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Subsequent Sexual Risks Among Men Who Have Sex with Men May Differ by Sex of First Partner and Age at Sexual Debut: A Cross-Sectional Study in Beijing, China

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Abstract

Sexual debut experience may influence HIV/sexual risks among men who have sex with men (MSM). We assessed associations between age of sexual debut and sex of debut partner with recent (past-3-month) sexual/HIV/syphilis risks among 3588 community-based Chinese MSM. Sexual debut with women was associated with more recent (condomless) insertive anal sex with men, more recent (condomless) vaginal sex, and more lifetime female partners. Sexual debut with men was associated with more recent (condomless) receptive anal sex with men and more lifetime male partners. All associations were strongest among those having first sex ≤18 years in both groups. Earlier sexual debut was associated with higher HIV/syphilis risk; HIV risk was higher with first sex with a man, but syphilis was higher with first sex with a woman. Earlier age of sexual debut is associated with greater HIV/syphilis and sexual risks, but MSM risk differs with first sex with women versus men.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Keywords

HIV; Syphilis; Sexual debut; Chinese men who have sex with men; Sexual risk

Introduction

Despite the national efforts in scaling up prevention interventions, men who have sex with men (MSM) in China continue to represent the most affected population by HIV [1, 2]. While HIV epidemics have stabilized or declined among other high-risk populations (e.g., female sex workers, people who inject drugs), HIV prevalence among Chinese MSM had increased from 0.9% in 2003 to 7.7% in 2014 [3]. In 2014, MSM accounted for 25.8% of the newly diagnosed HIV cases in China [3]. Personal, social, and structural barriers have resulted in the under-representation of Chinese MSM in HIV testing, post-diagnosis linkage-to-care, and treatment initiation/retention [4, 5], which limits the success of "test-and-treat" and "treatment as prevention" strategies to tackle the HIV epidemic among this high-risk subgroup [6].

Most Chinese MSM do not disclose their sexual identity to their family members, relatives and friend as a result of homosexuality-related stigma [7, 8]. Chinese men are also influenced by the traditional norms and cultural pressure to marry a woman (all "women/woman" in this paper are referred to cisgender women/woman unless specified), not only to carry their family line, but also to avoid bringing shame or disappointment to their parents by remaining single [9–11]. Therefore, practice of bisexual behaviors is common among Chinese MSM as well as in other culturally conservative Asian countries [12]. A recent meta-analysis showed that 31.2% of the 28,739 MSM in China had ever had sex with a woman [13]. Men who have sex with men and women (MSMW) are less likely to be infected with HIV than MSM-only (MSMO), probably because MSMW are more likely to practice insertive anal (with a man) and virginal intercourse with a woman, which is associated with lower HIV risk compared to receptive anal intercourse with a man [12, 14–16]. On the other hand, MSMW are shown not to use condom consistently with female sexual partners [17], which may bridge HIV/STIs to their average-risk female sexual partners [18].

The first sexual experience is an important part of one's life and human development [19]. Partner characteristics and age at sexual debut may influence future mental/sexual health and set risky behavior patterns [20]. Studies show that MSM who have sexual debut at a younger age are more likely to sell sex for money/drugs, have more sexual partners, practice condomless sex and encounter psychological/emotional problems [19, 21]. Another study also shows that MSM who have their first sex with an older partner may be at elevated risk of HIV and STIs [22]. In the context of sexual debut and bisexual behavior among MSM, it is likely that some men have their sexual debuts with women, but later initiate sex with men; some men continue bisexual behaviors with varying gender-specific frequencies. These MSM subgroups may carry different sociodemographic and sexual risk profiles that should be understood for designing specific HIV risk reduction strategies.

We have not identified any study that has assessed the influence of sex of first partner and age of sexual debut on subsequent sexual behaviors and HIV risk among MSM, despite its important implications for targeting prevention interventions. In a community-based sample of MSM in Beijing, China, we compared the sociodemographic and behavioral characteristics by sex of first partner, assessed the associations of sex of first partner with subsequent sexual/HIV/syphilis risk, examining whether associations are modified by their age of sexual debut.

Methods

Study Design and Population

We used the baseline data among a convenient sample of MSM from a randomized controlled trial: Multi-component HIV Intervention Packages for Chinese MSM—Test, Link and Care (China-MP3 trial; ClinicalTrials.gov Identifier: NCT01904877). Details of the parent trial design and study setting are described elsewhere [23, 24]. In short, we recruited 3760 self-reported HIV-uninfected or status unknown men between March 2013 and March 2014 via short message services, gay website-based advertisement, peer referral, outreach to gay-frequented venues and recruitment during their visit at our participating HIV hospitals/clinics. Men who self-reported to be (1) ≥18 years old, (2) having anal sex with men or transgender women in the past 12 months, (3) currently living in Beijing and not planning to leave in the next 12 months, and (4) willing/able to provide written informed consent, were eligible for study participation. The institutional review boards of Vanderbilt University and the National Center for AIDS/STD Control and Prevention of the China Center for Disease Control and Prevention reviewed and approved the study protocol.

