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Factors Associated with Unprotected Receptive Anal Intercourse with Internal Ejaculation Among Men Who Have Sex with Men in a Large Internet Sample from Asia

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Abstract

We examined socio-demographic and behavioral characteristics of men who have sex with men (MSM) residing in Asia and correlates of unprotected receptive intercourse with Internet ejaculation (URAIE). Asia Internet MSM Sex Survey, a behavioral survey of MSM in Asia was conducted from 1 January to 28 February 2010. Data analysis was limited to participants aged 18 or above, biological male, and had one regular or casual sex partner in the past 6 months (n = 10,413). Pearson's Chi-square test, t test and logistic regression were used to examine the correlates of URAIE in the past 6 months, the highest risk sexual behavior sampled. Of 7311 participants who had receptive anal intercourse, 47.5 % had URAIE, which was associated with the following attributes: less than high-school education and pre-college education compared to university (AOR = 1.53, 95 % CI: 1.28, 1.83; AOR = 1.22, CI: 1.08, 1.37), being in the heterosexual marriage (AOR = 1.35, CI: 1.18, 1.56), having regular partners or both regular and casual partners compared to having casual partners (AOR = 2.85, CI: 2.48, 3.27; AOR = 2.32, CI: 2.06, 2.62), HIV-positive compared to HIV-negative status (AOR = 1.39, 95 % CI: 1.08, 1.81), higher perception of HIV risk (AOR = 1.62, CI: 1.34, 1.95), use of recreational drug before sex (AOR = 1.30, CI: 1.14, 1.49), and use of the Internet as the main way to seek sex partners (AOR =

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1.21, CI: 1.08, 1.36). MSM from certain Asian countries reported alarming rates of URAIE. The internet can be used as a platform for HIV surveillance and intervention.

Keywords

Asia; Men who have sex with men; Internet; Unprotected receptive anal intercourse; Barebaking

Introduction

Alarming increases in HIV infection have been reported among men who have sex with men (MSM) communities in Asian countries [1]. Stigma and discrimination against sexual minorities pose tremendous challenges in conducting behavioral surveillance as well as outreach to MSM in this region. Many MSM are afraid to be identified for fear of cultural and legal consequences. Today, Internet users in Asia make up 44 % of the Internet users worldwide [2]. The anonymous and easy-to-access nature of the Internet has made gay chat rooms and websites popular spaces for Asian MSM to seek romance, sexual opportunities, and to express their sexual identities [3]. A Chinese study found that the most popular three gay websites in China have attracted more than half million users across mainland China [4]. An Internet-based survey is a practical way to collect socio-behavioral data on large numbers of MSM because it protects the privacy of the respondents and being more cost-effective than conducting venue-based behavioral surveys. For such reasons, the Internet provides a unique and well-timed opportunity to assess risk-taking contexts among MSM [5].

HIV surveillance surveys among MSM have been conducted in a number of Asian countries [1]. While the surveillance surveys at the traditional gay venues have been useful in understanding HIV prevalence and basic behavioral risks in various countries, these assessments lack indepth questions related to HIV acquisition and transmission risks. The usual variables are unprotected anal intercourse, having multiple sex partners, and the correlates of these. But in order to monitor the change in risk behaviors among MSM, regular assessments need to cover the range of activities currently being practiced by MSM, including the specifics of unprotected anal intercourse and harm reduction strategies such as withdrawal before ejaculation inside the partner’s anus. One behavior in particular that confers the highest HIV acquisition risk and not an uncommon activity among MSM is unprotected receptive anal intercourse with internal ejaculation (URAIE). And so by assessing these activities and regularly monitoring them, we will know (1) the prevalence and frequencies of various high-risk and harm reduction strategies and (2) the correlates of these activities so that we may better inform and evaluate the effectiveness of current preventive interventions for MSM. In this article, we investigated demographic characteristics, HIV risk behaviors, potential harm reduction behaviors and factors associated with URAIE among a large Internet sample of MSM throughout the Asia Pacific region.

Method

Study Design and Participants

The current study analyzed data from an online survey, AIMSS (Asian Internet MSM Sex Survey, http://www.2010aimss.com), the first online behavioral study of MSM in Southeast Asia and East Asia countries. Fridae.com, a website that has one of the largest subscription base of websites with gay-oriented content in Asia, has partnered with 40 community partners from 12 countries in Asia to administer this online survey from 1 January to 28 February 2010.

