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Prevalence and correlates of point-of-sex HIV self-testing among HIV-negative men who have sex with men in China

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Abstract

Background—HIV self-testing (HIVST) provides a promising tool to screen sex partners for men who have sex with men (MSM) who engage in condomless sex and want to avoid HIV infection. While previous studies have demonstrated HIVST acceptability and increased testing uptake, limited data exists on its use between sex partners for point-of-sex HIV testing. This study examined prevalence and correlates of point-of-sex HIVST among Chinese MSM.

Methods—A cross-sectional survey was conducted among 400 HIV-negative Chinese MSM in 2017. Participants were recruited through a multifaceted sampling approach and self-administered an electronic questionnaire. Point-of-sex HIVST was measured by asking participants if they had ever conducted HIVST with a sex partner before sex to ensure that they both knew their HIV statuses. Multivariable logistic regression was used to identify correlates of point-of-sex HIVST after controlling for age, education and sexual orientation.

Results—Overall, 19.2% (77/400) men reported point-of-sex HIVST (51.3% among self-testers). Participants who had four or more HIV self-tests before had 7.57 fold greater odds (95% CI: 3.75, 15.28) of reporting point-of-sex HIVST compared to those who had fewer HIVST experiences. Point-of-sex HIVST was otherwise not associated with most other socio-demographic or behavioral practices, suggesting that it may be broadly acceptable.

Conclusions—A substantial proportion of Chinese MSM had utilized HIVST with their partners before sex, especially among those who were more experienced with HIVST. Scale up and routine implementation of HIVST programs are further warranted to facilitate point-of-sex HIV testing.

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There are no competing interests.

Keywords

HIV self-testing; MSM (men who have sex with men); HIV/AIDS

Introduction

A substantial proportion of men who have sex with men (MSM) never use or prefer not to use condoms for anal sex. Prevalence of condomless sex has increased or remained stable among MSM worldwide.[1,2] However, these men may also want to avoid HIV infections at the same time. To prevent HIV acquisition in the context of condomless anal sex, one needs to have accurate knowledge of one's own and one's partner's HIV status.[3] This necessitates frequent HIV testing and mutual HIV status disclosure before engaging in condomless sex.[3,4] However, significant proportions of MSM have never tested or not tested recently and are unaware of their own and their partner's HIV status, especially in low- and middle-income countries where sexual minority- and HIV-related stigma continues to be a major barrier to accessing HIV testing services among this key population.[5,6]

The HIV epidemic in China is now concentrated among men who have sex with men (MSM), who account for a third and rising proportion of new infections.[7] Cohort studies document alarmingly high incidence rates among this population, ranging from 5 to 8 per 100 person-years.[8–11] Despite increased availability of HIV testing and treatment in the country, HIV testing uptake remains suboptimal (e.g., national surveillance data illustrated that between 43% and 49% of MSM received an HIV test in the past year).[12] Additionally, condomless sex is common. A meta-analysis found 64% of Chinese MSM did not use condoms consistently in the past six months; condomless sex is nearly ubiquitous with primary partners.[13] Therefore, many Chinese MSM may mistakenly assume their own and their partners' HIV status when they engage in condomless sex, rendering their attempts at preventing HIV infection highly unreliable. Strategies to improve testing uptake are needed to curb the HIV epidemic among Chinese MSM.

As significant numbers of Chinese MSM do not access facility-based testing due to concerns of confidentiality and stigma, a promising strategy is HIV self-testing (HIVST) which was officially endorsed by the World Health Organization as an additional approach to existing HIV testing services.[14] This recommendation was based on growing evidence that HIVST was highly acceptable to key populations in many settings as it offers improved privacy and convenience, and could substantially increase HIV testing.[15–18] In addition, a recent systematic review and meta-analysis demonstrated that self-testers can reliably and accurately conduct HIV rapid tests as compared with trained health-care workers.[19] While formal HIVST policies or guidelines have not yet been implemented in China, several observational studies of Chinese MSM reported that many of these men were willing to self-test, about a quarter already self-tested, and that it could reach untested MSM.[20–22]