Data Collection

A face-to-face questionnaire interview was administered by trained medical staff to survey: (1) sociodemographic information, including age, age of sexual debut, ethnicity, current marital status, education, employment, monthly income, health insurance, perception of HIV risk (self-report perception of “likely/very likely” or “low/no” risk to contract HIV), venues of seeking male sexual partners, house-hold registration status (*Hukou*), years of living in Beijing, residence of origin, and HIV testing history; (2) high-risk behaviors, including recent (in the past 3 months pre-survey) hazardous alcohol drinking (assessed with Alcohol Use Disorder Identification Test-Consumption, AUDIT-C, score ranges between 0 and 12, with a score ≥4 indicating hazardous alcohol drinking) [25], recent binge drinking (having 6 or more standard drinks on one occasion) [25], recent illicit drug use (self-report intake of methamphetamine, MDMA, rush, magu, ketamine, cannabis/marijuana, cocaine, opium, or heroin, morphine), recent pattern/frequency of insertive/ receptive anal sex with men, recent anal sex with HIV-infected men, recent sex with male commercial sex workers, recent pattern/frequency of vaginal sex with women (all “women/woman” in the analyses were confined to cisgender women/woman), year of sexual activity, and lifetime number of male/female sexual partners. We also tested participants for rapid HIV and syphilis tests after the questionnaire survey. For those with positive HIV or syphilis rapid test results, a 5-ml blood specimen was drawn for further laboratory screening and confirmatory tests. Each participant was provided pre-test and post-test counselling and compensated 50 Yuan (≈US

$8.) for transportation costs. Detailed measures of the variables and laboratory techniques are documented elsewhere [23, 24, 26].

Statistical Analysis

We used median with interquartile range (IQR; for continuous measures) and frequency distribution with percentage (for categorical measures) to describe the sociodemographic and high-risk behaviors among the participants. A predictive logistic regression model was built to evaluate sociodemographic predictors of having sexual debut with a woman. Factors ($p < 0.05$) associated with having sexual debut with a woman from the Chi square test or Wilcoxon Rank-Sum test were entered into a preliminary multivariable model, followed by a stepwise backward selection procedure to retain significant predictors ($p < 0.05$) for multivariable adjustment. Collinearity between included variables was assessed before fitting the final model.

To assess the association between sex of first partner and sexual risk among the participants, we first used a Chi square test to compare the high-risk behaviors (categorical variables) between those having sexual debut with a man versus with a woman. We further used separate multi-variable ordinal logistic regression to assess the association between sex of first partner and the likelihood of attaining a higher frequency category of selected risky sexual behaviors (continuous variables). We categorized these continuous variables into quartiles, and merged adjacent categories for some variables when necessary to avoid sparse data. These risky behaviors include: (1) total number of lifetime male sexual partners (1–4, 5–9, 10–19, ≥20), (2) total number of receptive anal sex with men in the past 3 months (0, 1, 2, ≥3), (3) total number of condomless receptive anal sex with men in the past 3 months (0, 1, 2, ≥3), (4) total number of insertive anal sex with men in the past 3 months (0, 1–2, 3–4, ≥5), (5) total number of condomless insertive anal sex with men in the past 3 months (0, 1, 2, ≥3), (6) total number of lifetime female sexual partners (0, 1, ≥2), (7) total number of vaginal sex with women in the past 3 months (0,1–2, ≥3), and (8) total number of condomless vaginal sex with women in the past 3 months (0,1–2, ≥3). We adjusted each model for age, education, perception of HIV risk, sex-finding venue, residence of origin, and migration status. The proportional odds assumption was tested and fulfilled for each of the multivariable models. We stratified the analyses to assess if their sexual risk may vary by age of sexual debut (≤18, 19–22 and ≥23 years).

Last, we used logit models and applied restricted cubic splines with four knots to model the non-linear relationship between age of sexual debut (≤16, 17, 18, 19, 20, 21, 22, 23, 24 and ≥25) and the predicted probability of being HIV or syphilis infection, by sex of first partner, adjusting for age, education, perception of HIV risk, sex-finding venue, residence of origin and migration status. All youth with sexual debut ≤16 years (cumulative %: 3.7%) were merged into a ≤16 year category; similarly, persons with sexual debuts at any age ≥25 years (cumulative %: 4.8%) were merged, to avoid sparse data. Data analyses were conducted using Stata 12.0™ (StataCorp LP, College Station, Texas, USA).