Procedures

Participants were recruited exclusively through online methods, primarily through animated web banners and direct electronic mailers sent through a network of gay community partners. For a two-month period, this online survey was advertised in a series of pop-ups and banners in gay chat rooms and gay-related websites. When participants clicked on a pop-up or banner, they were taken to the banner's website and were invited to complete an anonymous, self-administered survey. There was no sampling frame in which gay websites users were randomly selected to participate to the study. Therefore, results of this study cannot be generalized to the whole population of MSM who use Internet in the regions. This online survey, estimated to take between 15 and 30 min to complete, was available in English and 9 Asian languages and dialects (Chinese Simplified, Chinese Traditional, Cantonese, Japanese, Thai, Tagalog, Bahasa Malaysia, Bahasa Indonesia, and Vietnamese). Community-based organizations from various countries throughout the regions collaborated with Fridae and helped translate and back-translate the survey questions to ensure appropriateness to local cultural contexts.

Participants over the age of 18 years and self-identified as MSM or transgender were invited to participate in the survey. Personal identifying information was not collected and no incentives were given to participants for completing the survey. The University of Pittsburgh Institutional Review Board reviewed and approved the secondary data analysis. During the two-month period, 24,742 participants entered the survey and 13,883 (56.1 %) completed the questionnaire. For this analysis, participants needed to be biologically male, over the age of 18, and have had at least one male sex partner in the past six months (n = 10,861). In addition, 448 participants (4 %) who reported having had only commercial male sex partners in the past 6 months were excluded from the analysis, yielding a final analytic sample of 10,413 men.

Measures

AIMSS questionnaire was adapted from the Gay Community Periodic Survey, developed by the National Center in HIV Social Research of the University of New South Wales [6] (Table 1). The questionnaire included sociodemographic characteristics such as country of residence, age, employment status, educational level, sexual orientation, and marital status. Bhutan, Brunei, Cambodia, East Timor, India, Laos, Macau Mongolia, Myammar, Nepal, and Pakistan were grouped as "other regions or countries" because there were too few participants from these countries.

HIV-Related Behavior Variables—Unprotected receptive anal intercourse with internal ejaculation in the past 6 months (referred to as URAIE later in the text), a sex act that confers the highest per-contact risk of HIV transmission [7], was the main variable of interest. Additionally, participants were asked about their other sexual behaviors in the past 6 months, including the number of male and female sex partners, frequencies of anal intercourse with regular male partners ("boyfriend/lover") and casual male partners. Other variables related to HIV transmission included using recreational drugs before sex in the past 6 months, and drinking alcohol during or before sex in the past 6 months. Perceived risk of HIV infection was coded as very low to low (1–2), medium (3), and high to very high (4–5). In addition, participants were asked to identify the main way they met sexual partners in the past 6 months. HIV testing status and self-reported HIV status were also collected.

Statistical Analysis

Bivariate correlates for URAIE among those who reported having receptive anal intercourse in the past 6 months were examined by using *t* test (continuous variable) or Pearson's Chi-square test (categorical variables). Variables associated ($p \leq 0.1$) with URAIE in the bivariate analysis were entered into a multivariable logistic regression model. Age, country of residence, ethnicity, and employment status were treated as covariates in the final model and they were not reported in the final multivariable model. The number of male sex partners was not included in the bivariate or multivariable analysis because it was collinear with partner type (MSM who had both regular and casual partners are more likely to have higher number of male sex partners). All analyses were conducted using SAS 9.2 statistical software (SAS Institute Inc. Carrey, North Carolina, USA).

Results

Demographic Characteristics of the Overall Sample

As shown in Table 2, about 33 % (n = 3,426) of the sample came from mainland China, 15 % (n = 1,528) from Singapore, 11 % (n = 1,169) from Malaysia, 10 % (n = 1,048) from Taiwan and 9.5 % (n = 994) from Hong Kong. The median age of the participants was 30 (mean = 31.9, standard deviation = 9.4). The majority of participants were highly educated (68 % had college degree or higher), employed full time (73 %), never married (85 %), and self-identified as homosexual or gay (84 %). While 44 % (n = 4,574) of participants had an HIV test within the past year, 34 % (n = 3,542) had never been tested for HIV. About 38 % (n = 3,878) did not know their HIV status either because they never had a test or they did not collect their test results. Among those who knew their HIV status (n = 6,435), self-reported HIV prevalence was 6.2 %.

