysia. Venue–day–time sampling (VDTS) was applied to identify venues where men congregate to solicit sex from other men. Participants recruited from clubs, massage parlours, saunas and one park self-completed a computerized behavioural questionnaire, were administered an oral rapid HIV test and given the opportunity to return later to receive full counselling and learn their HIV status. A total of 517 men were enrolled into the study. The majority were Malays (47.0%) and Chinese (43.7%). Twenty tested HIV positive (3.9%). Significant predictors of HIV infection included having unprotected anal sex with a casual partner (44.9% of participants, odds ratio [OR] = 2.99; 95% confidence interval [CI] 1.13–7.90; $P = 0.027$), having unprotected receptive anal sex (27.9%, OR = 2.71; 95% CI 1.10–6.54; $P = 0.030$) and having group sex (33.3%, OR = 3.95; 95% CI 1.55–10.09; $P = 0.004$). One in five participants (20.1% and 19.5%) did not believe that HIV could be transmitted through insertive or receptive anal sex, respectively. Risk behaviour is high and knowledge of HIV transmission methods was low among MSM in Kuala Lumpur. Future prevention efforts should focus on providing risk reduction education to this community.

Keywords: HIV, AIDS, homosexuality, men who have sex with men, sexual behaviour, south east Asia, Malaysia

INTRODUCTION

When compared with the well-studied HIV epidemic among injecting drug users,[1] we know little about the prevalence of HIV infection in the community of men who have sex with men (MSM) in Malaysia. Of the 84,630 total reported cases of HIV infection in Malaysia from 1986 to 2008, the Ministry of Health reports that 1585, or 1.9%, were infected through homosexual or bisexual activity.[2] However, such data are based on a person's voluntary declaration of a history of male-to-male sex, which is illegal in Malaysia. Homosexuality is heavily stigmatized in Malaysian society, and anal sex (or publicly advocating for the safe practice thereof) is explicitly or implicitly prohibited by law.[3,4] No peer-reviewed research exists, but based on clinical anecdotes and unpublished internal reports, HIV incidence may be increasing and HIV-associated risk behaviour is common in the Malaysian MSM community.[4,5]

Recently, previously unrecognized HIV epidemics have been reported among MSM in urban areas throughout Asia.[6,7] HIV prevalence among MSM was found to be 8.7% in Phnom Penh, Cambodia,[8] as low as 0.0% in Khanh Hoa province, Vietnam,[9] 7.8% in Ho Chi Minh City, Vietnam,[10] 5.6% in Vientiane, Lao People's Democratic Republic,[11] 4.2% in Singapore,[12] 10.4–12.5% in Chongquing, China,[13] and 0.4–5.8% in Beijing, China.[14,15] Of particular concern is Bangkok, where HIV prevalence among MSM increased from 17.3% in 2003 to 30.8% in 2007.[16–18] Several studies have noted inconsistent condom use, co-infection with other sexually transmitted infections (STIs), multiple male partners and the existence of female partners among MSM in south east Asia.[19–25]

Kuala Lumpur, the capital of Malaysia, is a large metropolitan area of 1,629,000 people or 6.0% of Malaysia's total population,[26] which in 2008 accounted for 3.1% of the country's new HIV cases.[2] Entertainment venues targeting MSM clients exist in a quasi-legal status and are often the target of police raids and public scrutiny. Public parks where men 'cruise' for casual sexual encounters with other men have also been identified.[4,5] Only one registered organization, the PT Foundation (known locally as Pink Triangle Foundation), provides

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education, support, and HIV counselling and testing services to Kuala Lumpur's MSM community.

Socioeconomic and heath disparities exist between Malays, Indians and Chinese, the three main ethnicities that comprise Malaysian society.[27–30] However, little is known regarding ethnic-specific differences within the MSM community. In order to direct future prevention efforts, we aim in this study to determine the HIV prevalence, transmission risk factors and level of knowledge about HIV transmission methods for the MSM community of Kuala Lumpur as a whole and among its composite ethnicities.

METHODS

We employed an adaptation of venue–day–time sampling (VDTS)[31,32] to identify venues where men congregate for the purpose of meeting or soliciting sex from other men. In four distinct phases we: one, identified and mapped possible venues; two, enumerated foot traffic entering each venue at various times and days; three, determined logistical feasibility and venue owners' willingness to participate; and, four, enrolled MSM for HIV testing and risk behaviour assessment. Outreach workers from the PT Foundation, trained in study recruitment, data collection and rapid HIV testing procedures, conducted all phases of the VDTS protocol.