Results

Population Characteristics

Among the 3760 recruited participants, 172 men were excluded due to duplicate participation (126), confirmed prior HIV infection (30), no blood specimen collected (5), non-MSM (5), invalid identification numbers (4), and lack of a questionnaire (2), resulting in a final analytical sample of 3588 (95.4%). Of these 3588 men (transgender women were eligible, but none were recruited), the median age was 28 years (IQR: 24–33) and the median age of sexual debut was 20 years (IQR: 18–23). A majority of the participants were of Han-ethnicity (93.7%), single (85.0%), college-educated (71.9%), employed (82.5%), health-insured (61.1%), migrants (75.2%), previously residing in a city (67.9%), and finding sex via the Internet (79.1%). Confirmed HIV prevalence was 12.7%, and syphilis prevalence was 7.5%.

Thirty percent of our participants reported ever engaging in bisexual behavior, and 29.6% had their first sex with a woman. Compared to MSM who had their sexual debut with a man, MSM who had sexual debut with a woman were significantly ($p < 0.05$) more likely to be older, older at age of sexual debut, currently married, having education below college, not current students, self-perceiving low/no HIV risk, not health-insured, finding sex via non-Internet venues, migrants, having residence of origin in township/ village areas, living in Beijing for a longer duration, and syphilis-infected (Table 1).

Predictors of Having Sexual Debut with a Woman

Table 2 shows the significant predictors of having sexual debut with a woman. These included (after multivariable adjustment): older current age [e.g., ≥45 years vs. 25 years, adjusted odds ratio (AOR): 3.03; 95% confidence interval (CI) 2.03–4.52; $p < 0.001$], being currently married (AOR: 4.93; 95% CI 3.89–6.23; $p < 0.001$), being less educated (e.g., junior middle school and less vs. college and above, AOR: 1.75; 95% CI 1.42–2.17; $p < 0.001$), self-perceiving low/no risk of HIV (AOR: 1.23; 95% CI 1.06–1.42; $p = 0.008$), finding sexual partners via non-Internet venues (AOR: 1.69; 95% CI 1.39–2.06; $p < 0.001$), being migrants (AOR: 1.57; 95% CI 1.28–1.93; $p < 0.001$), and having township/village residence of origin (AOR: 1.40; 95% CI 1.19–1.65; $p < 0.001$).

Comparison of High-Risk Behaviors

Compared to MSM having sexual debut with a man (Table 3), those having sexual debut with a woman were more likely to have recent (in the past 3 months) hazardous alcohol drinking (21.2% vs. 11.6%; $\chi^2 = 56.13$; $p < 0.001$), have recent binge drinking (21.4% vs. 14.9%; $\chi^2 = 22.69$; $p < 0.001$), have recent alcohol drinking before sex (26.3% vs. 18.2%; $\chi^2 = 29.70$; $p < 0.001$), practice exclusively insertive anal sex roles (41.6% vs. 29.9%; $\chi^2 = 115.17$; $p < 0.001$), have recent insertive (69.5% vs. 56.9%; $\chi^2 = 49.61$; $p < 0.001$) or condomless insertive anal sex (27.9% vs. 19.5%; $\chi^2 = 30.90$; $p < 0.001$), have recent sex (26.1% vs. 4.1%; $\chi^2 = 383.58$; $p < 0.001$) or condomless vaginal sex (15.9% vs. 2.8%; $\chi^2 = 208.09$; $p < 0.001$) with women, have been sexually active for ≥7 years (67.6% vs. 41.2%; $\chi^2 = 207.86$; $p < 0.001$), and have ≥2 lifetime female sexual partners (45.2% vs. 5.1%; $\chi^2 = 852.63$; $p < 0.001$). Conversely, MSM having sexual debuts with men were more likely to

recently use illicit drugs (29.9% vs. 21.9%; $\chi^2 = 23.59$; $p < 0.001$), have recent receptive sex with men (56.4% vs. 42.3%; $\chi^2 = 59.16$; $p < 0.001$) or condomless receptive anal sex (21.5% vs. 17.7%; $\chi^2 = 6.73$; $p = 0.009$) with men, and have ≥10 lifetime male sexual partners (52.4% vs. 42.2%; $\chi^2 = 30.99$; $p < 0.001$).

