HHS Public Access

Author manuscript

Sex Transm Dis. Author manuscript; available in PMC 2018 April 01.

Published in final edited form as:

Sex Transm Dis. 2017 April ; 44(4): 239–244. doi:10.1097/OLQ.0000000000000575.

Faster and Riskier?: Online Context of Sex Seeking Among Men Who Have Sex with Men in China

Bolin Cao, PhD[1,2,3], **Chuncheng Liu, BA**[1,2,3], **Gabriella Stein**[5], **Weiming Tang, MD, PhD**[1,2,3], **John Best, BA**[1,2], **Ye Zhang, MS**[1,2,3], **Bin Yang, PhD**[3], **Shujie Huang, MS**[3], **Chongyi Wei, DrPH**[4], and **Joseph D. Tucker, MD, MPH**[1,2,*]

[1]University of North Carolina Project-China, No. 2 Lujing Road, Guangzhou, China, 510095

[2]SESH Global, No. 2 Lujing Road, Guangzhou, China, 510095

[3]Guangdong Provincial Centres for Skin Diseases and STI Control, No. 2 Lujing Road, Guangzhou, China, 510095

[4]School of Medicine, University of California, San Francisco, 550 16th Street San Francisco CA, USA 94158

[5]College of Arts and Sciences, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, USA, 27599

Abstract

Background—Many men who have sex with men (MSM) seek sex partners online, creating barriers and opportunities for HIV prevention. The purpose of this study was to examine the characteristics of MSM and the risks associated with seeking sex through websites, gay apps, and both platforms in China.

Methods—Data was collected through a cross-sectional online survey from September through October 2014 from three large gay web portals. Socio-demographic information, sexual behaviors, and online sex seeking behaviors were measured. Multinomial logistic regression was performed to compare sexual risk behaviors among website users, gay app users, and men who used both platforms.

Results—Of the 1201 participants, 377 (31.4%) were website only users, 487 (40.5%) were gay app only users, and 337 (28.0%) were men who used both platforms. These three MSM subgroups have distinct socio-demographic characteristics. Overall, 57.6% of participants reported having engaged in condomless anal sex with their last male partner in the past six months, but there was no significant difference in condomless sex between the three groups. Men who used both platforms viewed more STD-related messages than website only users (aOR = 2.19, 95% CI:1.57–3.05).

[*]**Corresponding author:** Joseph D. Tucker, University of North Carolina Chapel Hill Project-China, No. 2 Lujing Road, Guangzhou, China, 510095, Telephone number: +86-20-83027501, jdtucker@med.unc.edu.

Declaration of interests

We declare no competing interests.

Conclusion—Condom usage behaviors were unaffected by the medium through which sexual partners were found. However, the high frequency of condomless sex suggests that websites and gay apps are both risk environments. This study suggests using multiple platforms for HIV/STD social media interventions may be useful.

Keywords

app; website; MSM; sex seeking; China

INTRODUCTION

Online sex seeking is an increasingly common practice among men who have sex with men (MSM)[1,2]. The online environment provides MSM an alternative venue in which men can build social connections and find new sex partners[3]. At the same time, there is concern that sex seeking online may increase the risk of acquiring and transmitting STDs[4–7].

Technological advances now provide MSM multiple platforms for online sex seeking. Such platforms include websites and gay mobile apps[8]. MSM are likely to seek sex through a wide range of websites (e.g., gay-specific forums, chat rooms, and dating websites). These websites connect MSM from different places, and MSM often develop online relationships before meeting in person[9]. Gay mobile apps are another increasingly popular approach to online sex seeking. Unlike websites, gay apps use geospatial technology to identify physically proximate men[10,11]. Gay apps differ from websites in terms of a) the emphasis on physically proximate partners that decreases barriers to in-person meeting[12]; b) the real-time nature of partner choosing that facilitates rapid meeting[11]; and c) the widespread default profile photos which may simplify partner selection[2,13]. These differences may accelerate sex-seeking and promote condomless sex[7].