Alcohol, Recreational Drug Use and Online Sex Seeking in the Past 6 Months

Of 10,413 participants, 13.8 % (n = 1,439) reported using recreational drugs before sex once or more in the past 6 months while 39.6 % (n = 4,126) had alcohol before sex once or more in the past 6 months. Self-perception of risk for HIV infection was generally low, with 71 % (n = 7,367) rated their risk to be 'low to very low'. A majority of participants (71 %) reported using the Internet as their "main way to meet sex partners", 13 % (n = 1,330) went

to saunas, and 6.8 % (n = 706) used friendship networks as main ways to meet sex partners (data not shown).

Risky Sexual Behaviors in the Past 6 Months

Generally, participants reported having more than one male sex partners in the past 6 months (72 %). A small fraction of participants (7 %) also reported having one or more female sex partners in the past 6 months. A majority of participants (85.8 %) reported having had either insertive or receptive anal intercourse with their male sex partners in the past 6 months. Of the 6,950 men who had insertive anal intercourse, 46.8 % reported unprotected insertive anal intercourse with internal ejaculation (UIAIE); and of 7,311 men who had receptive anal intercourse, 47.5 % reported unprotected receptive anal intercourse with internal ejaculation (URAIE) in the past 6 months.

Correlates of URAIE

Table 3 shows bivariate correlates of URAIE in the past 6 months. Prevalence of URAIE was highest among participants from Indonesia (59.8 %), the Philippines (58.9 %) and lowest among participants from Japan (28.3 %). The differences of URAIE across countries were statistically significant (χ^2 = 149.4, df = 9, p<0.001). Similarly, URAIE prevalence also differed across ethnicity. Fifty eight percent of participants of Malay ethnicity, mostly from Indonesia and Malaysia, reported URAIE compared to 23.9 % of Japanese participants and 38.2 % of Caucasian participants who reported URAIE in the past 6 month (χ^2 = 99.8, df = 6, p<0.001). Other bivariate correlates of URAIE include having lower education, being a student, ever married, having regular male sex partners, never tested for HIV, having unknown or positive HIV status, having high perception of risk for HIV infection, ever having used recreational drugs before sex in the past 6 months and using the Internet to find sex partners in the past 6 months. Particularly, respondents who have regular partners only reported nearly double the prevalence of URAIE (56.6 %) compared to those who have casual partners only (31.3 %). Self-identified sexual orientation, having at least one female sex partner, and ever having used alcohol before sex were, however, not associated with URAIE in the past 6 months.

In multivariate analyses (Table 4), important association with URAIE were lower education (less than high school education and pre-college education compared to university, Adjusted Odds Ratio [AOR] = 1.53, 95 % Confidence Interval [CI]: 1.28, 1.83; AOR = 1.22, CI: 1.08, 1.37), ever married compared to never married (AOR = 1.35, CI: 1.18, 1.56), having regular partners or having both regular and casual partners compared to having casual partners only (AOR = 2.85, CI: 2.48, 3.27; AOR = 2.32, CI: 2.06, 2.62), HIV-positive status compared to HIV-negative status (AOR = 1.39, CI: 1.08, 1.81), higher perception of HIV risk (AOR = 1.62, CI: 1.34, 1.95), use of recreational drugs before sex (AOR = 1.30, CI: 1.14, 1.49), and use of the Internet as the main way to seek sex partners (AOR = 1.21, CI: 1.08, 1.36).

Discussion

In a large online survey of MSM in Southeast Asia and East Asia, we investigated the prevalence and correlates of risky sexual behaviors among sexually active MSM. The

prevalences of UIAIE and URAIE are high: 46.8 % and 47.5 %, respectively. Current epidemiological data show that while Thailand [8] and parts of China [9] have already experienced HIV epidemics among MSM (HIV prevalence 30.8 % and 12.5 %, respectively), the prevalence of HIV among MSM in major cities in Malaysia (3.9 %) [10], Indonesia (5.2 %) [11], Singapore (3.2 %) [12], Vietnam (8 %) [13], Laos (5.6 %) [14], and Japan (0.9 %) [15] remain relatively low. However, in this study, significantly higher rates of URAIE were reported among participants from China, Indonesia, Malaysia, and the Philippines. This finding is worrisome as previous studies found that Asian MSM who used Internet to seek sex partners reported greater number of male sex partners [4, 16–18], unprotected anal intercourse [4, 18], multiple substance use [18], higher prevalence of sexually transmitted diseases [4, 16– 18]. A recent study from Hong Kong found that close to 60 % of the recently diagnosed HIV infected MSM have used Internet to seek sex partners [19]. Taken together, these findings confirm that Internet has become a risk environment for MSM in Asia and suggest that HIV intervention need to incorporate the Internet before HIV can potentially spread more widely among MSM in these countries.