While previous studies have demonstrated that MSM prefer HIVST to provider- or facility-based testing and that it can increase testing uptake and frequency, it is uncertain if HIVST could facilitate HIV testing between sex partners before a sexual encounter (i.e., point-of-sex testing). Limited data from the US indicates that using HIVST to screen sex partners is a

viable option.[23,24] Furthermore, in markets where HIVST kits are already available and accessed by MSM (e.g., China), it is unclear to what extent these men utilize HIVST for point-of-sex testing. Therefore, the objective of this paper was to examine prevalence and correlates of point-of-sex HIVST among MSM in China.

Methods

Study Design and Recruitment

We conducted a cross-sectional survey among MSM in Nanjing, China between May and October 2017. This survey was the baseline data collection of a randomized controlled trial evaluating the preliminary efficacy of an HIVST intervention on testing uptake among HIV-negative Chinese MSM (ClinicalTrials.gov Identifier: NCT02999243). To be eligible for the study, participants had to: 1) be biologically male; 2) be 18 years old or older; 3) be currently residing in Nanjing and planning to stay during the study period; 4) have had oral or anal sex with another male in the past year; 5) speak either Mandarin or the local dialect; and 6) be confirmed HIV-negative through HIV rapid testing. Furthermore, we asked eligible and interested participants to provide their preferred contact information during the informed consent process for the purpose of follow-up data collection.

We employed a multifaceted sampling approach to recruit participants – online advertising including online, referrals from community-based organizations and clinics, and peers of eligible participants who completed the survey. Importantly, these recruitment sources mirror how MSM can currently access HIVST kits (e.g., 81% of self-testers from a previous survey reported obtaining HIVST kits from these sources).[21] In addition, as observed in previous studies of Chinese MSM, a multifaceted sampling strategy generates a more diverse sample of participants in terms of both demographic and risk profiles as compared to a single sampling method.[25,26] Interested men could either call the study phone-line or come directly to the study site for an initial eligibility screening. The study site was at the HIV testing and counseling clinic in the Jiangsu Provincial Center for Diseases Control and Prevention. Eligible and consented participants first received an HIV rapid test (NewScen Coast Bio-Pharmaceutical Co., Ltd., Tianjin, China) from a trained HIV testing and counseling professional. While waiting for their test results, they completed a self-administered electronic questionnaire on a mobile device. Participants received a 50RMB (1 USD ≈ 6 RMB) pre-paid cellphone card for completing the survey.

The study was approved by respective Institutional Review Boards at Rutgers University, University of California, San Francisco, and Jiangsu Provincial Center for Disease Control and Prevention.

Measures

We asked participants their age, legal marital status, education attainment, employment status, monthly gross income (1 USD ≈ 6 RMB), and sexual orientation. In terms of sexual behaviors, participants reported on the number of male anal sex partners in the past six months, their role during anal sex (receptive only, insertive only, both receptive and

insertive), and whether or not condoms were used consistently with these male anal sex partners when engaging in insertive and / or receptive anal sex.

In terms of HIV testing histories, we asked participants if they had ever been tested for HIV, and if ever tested for HIV the recency of their last HIV test. We further collected data on their HIVST behaviors, including whether they had ever self-tested, and the number of times they self-tested. Point-of-sex HIVST was measured by asking participants if they had ever conducted HIVST with a male partner before having sex to ensure that they both knew their HIV statuses.

Analysis

Frequencies and percentages were used to describe socio-demographic characteristics and HIV testing histories (including HIVST) of the participants. Chi-square tests were then conducted comparing participants who ever engaged in point-of-sex HIVST versus those did not. Variables that were significantly associated with having ever had point-of-sex HIVST in the bivariate analysis ($p \leq 0.10$) were entered into a multivariable logistic regression model while controlling for age, education and sexual orientation. All analyses were conducted in SPSS version 20.0. Statistical power considerations for this descriptive paper comparing men with a history of HIVST at point-of-sex and those without a history of HIVST at point-of-sex were not included in calculating sample size for the parent study thus our power is limited by the small sample size of men reporting a history of HIVST at point-of-sex.

