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Discordance of voluntary HIV testing with HIV sexual risk-taking and self-perceived HIV infection risk among social media-using black, Hispanic, and white young-men-who-have-sex-with-men (YMSM)

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Abstract

Discordance between self-perceived HIV risk and actual risk-taking may impede efforts to promote HIV testing among young adult men-who-have-sex-with-men (YMSM) in the United States (US). Understanding the extent of, and reasons for, the discordance of HIV risk self-perception, HIV risk-taking and voluntary HIV testing among black, Hispanic and white YMSM could aid in the development of interventions to increase HIV testing among this higher HIV risk population. HIV-uninfected 18–24-year-old black, Hispanic, and white YMSM were recruited from across the US through multiple social media websites. Participants were queried about their voluntary HIV testing history, perception of currently having an undiagnosed HIV infection, and condomless anal intercourse (CAI) history. We assessed the association between previous CAI and self-perceived possibility of currently having an HIV infection by HIV testing status using Cochran-Mantel-Haenszel testing. Of 2,275 black, Hispanic and white social media-using 18–24 year-old YMSM, 21% had never been tested for HIV voluntarily, 87% ever had CAI with another man, 77% believed that it was perhaps possible (as opposed to not possible at all) they currently could have an undiagnosed HIV infection, and 3% who reported CAI with casual or exchange

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partners yet had not been tested for HIV self-perceived having possibility of being HIV infected. Of 471 YMSM who had not been HIV tested, 57% reported CAI with casual or exchange partners, yet self-perceived having possibility of being HIV infected. Per the Cochran-Mantel-Haenszel test results, among those reporting HIV risk behaviors, the self-perception of possibly being HIV-infected was not greater among those who had never been tested for HIV, as compared to those who had been tested. Future interventions should emphasize promoting self-realization of HIV risk and translating that into seeking and accepting voluntary HIV testing among this higher HIV risk population.

Keywords

YMSM; HIV Testing; Sexual Risk; Self-Perceived Risk; Social Media

INTRODUCTION

Discordance between self-perceived HIV risk and actual risk-taking may impede efforts to promote HIV testing among young adult black, Hispanic, and white men-who-have-sex-with-men (YMSM) in the United States (US). Previous researchers reported discrepant results on the interrelationships of HIV risk self-perception, HIV risk-taking and voluntary HIV testing (Brown, 2000; Pringle, Merchant, & Clark, 2013; van der Velde, van der Pligt, & Hooykaas, 1994). These interrelationships need clarification, since understanding the extent of, and reasons for, discordance could aid in the development of interventions to increase HIV testing among this higher risk population.

The first objective of this investigation was to assess the relationship between lack of voluntary HIV testing and self-reported sexual HIV risk-taking behaviors, and also self-perception of possibly having an undiagnosed HIV infection among social media-using US black, Hispanic and white YMSM. In an attempt to measure the level of actual HIV risk among this population, the second objective was to quantify the intersection of lack of voluntary HIV testing, reported HIV sexual risk, and lack of self-perceived possibility of having an HIV infection. The third objective was to measure the extent of discordancy of voluntary HIV testing status as compared to self-reported HIV sexual risk-taking and self-perceived possibility of having an HIV infection among these YMSM.

METHODS

This study involved surveying an anonymous sample of 2,275 18–24-year-old US English- or Spanish-speaking black, Hispanic/Latino and white YMSM recruited from multiple social media websites (Supplemental Table I and Figure I). (Merchant et al., 2017) YMSM were study eligible if they reported prior anal sex with another man and never had a positive HIV test. The study was approved by the sponsoring institution's institutional review board. Participants were surveyed about HIV testing history, self-perception of currently having an undiagnosed HIV infection, and current/past HIV sexual risk-taking behaviors associated with condomless anal intercourse (CAI) with men by partner type (main, casual or exchange) and sexual positioning (top or bottom). Participants indicated their self-perception

of possibly being infected with HIV on a five point-scale (from “not possible at all” to “not likely”, “somewhat likely”, “likely”, or “very likely”).

