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Distribution of HIV Self-tests by HIV-Positive Men Who Have Sex with Men to Social and Sexual Contacts

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Abstract

HIV-positive men who have sex with men (MSM) were recruited on www.Facebook.com and www.Poz.com to give HIV self-tests to their contacts. Study participants completed a baseline survey, were given two self-tests, and completed a survey 2 months later. Of 133 eligible men, 40 (30%) completed both surveys. Most participants were 30–54 years old and non-Hispanic white. Some had a detectable viral load (n = 4), had condomless anal sex with male partners of negative or unknown status (n = 17), and had met anal sex partners at gay dating websites (n = 23). Of 80 self-tests given to participants, 59 (74%) were distributed, primarily to non-Hispanic white MSM, 30–54 years old who were friends. Participants reported results from 31 distributed tests; 2 sex partners of participants had positive results. Participants indicated these two persons were unaware of their infections. Expanding recruitment websites might reach non-white MSM. Unrecognized infections were identified through online recruitment and self-test distribution via HIV-positive persons.

Keywords Self-test · HIV · Internet · Network

Resumen

Los hombres VIH positivos que tienen sexo con hombres (HSH) fueron reclutados en Facebook.com y Poz.com para distribuir la prueba para el auto-diagnóstico del VIH a sus contactos. Los participantes del estudio completaron una encuesta de referencia, se les mando dos pruebas auto-diagnósticas del VIH, y completaron una encuesta dos meses después. De 133 hombres elegibles, 40 (30%) completaron ambas encuestas. La mayoría de los participantes tenían entre 30 y 54 años y eran blancos no hispanos. Algunos tenían una carga viral detectable (n = 4), tuvieron sexo anal sin condón con parejas masculinas de estatus VIH-negativo o desconocido (n = 17) y habían conocido a sus parejas sexuales anales en sitios web de citas gay (n = 23). De las 80 pruebas para el auto-diagnóstico del VIH que se dieron a los participantes, 59 (74%) se distribuyeron, principalmente a HSH blancos no hispanos, de 30-54 años y que eran amigos. Los participantes informaron los resultados de 31 pruebas distribuidas; 2 parejas sexuales de los participantes tuvieron resultados positivos. Los participantes indicaron que estas dos personas desconocían sus infecciones. Expandir los sitios web usados en el reclutamiento podría alcanzar a los HSH no blancos. Infecciones no conocidas se identificaron a través del reclutamiento en sitios web y la distribución de pruebas para el autodiagnóstico a través de personas VIH-positivas.

Introduction

HIV diagnosis and subsequent treatment are associated with improved health outcomes and reduced transmission [1, 2]. Testing is a requisite first step toward viral suppression [3]. Almost 70% of HIV diagnoses in the United States are among gay, bisexual and other men who have sex with men (MSM) [4]. HIV self-testing can increase testing frequency in high-risk MSM [5–7]. It provides an alternative to clinic- or outreach-based testing, and may be useful for persons seeking convenience and assurances of confidentiality [8].

Sexual and social contacts of HIV-positive MSM may be at increased risk for infection. HIV-positive persons have successfully recruited at-risk individuals in their social networks to participate in testing and studies [9, 10]. We conducted a pilot study to evaluate whether the

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provision of HIV self-tests to HIV-positive MSM resulted in their distribution and use among persons in their sexual and social networks.

Methods

HIV-positive MSM were invited to participate in the study through banner ads primarily depicting white, black and Hispanic men between the ages of 21 and 35, on Facebook (www.facebook.com), a social media website, and POZ (www.poz.com), a website for people living with and affected by HIV. Overall, 184,835 advertising impressions resulted in 1931 click-throughs to the study website from March 8 through 22, 2016. Interested persons completed an online informed consent form and screening survey. Men who reported being at least 18 years old, HIV-positive and who had anal sex with at least one man in the past year were eligible to participate. Eligible participants who registered for the study received an online baseline survey on demographics, medical care, sexual behavior, sex partner risk, and substance use. Survey questions had closed response sets, except for responses to 'other' categories. We mailed two oral fluid OraQuick In-home HIV tests (*OraQuick*; Orasure Technologies, Inc., Bethlehem, PA) to each participant who completed the baseline survey at no cost to them. Two months later, study participants were asked to complete an online survey on how the tests were used and by whom. We compared the demographics of study participants who completed the follow-up survey with those who did not using a Mantel–Haenszel χ^2 test. Small monetary tokens were provided for completion of the baseline survey ($20) and the follow-up survey ($10). The Emory University Institutional Review Board approved the protocol.