Along with the rapid proliferation of social media, using multiple types of platforms for social networking is generally on the rise, from 42% of Internet users in 2014 to 52% in 2015[14]. Evidence from online and offline research indicates that diversifying platforms to meet sex partners may increase the possibilities of causal sexual encounters and spread infections among MSM[15,16]. There is uncertainty about whether adopting multiple dating tools, e.g., using both websites and apps together, facilitates riskier sexual behaviors when compared to only using one platform[10,17].

In China, gay dating websites have been emerging since the late 1990s[16] and nearly half of Chinese MSM have used websites for sex seeking[18]. Gay apps have rapidly expanded in China during recent years[5,6]. As of 2015, 27 million MSM have used Blued[19], the world's largest sex-seeking gay app. Despite the similar purpose of both platforms, their features vary which likely attract different groups of MSM. Identifying the characteristics of MSM groups based on sex seeking platforms could help tailor interventions. Studies on comparison of website users, app users, and men who use both platforms are limited, especially in middle-income countries[2,17]. The purpose of this study was to identify and compare socio-demographics and sexual risk behaviors between Chinese MSM in the following subgroups: website only users, gay app only users, and men who use both platforms.

METHODS

Setting

In China, approximately 7.7% of MSM have HIV infection. The proportion of new HIV cases attributable to MSM behaviors has increased from 2.5% in 2006 to 25.8% in 2014[20].

The data for this study were collected through a cross-sectional, online survey from September through October 2014. Advertisements for study participation were put on three large, gay web portals that reach a large number of MSM in China. Banner links were presented on each web portal homepage and the announcement was sent out to registered users. The survey was developed based on interviews with MSM and then reviewed by many local stakeholders (local MSM, community-based organization (CBO) workers, social media experts, physicians, and public health experts)[6].

To be eligible for the survey, participants must have stated that they were born biologically male, were older than 16, and engaged in anal or oral sex with a man in the previous year. Participants signed a consent form before filling in the survey, and eligible participants received a small (10 USD) phone card reimbursement upon completion. Overall, a total of 1,424 eligible MSM finished the online survey. Among them, we excluded those who did not have sex in the last six months (n = 174) and those who only used offline means for finding sex partners (n = 49).

Measures

The survey measured socio-demographic information, sexual orientation, and online sex seeking behaviors. Based on survey responses, MSM were divided into three subgroups: website only users, gay app only users, and men who used both platforms for online sex seeking in the past six months. Each subgroup was further questioned about behaviors with sex partners they met in the past six months, including number of partners, condom use, time from initial conversation to in-person meeting, negotiation of condom use before meeting, HIV and STI testing, and exposure to STD-related messages. Sexual behaviors, including group sex, commercial sex, and sex when using drugs, were also assessed.

RESULTS

Of the 1201 individuals who were engaged in online sex seeking, 377 (31.4%) men were website only users, 487 (40.5%) were app only users, and 337 (28.0%) were men who used both platforms.

Sample Socio-demographics

Overall, the average age of men was 25.6 years old (±6.8), with the majority between 20–29 years old (n=814, 67.8%). One quarter (25.6%) had at most attended high school and 10.7% were married. In addition, 89.8% of men lived in urban areas and 81.9% had an annual income less than $9600 USD. In total, 64.4% of men (n=773) reported sexual orientation disclosure to anyone other than their partners. Nearly half of the participants (51.6%) had a main male sexual partner (Table 1).

