

Evaluating an Internet-based behavioral intervention to decrease risk behaviors for HIV acquisition among MSM in Peru

Abstract

Objectives: Internet has emerged as a promising tool for delivering HIV and STI prevention interventions to MSM in Peru. The objective of this cross-sectional study was to gather information among MSM regarding their preferences when seeking sexual health information on the web.

Methods: Between January and April 10th, 2010, we recruited 1,160 MSM, online and offline, who completed an online anonymous survey hosted on www.tunexo.org.

Results: The mean age of respondents was 26.8 years (range: 18-59). Around 90% had post-high school education. More than 90% were from the Lima Metropolitan area (Lima and Callao). 79% of subjects were recruited online. Self-reported HIV prevalence was 8.1%. "No previous HIV test" was reported by 32% of respondents and only 31% had been tested in the last 6 months. High risk sexual behavior was reported by 41.9%. Searching the internet for sexual health topics was a common activity, with 58% of respondents reporting this activity in the prior 6 months. Acceptability of images and specific language was lower in the least educated group. Preferences for topics and services varied by level of education, with more highly educated subjects preferring information about "How to be a better lover" and "Aging as a gay man"; and MSM with less education preferring to receive prevention messages via cell phone. Preferences for topics varied by age groups for the following: "Finding a stable partner" and "Men's physical sexual health".

Conclusions: MSM were interested in web-based prevention messages to improve their sexual health. They chose 16 topics and 14 services that most interested them and ranked acceptability of specific images and idiomatic language they preferred for conveying sexual health information. Future web- and cell-based interventions related to sexual health among targeted groups of MSM in Peru can be tailored to meet the preferences for topics, services and format.

Introduction

UNAIDS reports that 1.7 million people are living with HIV infection in Latin America, and in 2007 alone, an estimated 140,000 new infections occurred in this region. The vast majority of HIV infections were among men who have sex with men (MSM) and were transmitted during unprotected anal intercourse (UAI). [1] In Peru, HIV infections are concentrated in the capital city of Lima - where 70% of HIV-infected MSM live and 22% of MSM are HIV-infected. HIV prevalence among MSM outside of Lima is 14%. [2, 3, 4] The prevalence of other sexually transmitted infections (STI) in MSM is similarly high; 13.4% for syphilis and 46.3% for Herpes simplex virus type 2 (HSV-2). [2, 4] HIV disproportionately affects young Peruvians: in 2006, 50% of persons diagnosed with HIV were under age 30. [1] Among MSM, 26.5% report bisexuality and a low rate of consistent condom use, especially with female partners (17% compared to 25.5% with male partners). [6]

HIV/STI services do exist in Peru, and many are free. In the mid-1990's, the Peruvian Ministry of Health established a system of STI referral centers in districts throughout the country (*Centro de Referencia de*

ITS or CERITS) to address the high prevalence of HIV and STIs among MSM. HIV and syphilis testing are provided free to all MSM by experienced staff and antibiotics are provided free of charge for all physician-diagnosed infections. In 2004, Highly Active Antiretroviral Therapy – HAART - (known as TARGA or *Tratamiento Antirretroviral de Gran Actividad*) similarly became available with support from the Global Fund, and is free of charge for those who need it. In addition to the government-based services, there are private laboratories that conduct HIV tests for a fee, as well as several internationally-funded HIV and STI research trials conducted by organizations which provide free testing to study participants. While these various systems are not perfect, what was once a problem of nonexistent or only fee-based services has shifted to an issue of MSM not accessing HIV testing services. Indeed, an estimated 80% of Peruvian MSM have not been tested for HIV and have no knowledge of their HIV status, [3] which translates to upwards of 50,000 individuals who are unaware of being HIV-infected. [3] Government-sponsored HIV prevention interventions targeting MSM based on peer educators who “recruit and refer” MSM to the local CERITS are partially effective, but reach at most 18% of MSM and miss hidden subgroups such as those who do not identify as gay, as well as younger and bisexual men. [3, 7] Alternative strategies for reaching MSM (both “out” and hidden) are clearly needed. Fortunately, the Internet has emerged as a promising tool to increase access for MSM seeking HIV prevention information and services, many of whom do not seek traditional forms of face-to-face counseling because of the social stigma associated with being gay. [8, 9]