Participants were informed, "You can choose what you want to do with these test kits—you can give them away to others who may benefit from learning their HIV status or not do anything at all!" Instructions stated, "When someone who has HIV tests negative, it is called a false negative. In studies, 1 out of 11 persons with HIV who tested at home had a false-negative OraQuick result. People with HIV who are taking medicines to keep their HIV under control might get a negative test result, too." The test packaging indicated, "If you are HIV-positive or are on treatment or preventive treatment for HIV, the test is not meant for you."

Persons who received self-tests from the study participants could report their results on the study website without enrolling in the study and could call the study support line to talk to a counselor about conducting the test, interpreting the results, and getting information on follow-up testing. Additionally, anyone using an OraQuick self-test has access to the test manufacturer's 24/7 call center support.

We characterized the study participants recruited online who completed the baseline and follow-up survey, and describe how the HIV self-tests were used and by whom.

Results

The screening survey was completed by 239 men; 133 (55.7%) were eligible for the study, 97 (73%) of whom registered to participate. Of those, 65 (67%) completed a baseline survey, 40 (62%) of whom also completed the follow-up survey. Most were 30–54 years old, non-Hispanic white, and attended some college (Table 1). They were similar to the 25 men who did not complete the follow-up survey with respect to age ($\chi^2 = 2.93$, $p = 0.0867$); race/ethnicity ($\chi^2 = 1.74$, $p = 0.1869$); employment status ($\chi^2 = 0.06$, $p = 0.8155$); and whether their most recent viral load was detectable ($\chi^2 = 2.10$, $p = 0.1475$).

Almost all study participants (98%) had seen a healthcare provider in the last 6 months. Several men (15%) reported injecting methamphetamines in the past 3 months.

At enrollment, almost half of the participants had 2 or more male anal sex partners in the past 3 months. Most (70%) had met these sex partners through gay-specific dating or hookup websites. Approximately 43% of participants had anal sex without condoms in the past 3 months with male partners of HIV-negative or unknown status.

Most study participants (36/40, 90%) distributed at least one self-test during the course of the study. The participants who did not give away self-tests indicated that they didn't have them at the time they wanted to give them away, didn't know who to give them to, had no sex partners, and/or it irritated the person they offered a test kit. Of the 80 tests given to study participants, 74% (59/80) were distributed, 11% (9/80) were used by participants to test themselves, and 15% (12/80) were not used. Participants who tested themselves indicated that they did so because of curiosity, to confirm their HIV status, and/or to show someone how to use the test. When study participants were asked whether they had pressured someone to use the self-test, 1 participant indicated that he had pressured a family member and another indicated that he pressured a sex partner, though neither indicated that there was accompanying violence.

The study participants who distributed self-tests described the persons to whom they gave the tests (Table 2). Most recipients were 30–54 years old, male, and non-Hispanic white. Over half of the tests (59%, 35/59) were given to friends, and 24% (14/59) were given to sex partners. Most recipients (75%, 44/59) were MSM. Of the 31 results that study participants who distributed the tests claimed to know, 2 (7%) were positive, 2 (7%) were invalid, and 27 (87%) were negative. The distributors of the two tests with positive results indicated that neither recipient previously knew

Table 1 Characteristics at enrollment of HIV-positive MSM recruited through the internet in the United States to distribute HIV self-tests, n = 40, 2016

Characteristic	Categories	n (%)
Age	18–29	2 (5)
	30–54	30 (75)
	55–80	8 (20)
Race/ethnicity	Hispanic	4 (10)
	Non-Hispanic black	2 (5)
	Non-Hispanic white	33 (83)
	Other	1 (3)
Region	Midwest	6 (15)
	Northeast	7 (18)
	South	17 (43)
	West	10 (25)
Education	High school or less	5 (13)
	Some college or more	35 (88)
Household income	$0–$19,999	10 (25)
	$20,000–$39,999	13 (33)
	$40,000–$74,999	9 (23)
	$75,000 or more	8 (20)
First tested positive	Before 2000	9 (23)
	2000 to 2009	16 (40)
	2010 to 2016	15 (38)
Male sex partners past 3 months	0	7 (3)
	1	14 (42)
	2–5	12 (30)
	6 or more	7 (18)
Where met anal sex partners?[a]	Adult novelty store	3 (9)
	Gym/bar/dance club	3 (9)
	Bathhouse/sex club/gay resort/sex party	6 (18)
	Social organization or friend	5 (15)
	Gay-specific dating/hookup site	23 (70)
	Dating/hookup/social networking site	9 (27)
	Long-term partner	2 (6)
Male partners with HIV-negative or unknown status and condomless sex, past 3 months	0	23 (58)
	1	7 (18)
	2–5	7 (18)
	6–9	1 (3)
	10 or more	2 (5)