Results

Table 1 presents socio-demographic characteristics and HIV testing histories of participants. Of the 400 participants enrolled, about half were between the ages of 25 and 34 (49.5%) and a majority were never married (84.0%). Well over half had an educational level of college or above (68.0%) and were employed full-time (73.8%). About two thirds self-identified as gay (69.8%) and had ever disclosed their sexual orientation or MSM behavior to other people (62.7%). In our sample of participants, 45.2% reported that their last HIV test was within the past six months; 22.3% between six to a year ago, and 32.5% over a year ago or never tested. In terms of HIVST history, 37.5% had ever self-tested and 12.0% had self-tested four or more times in the past. Overall, 19.2% of men reported having ever had point-of-sex HIVST (51.3% among self-testers).

Table 2 presents bivariate correlates of having ever engaged in point-of-sex HIVST among participants. Compared to those who never engaged in point-of-sex HIVST, participants who ever engaged in point-of-sex HIVST were significantly more likely to be employed full-time (84.4% vs. 71.2%, $\chi^2 = 5.603$, $p = 0.018$). These men were significantly less likely to report that their anal sex role was receptive only (20.8% vs. 34.1%, $\chi^2 = 5.079$, $p = 0.024$). However, sexual risk behaviors (e.g., condomless anal sex) did not differ significantly between the two groups of men. Those reporting point-of-sex HIVST were significantly more likely to have had their last HIV test within the past six months (68.8% vs. 39.6%, $\chi^2 = 34.188$, $p < 0.001$) and had self-tested for HIV four or more times in the past (39.0% vs. 5.6%, $\chi^2 = 65.638$, $p < 0.001$).

Table 3 presents multivariable correlates of having ever engaged in point-of-sex HIVST. After controlling for age, education and sexual orientation, participants who had their last HIV test between six months to a year ago or over a year ago/never tested had significantly lower odds of reporting point-of-sex HIVST compared to those who had tested within the past six months (AOR = 0.12, 95% CI: 0.04, 0.34; AOR = 0.19, 95% CI: 0.06, 0.60; respectively). Furthermore, participants who had self-tested four or more times in the past had 7.6 fold greater odds (95% CI: 3.75, 15.28) of reporting point-of-sex HIVST compared to those who had three or less self-tests before.

Discussion

In this paper, we examined to what extent MSM in China used HIVST with their sex partners for point-of-sex HIV testing and its associated factors. We found that overall about one in five men had ever engaged in point-of-sex HIVST, and among those who ever self-tested, half reported point-of-sex HIVST. Our finding demonstrated that HIVST was not only accessed by Chinese MSM to test for their own HIV status, but was also utilized as a tool to prevent HIV infection within partnership. Room for further HIVST uptake is likely and can be expected. Several previous studies reported that couple-based HIV testing and counseling is acceptable to MSM including Chinese MSM, however, men who were “out” or those who had prior HIV testing experiences at facilities were more likely to be willing to receive couple-based testing.[27,28] As HIVST is being introduced to different settings and becoming increasingly accessible, it could appeal to couples who are not yet prepared to disclose their sexual identity to providers. In addition to couples who intend to establish long-term steady relationships and do not require repeated counseling sessions, HIVST may also be particularly suitable for men who engage in casual sex only. These men are unlikely to get tested together at a facility before a sexual encounter occurs but may wish to assure each other of their respective HIV statuses. HIVST provides the option of getting tested for HIV at any location and at any time, overcoming logistical barriers of having to travel to a facility at its operating hours.