The Internet is the world’s most extensive venue for sex negotiation and sexual information. As such, it constitutes an ideal place to provide MSM with HIV risk-reduction information. [10, 11] Furthermore, access to the internet in Peru is high, with an estimated 7.6 million users (representing penetration into 25.8% of the MSM population). [12] More than 80% of users access the internet via “cafes” [13] which often provide private booths. The inexpensive and widespread public access to the internet make this a feasible tool for delivering sexual health and STI prevention interventions in countries where in-person methods may be insufficient or lacking. [14, 15] For example, in an online survey of Peruvian MSM conducted in 2008-2009, only 10% of MSM (143/1481) reported having received HIV-related information from traditional peer-educators during the last year [5] yet more than 80% of the respondents in the study reported they were interested in accessing HIV prevention interventions via the Internet, 93.7% were interested in receiving these interventions from a web page, 87.4% in chat rooms, 83.4% through emails, 83.1% through e-groups and 60.2% through mobile-phone text messages. [5, 16] Furthermore, in a randomized controlled trial, an online video-based intervention increased HIV testing among MSM. [17]

The HIV epidemic is concentrated among MSM in Peru. Despite existing HIV and STI prevention programs directed at this population, there is low usage of these interventions by some MSM, perhaps because of the perceived risk of revealing homosexuality through seeking such services. The internet has emerged as a promising tool for delivering sexual health messaging and interventions to MSM. The objective of this cross sectional study was to survey MSM regarding their preferences of sexual health topics, prevention and counseling services and acceptability of images and specific language for web-based prevention and sexual health messaging.

Methodology

Design

An observational cross sectional study using an online anonymous survey comprised of 56 questions, with three main sections: demographics, behavioral characteristics and preferences. The third section was partially extracted and adapted from Hooper *et al.* [18] We assessed the acceptability of sexual health content with 15 items; likewise, 21 items regarding topics and 16 items regarding services, to include in a web-based sexual health-related intervention, were assessed with Likert scales. Acceptability was scored from unacceptable to acceptable. Interest in topics and services were scored from not interested to interested.

Recruitment

We created the name “*Tu Nexo*” for the study website - which means “your connection” (to better sexual health) and our slogan was: “Mark your preferences”. We performed targeted offline and online recruitment. Offline, we recruited subjects from the main gay venues in Lima frequented by MSM; including clubs, bars, video arcades, private parties, retail businesses and the *Epicentro* gay community center. Online, we recruited subjects who accessed the two major Peruvian websites used by MSM: gayperu.com and peruesgay.com; Facebook, Hi5 and listserves targeting MSM. Recruitment material included pictures and messages encouraging them to visit the study website and complete the survey. We asked them to help us with the fight against HIV/AIDS and STI among MSM and invited them to improve their sexual health. We highlighted the anonymous nature of the study.

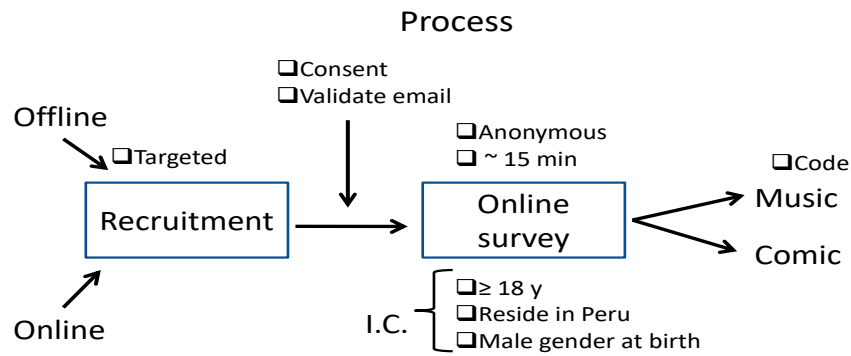
Process (Figure 1)

The survey was available from January 7th to April 10th, 2010. After visiting the study website (www.tunexo.org) and clicking on the “Start survey” icon, an online informed consent had to be accepted before continuing. Then, they had to register with an email address and password. In order to make sure they were using a valid email, we sent an email with a link through which they could start the survey. After this validation process, they could log in directly to complete the survey if they were unable to finish during the first log in.