For the first objective, voluntary HIV testing status was calculated for all participants and by race/ethnicity. Those who indicated that they had never previously been tested for HIV or only had been tested through a blood donation were considered not to have been tested voluntarily for HIV. Self-perceived possibility of having an HIV infection was dichotomized as “not possible” or “possible” (combining response options “not likely”, “somewhat likely”, “likely”, or “very likely”) for ease of interpretation and due to small samples in some of the response options. The association of voluntary HIV testing status with demographic characteristics, self-reported HIV sexual risk-taking behaviors, and self-perceived likelihood of currently having an HIV infection was assessed using Pearson’s χ^2 or Kruskal-Wallis testing, as applicable.

For the second objective, proportions of the following were calculated for all participants and by race/ethnicity along with corresponding 95% confidence intervals (CIs): (1) participants not previously voluntarily tested for HIV, (2) those who reported HIV CAI sexual risk behaviors by partner type, and (3) those who self-perceived themselves as not possibly being HIV-infected currently. To examine the intersections of these three components, two-way and three-way overlapping proportions also were calculated.

For the third objective, we first assessed the association between HIV CAI sexual risk behaviors by partner type and self-perceived possibility of currently having an HIV infection. Next, these associations were assessed within the two strata of voluntary HIV testing status. Cochran-Mantel-Haenszel testing was then performed to assess if the relationship between HIV risk behaviors and self-perceived possibility of having an HIV infection was concordant or discordant by voluntary HIV testing status. Odds ratios (ORs) with corresponding 95% CIs were estimated.

RESULTS

YMSM not previously voluntarily tested for HIV were more often younger, white, and not residing in a large city or surrounding suburb; did not have a primary care provider/clinic; and were less likely to have at least a high school diploma/general education diploma (GED) (Table I). Lack of voluntary HIV testing was also associated with prior CAI; less recent CAI; and lower frequency of CAI (Table II). Self-perceived possibility of having an HIV infection was not associated with HIV testing status. Although those previously tested generally reported more CAI sexual partners, although there was difference in self-reported HIV infection likelihood (Supplemental Table II).

Although 1.6% of participants were in the highest HIV risk group (no voluntary HIV testing despite reporting CAI with an exchange/casual male partner without the self-perception of possibly currently being HIV infected), 12% of all YMSM who reported CAI with an exchange/casual male partner had never been tested for HIV, and 13% also reported this HIV risk-taking behavior yet self-perceived having possibility of currently being HIV infected (Table III). Black YMSM generally were more likely to have been tested voluntarily for HIV

and self-perceive themselves as possibly currently being HIV infected, while white YMSM were less likely to have been tested voluntarily for HIV and more likely to self-perceive themselves as not possibly currently being HIV infected. Discrepancies between HIV testing status compared to reported HIV risk behaviors and self-perception of HIV infection likelihood tended to be higher among Hispanic YMSM, as well as between lack of HIV testing despite reported HIV risk.

Among all YMSM, self-perceived possibility of currently having an HIV infection was greater for those who reported CAI with a man, CAI with main male partner(s), and CAI with casual/exchange male partner(s) (Table IV). These relationships were present among white YMSM and Hispanic YMSM (except for CAI with main male partner(s)), but not among black YMSM. When adjusted for voluntary HIV testing status, for all participants who reported CAI with a man and CAI with a main male partner, CAI with a man or with a main male partner was not greater among those who had not been tested for HIV than those who had been tested for HIV. However, among all YMSM, those who reported CAI with casual/exchange male partner(s) were more likely to have a greater self-perception of possibly currently being HIV infected if they had not been voluntarily HIV tested.