[a]Of 33 with a male anal sex partner, past 3 months. Could choose more than one response

he was positive. The first indicated that his contact, a casual sex partner, called the study number and saw a healthcare provider. The second did not know whether his contact, also a casual sex partner, did so. Yet, both distributors said that they "helped the person to whom they gave the self-test to see the doctor after HIV + test result (e.g., encouraging him to call the study number, going with him to see a HIV healthcare professional)".

Most sex partners who received study tests (64%, 9/14) had sex with the study participant after using the test. Seven study participants indicated that their partners got a negative result or a result that was unknown to them, 43% (3/7) of

whom had sex without condoms. The two study participants with positive results used condoms.

One self-test recipient anonymously reported a negative result to the study website, the only result reported to that system. However, when selecting an image of control and test lines that matched his test, he selected the image depicting a preliminary positive result.

Of the four participants with a detectable viral load at baseline, two were not taking antiretroviral treatment; one indicated that his CD4 and viral load were good and the other said he did not have money or insurance for HIV medicine. One participant with a detectable viral load did

Table 2 Characteristics of 59 recipients of self-tests based on information provided by 36 HIV-positive persons who distributed the tests; pilot study on HIV Self-test Distribution by HIV-positive Persons, 2016

Characteristic	Categories	n (%)
Age	18–29	21 (36)
	30–54	36 (61)
	55–80	2 (3)
Gender	Male	51 (86)
	Female	5 (9)
	Transgender M to F	1 (2)
	Transgender F to M	1 (2)
	Prefer not to answer	1 (2)
Race	Hispanic	11 (19)
	Non-Hispanic black	7 (12)
	Non-Hispanic white	38 (64)
	Other	3 (5)
Sexuality	Man who has sex with men	40 (68)
	Man who has sex with men and women	4 (7)
	Man who has sex with women	4 (7)
	Woman who has sex with men	5 (25)
	Transgender (F to M) who has sex with men and women	1 (2)
	Transgender (M to F) who has sex with men	1 (2)
	I don't know	4 (7)
Years known	< 1 year	22 (37)
	1–3 years	12 (20)
	> 3 years	24 (41)
	Prefer not to answer	1 (2)
Relationship	Main sex partner	6 (10)
	Casual sex partner	8 (14)
	Family member	5 (9)
	Friend (not sex partner)	35 (59)
	Acquaintance (not sex partner)	3 (5)
	I don't know	2 (3)
HIV test result	Negative	27 (46)
	Positive	2 (3)
	Invalid	2 (3)
	Don't know	28 (48)

not have sex in the 3 months before baseline; he gave the self-tests to friends. The second had one HIV-negative male partner, sometimes used cocaine, and did not use a condom. He gave one self-test to a sex partner, and one to a friend. The third had sex with 4 men in the 3 months before baseline, and always discussed HIV status with new partners. His two most recent sex partners were HIV-positive; we do not know the status of the previous two. He gave the self-tests to friends. The fourth with a detectable viral load had sex with 2 HIV-negative men; he sometimes did not use a condom and sometimes discussed HIV status before sex. He gave a self-test to a sex partner.

Discussion

HIV-positive MSM recruited online successfully distributed self-tests to their network contacts, primarily MSM, a population the Centers for Disease Control and Prevention recommends to test for HIV at least annually [5, 11]. Though almost 40% of HIV-positive MSM study participants had condomless sex with persons of negative or unknown HIV status preceding the baseline survey, in most cases, study participants did not give tests to sex partners. Even when self-tests were used by sex partners

of discordant status, some continued to have condomless sex, which may have been underreported by study participants. Most study participants were on HIV treatment, and likely had suppressed viral loads, but increased potential for transmission existed for the sex and needle-sharing partners of study participants with detectable viral loads. Pre-exposure prophylaxis (PrEP) may be an important protective measure for the discordant partners, though we did not collect information on its use [12].