Socio-demographic characteristics of three MSM subgroups

Socio-demographic characteristics were significantly different between the three groups of men (Table 2). First, there was significant difference in age, $\chi^2 = 36.29$, $p < 0.001$. Younger men (20–29 years of age) constituted 72.3% of gay app only users and 70% of men who used both platforms, as compared to 59.9% of website only users. Education level was also different between the three groups, $\chi^2 = 18.52$, $p = 0.001$. For instance, 32.4% of website only users, 24.4% of gay app only users, and 19.9% of men who used both platforms received no more than a high school education. Furthermore, the three groups were different in marital status, $\chi^2 = 45.36$, $p < 0.001$. The percentages of those who had ever married were 26.0%, 9.4% and 13.6% for website only users, gay app only users, and men who used both platforms, respectively. Lastly, the three groups were different in disclosure of sexual orientation, $\chi^2 = 14.98$, $p < 0.001$. Among men who used both platforms, 70.6% had disclosed their sexuality or sexual history to someone, as compared to 57.0% of website only users and 65.7% of gay app only users.

Sexual behaviors between three MSM subgroups

Gay app only users (69.0%) were more likely to have multiple sex partners than website only users (52.8%), $\chi^2 = 204.81$, $p < 0.001$. However, there was no significant difference in condomless anal sex behaviors between the three subgroups. In total, 57.6% of men reported that they had engaged in condomless anal sex with their last male partner in the past six months. The percentages were 55.7%, 59.5% and 57.0% for website only users, gay app only users, and men who used both platforms, respectively. Also, exposure to STD-related messages was different between men using different platforms ($\chi^2 = 23.58$, $p < 0.001$); 58.1% of website only users, 63.2% of gay app only users, and 75.1% of men who used both platforms attained STD-related messages (Table 3).

Factors associated with choices of sex-seeking platforms

Table 4 shows the association between online sex seeking platforms and men's sexual behaviors after adjusting for potential confounders, including age, education, income, marital status, residency, sexual orientation, sexual orientation disclosure, and currently had a main partner. Compared with website only users, gay app only users have multiple sex partners (aOR = 2.15, 95% CI: 1.60–2.88). There was also an association between sex-partner seeking platforms and the time duration between initial conversation to in-person meeting. Compared with website only users, gay app only users were more likely to meet sex partners within a day (aOR = 2.24, 95% CI:1.57–3.19) or within 2 to 7 days (aOR = 1.88, 95% CI:1.34–2.64). Men who used both platforms were more likely to meet in person within one day or 2 to 7 days in comparison to website only users (aOR = 3.71, 95% CI: 2.50–5.51) and gay app users (aOR = 2.32, 95% CI:1.56–3.43). Using different online platforms to seek sex partners was also significantly associated with condom use negotiation. MSM who used both platforms were less likely to negotiate for condom use compared to website only users (aOR = 0.52, 95% CI: 0.39–0.71). Finally, the results showed that men who used both platforms exposed to more STD-related information than website only users (aOR = 2.19, 95% CI: 1.57–3.05).

DISCUSSION

Multiple online platforms are now available for MSM to meet sex partners around the world, creating barriers and opportunities for HIV prevention[21]. The online environment creates a new local context that may influence sexual risk taking[6,7]. This study extends the literature on online sex seeking[2,17] by differentiating website and gay app channels, examining men who used both types of platforms as a separate group, and focusing on a middle-income country. Our data may help inform the development of tailored online interventions.

Our data suggest that these three MSM subgroups have distinct socio-demographic characteristics. Men who only used websites were more likely to be older, received less education, and married compared to men who only used gay apps. Men who used both platforms were similar to men who were gay app only users, except that men who used both platforms were more likely to have ever disclosed their sexual orientation to others. This observation is consistent with other literature showing that online sex seeking preferences are related to sexual orientation disclosure[22]. Openness of sexual identity is likely to be associated with active engagement in community and sexual networks as such men may feel safer and more comfortable to get involved.

Young men are more likely to use either gay apps exclusively or both platforms. This trend may be because young men generally adopt new technologies faster and are more interested in getting involved in multiple platforms[11]. This trend suggests targeting interventions for older MSM through websites and for younger MSM through both websites and gay apps. Although dating websites are decreasing in frequency as compared to gay apps, this study re-emphasizes the importance of performing promotional interventions on websites. A subgroup of MSM remains active on websites because they have become used to websites or they have privacy concerns regarding the geo-locating features of gay apps[13,16].