DISCUSSION

It is concerning that slightly over one-fifth of these YMSM had never been tested for HIV, even though the majority reported CAI, typically recently. Further, white YMSM were less likely to have been tested than blacks or Hispanics, and HIV testing was dissociated from risk among white YMSM. These findings are troubling given that the absolute numbers of new and undiagnosed infections are highest among white MSM in the US, in addition to the disproportionate toll taken by HIV among blacks and Hispanics (Centers for Disease Control and Prevention, 2016). Also concerning is the discordance of voluntary HIV testing status with reported HIV risk and self-perception of possibly currently being HIV infected. Voluntary HIV testing was not more likely among YMSM who had a self-perception of possibly currently being infected with HIV. In addition, these YMSM were not more likely to have been tested for HIV although self-perception of HIV infection was greater among YMSM who reported CAI with other men. One interpretation is that despite these YMSM understanding that engaging in CAI with other men makes it possible that they could become HIV infected, this realization was not compelling them to be tested for HIV.

On an encouraging note, YMSM in this study were more likely to think that they could possibly currently be HIV infected if they had engaged in CAI, especially with casual/exchange male sexual partners. If these men reflected on their prior behaviors and consequently acknowledged that an HIV infection was possible, then there is hope that self-realization that they are at risk for HIV is occurring. Translating that self-realization to action in regards to voluntary HIV testing is the challenge. If YMSM did previously appreciate this relationship independent of the study questionnaire, yet did not seek testing, then interventions should focus on translating self-realization to seeking testing as well as overcoming potential barriers to testing. If participating in the study provoked the self-realization, then the questionnaire might be employed as part of an intervention to initiate testing.

Among the limitations of this investigation, all data were self-reported and anonymous, so there was no mechanism to verify survey responses. We also cannot claim that the sample is representative of the underlying population of social media-using or even non-social media-using black, Hispanic and white YMSM. Dichotomizing self-perception of possibly having an HIV infection might oversimplified or magnified differences of the measured relationships. Placement of the HIV infection self-perception question after the reported HIV risk behavior questions might have affected participant responses and the observed relationships.

In conclusion, this study provides further evidence of discordancy between self-perceived possibility of currently being HIV infected and reported HIV sexual risk behaviors, and perhaps consequently why a considerable percentage of black, Hispanic and white YMSM have not been tested for HIV. Future interventions should emphasize promoting self-realization of HIV risk and translating that into seeking and accepting voluntary HIV testing among this higher HIV risk population.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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REFERENCES

- Brown E (2000). Theoretical Antecedents to HIV Risk Perception. *Journal of the American Psychiatric Nurses Association*, 6(6), 177–182. doi: 10.1067/mpn.2000.112606
- Centers for Disease Control and Prevention. (2016). HIV Surveillance Report, 2015. Atlanta, GA: United States Public Health Service.
- Merchant RC, Clark MA, Liu T, Rosenberger JG, Romanoff J, Bauermeister J, & Mayer KH (2017). Preferences for oral fluid rapid HIV self-testing among social media-using young black, Hispanic, and white men-who-have-sex-with-men (YMSM): implications for future interventions. *Public Health*, 145, 7–19. doi: 10.1016/j.puhe.2016.12.002 [PubMed: 28359394]
- Pringle K, Merchant RC, & Clark MA (2013). Is self-perceived HIV risk congruent with reported HIV risk among traditionally lower HIV risk and prevalence adult emergency department patients? Implications for HIV testing. *AIDS Patient Care STDS*, 27(10), 573–584. doi: 10.1089/apc.2013.0013 [PubMed: 24093811]
- van der Velde FW, van der Pligt J, & Hooykaas C (1994). Perceiving AIDS-related risk: accuracy as a function of differences in actual risk. *Health Psychol*, 13(1), 25–33. [PubMed: 8168467]