Of the 21 venues identified and mapped during phase 1 of VDTS, three were eliminated based on insufficient foot traffic. A further four venues were eliminated because of the managements' unwillingness to participate. Three clubs, two massage parlours, eight saunas and one park were selected for study participation at the completion of VDTS phase 3. Due to the sensitive nature of homosexuality in Malaysia and the ongoing threat of police raids, care was taken to keep the names and locations of selected venues confidential. Each venue was sampled during hours of peak foot traffic on two evenings, one weekday and one weekend, between May and July 2009. To be eligible, men needed to be at least 18 years of age, self-identifying as gay or bisexual (ascertained simply by asking the potential participant straightforwardly if they were gay or bisexual) or having any type of sexual interaction with another man in the past five years, and residing in Kuala Lumpur or having visited the city at least three times in the past six months for the purpose of sexual contact of any kind with another man. This arbitrary cut-off of three times in the past six months was adopted after unanimous agreement between local MSM peer staff and health-care workers. Peer staff asked potential participants verbally if they met eligibility criteria. After obtaining verbal informed consent, participants were asked to self-complete a 15-minute risk behaviour and demographic questionnaire administered on hand-held mini-PCs (Model HP 2133 Mini Note-PC, HP, Inc, Palo Alto, CA, USA), offered in the participant's language choice of English, Mandarin or Bahasa Melayu. Outreach workers made themselves available to assist participants with the questionnaire, if needed. Upon completion, outreach workers administered an oral rapid HIV test (OraQuick ADVANCE Rapid HIV-1/2 Antibody Test, OraSure Technologies, Inc, Bethlehem, PA, USA). The tests were read by trained laboratory technicians stationed in an office within the venue or in a specially retrofitted van nearby. A participant was considered oral fluid HIV-positive if the OraQuick test was reactive for infection (99.6% sensitive and 100% specific for the detection of HIV in oral fluid based on clinical trials).[33] HIV test results were linked to questionnaire answers via randomly generated barcodes to maintain participant anonymity. Participants were also given a bar-coded identification card, informed the location of an office to which they could return one week later for full counselling, retrieval of HIV results and HIV confirmatory testing if found reactive. Participants were allocated RM 50 (approximately USD$14) as compensation for time and transportation. Study procedures were considered complete for a participant after they provided consent, completed the questionnaire, were administered a rapid oral HIV test and received his bar-coded return-to-clinic card. Our computerized questionnaire asked for subject's specific birth date, from which we planned to calculate numerical age. As a large percentage of participants (57%) declined to provide their birth dates or provided fictional dates, we were unable to evaluate age in our analysis. The association between demographic and behavioural factors and HIV infection was evaluated using Pearson's chi-squared test (SPSS Version 16.0, SPSS, Inc, Chicago, IL, USA). Factors found to be statistically significant ($P < 0.05$) were examined further with multivariate analysis. Since sexual eligibility criteria differed for those residing in- and outside of Kuala Lumpur, all analyses controlled for participants' place of residence. Bivariate analysis was also used to evaluate the association between ethnicity and correct knowledge of established HIV transmission methods (sharing of needles and anal intercourse), and also between ethnicity and sexual risk behaviours found associated with HIV infection in the current study.

RESULTS

Demographics and HIV prevalence

Of the 529 men eligible for the study, 517 (97.7%) completed study procedures. Twelve men did not complete the computerized questionnaire or refused to provide an oral fluid sample. Of all men initially approached, eligibility and consent rates were 97.2% in clubs, 61.1% in massage parlours, 73.4% in saunas and 84.0% in the park. Of the 517 study participants, 47.0% were ethnic Malays, 43.7% Chinese and 5.0% Indians (Table 1). Most (86.5%) participants resided in Kuala Lumpur, with 25.5% living alone, 32.7% with their family and 41.8% with a partner or friend. A range of educational levels were represented: 34.8% completed less than or up to secondary school, 30.0% completed a vocational or diploma programme and 35.2% of participants completed university. Overall, 20 (3.9%) tested positive for HIV. Bivariate analysis showed that being recruited in a massage parlour (compared with a club) and being of Malay or 'other' (compared with Chinese) race were statistically significant predictors of testing positive for HIV infection.