We also found that MSM participants who reported more recent HIV testing and increased number of prior self-tests had significantly higher odds of reporting point-of-sex HIVST. While our cross-sectional data cannot establish causality, we hypothesize that: recent or frequent testers in general have greater HIV testing self-efficacy and control and could consequently have improved communication and/or negotiations skills around testing with their partners leading to increased testing at the partnership-level where HIVST can be conveniently utilized at privacy. Additionally, men who were more experienced with HIVST may gain comfort and confidence enough to introduce it to their sex partners for routine screening. Our results also suggest that there were no socio-demographic differences between MSM who ever had point-of-sex HIVST and those who had not. We interpreted this as a promising sign that HIVST would not just appeal to certain socio-demographic segments of MSM who want to test with their partners but it could potentially benefit all sub-groups.

Our study has several limitations. First, our findings may not be generalizable to MSM populations in other parts of China. However, this was the first study to examine point-of-

sex HIVST among Chinese MSM. Studies in other geographic areas of China are warranted to determine wider generalizability. Second, as participants were recruited through similar channels that MSM access HIVST, the prevalence of HIVST and point-of-sex testing might have been overestimated. Third, our data did not capture certain nuanced dynamics of point-of-sex HIVST including type of partners with whom men self-tested, location of sex, if they engaged in condomless sex when both tested HIV-uninfected (i.e., serosorting), and whether or not there were any negative consequences or social harms when one tested HIV-infected during a HIVST experience with a potential sex partner. Future studies including qualitative research should explore these issues. Fourth, the present analysis is a secondary analysis of data from an RCT. As such the present analysis was not taken into account in the parent study's power calculation. However, sample size issues are reflected in the CIs presented in this analysis. Finally, the cross-sectional design of the study could not establish causality. Longitudinal studies are needed to examine if HIVST can truly facilitate point-of-sex testing and thus improve sexual harm reduction behaviors (e.g., serosorting).

Despite these limitations our study shows that a substantial proportion of MSM in China had utilized HIVST for point-of-sex testing. Scale up and routine implementation of HIVST programs are further warranted given suboptimal HIV testing uptake and high rates of condomless sex among Chinese MSM. In the meantime, behavioral interventions that encourage HIVST uptake (e.g., health communication campaigns) and provide psychosocial support (e.g., couple-based counseling) should be developed and incorporated into HIVST programs. Furthermore, such programs should implement components that facilitate linkage to confirmatory testing and care of those who test positive, education on testing during window period, and finally referral mechanisms for STD treatment as there is potential for increased transmission of other STDs when condomless sex is supported by point-of-sex HIVST and serosorting.

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Summary

A substantial proportion of Chinese men who have sex with men had engaged in HIV self-testing (HIVST) with their partners before sex. Scale up and routine implementation of HIVST programs are further warranted to facilitate point-of-sex HIV testing.

TABLE 1

Socio-demographic characteristics and HIV testing histories among HIV-negative men who have sex with men in Nanjing, China, 2017 (N = 400)

	N (%)
Age	
18 – 24	138 (34.5)
25–34	198 (49.5)
>=35	64 (16.0)
Marital status	
Single	336 (84.0)
Married/Divorced/Widowed	64 (16.0)
Education	
High school or less	51 (12.7)
Technical or some college	77 (19.3)
College or higher	272 (68.0)
Employment	
Full-time	295 (73.8)
Student/Part-time/Other	105 (26.2)
Monthly income (RMB)[a]	
≤ 2,999	117 (29.2)
3,000– 4,999	94 (23.5)
≥ 5,000	189 (47.3)
Sexual orientation	
Gay	279 (69.8)
Bisexual/Heterosexual/Not sure	121 (30.2)
Last HIV test	
Past 6 months	181 (45.2)
6 to 1 year ago	89 (22.3)
Over 1 year ago or never tested	130 (32.5)
Ever self-tested for HIV	
Yes	150 (37.5)
No	250 (62.5)
Number of prior HIV self-tests	
≤3	352 (88.0)
≥4	48 (12.0)
Point-of-sex HIV self-testing ever	
Yes	77 (19.2)
No	323 (80.8)

Note:

[a] 1 USD ≈ 6 RMB.