Table I

: Participant characteristics by HIV testing status

<i>Demographic characteristics</i>	Total <i>n</i> =2,275	Previously Voluntarily Tested for HIV <i>n</i> = 1,804	Never Voluntarily Tested for HIV <i>n</i> =471	<i>p</i> -value <i>p</i> <
Median age, years (IQR)¹	22 (20–23)	22 (21–24)	21 (19–23)	0.001
Race/Ethnicity				0.031
Black	440 (19.3)	368 (20.4)	72 (15.3)	
Hispanic	819 (36.0)	648 (35.9)	171 (36.3)	
White	1,016 (44.7)	788 (43.7)	228 (48.4)	
Geographic region²				0.836
Northeast	372 (16.4)	299 (16.6)	73 (15.5)	
Midwest	50 (22.3)	407 (22.6)	101 (21.4)	
South	968 (42.6)	764 (32.4)	204 (43.3)	
West	427 (18.8)	334 (18.5)	93 (19.8)	
Residential community type				0.001
Large city or surrounding suburb	918 (40.4)	791 (43.9)	127 (27.0)	
Medium city or surrounding suburb	731 (32.1)	551 (30.5)	180 (38.2)	
Small city	297 (13.1)	226 (12.5)	71 (15.1)	
Town	233 (10.2)	172 (9.5)	61 (13.0)	
Rural area	84 (3.7)	57 (3.2)	27 (5.7)	
Don know	12 (0.5)	7 (0.4)	5 (1.1)	
Primary care provider/clinic status				0.001
Have a provider/clinic	1,593 (70.0)	1,306 (72.4)	287 (60.9)	
No provider/clinic	640 (28.1)	470 (26.1)	170 (36.1)	
Don know	39 (1.7)	25 (1.4)	14 (3.0)	
Refuse to answer	3 (0.1)	3 (0.2)	0 (0.0)	
Health care insurance status				0.600
Insured	1,727 (75.9)	1,378 (76.4)	349 (74.1)	
Not insured	512 (22.5)	403 (22.3)	109 (23.1)	
Don know	31 (1.4)	20 (1.1)	11 (2.3)	
Refuse to answer	5 (0.2)	3 (1.2)	2 (0.4)	
Years of formal education				0.001
Have not received high school diploma or GED ³	119 (5.2)	72 (4.0)	47 (10.0)	
Received high school diploma or GED ³	297 (13.1)	222 (12.3)	75 (15.9)	
Have not received bachelor's degree	1,390 (61.1)	1,095 (60.7)	295 (62.6)	
Received bachelor's degree or higher	463 (20.4)	412 (22.8)	51 (10.8)	
Don know	1 (0.04)	1 (0.06)	0 (0.0)	
Refuse to answer	5 (0.2)	2 (0.1)	3 (0.6)	

¹ Interquartile range

²United States

³General Education Diploma

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: Participant male-male reported HIV sexual risk-taking behavior history and self-perceived possibility of currently having an HIV infection

Table II

	Total n=2,275 n (%)	Previously Voluntarily Tested for HIV n=1,804 n (%)	Never Voluntarily Tested for HIV n=471 n (%)	p-value
Male-male reported HIV sexual risk-taking behavior history				
CAI¹ with a man				0.001
Ever	1962 (86.2)	1,609 (89.2)	353 (75.0)	
Last CAI¹ with a man				0.001
Less than a month ago	852 (37.5)	711 (39.4)	141 (29.9)	
Between one and six months ago	596 (26.2)	484 (26.8)	112 (23.8)	
More than six months ago	511 (22.5)	412 (22.8)	99 (21.0)	
Not applicable (no anal sex without condoms)	313 (13.8)	195 (10.8)	118 (25.1)	
Don't know/Refuse to answer	3 (0.1)	2 (0.1)	1 (0.2)	
Ever CAI¹ with main male partners				
Insertive	1,189 (52.3)	1,026 (56.9)	163 (34.6)	0.001
Receptive	1,252 (55.0)	1,077 (59.7)	175 (37.2)	0.001
Either	1,483 (65.2)	1,264 (70.1)	219 (46.5)	0.001
Ever CAI¹ with casual male partners				
Insertive	1,165 (51.2)	986 (54.7)	179 (38.0)	0.001
Receptive	1,229 (54.0)	1,013 (56.2)	216 (45.9)	0.001
Either	1,515 (66.6)	1,250 (69.3)	265 (56.3)	0.001
Ever CAI¹ with exchange male partners				
Insertive	260 (11.4)	220 (12.2)	40 (8.5)	0.025
Receptive	246 (10.8)	203 (11.2)	43 (9.1)	0.190
Either	336 (14.8)	281 (15.6)	55 (11.7)	0.034
Ever CAI¹ with casual or exchange partners				
Insertive	1188 (52.2)	1,004 (55.7)	184 (39.1)	0.001
Receptive	1,253 (55.1)	1,032 (57.2)	221 (46.9)	0.001
Either	1,540 (67.7)	1270 (70.4)	270 (57.3)	0.001