Inclusion criteria included male gender at birth, residence in Peru and age older than 17 years. We allowed all registered subjects to complete the survey and excluded those who did not meet the inclusion criteria from the analysis; this method was chosen to reduce the possibility of persons excluded at the beginning, from logging in later using a false identity, and providing invalid information.

After completing the survey, each subject was offered a gift: a sexual health-related comic or a music disc. Each subject was sent them a code which they could use to pick up the gift at the *Epicentro* gay community center. In order to ensure confidentiality, they were not asked for their names, they just had to show the code.

Figure 1. **Process**



I.C.: inclusion criteria.

Data analysis

A survey was considered to be complete if the demographic section and at least half of the questions in each of the preferences sub-sections (acceptability, topics and services) were answered. To eliminate duplicate entries, we crossed the following variables: IP location, date of survey, password, age, month of birth, year of birth, city, district and time of survey (starting, ending, duration). Also, we verified for self-misrepresentation by assessing for incongruent data, demographics or questions regarding sexuality and group self-identification.

Data analysis was conducted using Stata/IC 10.1. We performed a complete descriptive analysis. Differences in preferences across age group, education and HIV status were evaluated using Chi square (independent test) and Fisher's exact test. In order to be more conservative with our type I error, we adjusted it for three non-pairwise comparisons and worked with the type I error: 0.017 when assessing these differences.

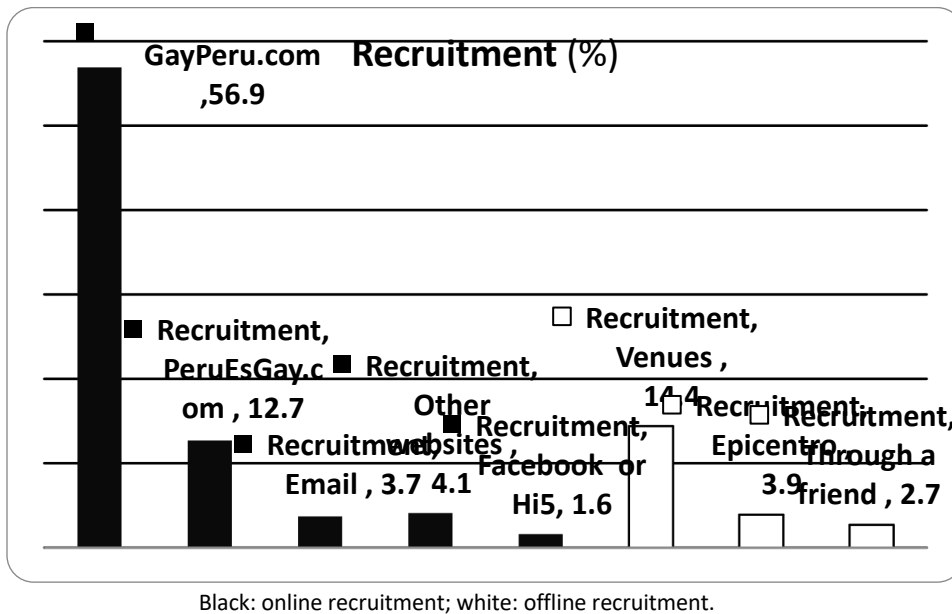
IRB

Our proposal was approved by the Institutional Review Board of the University of Washington in Seattle and the Cayetano Heredia University in Lima, Peru.

Results

Between January 7th and April 10th, 2010, 2,183 subjects registered on the website, of whom 1,382 validated their email. After cleaning the data base for incomplete, duplicate entries, self-misrepresentation and those who did not meet inclusion criteria, we ended up with 1,160 subjects. 79% of our sample came from online recruitment and 21% from offline recruitment. The main source of subjects came from the Peruvian website gayperu.com (56.9%) and the second greatest source was gay venues (14.4%) (Figure 2). Within the preferences sub-sections (acceptability, topics and services), the overall missing data was 8.4%.

Figure 2. Venues the subjects came from



Demographic characteristics

More than 70% of subjects were younger than 30 years. The mean age was 28.6 years (range 18 to 59); 90.9% reported living in the Lima Metropolitan area, with more than half living in the central zone of Lima. Nearly 90% reported post-high school education.

Regarding sexual identity, 77% self-reported being gay (discreet, open or in the closet) and 18.8% bisexual. We had low self-reporting of other groups of MSM such as transgender (0.4%) and sex workers (0.3%) (Table 1).