TABLE 2

Bivariate correlates of having ever engaged in point-of-sex HIV self-testing (HIVST) among HIV-negative men who have sex with men in Nanjing, China 2017 (N = 400)

	Never point-of- sex HIVST (N = 323) n (%)	Ever point-of-sex HIVST (N = 77) n (%)	χ^2	*p*
Age			3.560	0.169
18 – 24	118 (36.5)	20 (26.0)		
25–34	153 (47.4)	45 (58.4)		
>=35	52 (16.1)	12 (15.6)		
Marital status			2.621	0.105
Single	276 (85.5)	60 (77.9)		
Married/Divorced/Widowed	47 (14.5)	17 (22.1)		
Education			3.016	0.221
High school or less	39 (12.1)	12 (15.6)		
Technical or some college	58 (18.0)	19 (24.7)		
College or higher	226 (69.9)	46 (59.7)		
Employment			5.603	0.018
Full-time	230 (71.2)	65 (84.4)		
Student/Part-time/Other	93 (28.8)	12 (15.6)		
Monthly income (RMB)[a]			3.313	0.191
≤2,999	101 (31.3)	16 (20.8)		
3,000 – 4,999	74 (22.9)	20 (26.0)		
≥5,000	148 (45.8)	41 (53.2)		
Sexual orientation			0.127	0.721
Gay	224 (69.4)	55 (71.4)		
Bisexual/Heterosexual/Not sure	99 (30.6)	22 (28.6)		
Insertive anal sex role only			0.026	0.872
Yes	131 (40.6)	32 (41.6)		
No	192 (59.4)	45 (58.4)		
Receptive anal sex role only	110 (34.1)	16 (20.8)	5.079	0.024
Yes	213 (65.9)	61 (79.2)		
No				

	Never point-of- sex HIVST (N = 323) n (%)	Ever point-of-sex HIVST (N = 77) n (%)	χ^2	*p*
Number of male anal sex partners[b]			0.259	0.611
≤1	174 (53.9)	39 (50.7)		
≥2	149 (46.1)	38 (49.3)		
Any condomless insertive anal sex[b]			1.000	0.317
Yes	67 (20.7)	20 (26.0)		
No	256 (79.3)	57 (74.0)		
Any condomless receptive anal sex[b]			1.087	0.297
Yes	72 (22.3)	13 (16.9)		
No	251 (77.7)	64 (83.1)		
Last HIV test			34.188	< 0.001
Past 6 months	128 (39.6)	53 (68.8)		
6 to 1 year ago	69 (21.4)	20 (26.0)		
Over 1 year ago or never tested	126 (39.0)	4 (5.2)		
Number of prior HIV self-tests			65.638	< 0.001
≤3	305 (94.4)	47 (61.0)		
≥4	18 (5.6)	30 (39.0)		

Note:

[a] 1 USD ≈ 6 RMB;

[b] in the past six months.

TABLE 3

Multivariable correlates of having ever engaged in point-of-sex HIV self-testing (HIVST) among HIV-negative men who have sex with men in Nanjing, China 2017 (N = 400)

	Ever point-of-sex HIVST AOR (95% CI)	*p*
Age		
18–24	1	
25–34	0.77 (0.28,2.07)	0.599
>=35	0.76 (0.33,1.79)	0.535
Education		
High school or less	1	
Technical or some college	0.67 (0.27,1.64)	0.378
College or higher	0.60 (0.29,1.21)	0.149
Sexual orientation		
Gay	1	
Bisexual/Heterosexual/Not sure	0.96 (0.51,1.81)	0.903
Employment		
Full-time	1	
Student/Part-time/Other	0.67 (0.28,1.64)	0.383
Receptive anal sex role only		
Yes	1	
No	1.78 (0.90,3.51)	0.096
Last HIV test		
Past 6 months	1	
6 to 1 year ago	0.12 (0.04,0.34)	< 0.001
Over 1 year ago or never tested	0.19 (0.06,0.60)	0.005
Number of prior HIV self-tests		
≤3	1	
≥4	7.57 (3.75,15.28)	< 0.001