	Total	Previously Voluntarily Tested for HIV <i>n</i> (%)	Never Voluntarily Tested for HIV <i>n</i> (%)	<i>p</i> -value
<i>Male-male reported HIV sexual risk-taking behavior history</i>	<i>n</i> =2,275	<i>n</i> =1,804	<i>n</i> =471	
<i>Self-perceived possibility of having an HIV Infection</i>				
Likely Infected				
Possible	1,752 (77.0)	1,382 (76.6)	370 (78.6)	0.371
Not Possible	523 (23.0)	422 (23.4)	101 (21.4)	

I Condomless anal intercourse

: HIV voluntary testing status, reported HIV sexual risk-taking behavior, and perceived possibility of currently having an HIV infection by race/ethnicity

Table III

	All n=2,275 % (95 % CI)	Black n=440 % (95 % CI)	Hispanic n=819 % (95 % CI)	White n=1,016 % (95 % CI)
HIV Voluntary Testing Status				
Never Tested	20.7 (19.1–22.4)	16.4 (13.2–20.1)	20.9 (18.2–23.8)	22.4 (20.0–25.1)
Reported HIV Sexual Risk-Taking Behavior				
CAI ¹ with a Man	86.2 (84.8–87.6)	85.4 (81.8–88.5)	88.9 (86.5–90.9)	84.4 (82.1–86.6)
CAI ¹ with Main Male Partner	65.2 (63.2–67.1)	59.5 (54.9–64.0)	67.4 (64.1–70.5)	65.8 (62.9–68.7)
CAI ¹ with Exchange/Casual Male Partner	67.7 (65.7–69.6)	68.4 (63.9–72.6)	71.6 (68.4–74.5)	64.3 (61.3–67.2)
Self-Perceived Possibility of HIV Infection				
No Self-Perceived Risk	23.0 (21.3–24.8)	26.6 (22.7–30.9)	23.9 (21.1–27.0)	20.7 (18.3–23.3)
HIV Voluntary Testing Status & Self-Perceived Possibility of HIV Infection				
Never Tested & Self-Perceived Risk	04.4 (03.6–05.4)	3.2 (1.8–5.3)	5.3 (3.8–7.0)	4.3 (3.2–5.8)
HIV Voluntary Testing Status & Reported HIV Sexual Risk-Taking Behavior				
Never Tested & CAI ¹ with a man	15.6 (14.1–17.1)	11.4 (8.6–14.7)	17.0 (14.5–19.7)	16.1 (13.4–18.6)
Never Tested & CAI ¹ with Main Male Partner	09.6 (08.4–10.9)	6.4 (4.3–9.1)	9.9 (7.9–12.1)	10.8 (9.0–12.9)
Never Tested & CAI ¹ with Exchange/Casual Male Partner	11.9 (10.6–13.3)	9.8 (7.2–12.9)	13.4 (11.2–16.0)	11.5 (9.6–13.6)
Self-Perceived Possibility of HIV Infection & Reported HIV Sexual Risk-Taking Behavior				
No Self-Perceived Risk & CAI ¹ with a man	18.1 (16.5–19.7)	21.4 (17.6–25.5)	19.0 (16.4–21.9)	15.8 (13.7–18.2)
No Self-Perceived Risk & CAI ¹ with Main Male Partner	13.9 (12.5–15.4)	13.9 (10.8–17.4)	15.9 (13.4–18.6)	12.3 (10.3–14.5)
No Self-Perceived Risk & CAI ¹ with Exchange/Casual Male Partner	13.1 (11.8–14.6)	16.4 (13.0–20.2)	14.2 (11.8–16.7)	10.9 (9.2–13.0)
HIV Voluntary Testing Status & Self-Perceived Possibility of HIV Infection & Reported HIV Sexual Risk-Taking Behavior				
Never Tested & Self-Perceived Risk & CAI ¹ with a man	2.7 (2.1–3.4)	1.6 (0.6–3.3)	3.4 (2.3–4.9)	2.6 (2.7–3.7)
Never Tested & Self-Perceived Risk & CAI ¹ with Main Male Partner	2.1 (1.5–2.7)	1.1 (0.4–2.6)	2.4 (1.5–3.7)	2.2 (1.4–3.3)
Never Tested & Self-Perceived Risk & CAI ¹ with Exchange/Casual Male Partner	1.6 (1.1–2.2)	1.4 (0.5–2.9)	2.3 (1.4–3.6)	1.2 (0.6–2.1)