Risk behaviour and knowledge of transmission methods

Among the 517 participants 196 (37.9%) reported two to five partners, and 133 (25.7%) reported six or more regular or casual male partners in the past six months (Table 2). A total of 28.5% of men recruited at clubs reported no male partners within the past six months, as compared with 9.1% of men recruited from massage parlours, 14.7% of men from saunas

Table 1 **HIV prevalence for men who have sex with men in Kuala Lumpur by demographic variables**

Categorical variables	Total *n* (%)	HIV positive *n* (%)	OR (95% CI)	*P* value*
Overall	517 (100)	20 (3.9)		
Recruitment venue				
Club	207 (40.0)	7 (3.4)	Referent	
Massage parlour	11 (2.1)	3 (27.2)	10.71 (2.32–49.28)	0.002
Sauna	163 (31.5)	8 (4.9)	1.48 (0.52–4.15)	NS
Park	136 (26.3)	2 (1.5)	0.43 (0.09–2.08)	NS
Language				
English	208 (40.2)	5 (2.4)	Referent	
Bahasa Melayu	209 (40.4)	12 (5.7)	2.47 (0.86–7.15)	0.095
Mandarin	100 (19.3)	3 (3.0)	1.26 (0.29–5.36)	NS
Ethnicity				
Malay	243 (47.0)	13 (5.3)	3.14 (1.01–9.77)	0.049
Chinese	226 (43.7)	4 (1.8)	Referent	
Indian	26 (5.0)	0 (0.0)	–	
Other	22 (4.3)	3 (13.6)	8.76 (1.83–42.06)	0.007
Religion at birth				
Muslim	251 (48.5)	15 (5.6)	2.50 (0.81–7.16)	0.112
Hindu	22 (4.3)	0 (0.0)	–	
Buddhist	173 (33.5)	4 (2.3)	Referent	
Christian	43 (8.3)	1 (2.3)	1.01 (0.11–9.27)	NS
None	19 (3.7)	0 (0.0)	–	
Other	9 (1.7)	1 (11.1)	5.28 (0.53–52.85)	NS
Current religion				
Muslim	245 (47.4)	13 (5.3)	1.93 (0.62–6.05)	NS
Hindu	22 (4.3)	0 (0.0)	–	
Buddhist	142 (27.5)	4 (2.8)	Referent	
Christian	60 (11.6)	2 (3.3)	1.19 (0.21–6.68)	NS
None	41 (7.9)	0 (0.0)	–	
Other	7 (1.4)	1 (14.3)	5.75 (0.56–59.62)	NS
Education				
Secondary or less	180 (34.8)	9 (5.0)	1.86 (0.61–5.67)	NS
Diploma/vocational	155 (30.0)	6 (3.9)	1.43 (0.43–4.76)	NS
University	182 (35.2)	5 (2.7)	Referent	
Living situation				
Alone	132 (25.5)	9 (6.8)	2.56 (0.89–7.37)	0.081
Family	169 (32.7)	5 (3.0)	1.07 (0.32–3.56)	NS
Partner/friend	216 (41.8)	6 (2.8)	Referent	
Residence				
Kuala Lumpur	447 (86.5)	17 (3.8)	Referent	
Other	70 (13.5)	3 (4.3)		NS
Employment status				
Student	87 (16.8)	1 (1.1)	Referent	
Employed†	397 (76.8)	18 (4.5)	4.08 (0.54–31.01)	
Unemployed‡	33 (6.4)	1 (3.0)	2.69 (0.16–44.26)	NS

OR = odds ratio; CI = confidence interval; NS = not significant
*NS, *P* value >0.2
†Defined as full- or part-time employment
‡Defined as unemployed or on pension