Table 4 presents the associations of sex of first partner with the odds of attaining a higher frequency category of risky sex/partnership, stratified by their age of sexual debuts. Men who had sexual debut with a man at early age (≤18 years) had the highest odds (vs. 19–22 and ≥23 years) of having a higher total number of lifetime male sexual partners (AOR: 2.38; 95% CI 1.74–3.25; $p_{trend} < 0.001$), a greater number of recent receptive sexual encounters (AOR: 1.82; 95% CI 1.36–2.43; $p_{trend} < 0.001$), and condomless receptive anal sexual encounters (AOR: 1.68; 95% CI 1.05–2.69; $p_{trend} < 0.001$) with men. Men who had their sexual debut with a woman at an early age (≤18 years) had the highest odds (vs. 19–22 and ≥23 years) of having had a higher frequency of total number of recent insertive sexual encounters (AOR: 1.99; 95% CI 1.52–2.61; $p_{trend} < 0.001$) or condomless insertive anal sexual encounters (AOR: 2.32; 95% CI 1.67–3.23; $p_{trend} = 0.03$) with men, total lifetime female sexual partners (AOR: 66.35; 95% CI 43.08–102.22; $p_{trend} = 0.04$), and total number of recent vaginal sexual encounters (AOR: 5.90; 95% CI 3.61–9.64; $p_{trend} = 0.21$) or condomless vaginal sexual encounters (AOR: 3.68; 95% CI 1.58 –8.58; $p_{trend} = 0.75$) with women.

Predicted Probability of HIV and Syphilis

Figure 1a shows a non-linear relationship between the age of sexual debut and the predicted probability of being diagnosed positive with HIV, stratified by sex of first partner. The probability of HIV infection was slightly higher among men having sexual debut with a man than those with a woman across all ages of sexual debut. The older the age of sexual debut, the lower the probability of HIV infection, with this association being even more dramatic when age of sexual debut was >22 years.

In contrast, the predicted probability of being diagnosed positive with syphilis was higher among men having sexual debut with a woman than those with a man (Fig. 1b). A stronger negative relationship between the probability of syphilis and age of sexual debut ≤22 years was seen among both groups, with a nadir of risk noted at sexual debut at age 22 years, but then there was a gradual increase in risk with later year of sexual debut.

Discussion

We found that men having sexual debut with a woman were more likely to predominantly practice an insertive anal role, have more lifetime female sex partners, have more recent condomless insertive anal sex with men, and have more recent condomless vaginal sex with women. Conversely, men having their first sex with a man were more likely to take a receptive anal role, report more lifetime male sex partners, and have had more recent condomless receptive anal sex with a man. Regardless of sex of first partner, we also found that earlier age of sexual debut was associated with an increased likelihood of having more frequent condomless sex, having more lifetime sexual partners and being infected with HIV or syphilis. Our observation of the associations between earlier age of sexual debut and later

risky sexual behaviors are consistent with other studies among both MSM and general populations [19, 21, 27, 28].

A person's first sexual intercourse experience may have possible effects on sexual attitude, belief, subsequent sexual preference, development and adjustment [29]. The self-labeling and anal sex role preference is an important identity among both MSM and MSMW; early patterns and preferences may be influenced by early partner characteristics (e.g., first sexual encounter with a male or a female), and be associated with psychosexual preferences of specific male-to-male anal sex roles, influencing different HIV/STI risk exposures (e.g., receptive anal sex riskier than insertive) [30–32]. Complex prospective studies of youth and young adults would be needed to assess whether the sex of the first partner has a predisposing influence on subsequent sexual positioning and practice preference, or in turn, whether this choice merely reflects these early preferences without influencing them. Qualitative assessments would be essential components of such studies, and even then a "chicken and egg" element would be hard to tease out.

In this study, 39.6% of our Beijing MSM reported ever having sex with a woman, higher than the findings from recent meta-analyses among both Chinese MSM (31.2%) and Asian MSM (32.8%) [12, 13]. Studies in the U.S. also reported high prevalence of bisexuality, particularly among black MSM [33, 34]. As the capital of China, Beijing attracts migrants, including MSM, for better employment opportunity and living condition [35]. Previous studies have shown a higher marriage rate among migrant MSM than local MSM [11, 36], explaining why higher prevalence of bisexual behaviors is seen in our study, as well as other Beijing studies (45.6–46.2%) [25, 37, 38].