Table 1. Demographic characteristics

Demographic characteristics (N=1,160)	Nº	%
Age		
18 - 24	510	43.9
25 - 29	322	27.8
30 - 39	257	22.2
40 +	71	6.1
Education		
Some or all High School	120	10.4
Incomplete post-High School	467	40.6
Completed post-High School	563	49
City		
Lima and Callao (Lima Metropolitan)	1054	90.9
Outside Lima Metropolitan	106	9.1
Regions*		
Lima Central and residential	562	53.3
Lima North	228	21.6
Lima South	113	10.7
Lima East	87	8.3
Callao	64	6.1
Sexual identity		
Gay	834	72.1
Bisexual	217	18.8
In the closet	56	4.9
Transgender	5	0.4
Sex worker	3	0.3
Others	40	3.5

Numbers may not sum to total due to missing data; * in Lima Metropolitan (N=1,054)

Behavioral characteristics

Nearly half of subjects reported having first anal sex with a man before they were 18 years old. High risk sexual behavior, defined as two or more episodes of unprotected anal intercourse in the last 3 months, was reported by 41.9%, with the top reasons for not having used condom: “It was with my boyfriend” (47%), “We did not have a condom at that moment” (18.5%) and “I do not like to use condoms” (12.5%) (Table 2).

Table 2. **Reasons why a condom was not used**

Reasons why a condom was not used	%
It was with my boyfriend	47
We did not have a condom at that moment	18.5
I do not like to use condoms	12.5
The ejaculation was outside	8.3
I was drunk or had consumed another drug	6.8
I had sex with a person whose status was negative	6.8
The other guy did not want to use it	6
The other guy told me that he was HIV negative	4.6
I am embarrassed to buy condoms	2.3
I think I will never get infected	1.7
I had one but it broke before	0.8
I am taking ARV and my HIV infection is under control	0.8
I do not care since there is a treatment now	0.6
I do not know how to use a condom	0.5
I cannot afford condoms	0.3

Last sexual intercourse; ARV: antiretrovirals.

When examining high risk sexual behavior by age group and education, we found more high risk sexual behavior in people younger than 30 years and in those with the lowest level of education.

HIV and other STI

Self-reported HIV prevalence was 8.1% (94/1160), but 32% had never been tested and only 31% had been tested in the last 6 months. The top reasons for never having been tested were: “I am afraid they will disclose my status if I test positive” (49%) and “I do not know where they perform the test” (44.6%) (Table 3). 60% had been tested in a private facility (Non-governmental organization –NGO–, laboratory or doctor’s office) and about 25% in a Ministry of Health facility. Among those self-reporting as HIV positive, 55.4% also reported receiving HAART (highly active antiretroviral therapy).

Subjects in the 18 – 24 year-old group had the lowest self-reported prevalence of HIV (3.7%) and the highest percentage of untested subjects (45%); the highest self-reported prevalence of HIV was shown

in the 30 – 39 year-old group (14.4%). Regarding education level, the highest self-reported prevalence of HIV and untested subjects was by the least educated group, 9.2% and 50%, respectively.

Table 3. **Reasons for never having been tested**

Reasons for never having been tested	%
I am afraid they will disclose my status if I test positive	49
I do not know where they perform the test	44.6
I have not been at risk for getting infected	42.4
I do not have a close friend who will go with me to get tested	26.9
I do not know what to do or where to go if I test positive	23.8
I cannot afford the test	21.1
I do not like to talk about my sexual life with a health care provider	16.6
I could not afford the treatment if I test positive	15
I am afraid of blood and needles	10.8
They do not give you the result the same day	7.8
My partners have never asked me to get tested	6.9
I would not like to start taking ARV if I test positive	6.6
I am afraid of losing my job if I test positive	3.6

56.2% had received at least one shot of the hepatitis B vaccine; while only 34.1% had been tested for any STI (from urine, blood, rectum or a penis sample) in the last 6 months; among whom 20% reported at least one positive STI test.

Internet

57.7% had had sex with a partner met over the Internet during the last 3 months, with 84.3% reporting having had 1 to 5 of such partners. During the last 6 months, 58% had searched for sexual health information on the Internet; 99% used Google or Yahoo, 27.5% contacted gay websites and 26.6% contacted NGO's or institutions working with MSM (Table 4).