We found similar rates of condomless sex among different MSM subgroups. Our study showed that 57.6% of men had condomless sex in the past six months, which is consistent with earlier literature[2,18,23]. This high prevalence of unsafe sex behaviors underlines the importance for HIV prevention intervention to reach men on both websites and gay apps. Prior studies reported inconsistent findings on whether sex seeking platforms influence risky sexual behaviors. Some studies indicated gay app users were riskier compared to non-app users[7,24], some studies suggested gay app users were less risky[11], and other studies found no difference between these two groups[17,21,25]. Our study also found no difference and is consistent with findings from Hong Kong[21] and the US[25]. More importantly, it is consistent with the only identifiable empirical study in China that gay app users were associated with higher rates of multiple sex partners but not associated with higher rates of condomless anal sex behaviors[5]. Despite similar condomless behaviors, gay app users had greater numbers of sex partners compared to website users. Our findings indicate that sex seeking platforms may be facilitators for meeting sex partners, but they are not necessarily related to risky sexual behaviors.

Lastly, this study showed that men who used both platforms received more STD-related messages. This finding suggests that social media interventions may benefit from using

multiple platforms. It aligns with prior studies that using a combination of active (e.g., instant messaging, mobile apps) and passive (web banners) channels can reach a larger population for sexual health promotion[26]. This study also echoes reports that consider online dating and sex seeking channels as important sources for health information and support[17]. Social and sexual networks may provide more opportunities to conduct innovative interventions for HIV prevention[27].

This study examines men's online sex seeking and risky sexual behaviors in the context of China. Due to the highly stigmatized environment in China, MSM often utilize fast, convenient online channels for sex seeking[15]. In addition, advanced development of mobile internet allows individuals to be connected at all times in any place. The accessibility and affordability of mobile internet in China facilitates men to adopt mobile apps as social networking channels[28]. With more platforms available, men's likelihood of finding a sex partner increases. However, we found no correlation between condomless sex are platforms used. Furthermore, men are likely to transfer from old platforms (e.g., websites) to new platforms (e.g., gay apps)[29]. It is important for this study to note that although an increasing number of men are adopting gay apps in China, some men prefer to remain on websites for sex seeking. This suggests that interventions should consider using both old and new platforms.

This study has limitations. First, we only examined men who had sought sex online in the past six months. Although this may overestimate sexual behaviors among the general MSM population, it would not influence the validity of comparing men's online sex seeking platforms. Second, men self-reported their behaviors and this may lead to social desirability bias. Nevertheless, participants' personal information was not collected except for their cellphone numbers for compensation. Third, this study used a cross-sectional survey and thus could not claim causal relationship between men's online sex seeking behavior and their risky sexual behavior.

This study has policy and research implications. First, MSM social media interventions may opt to use multiple platforms in order to better reach MSM. Future studies can look more closely into men who use multiple platforms[2,17]. Moreover, as online sex seeking platforms proliferate alongside an expanding HIV epidemic among MSM[20], how these online behaviors relate to disease transmission requires research. Additionally, men acknowledged receiving health messages when seeking sexual partners online. This finding is of great importance for men who are not motivated to actively search for health information. Further investigation can be done on the behavioral differences associated with actively seeking versus passively receiving sexual health information on safe sex behaviors and disease control.

CONCLUSION

The persistent increase in newly diagnosed HIV infections among gay men in China calls for intensifying interventions in key areas and target groups[20]. Given gay dating websites and apps are both risk environments where low prevalence of consistent condom use are identified, focusing HIV prevention interventions in these online platforms may be useful[27].