The differences in URAIE prevalences among different countries represented in the survey may result from the differences in the social and cultural factors surrounding safer sex in these countries. In traditional societies, cultural and religious sensitivities can make MSM shy away from prevention program for fear of being identified as gay men and hence be subjected to draconian religiously motivated legal sanctions as well as ostracism from important networks of family and community. Furthermore, structural barriers to HIV prevention, such as penal code criminalizing anal sex in Malaysia have made effective prevention difficult [10].

Owing to social stigma and cultural prohibitions, many MSM in Asia, particularly Chinese MSM, are pressured to marry women and have children [20, 21]. In our study, married MSM respondents reported highest levels of URAIE in the past 6 months. The part played by MSM in transmitting HIV to their female partners in heterosexual relationships has been reported in studies from China [22, 23], Indonesia [11], Vietnam [13], and Thailand [24]. Therefore, the high levels of risky sexual behavior reported by MSM in such relationships needs to be addressed.

In the sample in which the majority of participants were university graduates, the present study found that increasing levels of education were associated with decreasing likelihood of reporting URAIE in the past 6 months. This result confirms the findings from previous studies which found MSM with low education in the region were engaging in risky sexual behavior [11, 13]. Prevention efforts need to reach MSM with low education and messages on condom use need to be simple and conveyed in a manner understandable to MSM with low education.

URAIE in the past 6 months was found to be more frequent among MSM when having anal sex with a regular partner rather than with a casual partner. This finding is consistent with previous study in which MSM reported higher level of unprotected sex with the main partners rather than with casual partners [25]. The motivations of the men who appear to be in a committed relationship to access gay websites remain unknown. Future study should

collect more detailed data which may elucidate the risk profiles of these men. An important question is whether these men who had unprotected sex with regular partners were in the sero-concordant or sero-discordant relationship. Unfortunately, the online survey collected such data only for participants reported to HIV positive.

Compared to MSM who never tested for HIV, MSM who have ever tested had a marginally significant lower risk with respect to engaging in URAIE, which suggests the importance of promoting HIV testing among MSM in Asia [26]. Additionally, MSM who tested positive reported a higher prevalence of URAIE, which points to the need for secondary prevention measures as well as prevention of other sexually transmitted diseases among HIV-positive MSM. Currently, HIV prevention programs designed for HIV-positive MSM are insufficient in Asia.

Interestingly, MSM in the study who rated themselves to be at higher risk for HIV infection also reported higher URAIE. A previous study in Hong Kong also found that MSM who used the Internet to seek male sex partners rated themselves having a high chance of contracting HIV in the future [16]. These findings imply that these men continue to engage in these high-risk behaviors despite awareness of the consequences of such behaviors. Future studies may elucidate more contextual factors (attitudes, motivation and beliefs) related to the decision-making involved in this risky sexual behavior. Consistent with the findings from an online survey of Japanese MSM [18], the present study found recreational drug use before sex as an important correlate of URAIE.

Some limitations of our study should be noted. First, our findings are not be generalizable to MSM who do not visit gay websites, who abstained from anal sex, or who only had sex with commercial sex partners in the past 6 months. Our analytic sample was limited to MSM who had at least one regular and/or casual sex partner in the past 6 months, and the analysis of the correlates of URAIE was further limited to those who reported to have receptive anal intercourse. About 86 % of the study sample reported having anal intercourse in the past 6 months and of those, 82 % had receptive anal intercourse. The sample in the final analysis may therefore represent MSM at the higher spectrum of risk behaviors. Additionally, the survey over-sampled MSM from Singapore, Malaysia, Taiwan, and Hong Kong, where most of the subscribers of Fridae.com reside. The survey included only a few participants from Cambodia, India, Laos, where the use of the Internet is not as widespread as other countries in Asia. The results of the study can therefore only be indicative of MSM who use the Internet in the countries represented in the study.