Table 4. **Websites accessed during search for sexual health information**

Websites accessed during search for sexual health information	%
Internet search engines (e.g., Google, Yahoo)	99
Gay, Lesbian, Bisexual Transgender web sites (e.g., gay.com)	27.5
NGOs or institutions that work with MSM	26.6
Internet health sites (e.g., WebMD, Yahoo! Health)	20.8
Bulletin boards/blogs	17.5
Government sites (e.g., MOH, NIH)	12.3
National radio and television websites	2.9

 MOH: ministry of health; NIH: national institute of health

Preferences

When scoring these three sub-sections, we considered as highest-rated items receiving a mean score equal or greater to 2.5 (each item was ranked using an ordinal scale from 1 -least preferred- to 3 -most preferred-). We report the three sub-sections showing the percentage of acceptability or interest for each of the highest-rated items. With regard to acceptability of sexual health information images and specific language, there were 10 highly-rated items (Table 5). Similarly, 16 topics and 14 services were highly-rated (Table 6).

Table 5. **Acceptability of images and specific language**

Images/language	Acceptability (%)
Images of naked men	91
Men kissing	87
Images of men having anal sex	86
Video showing how to put on a condom	81
Images of men masturbating	80
Images of men having oral sex	80
Pictures of a penis	76
Use of indirect sexual language	75
Use of graphic sexual language	71
Stories with sexual content	68

Table 6. **Interest in topics and services**

Topics of interest	Interest (%)
How to protect myself against HIV and STI	94
Men's physical sexual health	90
How to keep a healthy relationship	89
Ways to feel comfortable with my body	87
Ways to feel better about myself	87
How to deal with depression	84
How to deal with anxiety	83
How to have anal sex without pain	81
How to be a better lover	80
How to deal with sexual abuse	78

Ways to feel comfortable with my genitalia	78
Finding a stable partner	77
How to use a condom	76
Aging as a gay man	75
How to date men offline	73
How to convince my partner to use a condom	73

Services of interest	Interest (%)
Contact with offline doctors that attend MSM	93
Contact with counselors in case I am HIV positive	92
Contact with offline counselors	91
Contact with institutions providing free testing HIV/STI	89
Videos about sexual health	88
Online psychological counseling	88
Online medical counseling	88
Scientific articles about sexual health	84
Statistic information about sexual health	83
Images about sexual health	81
Reports about sexual health	80
Online forums about sexual health	78
Online games for learning about HIV and STI	72
Chat with other users	70

Preferences across education level (Table 7)

Overall, the acceptability of images and specific language was greater in MSM with the highest level of education (any completed post-high school education) compared to MSM with the least educated (some or all high school). The five items that had significant differences in acceptability across level of education included: “Video showing how to put on a condom” (83% vs. 72%; p-value 0.005), “Men kissing” (88% vs. 78%; p-value 0.001), “Pictures of a penis” (82% vs. 65%; p-value 0.00); “Images of naked men” (94% vs. 82%; p-value 0.002) and “Images of men masturbating” (84% vs. 70%; p-value 0.003).

Topics of interest also differed according to level of education, with topics more highly rated by MSM with higher levels of education including: “Aging as a gay man” (79% vs. 66%; p-value 0.002) and “How to be a better lover” (83% vs. 68%; p-value 0.003). Overall, differences in topics of interest were less marked as compared to acceptability of images and specific language across education.

Regarding interest in prevention and counseling services, although “Get prevention messages on my mobile phone” was poorly rated overall (57%, mean: 2.32), when stratified by education, we found a

significant difference between the least educated vs. higher educated group regarding preference for receiving messages via mobile phone (71% vs. 52%; p-value 0.00) (Figure 3).

Preferences across age groups (Table 7)

When comparing age groups, we found significant differences in acceptability of two sexual health items between the 30 – 39 and the 18 – 24 years age groups. Pictures of a penis (83% vs. 71%) and “Use of graphic sexual language” (81% vs. 66%) were more well-accepted by older MSM (p-value 0.001 for both).

Regarding topics, there were significant differences in two items. “Finding a stable partner” was of more interest to the 18 – 24 year-old group than to the 40 + age group (81% vs. 68%; p-value 0.009). Men’s physical sexual health was of more interest to the 30 – 39 year-old group than to the 18 – 24 year-old group (97% vs. 87%; p-value 0.005).