and 22.1% of men from the park. Common risk behaviours in our study population included having unprotected anal sex with a regular (steady) male partner (37.1%), unprotected anal sex with a casual male partner (44.9%), unprotected insertive anal sex with a regular or casual partner (34.8%), unprotected receptive anal sex with a regular or casual partner (27.9%) and group sex involving at least two other men (33.3%) in the past six months. Nearly a quarter of participants reported having anal sex with a regular or casual partner while under the influence of recreational drugs (23.8%) and alcohol (23.2%), and nearly half (47.2%) had found regular or casual male partners via the Internet in the past six months. There were no significant variations in group sex or anal sex while using drugs or alcohol between the four different recruitment venues. A sizable proportion (34.8%) reported having a previous HIV test, with or without counselling, within the past two years, and 6.8% reported to have been diagnosed with an STI other than HIV in the past year. Insertive anal sex was correctly identified as a possible route of HIV transmission by 79.9%, and receptive anal sex by 80.5%. In bivariate analysis, as well as multivariate analysis, controlling for place of residence, having unprotected anal sex with a casual male partner, having unprotected receptive anal sex with a regular or casual partner in the past six months and having group sex in the past six months were significantly associated with testing positive for HIV. Of these factors, unprotected anal sex with a casual male partner in the past six months was significantly more often reported by Malays when compared with Chinese. No other differences in HIV risk factors were found by ethnicity (Table 3). Across the three established routes of HIV transmission (sharing of needles and insertive and receptive anal sex) Indians were consistently more likely than Malays and Chinese to express the incorrect belief that these behaviours cannot transmit HIV infection (Table 4).

Table 2 **HIV prevalence among men who have sex with men in Kuala Lumpur by risk behaviour and knowledge of transmission methods**

Categorical variables	Total *n* (%)	HIV-positive *n* (%)	OR (95% CI)	*P* value	Bivariate OR (95% CI)	Multivariate (control for residency)* *P* value†
Sexual orientation						
Homosexual	329 (63.6)	10 (3.0)	Referent			
Heterosexual/bisexual/confused	178 (34.4)	10 (5.3)	1.79 (0.73–4.39)	0.202		
Free time spent with men who have sex with men						
None or a little	167 (32.3)	9 (5.4)	2.35 (0.71–7.78)	0.162		
Some	181 (36.0)	7 (3.9)	1.66 (0.48–5.77)			
A lot	169 (32.7)	4 (2.4)	Referent			
Number of recent male partners, total (underlined) and by venue type (regular or casual partners, past 6 months)‡						
0	114 (22.1)	4 (3.5)	Referent			
Club	59 (28.5)	–	–			
Massage parlour	1 (9.1)	–	–			
Sauna	24 (14.7)	–	–			
Park	30 (22.1)	–	–			
1	74 (14.3)	4 (5.4)	1.57 (0.38–6.49)	0.532		
Club	35 (16.9)	–	–			
Massage parlour	1 (9.1)	–	–			
Sauna	16 (9.8)	–	–			
Park	22 (16.2)	–	–			
2–5	196 (37.9)	6 (3.1)	0.87 (0.24–3.15)			
Club	78 (37.7)	–	–			
Massage parlour	7 (63.6)	–	–			
Sauna	57 (35.0)	–	–			
Park	54 (39.7)	–	–			
6 or more	133 (25.7)	6 (4.5)	1.30 (0.36–4.72)			
Club	35 (16.9)	–	–			
Massage parlour	2 (18.2)	–	–			
Sauna	66 (40.5)	–	–			
Park	30 (22.1)	–	–			
Anal sex with a regular (steady) male partner (insertive or receptive, past six months)§						
No	192 (37.1)	6 (3.1)	–			
Yes	325 (62.9)	14 (4.3)	–			
Unprotected anal sex with a regular (steady) male partner (insertive or receptive, past 6 months)§						
No	325 (62.9)	12 (3.7)	Referent			
Yes	192 (37.1)	8 (4.2)	1.13 (0.46–2.83)	0.787		
Anal sex with a casual male partner (insertive or receptive, past 6 months)**						
No	141 (27.3)	3 (2.1)	–			
Yes	376 (72.7)	17 (4.5)				
Unprotected anal sex with a casual male partner (insertive or receptive, past 6 months)**						
No	285 (55.1)	6 (2.1)	Referent			
Yes	232 (44.9)	14 (6.0)	2.99 (1.13–7.90)	0.027	3.00 (1.13–7.95)	0.027
Unprotected insertive anal sex (regular or casual partner, past 6 months)						
No	337 (65.2)	12 (3.6)	Referent			
Yes	180 (34.8)	8 (4.4)	1.26 (0.51–3.14)	0.620		
Unprotected receptive anal sex (regular or casual partner, past 6 months)						
No	373 (72.1)	10 (2.7)	Referent			
Yes	144 (27.9)	10 (6.9)	2.71 (1.10–6.54)	0.030	2.70 (1.10–6.65)	0.030
Vaginal sex (past 6 months)						
No	434 (83.9)	15 (3.5)	Referent			
Yes	83 (16.1)	5 (6.0)	1.79 (0.63–5.07)	0.273		
Group sex involving at least 2 other men (anal or oral, past 6 months)						
No	345 (66.7)	7 (2.0)	Referent			
Yes	172 (33.3)	13 (7.6)	3.95 (1.55–10.09)	0.004	4.00 (1.56–10.26)	0.004
Had HIV test (ever)						
No	305 (59.0)	11 (3.6)	Referent			
Yes	212 (41.0)	9 (4.2)	1.19 (0.48–2.91)	0.711		
Date of last HIV test						
1–7 days ago	3 (0.6)	0 (0.0)	–			
1–4 weeks ago	11 (2.1)	0 (0.0)	–			
1–6 months ago	88 (17.0)	3 (3.4)	–			
1–2 years ago	78 (15.1)	3 (3.8)	–			
2–4 years ago	31 (6.0)	2 (6.5)	–			
4 or more years ago	9 (1.7)	0 (0.0)	–			
Never	297 (57.4)	12 (4.0)	–			
Found male partners via the Internet (regular or casual partner, past 6 months)						
No	273 (52.8)	8 (2.9)	Referent			
Yes	244 (47.2)	12 (4.9)	1.71 (0.69–4.26)	0.247		
Diagnosed with STI other than HIV (self-reported, past year)						
No	482 (93.2)	20 (100.0)	–			
Yes	35 (6.8)	0 (0.0)	–			