Different socio-demographic features between MSM subgroups suggests tailoring interventions on different platforms for different generations. Meanwhile, government and health agencies have collaborated with gay dating apps to fight the spread of HIV[30]. Since MSM who used both platforms reported receiving more online health messages than single platform users, more such cooperation with both gay websites and apps should be encouraged.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

We thank all the study participants and staff members at SESH Global, Danlan, and the Guangdong Provincial Center for Skin Diseases and STI Control who contributed.

Funding

US National Institute of Allergy and Infectious Diseases (NIAID; 1R01AI114310); University of North Carolina (UNC)-South China STD Research Training Centre (Fogarty International Centre 1D43TW009532); UNC Center for AIDS Research (NIAID; 5P30AI050410); UNC Chapel Hill, Johns Hopkins University, Morehead School of Medicine and Tulane University (UJMT) Fogarty Fellowship (FIC R25TW0093).

References

1. Liau A, Millett G, Marks G. Meta-analytic examination of online sex-seeking and sexual risk behavior among men who have sex with men. Sex Transm Dis. 2006; 33:576–84. [PubMed: 16540884]
2. Grosskopf, Na, LeVasseur, MT., Glaser, DB. Use of the internet and mobile-based “apps” for sex-seeking among men who have sex with men in new york city. Am J Mens Health. 2014; 8:510–20. [PubMed: 24658284]
3. Grov C, Breslow AS, Newcomb ME, Rosenberger JG, Bauermeister JA. Gay and bisexual men’s use of the Internet: research from the 1990s through 2013. J Sex Res. 2014; 51:390–409. [PubMed: 24754360]
4. Bolding G, Davis M, Hart G, Sherr L, Elford J. Gay men who look for sex on the Internet: is there more HIV/STI risk with online partners? AIDS. 2005; 19:961–8. [PubMed: 15905678]
5. Bien CH, Best JM, Muessig KE, Wei C, Han L, Tucker JD. Gay apps for seeking sex partners in China: Implications for MSM sexual health. AIDS Behav. 2015; 19:941–6. [PubMed: 25572834]
6. Tang W, Best J, Zhang Y, Liu F, Sze L, et al. Gay mobile apps as an emerging risk environment: A cross-sectional online survey among men who have sex with men in China. Sex Transm Infect. 2016; doi: 10.1136/sextrans-2015-052469
7. Zou H, Fan S. Characteristics of men who have sex with men who use smartphone geosocial networking applications and implications for HIV interventions: A systematic review and meta-analysis. Arch Sex Behav. 2016; doi: 10.1007/s10508-016-0709-3
8. Bull SS, McFarlane M, Rietmeijer C. HIV and sexually transmitted infection risk behaviors among men seeking sex with men on-line. Am J Public Health. 2001; 91:988–9. [PubMed: 11392947]
9. Couch D, Liamputtong P. Online dating and mating: The use of the internet to meet sexual partners. Qual Health Res. 2008; 18:268–79. [PubMed: 18216345]
10. Holloway IW, Rice E, Gibbs J, Winetrobe H, Dunlap S, Rhoades H. Acceptability of smartphone application-based HIV prevention among young men who have sex with men. AIDS Behav. 2014; 18:285–96. [PubMed: 24292281]
11. Rice E, Holloway I, Winetrobe H, Rhoades H, Barman-Adhikari A, Gibbs J, et al. Sex risk among young men who have sex with men who use Grindr, a smartphone geosocial networking application. J AIDS Clin Res. 2012; 3