Conceivably, MSM who use the Internet may differ by age, ethnicity, occupation, and other demographic variables from MSM who do not. Compared to a community sample, MSM from the Internet sample were found to be significantly younger, more educated, more likely to be students and self-identified as homosexual [27]. The median age of the sample of the study is 30, which is similar to an online MSM study in Japan (mean age 29) [18] but is relatively older than previous online studies of MSM in mainland China (median age 25 years) [4, 27]. The inclusion of slightly older MSM in the survey may be due to greater Internet penetration in Japan, Singapore, Taiwan, Malaysia, and Hong Kong and therefore the use of the Internet is more common among older MSM in these regions. Most of the

respondents were highly educated (68 % had a university degree or higher) and fully employed (73 %). They may be more technologically savvy and have more access to computers (e.g., to use a computer in the workplace or home) than other MSM.

Second, there is no mechanism (e.g. checking the IP address) to prevent multiple responses from a single participant. The absence of incentives to participate may have, however, minimized this source of uncertainty. Third, our sample includes MSM who self-selected and "volunteered" to respond to the survey and the extent to which the sample represents all MSM using the Internet is unknown. Fourth, a biological endpoint relative to HIV was not available as biological samples could not be collected in this online survey. Hence, the prevalence of HIV infection among MSM in this sample is self-reported and may not be accurate. In fact, 38 % participants did not know their HIV status. Because it has been shown that antiviral treatment can in fact reduce transmission of HIV, public health efforts should be targeted to MSM to promote testing and link them to treatment and care.

Conclusion

Internet-based survey, because of its anonymity and ease of data collection, can be a useful tool to study risk-related behaviors among MSM in Asia. This study indicates that a pan-Asian online behavioral surveillance of MSM is feasible with close collaboration with community-based organizations across the regions.

The majority of participants in this survey were highly educated, employed full time, never married and self-identified as homosexual or gay. This study also found a high prevalence of risky sexual behaviors among MSM, especially those with lower education, being in a heterosexual marriage, having regular partner, positive HIV status, having high perception of risk for HIV infection, using recreational drug for sex, and using the Internet as their main way to seek partners. These factors should be considered in designing future interventions for this important population.

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Table 1

Survey items and response options from the Asia Internet MSM Sex Survey

	Item	Response options
Gender	What sex are you?	Male, female, male-to-female transgender, female-to-male transgender, intersex
Residence	Which country do you currently live?	
Age	Which year were you born?	
Employment	Are you employed?	Full time, part-time, on pension/social security, a student, unemployed, other
Education	What is the highest level of education you have had?	No formal education, primary, secondary, tertiary (junior college, polytechnic), university, post-graduate
Race/ethnicity	What is your race?	Caucasian, Chinese, Eurasian, Filipino, Indian, Indonesian, Japanese, Korean, Laotian, Malay, Mixed, Other, Taiwanese, Thai, Vietnamese
Marital status	What is your marital status?	Single, married (opposite sex), married/civil partnership (same sex), divorced/separated, widowed
Sexual identity	Do you think yourself as:	Gay/homosexual, bisexual, heterosexual, transgender, other
Past sexual behavior	Have you ever had anal sex with another male?	Yes or no
Current sexual behavior	How many different male sex partners have you had sex with in the past 6 months	0 = None, 1 = one, 2 = 2–5 men, 3 = 6–10 men, 4 = 11–50 men, 5 = more than 50 men
Sex with regular partners[a]	Do you currently have sex with a **regular** male partner?	Yes or no
	How many different **regular** male partners have you had sex with in the past 6 months?	0 = None, 1 = one, 2 = 2–5 men, 3 = 6–10 men, 4 = 11–50 men, 5 = more than 50 men
In the past 6 months, which of the following have you done with any of your *regular* male partner(s)?		
Anal sex[a]	I fucked him with a condom	Never, sometimes, most of the time, all the time
	He fucked me with a condom	Never, sometimes, most of the time, all the time
	I fucked him without a condom but pulled out before I came	Never, sometimes, most of the time, all the time
	He fucked me without a condom but pulled out before he came	Never, sometimes, most of the time, all the time
	I fucked him without a condom and came inside	Never, sometimes, most of the time, all the time
	He fucked me without a condom and came inside	Never, sometimes, most of the time, all the time
HIV testing	When did you have your most recent voluntary HIV test?	Never tested, in the last month, 1 to 6 months ago, 6 to 12 months ago, 1 to 2 years ago, more than 2 years ago
HIV status	Based on the results of your HIV antibody tests, what is your HIV status?	No test, did not collect results, negative, positive, don't know
HIV risk perception	What do you perceive about your own risk of HIV infection?	1 = very low, 2 = low, 3 = medium, 4 = high, 5 = very high
	Which is the **main** way you meet male sex partners?	Internet, gay sauna, gay bar, gym, dance or circuit party, gym, public cruising spot, private sex parties, through a friend
Recreational drug before sex	In the past 6 months, how often have you consumed recreational drugs prior to sex ("chem sex")?	Never, once or a few times, at least monthly, every week
Alcohol before sex	In the past 6 months, how often have you consumed alcohol during or prior to sex (oral or anal)?	Never, once or a few times, at least monthly, every week