There were no differences between desired prevention or counseling services across age groups. We also examined for differences in reported preferences between the 18 – 24 and the 25 – 29 years age group, and adjusted for an additional non-pairwise comparison (type I error: 0.0085), but found no significant differences.

Table 7. Differences in acceptability of images and specific language and topics and services of interest across education level and age groups

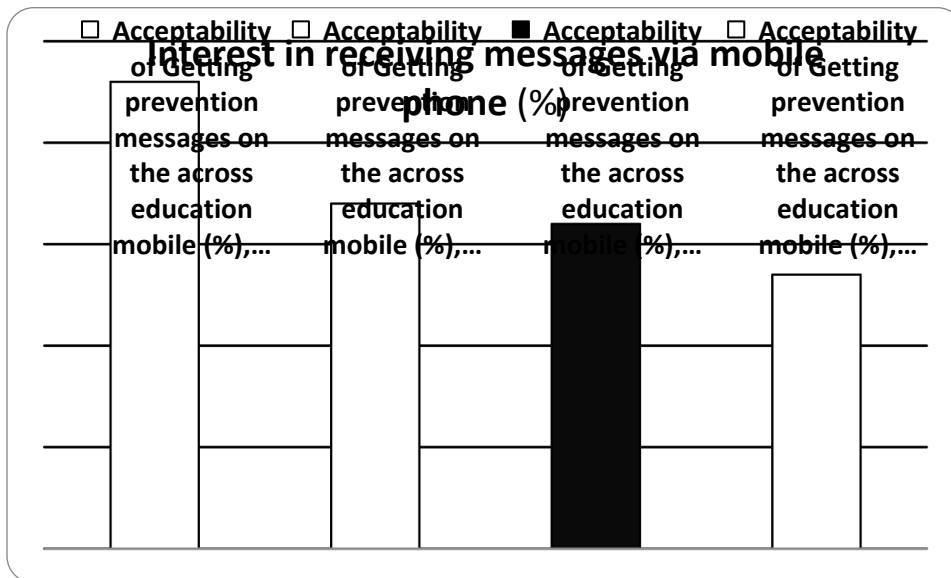
	Education level (%)				Chi2
	Overall	HS (n=120)	I-HS (n=467)	C-HS (n=563)	
Acceptability					
Images of naked men	91	82	89	94	16.6
Men kissing	87	78	88	88	19.6
Video showing how to put on a condom	81	72	81	83	15.1
Images of men masturbating	80	70	77	84	15.7
Pictures of a penis	76	65	72	82	20.7
Topics					
How to be a better lover	80	68	79	83	15.7
Aging as a gay man	75	66	73	79	17.4
Services					
Receiving messages via mobile phone	57	71	59	52	21.1

Overall	Age groups (%)*				Chi2
	18 - 24	25 - 29	30 - 39	40 +	

		(n=510)	(n=322)	(n=257)	(n=71)	
Acceptability						
Pictures of a penis	76	71	76	83	82	21.7
Use of graphic sexual language	71	66	70	81	77	21.5
Topics						
Men's physical sexual health	90	87	90	97	93	18.4
Finding a stable partner	77	81	76	71	68	17.1

Type I error: 0.017; * additional non-pairwise comparison between the 18 – 24 and the 25 – 29 years age group with adjusted type I error: 0.0085. HS: some or all High School; I-HS: Incomplete post-High School; C-HS: completed post-High School. Topics: topics of interest; Services: services of interest.

Figure 3. Interest in receiving messages via mobile phone across education level



We found no differences in preferences when stratified by HIV status.

Discussion

This is the first study of Peruvian MSM regarding preferences for web-based sexual health information, Our sample included 1,160 predominately young and well educated MSM with a self-reported HIV prevalence of 8.1%. The prevalence of HIV infection in our study, although lower than other reports, is still high compared to 0.6% in the general population. [24] The low HIV prevalence in our subjects could be explained by the high proportion of subjects never tested or not tested within the prior six months. If we included only MSM reporting ever being tested, the prevalence was 12.3% - similar to the prevalence

reported by Sanchez et al. [23] Similar to other studies, MSM in this study also reported frequent high risk sexual behaviors. [5, 19, 20]

We also confirmed what has been reported by other studies: that MSM not only use the internet for finding sex partners, but also for obtaining information about sexual health. [5, 25] The websites searched by our subjects were often websites not related to sexual health, thus increasing the chances of finding information that could be unreliable or not tailored to the needs of MSM.