Condomless anal intercourse
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: Self-perceived possibility of currently having an HIV infection and reported HIV sexual risk-taking behaviors stratified by voluntary testing status

Table IV

Association Between Self-Perceived and Reported HIV risk		Association between self-perceived and reported HIV risk and HIV testing status				Test for homogeneity
		Previously Voluntarily Tested for HIV	Never Voluntarily Tested for HIV	Mantel-Haenszel Combined		
CAI ¹ with a Man						
All	2.10 (1.61–2.73)	2.11 (1.51–2.91)	2.45 (1.49–2.02)	2.21 (1.70–2.87)	0.595	
White	1.95 (1.30–2.88)	2.04 (1.23–3.32)	2.08 (.97–4.34)	2.05 (1.39–3.02)	0.964	
Black	1.68 (.91–3.04)	1.69 (.81–3.45)	2.87 (.71–11.24)	1.91 (1.07–3.43)	0.452	
Hispanic	2.88 (1.78–4.61)	2.65 (1.46–4.75)	3.50 (1.43–8.45)	2.90 (1.84–4.57)	0.578	
CAI ¹ with Main Male Partner						
All	1.31 (1.06–1.61)	1.46 (1.15–1.85)	1.00 (.63–1.60)	1.34 (1.10–1.65)	0.133	
White	1.41 (1.02–1.95)	1.68 (1.15–2.44)	0.92 (.45–1.87)	1.45 (1.06–1.99)	0.113	
Black	1.51 (0.96–2.37)	1.72 (1.05–2.80)	1.18 (.31–5.08)	1.62 (1.06–2.52)	0.574	
Hispanic	1.07 (.75–1.52)	1.05 (.68–1.60)	1.05 (.50–2.22)	1.05 (0.74–1.49)	0.989	
CAI ¹ with Exchange/Casual Male Partner						
All	1.82 (1.48–2.24)	1.65 (1.30–2.08)	2.94 (1.82–4.78)	1.86 (1.52–2.28)	0.026	
White	1.83 (1.33–2.52)	1.60 (1.10–2.31)	3.54 (1.64–8.02)	1.89 (1.38–2.59)	0.053	
Black	1.52 (0.95–2.42)	1.47 (0.88–2.45)	2.35 (0.61–9.33)	1.58 (1.01–2.47)	0.476	
Hispanic	2.12 (1.49–3.01)	1.89 (1.25–2.83)	3.11 (1.43–6.75)	2.12 (1.51–2.98)	0.229	

¹Condomless anal intercourse

¹Condomless anal intercourse