12. Landovitz RJ, Tseng CH, Weissman M, Haymer M, Mendenhall B, Rogers K, et al. Epidemiology, sexual risk behavior, and HIV prevention practices of men who have sex with men using GRINDR in Los Angeles, California. J Urban Heal. 2013; 90:729–39.
13. Blackwell C, Birnholtz J, Abbott C. Seeing and being seen: Co-situation and impression formation using Grindr, a location-aware gay dating app. New Media Soc. 2014:1–20.
14. Duggan, M., Ellison, NB., Lampe, C., Lenhart, A., Madden, M. Social Media Update 2014. Pew Research Center; 2015. Available at: http://www.pewinternet.org/2015/01/09/social-media-update-2014/. Accessed August 5, 2016
15. Wei C, Lim SH, Guadamuz TE, Koe S. Virtual Versus Physical Spaces: Which Facilitates Greater HIV Risk Taking Among Men Who Have Sex with Men in East and South-East Asia? AIDS Behav. 2014; 18:1428–35. [PubMed: 24077974]
16. Zhang D, Bi P, Lv F, Tang H, Zhang J, Hiller JE. Internet use and risk behaviours: an online survey of visitors to three gay websites in China. Sex Transm Infect. 2007; 83:571–6. [PubMed: 17971376]
17. Ko N-Y, Tseng P-C, Huang Y-C, Chen Y-C, Hsu ST. Seeking sex partners through the internet and mobile phone applications among men who have sex with men in Taiwan. AIDS Care. 2016:1–5.
18. Wu Z, Xu J, Liu E, Mao Y, Xiao Y, Sun X, et al. HIV and syphilis prevalence among men who have sex with men: A cross-sectional survey of 61 cities in China. Clin Infect Dis. 2013; 57:298–309. [PubMed: 23580732]
19. Blued. Blued official website. Available at: https://www.blued.com/en/. Accessed August 25, 2016
20. UNAIDS. China AIDS response progress report 2015. 2015. Available at: http://www.unaids.org/sites/default/files/country/documents/CHN_narrative_report_2015.pdf. Accessed September 10, 2016
21. Lee SS, Lam ANS, Lee CK, Wong NS. Virtual versus physical channel for sex networking in men having sex with men of sauna customers in the city of Hong Kong. PLoS One. 2012; 7
22. Duguay S. “He has a way gayer Facebook than I do”: investigating sexual identity disclosure and context collapse on a social networking site. New Media Soc. 2014:1–17.
23. Yeo TED, Ng YL. Sexual risk behaviors among apps-using young men who have sex with men in Hong Kong. AIDS Care. 2015; 0121:1–5.
24. Beymer MR, Weiss RE, Bolan RK, Rudy ET, Bourque LB, Rodriguez JP, et al. Sex on demand: geosocial networking phone apps and risk of sexually transmitted infections among a cross-sectional sample of men who have sex with men in Los Angeles County. Sex Transm Infect. 2014; 90:567–72. [PubMed: 24926041]
25. Lehmiller JJ, Ioerger M. Social networking smartphone applications and sexual health outcomes among men who have sex with men. PLoS One. 2014; 9
26. Muessig KE, Nekkanti M, Bauermeister J, Bull S, Hightow-Weidman LB. A systematic review of recent smartphone, internet and web 2.0 interventions to address the HIV continuum of care. Curr HIV/AIDS Rep. 2015:173–90. [PubMed: 25626718]
27. Tso LS, Tang W, Li H, Yan HY, Tucker JD. Social media interventions to prevent HIV: A review of interventions and methodological considerations. Curr Opin Psychol. 2015; 9:6–10.
28. Zheng L, Zhang X, Feng Y. The new avenue of online sexual activity in China: The smartphone. Comput Human Behav. 2016
29. Feldmann, V. Leveraging Mobile Media: Cross-Media Strategy and Innovation Policy for Mobile Media Communication. Physica-Verlag: A Springer Company; 2005.
30. Potkin, F. Taking China’s fight against AIDS online. Dipl. 2016. Available at: http://thediplomat.com/2016/01/taking-chinas-fight-against-aids-online/. Accessed August 2, 2016

Table 1

Demographic characteristics of the survey participants in China, 2014 (N=1201)