Our sample may not be representative of MSM in Peru or in metropolitan Lima; nevertheless, we tried to minimize sampling bias by recruiting MSM in different venues online as well as offline. Regarding possible self-misrepresentation and duplicate entries, we handled it in various ways; first, we used a protocol for detecting self-misrepresentation and duplicate entries; second, we did not coerce subjects with an expensive gift for completing the survey; third, we allowed all registered subjects to complete the survey and later excluded from the analysis those MSM who did not meet the inclusion criteria; fourth, we posted a version of the survey for those who did not want to participate but wanted to know about our study. Although the online recruitment was available throughout Peru, the majority of subjects were from metropolitan Lima. As Lima contains a third of Peru's population and the majority of people with HIV infection, this bias towards urban MSM should not affect the impact of web-based prevention efforts, but future studies and prevention efforts should consider variations in preferences that could be present in MSM living in rural areas.

Young MSM are perhaps the most appropriate target for prevention interventions as they are frequent Internet users, are overrepresented in online studies of MSM and report higher risk sexual behaviors. In designing new strategies to meet the needs of differing levels of education, it is important to consider that higher educated MSM had higher levels of *acceptability* of images and graphic language. We found that "Receiving messages via mobile phone", was of significant interest to the least educated group, similar to a study by Blas *et al* [5]. Although this method may prove useful, it should perhaps be aimed with prevention messages tailored to less educated MSM. Future web-based interventions should include a reliable, up-to-date source of information tailored to the preferred topics and services and format preferred by MSM. These preferences are likely variable from county to country and may also vary within a country across urban and rural MSM, as suggested by our analyses. Improving access and acceptance of condom use should be included in all prevention interventions, regardless of the audience.

Our advertising and recruitment methodology increased rapport between MSM and our website that will be capitalized for a future intervention, which has been reported by others as a key step prior to starting an online intervention. [22] Future research is needed in the country in order to assess if an online behavioral prevention intervention for MSM can be effective. Our results can be used to design, tailor and implement sexual health-related and web-based interventions for Peruvian MSM.

Using information from this study, we can develop and implement the Tu Nexo interactive website to contain dynamic visual, written information as well as resources for HIV/STI testing and care.; We would

then assess efficacy of this intervention upon increasing self-reported knowledge and risk perceptions about HIV/STI, use of condoms and access to sexual health care. The website would be the first internet-based resource solely dedicated to the sexual health needs of MSM in Lima, Peru. If effective, Tu Nexo could be scaled-up throughout Peru and offered outside of a research context to MSM in other countries and implemented as part of a formal HIV/STI prevention strategy.

References

1. UNAIDS. Report on the global AIDS epidemic: 2008.
2. Sanchez J, Lama JR, Kusunoki L, et al. HIV-1, sexually transmitted infections, and sexual behavior trends among men who have sex with men in Lima, Peru. *J Acquir Immune Defic Syndr*. Apr 15 2007;44(5):578-585.
3. Kusunoki L GJ, Navarro C, Velasquez C. Report of Monitoring the declaration of commitment on HIV/AIDS Peru 2005. http://data.unaids.org/pub/Report/2006/2006_country_progress_report_peru_en.pdf.
4. Lama JR, Lucchetti A, Suarez L, et al. Association of herpes simplex virus type 2 infection and syphilis with human immunodeficiency virus infection among men who have sex with men in Peru. *J Infect Dis*. Nov 15 2006;194(10):1459-1466.
5. Blas MM, Alva IE, Cabello R, et al. Internet as a tool to access high-risk men who have sex with men from a resource-constrained setting: a study from Peru. *Sex Transm Infect*. Dec 2007;83(7):567-570.
6. Tabet S, Sanchez J, Lama J, et al. HIV, syphilis and heterosexual bridging among Peruvian men who have sex with men. *AIDS*. Jun 14 2002;16(9):1271-1277.
7. Orellana ER, Picciano JF, Roffman RA, Swanson F, Kalichman SC. Correlates of nonparticipation in an HIV prevention program for MSM. *AIDS Educ Prev*. Aug 2006;18(4):348-361.
8. HIV/AIDS in Latin America and the Caribbean. *Lancet*. 2008 Jul 26;372(9635):263.
9. Soto-Ramírez LE. HIV/AIDS in Latin America. *Science*. 2008 Jul 25;321(5888):465.
10. Bull SS, McFarlane M. Soliciting sex on the Internet: what are the risks for sexually transmitted diseases and HIV? *Sex Transm Dis*. Oct 2000;27(9):545-550.
11. Pequegnat W, Rosser BR, Bowen AM, et al. Conducting Internet-based HIV/STD prevention survey research: considerations in design and evaluation. *AIDS Behav*. Jul 2007;11(4):505-521.
12. Internet World Stats. Internet usage statistics. Accessed 20 April 2010. <http://www.internetworldstats.com/stats15.htm#south>