Study participants recruited from Facebook and POZ were primarily over 30, non-Hispanic white, and insured, and they gave tests to non-Hispanic white, middle-aged persons. Though banner advertisements depicted black and Hispanic MSM, few enrolled in this study. Expanding recruitment websites or using phone apps to reach HIV-positive black, Hispanic, and young MSM, populations at an elevated risk for infection, may increase distribution to peers who are unaware of their infections [4]. Study participants had met most of their sex partners on gay-specific dating or hookup websites. Dating sites have been used as a portal for test distribution. In one study, Grindr, a smartphone social networking application, was used to make self-tests available to black and Hispanic MSM in Los Angeles County [13, 14].

With two previously unrecognized infections detected, this study demonstrated the potential to identify infections through online recruitment and test distribution via HIV-positive persons. One participant indicated that his contact with positive results saw a healthcare provider; data on the other person with positive results are not available. Programs that distribute HIV self-tests should provide referrals for HIV counseling, further testing, and medical care services for persons with a positive result [15], though some MSM indicate that not having a counselor is a benefit of self-testing. New methods exist to provide counseling and referral to accompany self-testing. Smart home testing kits are being developed that monitor self-test use in real-time to enable timely counseling and phone referrals [16].

Most test results reported by the distributors of the study tests were negative. We do not know whether persons tested in the window period in spite of the labeling on the test's packaging that this period is 3 months after infection. Some MSM and other self-testing stakeholders have expressed concern about the inability of the oral fluid self-tests to identify acute infections [8, 15]. They have also cited concerns that high-risk persons with negative self-test results may not know when to access prevention services. Smartphone apps, such as HealthMindr, combine self-test distribution with self-risk assessments and suggestions for prevention services, such as tests that can detect acute infection [17].

Most people can follow self-test instructions and perform self-testing correctly [18, 19]. In this pilot study, only one test recipient reported results into the study system. Though the result was reported as negative, the image selected was

positive. He may have misinterpreted the result, made an error in selecting an image, or been unwilling to report a positive result. Almost half of the results of self-test recipients in this pilot study were unknown, and two were reported to be invalid [20]. We were not able to assess the validity of the results reported. Not having information on study results or information on the circumstances surrounding the use of the test direct from self-test recipients is a limitation of the study.

Though the 25 initial study participants who did not complete the follow-up survey appear to be similar to those who did, it is not clear whether or how they used the self-tests that they received. Additionally, some study participants did not distribute the test kits. Participants were not trained on how to initiate conversations on self-testing with their network contacts. Offering an HIV self-test has the potential to be awkward, which may explain why most were given to friends. Some MSM may be unlikely to distribute free self-tests if they are concerned that the recipient will be upset or angry [21]. Even in our small sample, although physical violence was not reported, two persons pressured others to use the test. To mitigate coercion, programs that distribute HIV self-tests should emphasize the voluntary nature of using the tests.

Several study participants tested themselves even though they knew they were HIV-positive. The study materials indicated not to do so, due to the potential for false-negative test results, which can occur more often when someone is on treatment [20, 22]. Most were curious or wanted to advise their associates on how to use the tests. It would have been problematic if they perceived themselves to be uninfected.

The major study limitation was the small sample size, which was due in part to the recruitment response rate and the limited completion of the follow-up survey. The response rate was consistent with other studies with online recruitment for self-testing. When free HIV self-test kits were advertised on Grindr to reach high-risk black or Latino MSM, 300,000 banner ads resulted in approximately 4000 visitors to the website, and 333 requests for tests [14]. Of these requests, 17% completed a follow-up survey and reported their test results. Similarly, in our study as well as another study with online recruitment of MSM for self-testing, almost 1% of advertising impressions resulted in a click-through to the study website [21]. Though our study had a higher completion rate for the follow-up survey (almost 60%) than the study with recruitment on Grindr, fewer test results were reported than in that study as, generally, the acquaintances, not the study participants, were testing.

Conclusions

This study, though limited in the generalizability of its findings by size and lack of participant diversity, indicates that HIV-positive MSM can be recruited online to distribute free

self-tests to others, including at-risk MSM. Recruitment through additional websites or apps may reach black or Hispanic MSM. Although many participants had sex partners of negative or unknown status, most distributed tests to their friends rather than sex partners. Even in this small sample, previously unrecognized infections were identified through the distribution and use of self-tests.

Compliance with Ethical Standards

Conflict of interest Dr. Sullivan reports grants from National Institutes of Health, grants from Centers for Disease Control and Prevention, grants from Gilead Sciences and grants from MAC AIDS Fund outside the submitted work.

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.

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