Characteristics	n	percent
Age		
<20	80	6.7%
20–29	814	67.8%
≥30	307	25.6%
Education		
High school/below	308	25.6%
College/Bachelors	820	68.3%
Masters/PhD	73	6.1%
Marital status		
Never married	1011	84.2%
Ever married	190	15.8%
Residency		
Urban	1078	89.8%
Rural	123	10.2%
Annual income (USD)		
< 3000	290	24.1%
3001–6000	363	30.2%
6001–9600	331	27.6%
9601–15000	143	11.9%%
> 15000	74	6.2%
Sexual orientation		
Gay	883	73.5%
Others[#]	318	26.5%
Ever disclosed sexuality		
Yes	773	64.4%
No	428	35.6%
Currently had a main partner		
Yes	620	51.6%
No	581	48.4%

[#]Others refer to bisexual, heterosexual or transgender.

Table 2

Comparison of socio-demographics between MSM who were website only users, gay app only users, and men who used both platforms in China, 2014 (N=1201)

	Website only users (*N* = 377)		Gay Apps only users (*N* = 487)		Both (*N* = 337)		χ^2
Age	**n**	**percent**	**n**	**percent**	**n**	**percent**	
<20	15	4.0%	41	8.4%	24	7.1%	36.29***
20–29	226	59.9%	352	72.3%	236	70.0%	
≥30	136	36.1%	94	19.3%	77	22.8%	
Education							
High school/below	122	32.4%	119	24.4%	67	19.9%	18.52***
College/Bachelors	232	61.5%	345	70.8%	243	72.1%	
Masters/PhD	23	6.1%	23	4.7%	27	8.0%	
Marital status							
Never married	279	74.0%	441	90.6%	291	86.4%	45.36***
Ever married	98	26.0%	46	9.4%	46	13.6%	
Residency							
Urban	326	86.5%	444	91.2%	308	91.4%	6.47*
Rural	51	13.5%	43	8.8%	29	8.6%	
Annual income (USD)							
< 3000	68	18.0%	131	26.9%	91	27.0%	17.83*
3001–6000	130	34.5%	145	29.8%	88	26.1%	
6001–9600	116	30.8%	129	26.5%	86	25.5%	
9601–15000	43	11.4%	53	10.9%	47	13.9%	
> 15000	20	5.3%	29	6.0%	25	7.4%	
Sexual orientation							
Gay	257	68.2%	373	76.6%	253	75.1%	8.32*
Others	120	31.8%	114	23.4%	84	24.9%	

	Website only users (*N* = 377)		Gay Apps only users (*N* = 487)		Both (*N* = 337)		χ^2
Age	**n**	**percent**	**n**	**percent**	**n**	**percent**	
Ever disclosed sexuality							
Yes	215	57.0%	320	65.7%	238	70.6%	14.98***
No	162	43.0%	167	34.3%	99	29.4%	
Currently had a main partner							
Yes	211	56.0%	239	49.1%	170	50.4%	4.30
No	166	44.0%	248	50.9%	167	49.6%	

* $p<0.05$;

** $p<0.01$;

*** $p<0.001$

Table 3

Comparisons of sexual and HIV/STD testing behaviors between MSM who were website only users, gay app only users, and men who used both platforms in China, 2014 (N=1201)

	Website only users (N = 377)		Gay App only users (N = 487)		Both (N = 337)		
	n	percent	n	percent	n	percent	χ^2
Number of sex partners found through the platform in the past 6 months							
Single	178	47.2%	151	31%	–	–	204.81***
Multiple	199	52.8%	336	69%	–	–	
Condomless anal sex with last male partner in the last 6 months							
Yes	210	55.7%	290	59.5%	192	57%	1.37
No	167	44.3%	197	40.5%	145	43%	
Time duration between meeting the last sex partner through the platform and meeting in person							
< 1 day	101	26.8%	171	35.1%	149	44.2%	51.16***
2–7 days	118	31.3%	189	38.8%	121	35.9%	
>1 week	158	41.9%	127	26.1%	67	19.9%	
Negotiation about condom use with last partner before meeting in person							
Yes	228	60.5%	300	61.6%	148	43.9%	29.24***
No	149	39.5%	187	38.4%	189	56.1%	
Asked for HIV status before meeting in person							
Yes	129	34.2%	171	35.1%	94	27.9%	5.21
No	248	65.8%	316	64.9%	243	72.1%	
Had group sex in the last 12 months							
Yes	39	10.3%	43	8.8%	47	13.9%	5.53
No	338	89.7%	444	91.2%	290	86.1%	
Had commercial sex in the last 12 months							
Yes	20	5.3%	27	5.5%	26	7.7%	2.22
No	357	94.7%	460	94.5%	311	93.9%	