[a] repeated for casual partners

Table 2

Demographic and HIV-related behavioral characteristics of MSM in the Asian Internet MSM Sex Survey (data are in percentages unless indicated otherwise)

	***N* = 10,413**
Age in years, mean (SD)	31.9 (9.38)
Median	30
Country currently living	
Mainland China	32.9
Singapore	14.8
Malaysia	11.2
Taiwan	10.1
Hong Kong	9.5
Thailand	7.0
Japan	4.4
Indonesia	3.7
The Philippines	2.5
Other	3.9
Ethnicity	
Chinese[a]	70.6
Malay[a]	4.3
Thai	4.0
Japanese	3.5
Filipino	2.5
Indian	1.0
Mixed	2.3
Caucasian	7.8
Other	3.9
Education level	
Secondary or less	8.8
Some college/tech/vocational	23.4
University	49.6
Post graduate	18.3
Employment status	
Unemployed	3.7
Student	16.1
On pension/social security	7.6
Employed full time	72.6
Marital status	
Single	84.6
Married (Opposite Sex)	9.1
Married/Civil Partnership (Same Sex)	4.2
Divorced/Separated/Widowed	2.0

	***N* = 10,413**
Sexual orientation	
Bisexual	0.8
Heterosexual/other	15.2
Gay/homosexual	84.0
Number of male sex partners[b]	
One	27.8
2–5	47.0
6–10	14.2
11–50	9.4
>50	1.6
Number of female sex partners[b]	
None	93.0
One	5.1
2–5	1.5
6–10	0.1
>11	0.3
Anal sex with either regular or casual partner[b]	85.8
Any insertive anal intercourse(*n* = 8,936)	77.8
UIAIE prevalence	46.8
Any receptive anal intercourse (*n* = 8,936)	81.8
URAIE prevalence	47.5
Recreational drugs before sex[b]	
At least monthly	3.3
Once or a few times	10.5
Never	86.2
Alcohol during or before sex[b]	
At least monthly	7.9
Once or a few times	31.7
Never	60.4
Self-perceived risk for infection	
Low to very low	70.7
Medium	21.1
High to very high	8.1
Main way to meet sex partners[b]	
Internet	70.6
Others	29.4
HIV testing	
Never	34.0
Within the past year	43.9
More than 1 year ago	22.1
HIV status[c]	
Negative	93.8

	***N* = 10,413**
Positive	6.2

[a]Chinese include Chinese from China, Taiwan, Hong Kong, Malaysia, and Singapore; Malay include Malay from Malaysia, Indonesia, and Singapore [b] in the past 6 months, [c] only include those who know their HIV status (*n* = 6,435)

Table 3

Correlates of unprotected receptive anal intercourse with internal ejaculation (URAIE) in the past 6 months among men who had receptive anal sex (N = 7,311, data are in percentages unless indicated otherwise)