We found that a high proportion of Chinese MSM had their sexual debuts with women (29.6%), while Mao et al. reported this at 41.3% [39]. Among this subgroup, 37% eventually married a woman (compared to 6.0% among men who had their sexual debuts with men; $p < 0.001$), and 87% were migrants. In western countries, the prevalence of MSM marrying a woman is lower than in China, below 6% [40–42]. This might due to the existence of more open social/family norms and cultural acceptability towards homosexuality. In China, as in other culturally conservative countries, MSM may experience family/social isolation once they are discovered to be homosexual, especially MSM originated from rural/village areas [11]. These geographical and cultural constructs may influence some MSM to use marriage as a disguise [9]. These men may endure pressures of gay-related stigma, fear of sexual orientation disclosure, as well as carrying a heavy responsibility to support their families [16]. These pressures may partially explain our finding of a higher likelihood of hazardous or binge drinking problems among this subgroup [43]. Older MSM were more likely to have sexual debut with a woman, perhaps reflecting the birth cohort effect that those were born before the mid-1970s in China who were exposed to more conservative cultural values. Initiating sex with a man was a stronger past taboo than it is at present. Similar to our findings, a 7-city Chinese study conducted from 2008 to 2009 suggested that older MSM were more likely to be married and to practice condomless vaginal intercourse [44]. It is a challenging, high priority public health intervention to help married MSM who do not use condoms with their wives to use condoms, both with their typically clandestine male partners and with their wives [11].

Men having their sexual debut with a man were more likely to practice condomless receptive or condomless receptive intercourse with men and also to have more male sexual partners. These biologically and epidemiologically established high risk behaviors are suggested to be associated with increased risk of HIV, supporting our findings that men who had their first sex with a man showing higher predicted probability of HIV, confirmed with our sero-diagnostics. In contrast, men having their first sex with a woman presents higher predicted probability of syphilis across all ages of sexual debut. Compared to MSM having first sex with a man, these subgroups were more likely to seek sex via non-Internet venues and have increased recent or lifetime female sex partners, which might include syphilis-at-risk female sex workers, increasing their exposure to contract syphilis through unprotected virginal sex [24, 45, 46].

Strengths of our study include the exploration of the association of sex of first partner on sexual and HIV/ syphilis risk among a large community-based sample of Chinese MSM, and the application of rigorous multivariable modeling as well as restricted cubic spline methods. We think that recall of the sex of a first lifetime sexual partner and age of sexual debut are less biases than for less memorable life experiences. Limitations include our lack of an Audio Computer-Assisted Self-Interview which might have reduced social desirability bias in our sensitive questions regarding sexual and substance use behaviors. Second, the study was conducted among a convenient sample of Beijing MSM and the findings may have limited generalizability to other settings. Third, the cross-sectional nature of the study may not infer causality. Finally, we were limited in assessing detailed partner characteristics at sexual debut and possible intermediate psychological constructs that may further elucidate the mechanism underlying the observed associations.

Bisexual behavior is common among Chinese MSM, exacerbating the spread of HIV to lower-risk persons. The sex of one’s first partner and the exact age of sexual debut may both play a role in shaping subsequent risky sexual behaviors among Chinese MSM. Patterns differed for HIV versus syphilis risk, reminding us that risk assessments for one STI is not necessarily a strong surrogate for another. Further exploration of the social, psychological, and behavioral contexts of early sexual experiences and latter STI risks can help design of targeted risk reduction programs among Chinese MSM.

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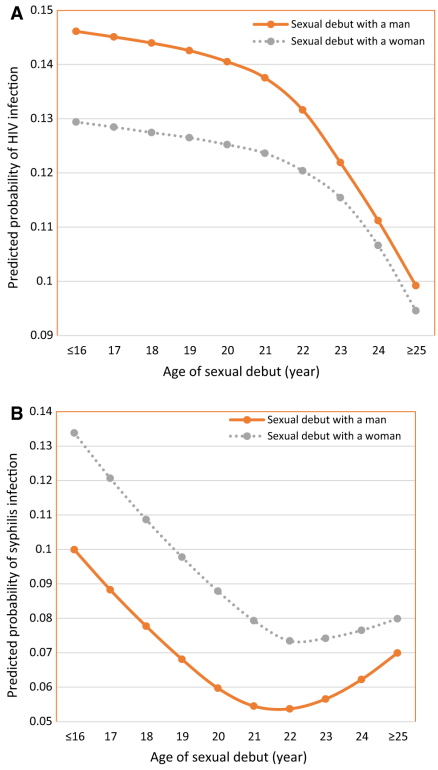

Fig. 1.

a Predicted probability of HIV infection by age of sexual debut among men who have sex with men in Beijing, China (N = 3588). **b** Predicted probability of syphilis infection by age of sexual debut among men who have sex with men in Beijing, China (N = 3588)

Table 1

Characteristics of Chinese MSM who had sexual debut with a male or female sexual partner (N = 3588)