13. Proenza FJ, Bastidas-Buch R, Montero G (2000) Telecenters for socioeconomic and rural development in Latin America and the Caribbean. Inter-American Development Bank. Available: <http://www.iadb.org/sds/itdev/telecenters/index.htm>
14. Villalobos H Feb 23. 2005 [Only 22 districts regulate the use of filters.] [Article in Spanish.] El Comercio Peru. Available: <http://www.elcomercioperu.com.pe/EdicionImpresa/Html/20050221/ImpTemaDia0263138.html>
15. Fernandez-Maldonado AM (2001) The diffusion and use of information and communication technologies in Lima, Peru. *Journal of Urban Technology* 8: 21–43.
16. Curioso WH, Blas MM, Nodell B, Alva IE, Kurth AE. Opportunities for providing web-based interventions to prevent sexually transmitted infections in Peru. *PLoS Med.* Feb 2007;4(2):e11.
17. Blas MM, Alva IE, Carcamo CP, Cabello R, Goodreau SM, Kimball AM, Kurth AE. Effect of an online video-based intervention to increase HIV testing in men who have sex with men in Peru. *PLoS One.* 2010 May 3;5(5):e10448.
18. Hooper S, Rosser BR, Horvath KJ, Oakes JM, Danilenko G. An online needs assessment of a virtual community: what men who use the internet to seek sex with men want in Internet-based HIV prevention. *AIDS Behav.* 2008 Nov;12(6):867-75. Epub 2008 Apr 10.
19. Evans AR, Wiggins RD, Mercer CH, Bolding GJ, Elford J. Men who have sex with men in Great Britain: comparison of a self-selected internet sample with a national probability sample. *Sex Transm Infect.* 2007 Jun;83(3):200-5; discussion 205.
20. Cowan SA, Haff J. HIV and risk behaviour among men who have sex with men in Denmark--the 2006 Sex Life Survey. *Euro Surveill.* 2008 Nov 27;13(48). pii: 19050.
21. Rosser BR, Miner MH, Bockting WO, Ross MW, Konstan J, Gurak L, Stanton J, Edwards W, Jacoby S, Carballo-Diéguez A, Mazin R, Coleman E. HIV risk and the internet: results of the Men's INternet Sex (MINTS) Study. *AIDS Behav.* 2009 Aug;13(4):746-56. Epub 2008 May 30.
22. Lau JT, Lau M, Cheung A, Tsui HY. A randomized controlled study to evaluate the efficacy of an Internet-based intervention in reducing HIV risk behaviors among men who have sex with men in Hong Kong. *AIDS Care.* 2008 Aug;20(7):820-8.
23. Chiasson MA, Hirshfield S, Remien RH, Humberstone M, Wong T, Wolitski RJ. A comparison of on-line and off-line sexual risk in men who have sex with men: an event-based on-line survey. *J Acquir Immune Defic Syndr.* 2007 Feb 1;44(2):235-43.
24. Carcamo C, Hughes J, Garcia P, Campos P, Garnett G, et al. (2003) Sexually transmitted disease (STD) prevalences from the 2002 national household-based general population survey of young urban adults in Peru [poster]. 15th Biennial Meeting of the International Society for Sexually Transmitted Diseases Research (ISSTD) Conference; 27–30 July 2003; Ottawa, Canada.

25. Chiasson MA, Parsons JT, Tesoriero JM, Carballo-Diequez A, Hirshfield S, Remien RH. HIV behavioral research online. *J Urban Health*. 2006 Jan;83(1):73-85. Review.