(Continued)

Table 2 Continued

Categorical variables	Total *n* (%)	HIV-positive *n* (%)	OR (95% CI)	*P* value	Bivariate OR (95% CI)	Multivariate (control for residency)* *P* value†
Had anal sex while under influence of recreational drugs (past 6 months)						
No	394 (76.2)	13 (3.3)	Referent			
Yes	123 (23.8)	7 (5.7)	1.77 (0.69–4.54)	0.236		
Had anal sex while under influence of alcohol (past 6 months)						
No	397 (76.8)	15 (3.8)	Referent			
Yes	120 (23.2)	5 (4.2)	1.11 (0.39–3.11)	0.847		
Believe HIV can be transmitted through touch						
No	485 (93.8)	17 (3.5)	Referent			
Yes	32 (6.2)	3 (9.4)	2.85 (0.79–10.28)	0.110		
Believe HIV can be transmitted through sharing food						
No	479 (92.6)	19 (4.0)	1.53 (0.20–11.74)	0.683		
Yes	38 (7.4)	1 (2.6)	Referent			
Believe HIV can be transmitted through sharing a toilet						
No	509 (98.5)	20 (100.0)	–			
Yes	8 (1.5)	0 (0.0)	–			
Believe HIV can be transmitted through sharing needles						
No	108 (20.9)	6 (5.6)	1.66 (0.62–4.43)	0.311		
Yes	409 (79.1)	14 (3.4)	Referent			
Believe HIV can be transmitted through kissing						
No	387 (74.9)	13 (3.4)	Referent			
Yes	130 (25.1)	7 (5.4)	1.64 (0.64–4.20)	0.305		
Believe HIV can be transmitted through giving oral sex						
No	198 (38.3)	9 (4.5)	1.33 (0.54–3.28)	0.531		
Yes	319 (61.7)	11 (3.4)	Referent			
Believe HIV can be transmitted through receiving oral sex						
No	266 (51.5)	12 (4.5)	1.44 (0.58–3.57)	0.437		
Yes	251 (48.5)	8 (3.2)	Referent			
Believe HIV can be transmitted through insertive anal sex						
No	104 (20.1)	6 (5.8)	1.75 (0.65–4.66)	0.266		
Yes	413 (79.9)	14 (3.4)	Referent			
Believe HIV can be transmitted through receptive anal sex						
No	101 (19.5)	5 (5.0)	1.39 (0.49–3.93)	0.531		
Yes	416 (80.5)	15 (3.6)	Referent			

OR = odds ratio; CI = confidence interval; NS = not significant

*Bivariate analysis controlled for participant's place of residence (between those residing in Kuala Lumpur and those residing elsewhere)

†NS, *P* value >0.2

‡Percentages listed for individual venue types refer to the number of participants recruited from that particular venue type who reported the specified number of recent male partners divided by the total number of participants recruited from that venue type

§Regular partner defined as 'a boyfriend or someone they have sex with regularly'