Characteristics	Total N = 3588 n (%)	Sexual debut		χ^2 or z-statistics	*p* value
		With a man N = 2538 n (%)	With a woman N = 1050 n (%)		
Age (year)				352.654 (χ^2) –18.349 (z)	<0.001 *
Median (IQR)	28 (24–33)	27 (24–31)	32 (27–40)		
<25	914 (25.5)	764 (30.1)	150 (14.3)		
25–34	1927 (53.7)	1440 (56.7)	487 (46.4)		
35–44	536 (14.9)	265 (10.5)	271 (25.8)		
≥45	211 (5.9)	69 (2.7)	142 (13.5)		
Age of sexual debut (year)				36.355 (χ^2) –6.203 (z)	<0.001 *
Median (IQR)	20 (18–23)	20 (18–22)	21 (19–24)		
≤18	995 (27.7)	749 (29.5)	246 (23.4)		
19–22	1642 (45.8)	1186 (46.7)	456 (45.8)		
≤23	951 (26.5)	603 (23.8)	951 (26.5)		
Ethnicity				1.254	0.263
Han	3361 (93.7)	2370 (93.4)	991 (94.4)		
Non-Han	227 (6.3)	168 (6.6)	59 (5.6)		
Current marital status				559.229	<0.001
Single	3049 (85.0)	2387 (94.0)	662 (63.0)		
Married	539 (15.0)	151 (6.0)	388 (37.0)		
Education (year of schooling)				235.261	<0.001
College and above (>12)	2579 (71.9)	2010 (79.2)	569 (54.2)		
Senior high (10–12)	593 (16.5)	327 (12.9)	266 (25.3)		
Junior middle school and less (≤9)	416 (11.6)	201 (7.9)	215 (20.5)		
Employment				117.416	<0.001
Employed	2960 (82.5)	2031 (80.0)	929 (88.5)		
Unemployed/retired	182 (5.1)	109 (4.3)	73 (6.9)		
Student	388 (10.8)	363 (14.3)	25 (2.4)		
Other	58 (1.6)	35 (1.4)	23 (2.2)		
Personal monthly income, Chinese yuan				0.258	0.612
<5000	1698 (47.3)	1208 (47.6)	490 (46.7)		
≥5000	1890 (52.7)	1330 (52.4)	560 (53.3)		
Health insurance				36.048	<0.001
No	1395 (38.9)	907 (35.7)	488 (46.5)		
Yes	2193 (61.1)	1631 (64.3)	562 (53.5)		
Perception of HIV risk prior to HIV diagnosis				7.570	0.006
Likely/very likely	1462 (40.7)	1071 (42.2)	391 (37.2)		
Low/no risk	2126 (59.3)	1467 (57.8)	659 (62.8)		
Sex-finding venue				160.794	<0.001

Characteristics	Total N = 3588 n (%)	Sexual debut		χ^2 or z-statistics	*p* value
		With a man N = 2538 n (%)	With a woman N = 1050 n (%)		
Internet	2838 (79.1)	2148 (84.6)	690 (65.7)		
Non-Internet **	750 (20.9)	390 (15.4)	360 (34.3)		
Migrant (No Beijing Hukou)				27.021	<0.001
No	889 (24.8)	690 (27.2)	199 (18.9)		
Yes	2699 (75.2)	1848 (72.8)	851 (81.1)		
Year of living in Beijing				18.267	<0.001
≤5	1533 (42.7)	1142 (45.0)	391 (37.2)		
>5	2055 (57.3)	1396 (55.0)	659 (62.8)		
Residence of origin				39.715	<0.001
City	2437 (67.9)	1804 (71.1)	633 (60.3)		
Township/village	1151 (32.1)	734 (28.9)	417 (39.7)		
HIV infection				1.019	0.313
No	3133 (87.3)	2207 (87.0)	926 (88.2)		
Yes	455 (12.7)	331 (13.0)	124 (11.8)		
Syphilis infection				5.145	0.023
No	3319 (92.5)	2364 (93.1)	955 (90.9)		
Yes	269 (7.5)	174 (6.9)	95 (9.1)		

IQR interquartile rage; *Hukou* household registration; 1 Chinese yuan ≈ 0.15 US dollar

* $p < 0.001$ for both Chi square Test (categorical age and age of sexual debut) and Wilcoxon Rank-Sum Test (continuous age and age of sexual debut)

** Park, bar or night/dance club, public bathroom, fitness center/gym, public restroom, college dormitory, beach, woods, street, theater, public transportation, hotel and private homes

Table 2

Sociodemographic predictors of Chinese men who have sex with men experiencing sexual debut with a woman (N = 3588)