	No URAIE *n* = 3,837	**URAIE *n* = 3,474**	***p***
Age mean (SD)	32.0 (9.21)	30.5 (9.13)	<0.001
Country			
China (*n* = 2,443)	47.7	52.3	<0.001
Singapore (*n* = 1,019)	60.3	39.7	
Malaysia (*n* = 835)	48.1	51.9	
Taiwan (*n* = 800)	49.6	50.4	
Hong Kong (*n* = 702)	61.0	39.0	
Thailand (*n* = 517)	58.0	42.0	
Japan (*n* = 286)	71.7	28.3	
Indonesia (*n* = 266)	40.2	59.8	
Philippines (*n* = 163)	41.1	58.9	
Other (*n* = 280)	53.9	46.1	
Ethnicity			
Chinese[a] (*n* = 5,207)	51.0	49.0	<0.001
Malay[a] (*n* = 321)	42.1	57.9	
Thai (*n* = 310)	59.4	40.7	
Japanese (*n* = 230)	76.1	23.9	
Filipino (*n* = 163)	44.2	55.8	
Caucasian (*n* = 553)	61.8	38.2	
Others (*n* = 527)	51.6	48.4	
Education			
Secondary or less (*n* = 658)	45.3	54.7	<0.001
Pre-college or technical (*n* = 1,736)	49.4	50.6	
University or higher (*n* = 4,917)	54.6	45.5	
Employment			
Unemployed (*n* = 286)	49.7	50.4	0.002
Student (*n* = 1,269)	48.0	52.0	
On pension/social security (*n* = 536)	52.5	47.8	
Employed full time (*n* = 5,220)	53.8	46.3	
Marital Status			
Ever married (*n* = 1,105)	45.0	55.0	<0.001
Never married (*n* = 6,206)	53.8	46.2	
Sexual orientation			
Bisexual (*n* = 52)	59.6	40.4	0.104
Heterosexual/other (*n* = 959)	49.6	50.4	
Gay/homosexual (*n* = 6,300)	52.9	47.1	
Partner type[b]			

	No URAIE *n* = 3,837	URAIE *n* = 3,474	*p*
Regular only (*n* = 1,900)	43.4	56.6	<0.001
Casual only (*n* = 1,989)	68.7	31.3	
Both regular and casual (*n* = 3,422)	48.1	51.9	
Had at least one female sex partner[b]			
Ever (*n* = 321)	50.8	49.2	0.532
Never (*n* = 6,990)	52.6	47.4	
HIV testing			
Ever tested (*n* = 4,908)	55.8	44.2	<0.001
Never tested (*n* = 2,403)	45.7	54.3	
HIV status			
Unknown (*n* = 2,746)	46.3	53.8	<0.001
Negative (*n* = 4,236)	57.0	43.0	
Positive (*n* = 329)	46.2	53.8	
Risk perception			
Very low to low (*n* = 4,962)	54.2	45.8	<0.001
Medium (*n* = 1,675)	50.8	49.3	
High to very high (*n* = 674)	44.4	55.6	
Recreational drugs before sex[b]			
Ever (*n* = 1,211)	50.0	50.0	0.054
Never (*n* = 6,100)	53.0	47.0	
Alcohol during or before sex[b]			
Ever (*n* = 3,029)	51.5	48.5	0.158
Never (*n* = 4,284)	53.2	46.8	
Main way to seek partner[b]			
Internet (*n* = 5,193)	50.1	49.9	<0.001
Offline (*n* = 2,118)	58.2	41.8	

[a] Chinese include Chinese from China, Taiwan, Hong Kong, Malaysia, and Singapore; Malay include Malay from Malaysia, Indonesia, and Singapore [b] in the past 6 months

Table 4

Multivariable correlates of URAIE in the past 6 months (N = 7,311)

	AOR*	95 % CI	*p*
Education			
Secondary or less	1.53	(1.28, 1.83)	<0.001
Pre-college or technical	1.22	(1.08, 1.37)	0.001
University or higher	(ref)		
Marital Status			
Ever married	1.35	(1.18, 1.56)	<0.001
Never married	(ref)		
Partner type[a]			
Regular only	2.85	(2.48, 3.27)	<0.001
Casual only	(ref)		
Both regular and casual	2.32	(2.06, 2.62)	<0.001
HIV testing			
Ever tested	0.82	(0.64, 1.04)	0.096
Never tested	(ref)		
HIV status			
Unknown	1.14	(0.91, 1.44)	0.245
Negative	(ref)		
Positive	1.39	(1.08, 1.81)	0.010
Risk perception			
Very low to low	(ref)		
Medium	1.25	(1.11, 1.40)	<0.001
High to very high	1.62	(1.34, 1.95)	<0.001
Recreational drug before sex[a]			
Ever	1.30	(1.14, 1.49)	<0.001
Never	(ref)		
Main way to seek partner[a]			
Internet	1.21	(1.08, 1.36)	<0.001
Offline	(ref)		

Multivariable included age, country, ethnicity, and employment as covariates in the model

[a]in the past 6 months