	Website only users (N = 377)		Gay App only users (N = 487)		Both (N = 337)		
	n	percent	n	percent	n	percent	χ^2
Had sex while using drugs in the last 12 months							
Yes	74	19.6%	125	25.7%	103	30.6%	11.42**
No	303	80.4%	362	74.3%	234	69.4%	
Received online health message in the last 6 months							
Yes	219	58.1%	308	63.2%	253	75.1%	23.58***
No	158	41.9%	179	36.8%	84	24.9%	
Ever been tested for HIV							
Yes	189	50.1%	239	49.1%	181	53.7%	1.78
No	188	49.9%	248	50.9%	156	46.3%	
Ever been tested for STDs							
Yes	123	32.6%	145	29.9%	122	36.2%	3.76
No	254	67.4%	342	70.2%	215	63.8%	

* $p<0.05$;

** $p<0.01$;

*** $p<0.001$

Table 4

Multinomial logistic regression: sexual and HIV/STD testing behaviors among MSM who were website only users, gay app only users, and men who used both platforms in China, 2014 (N=1201)

	Gay App only versus website only user		Both versus website only user	
	aOR	**95% CI**	**aOR**	**95% CI**
Number of sex partners found through the platform in the past 6 months				
Single	*Ref*		*Ref*	
Multiple	2.15	1.60, 2.88***	–	–
Condomless anal sex with last male partner men in the last 6 months				
Yes	1.10	0.82, 1.46	1.00	0.74, 1.36
No	*Ref*		*Ref*	
Time duration between meeting the last sex partner through the platform and meeting in person				
< 1 day	2.24	1.57, 3.19***	3.71	2.50, 5.51***
2–7 days	1.88	1.34, 2.64***	2.32	1.56, 3.43***
>1 week	*Ref*		*Ref*	
Negotiation about condom use with last partner before meeting in person				
Yes	1.09	0.82, 1.46	0.52	0.39, 0.71***
No	*Ref*		*Ref*	
Asked for HIV status before meeting in person				
Yes	1.15	0.86, 1.56	0.79	0.57, 1.10
No	*Ref*		*Ref*	
Had group sex in the last 12 months				
Yes	1.04	0.64, 1.48	1.57	0.97, 2.53
No	*Ref*		*Ref*	
Had commercial sex in the last 12 months				
Yes	1.11	0.60, 2.06	1.63	0.87, 3.05
No	*Ref*		*Ref*	
Had sex while having drugs in the last 12 months				
Yes	1.32	0.94, 1.86	1.66	1.17, 2.37**
No	*Ref*		*Ref*	
Received online health message				
Yes	1.25	0.94, 1.67	2.19	1.57, 3.05***
No	*Ref*		*Ref*	
Ever been tested for HIV				
Yes	1.05	0.79, 1.40	1.23	0.90, 1.68
No	*Ref*		*Ref*	

	Gay App only versus website only user		Both versus website only user	
	aOR	**95% CI**	**aOR**	**95% CI**
Ever been tested for STDs				
Yes	0.99	0.73, 1.35	1.28	0.92, 1.78
No	*Ref*		*Ref*	

Note: Multivariable model controlled for age, education, income, marital status, residency, currently had a main partner, sexual orientation, and disclosure status.

* $p < 0.05$;

** $p < 0.01$;

*** $p < 0.001$