Characteristics	AOR (95% CI)†	*p*-value
Age, year		
<25	Reference	
25–34	1.48 (1.20, 1.83)	<0.001
35–44	2.53 (1.92, 3.34)	<0.001
≥45	3.03 (2.03, 4.52)	<0.001
Current marital status		
Single	Reference	
Married	4.93 (3.89, 6.23)	<0.001
Education (year of schooling)		
College and above (>12)	Reference	
Senior high (10–12)	1.51 (1.16, 1.96)	0.002
Junior middle school and less (≤9)	1.75 (1.42, 2.17)	<0.001
Perception of HIV risk prior to HIV diagnosis		
Likely/very likely	Reference	
Low/no risk	1.23 (1.06, 1.42)	0.008
Sex-finding venue		
Internet	Reference	
Non-Internet**	1.69 (1.39, 2.06)	<0.001
Migrant (No Beijing Hukou)		
No	Reference	
Yes	1.57 (1.28, 1.93)	<0.001
Residence of origin		
City	Reference	
Township/village	1.40 (1.19, 1.65)	<0.001

AOR adjusted odds ratio; *CI* confidence interval; *Hukou* household registration

† Only significant predictors ($p < 0.05$) after stepwise backward selection are presented in the current table and are adjusted in the final multivariable predictive model

** Park, bar or night/dance club, public bathroom, fitness center/gym, public restroom, college dormitory, beach, woods, street, theater, public transportation, hotel and private homes

Table 3

Comparison of high-risk behaviors between Chinese MSM who had sexual debut with a male versus female sexual partner (N = 3588)

High-risk behaviors	Total N = 3588 n (%)	Sexual debut		χ^2 statistics	*p*-value
		With a man N = 2538 n (%)	With a woman N = 1050 n (%)		
Had hazardous alcohol drinking in the past 3 months (AUDIT-C score ≥4)				56.129	<0.001
No	3071 (85.6)	2244 (88.4)	827 (78.8)		
Yes	517 (14.4)	294 (11.6)	223 (21.2)		
Had binge drinking in the past 3 months †				22.686	<0.001
No	2985 (83.2)	2160 (85.1)	825 (78.6)		
Yes	603 (16.8)	378 (14.9)	225 (21.4)		
Alcohol drinking before sex in the past 3 months				29.697	<0.001
No	2850 (79.4)	2076 (81.8)	774 (73.7)		
Yes	738 (20.6)	462 (18.2)	276 (26.3)		
Drug use in the past 3 months				23.592	<0.001
No	2600 (72.5)	1780 (70.1)	820 (78.1)		
Yes	988 (27.5)	758 (29.9)	230 (21.9)		
Predominant anal role *				115.169	<0.001
Exclusively insertive	1131 (33.3)	723 (29.9)	408 (41.6)		
Versatile	1434 (42.2)	982 (40.7)	452 (46.0)		
Exclusively receptive	832 (24.5)	710 (29.4)	122 (12.4)		
Had insertive anal sex with men in the past 3 months				49.606	<0.001
No	1414 (39.4)	1094 (43.1)	320 (30.5)		
Yes	2174 (60.6)	1444 (56.9)	730 (69.5)		
Had condomless insertive anal sex with men in the past 3 months				30.903	<0.001
No	2801 (78.1)	2044 (80.5)	757 (72.1)		
Yes	787 (21.9)	494 (19.5)	293 (27.9)		
Had receptive anal sex with men in the past 3 months				59.162	<0.001
No	1713 (47.7)	1107 (43.6)	606 (57.7)		
Yes	1875 (52.3)	1431 (56.4)	444 (42.3)		
Had condomless receptive anal sex with men in the past 3 months				6.731	0.009
No	2855 (79.6)	1991 (78.5)	864 (82.3)		
Yes	733 (20.4)	547 (21.5)	186 (17.7)		
Had anal sex with HIV-infected men in the past 3 months				0.199	0.655
No	3946 (97.4)	2471 (97.4)	1025 (97.6)		
Yes	92 (2.6)	67 (2.6)	25 (2.4)		
Buying sex from male commercial sex worker in the past 3 months				1.115	0.291
No	3488 (97.2)	2472 (97.4)	1016 (96.8)		
Yes	100 (2.3)	66 (2.6)	34 (3.2)		
Had sex with women in the past 3 months				383.578	<0.001
No	3211 (89.5)	2435 (95.9)	776 (73.9)		