**Casual partner defined as 'a one-night stand or someone who you have sex with once or twice but don't plan to see again in the future'

DISCUSSION

This survey found that 3.9% of MSM attending entertainment venues and parks in Kuala Lumpur were infected with HIV – a value higher than Malaysia's overall adult HIV prevalence of 0.5%.[34] This prevalence is similar to that found in MSM communities in Cambodia, Laos, Vietnam and Singapore,[11–15] but considerably less than that of neighbouring Bangkok.[12] The large number of different partners, unprotected anal sex, anal sex while under the influence of drugs or alcohol and misconceptions about HIV transmission provide a suitable epidemiological background for a growing epidemic of HIV infection in this population in the future.

The considerable amount of misinformation about routes of HIV transmission among MSM in Kuala Lumpur underscores the need for increased prevention activities. With 20.1% and 19.5% of MSM believing HIV cannot be transmitted through insertive or receptive anal sex, respectively, we are less surprised to find that 34.8% reported having unprotected insertive anal sex and 27.9% reported unprotected receptive anal sex in the past six months. Clubs, saunas and massage parlours could serve as key sources of men's health information for the MSM community, but as many venue owners anecdotally lamented to us during preparations for this study, displaying safe-sex educational materials or distributing condoms could expose venue owners to criminal persecution due to the interpretation or misinterpretation of Malaysian law. Passages such as 'whoever sells, lets to hire, distributes, publicly exhibits or in any manner puts into circulation, or for purposes of sale, hire, distribution, public exhibition or circulation makes, produces or has in his possession any obscene book, pamphlet, paper, drawing, painting representation or figure or any other obscene object whatsoever…' (Section 292 of the Malaysian Penal Code) are often misinterpreted by the police to include safe-sex educational materials and condoms. Unfortunately, laws criminalizing homosexual behaviour or discouraging related safe-sex education can hinder effective HIV prevention programmes for MSM.[4,5]

Of particular concern is the high proportion of men reporting anal sex under the influence of drugs. Among MSM in the western world, use of amphetamine-type substances (ATS) during sex has been found associated with prevalent and incident HIV infection, particularly if used in combination with erectile dysfunction drugs.[35] The usage of ATS is increasing in Malaysian society, a trend for which the public health sector in Malaysia seems ill-prepared to address.[36]

Table 3 **Selected risk behaviour by ethnicity among men who have sex with men in Kuala Lumpur**

Type of risk behaviour	Total *n* (%)	Reporting behaviour *n* (% of total)	OR (95% CI)	*P* value*
Unprotected anal sex with a casual male partner (receptive or insertive, past 6 months)†				
Malay	243 (47.0)	120 (49.4)	1.47 (1.02–2.13)	0.038
Chinese	226 (43.7)	90 (39.8)	Referent	
Indian	26 (5.0)	11 (42.3)	1.11 (0.49–2.52)	
Other	22 (4.3)	11 (50.0)	1.51 (0.63–3.63)	
Unprotected receptive anal sex (regular or casual partner, past 6 months)				
Malay	243 (47.0)	74 (30.5)	1.40 (0.93–2.10)	
Chinese	226 (43.7)	54 (23.9)	Referent	
Indian	26 (5.0)	7 (26.9)	1.17 (0.47–2.94)	
Other	22 (4.3)	9 (40.9)	2.21 (0.89–5.44)	0.086
Group sex involving at least 2 other men (past 6 months)				
Malay	243 (47.0)	86 (35.4)	1.27 (0.86–1.88)	0.222
Chinese	226 (43.7)	68 (30.1)	Referent	
Indian	26 (5.0)	10 (38.5)	1.45 (0.63–3.36)	
Other	22 (4.3)	8 (36.4)	1.33 (0.53–3.31)	

OR = odds ratio; CI = confidence interval; NS = not significant
*NS, *P* value >0.2
†Casual partner defined as 'a one-night stand or someone who you have sex with once or twice but don't plan to see again in the future'

Table 4 **Knowledge of HIV transmission methods by ethnicity among men who have sex with men in Kuala Lumpur**