High-risk behaviors	Total N = 3588 n (%)	Sexual debut		χ^2 statistics	*p*-value
		With a man N = 2538 n (%)	With a woman N = 1050 n (%)		
Yes	377 (10.5)	103 (4.1)	274 (26.1)		
Had condomless vaginal sex with women in the past 3 months				208.086	<0.001
No	3351 (93.4)	2468 (97.2)	883 (84.1)		
Yes	237 (6.6)	70 (2.8)	167 (15.9)		
Year of sexual activity				207.863	<0.001
<7	1833 (51.1)	1493 (58.8)	340 (32.4)		
≥7	1755 (48.9)	1045 (41.2)	710 (67.6)		
Lifetime number of male sexual partners				30.992	<0.001
<10	1815 (50.6)	1208 (47.6)	607 (57.8)		
≤10	1773 (49.4)	1330 (52.4)	443 (42.2)		
Lifetime number of female sexual partners				852.627	<0.001
≤1	2983 (83.1)	2408 (94.9)	575 (54.8)		
≥2	605 (16.9)	130 (5.1)	475 (45.2)		
Ever tested for HIV				0.475	0.491
No	1054 (29.4)	737 (29.0)	317 (30.2)		
Yes	2534 (70.6)	1801 (71.0)	733 (69.8)		

AUDIT-C alcohol use disorders identification test

*Sample size reduces to 3397 due to 191 participants self-reported no anal sex with men in the past 3 months

†Having 6 or more standard drinks on one occasion; a standard drink is defined as any drink that contains about 10 grams of pure alcohol [50 ml of spirits; or 40 ml (one small cup) of rice wine; or one can of beer; or 140 ml (one cup) of red wine]

Table 4

Multivariable ordinal logistic regression of association between sex of first sexual partner and high-risk behaviors among Chinese men who have sex with men (N = 3588)

Partner's gender at sexual debut	Age of sexual debut						*p* for trend
	≤18 years, age		19–22 years, age		≥23 year, age		
	AOR† (95% CI)	*p*-value	AOR† (95% CI)	*p*-value	AOR† (95% CI)	p-value	
Total number of lifetime male sexual partners[a]							
With a woman	Reference		Reference		Reference		
With a man	2.38 (1.74, 3.25)	<0.001	2.28 (1.83, 2.85)	<0.001	1.85 (1.39, 2.45)	<0.001	<0.001
Total number of receptive anal sex with men in the past 3 months[b]							
With a woman	Reference		Reference		Reference		
With a man	1.82 (1.36, 2.43)	<0.001	1.54 (1.23, 1.94)	<0.001	1.64 (1.18, 2.28)	0.003	<0.001
Total number of condomless receptive anal sex with men in the past 3 months[c]							
With a woman	Reference		Reference		Reference		
With a man	1.68 (1.05, 2.69)	0.03	1.28 (0.94, 1.73)	0.112	1.04 (0.73, 1.49)	0.817	<0.001
Total number of insertive anal sex with men in the past 3 months[d]							
With a man	Reference		Reference		Reference		
With a woman	1.99 (1.52, 2.61)	<0.001	1.46 (1.19, 1.82)	<0.001	1.22 (0.91, 1.65)	0.186	<0.001
Total number of condomless insertive anal sex with men in the past 3 months[e]							
With a man	Reference		Reference		Reference		
With a woman	2.32 (1.67, 3.23)	<0.001	1.41 (1.07, 1.86)	0.015	1.05 (0.71, 1.55)	0.801	0.031
Total number of lifetime female sexual partners[f]							
With a man	Reference		Reference		Reference		
With a woman	66.35 (43.08, 102.22)	<0.001	31.31 (23.29,42.09)	<0.001	30.06 (19.66,45.97)	<0.001	0.042
Total number of vaginal sex with women in the past 3 months[g]							
With a man	Reference		Reference		Reference		
With a woman	5.90 (3.61,9.64)	<0.001	3.71 (2.43, 5.66)	<0.001	3.84 (2.11, 6.99)	<0.001	0.211
Total number of condomless vaginal sex with women in the past 3 months[h]							
With a man	Reference		Reference		Reference		
With a woman	3.68 (1.58, 8.58)	0.002	2.44 (1.48, 4.03)	<0.001	2.94 (1.65, 5.24)	<0.001	0.747

Odds ratios represent the odds of attaining a higher category of the specific high-risk behavior outcome; p for trend denotes the trend of attaining higher frequency category of the specific high-risk behaviors across increased order of age groups

[a] Category (number of lifetime male sexual partners): 1–4, 5–9, 10–19, ≥20

[b] Category (Total number of receptive anal sex with men in the past 3 months): 0, 1, 2, ≥3

[c] Category (Total number of condomless receptive anal sex with men in the past 3 months): 0, 1, 2, ≥3

[d] Category (Total number of insertive anal sex with men in the past 3 months): 0, 1–2, 3–4, ≥5

[e] Category (Total number of condomless insertive anal sex with men in the past 3 months): 0, 1, 2, ≥3

[f] Category (Total number of lifetime female sexual partners): 0, 1, ≥2

[g] Category (Total number of vaginal sex with women in the past 3 months): 0, 1–2, ≥3

[h] Category (Total number of condomless vaginal sex with women in the past 3 months): 0, 1–2, ≥3