Transmission belief	Total *n* (%)	Incorrect response *n* (% of total)	OR (95% CI)	*P* value
Incorrectly believing HIV cannot be transmitted through sharing needles				
Malay	243 (47.0)	41 (16.9)	1.47 (0.93–2.33)	0.097
Chinese	226 (43.7)	52 (23.0)	Referent	
Indian	26 (5.0)	9 (34.6)	0.56 (0.24–1.34)	
Other	22 (4.3)	6 (27.3)	0.80 (0.30–2.14)	
Incorrectly believing HIV cannot be transmitted through insertive anal sex				
Malay	243 (47.0)	53 (21.8)	1.58 (0.98–2.53)	0.061
Chinese	226 (43.7)	34 (15.0)	Referent	
Indian	26 (5.0)	10 (38.5)	3.53 (1.48–8.43)	0.005
Other	22 (4.3)	7 (31.8)	2.64 (1.00–6.94)	0.050
Incorrectly believing HIV cannot be transmitted through receptive anal sex				
Malay	243 (47.0)	48 (19.8)	1.18 (0.74–1.88)	
Chinese	226 (43.7)	39 (17.3)	Referent	
Indian	26 (5.0)	10 (38.5)	3.00 (1.27–7.10)	0.013
Other	22 (4.3)	4 (18.2)	1.07 (0.34–3.32)	

OR = odds ratio; CI = confidence interval

The sexual transmission of HIV among MSM can be seen as a shift away from an epidemic centred around injecting drug use, which has long been regarded as the driving force in the spread of HIV in Malaysia.[1] Recent increases in reported cases of HIV among Malaysian women appear to signify the growing role of sexual transmission of HIV in Malaysia.[2] Male-to-male transmission will continue to add to this trend. Although the heterosexual and MSM epidemics are likely separate, it should be noted that, with 34.4% of our participants not identifying as strictly homosexual, and 16.1% reporting vaginal sex with a female in the past six months, potential bridges for HIV transmission exist between this community of MSM and the general population.

One cannot ignore the role of Islamic cultural norms when exploring why Malays were more likely than their Chinese peers to be HIV-positive and to engage in key risk behaviour (unprotected anal sex with a casual male partner). Research in Islamic societies has shown that local culture can reinforce the notion that 'HIV transmission cannot be a problem in the Muslim world'.[37] This probably rises from the belief that traditional religious values regarding pre- and extra-marital sex should suffice as protection from HIV infection. In addition, MSM in Islamic countries often experience 'social stigmatization, class discrimination, ostracization from family and friends, and...prosecution by law'.[37] This may limit their access to HIV prevention information and tools, since such services may identify them as MSM or at risk for HIV infection. Future prevention initiatives would be well served to specifically address these types of cultural beliefs.

The study has a number of methodological limitations. We only examined men frequenting gay entertainment venues and cruising parks; those who are not visiting such venues may have a different HIV prevalence and risk factor profile. Men who attend venues infrequently may be underrepresented, and it is possible (because this study was anonymous) that a participant may have enrolled more than once. The inclusion of a particular venue was dependent on the willingness of that venue's owner to participate; we do not know if MSM attending venues with uncooperative owners have different HIV prevalence levels or risk behaviour profiles. The small number of massage parlours included, and the possibility that some of the massage staff may have enrolled in the study, could have artificially inflated the high HIV prevalence found in this venue type. We sampled only one park, albeit the largest and most prominently associated with male 'cruising', according to our peer staff contacts in Kuala Lumpur. Furthermore, we

did not consider Internet dating sites as potential venues. With 47.2% of our participants reporting to have found one or more male partners via the Internet in the past six months, future surveillance efforts should incorporate online recruitment. This could be accomplished within VDTS methodology by the inclusion of MSM-oriented Internet dating sites as an additional recruitment 'venue', or by employing a variation of respondent-driven sampling.[38] A final limitation of our study is the absence of age data and our inability to control for age in our analysis. Age is a common correlate of HIV infection and behavioural risk and some of the differences between groups in our study may have been due to differences in age. Future studies may avoid this pitfall by simply asking participants to list their numerical age instead of requesting their actual birth date, since the latter could be a potential identifier.

Regardless, this study establishes a clear and urgent need to provide more effective HIV education to the Malaysian MSM community. Advocate groups like the PT Foundation have established infrastructure and maintain close, well-informed ties with the community, but their efforts are constrained by social stigma and the interpretation or misinterpretation of legal codes of Malaysia.[3–5] Resultantly, they often lack financial and technical resources. In addition to behavioural interventions, legal and social changes are therefore necessary to more effectively combat the spread of HIV infection among MSM in Malaysia.

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