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Mobile Phone and Internet Use Mostly for Sex-Seeking and Associations with Sexually Transmitted Infections and Sample Characteristics among Black/African American and Hispanic/Latino Men who have Sex with Men in Three U.S. Cities

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Abstract

Background—Men who have sex with men (MSM) have a relatively high prevalence of sexually transmitted infections (STIs). This study examines the association of self-reported STIs and use of mobile phones and/or computer-based Internet to meet sexual partners among black and Hispanic/Latino MSM in the U.S.

Methods—Black and Hispanic/Latino MSM (N=853) were recruited from three U.S. cities (Chicago, IL, Kansas City, MO, and Fort Lauderdale, FL) via online and community outreach. Men completed a computer-assisted, self-interview assessment on demographics, use of mobile phones and computer-based Internet for sex-seeking, sexual risk behavior, and self-reported bacterial STIs in the past year. Multivariable logistic regression was used to model independent associations of STIs and use of these technologies to meet sexual partners.

Results—23% of the sample reported having an STI in the past year; 29% reported using a mobile phone and 28% a computer-based Internet mostly for sex-seeking; and 22% reported using both. Number of male sexual partners (past year) was associated with any STI (AOR=1.03, 95% CI =1.01–1.06). Adjusting for HIV status, number of male sexual partners (past year), and

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demographic variables, men who reported use of both mobile phones and computer-based Internet for sex-seeking had increased odds of reporting an STI (AOR=2.59, 95% CI=1.75–3.83), as well as with separate reports of chlamydia, gonorrhea, and syphilis (p 's<.05).

Conclusions—Enhanced community education regarding STI prevention, testing and treatment options are necessary among this subpopulation of MSM, who may benefit from messaging via Internet and mobile phone application sites.

Keywords

Internet; mobile phone; human immunodeficiency virus; sexually transmitted disease; STI

Introduction

Sexually transmitted infections (STIs) represent a major health concern in the United States, particularly among gay, bisexual and other men who have sex with men (MSM).¹ In recent years, populations of MSM have experienced an increase of syphilis infections.^{2–3} In 2014, 83% of reported cases of primary and secondary syphilis among men were MSM, and half of MSM diagnosed with syphilis were co-infected with HIV.² Evidence also suggests that MSM are experiencing increases in chlamydia and gonorrhea infections.^{2–3} Racial and ethnic minority MSM have disproportionately high incidence rates of STIs. Rates of HIV infection are higher among black and Hispanic/Latino MSM than white MSM, and black MSM compose the highest percentage of all new HIV infections (44%).^{4–5}

The Internet is commonly used to build and sustain social networks among MSM, including meeting sexual partners.^{6–7} One study of young MSM found that 80% reported use of the Internet for male sex-seeking and 61% reported having sex with a partner met online.⁸ Results from a meta-analysis of studies conducted in the early 2000s indicated MSM who used the Internet for sex-seeking were more likely to have anal sex without a condom when compared to MSM who did not use the Internet to seek sex.⁹ For MSM recruited in London gyms, seeking sex through the Internet was associated with having a STI diagnosis in the prior year.¹⁰ However, this study and the majority of studies included in this meta-analysis included predominantly white, gay self-identified MSM. In an online sample obtained from a popular MSM sex-seeking website, Internet use for meeting sexual partners was associated with higher rates of anal intercourse without a condom.¹¹ Together, these studies suggest MSM who seek sex through the Internet are more likely to engage in unsafe sex and to acquire STIs. However, these results were collected more than a decade ago, and do not distinguish between different types of online sex-seeking including computer-based Internet and mobile phone applications.

Technology advances in mobile phone capabilities and applications (Apps) have enabled people to meet one another through use of handheld devices, allowing for even greater social connections than through Internet access on standard computers. In a 2015 phone survey (random selection of landline and cellular numbers) of American adults aged 18 years and older, approximately 92% had a mobile phone and 68% had smartphones (i.e., mobile phones capable of accessing the Internet).¹² In a small qualitative study of young black MSM, smartphone use was both an integral part of life and used as much and sometimes

more than traditional computers.¹³ One study investigated demographic characteristics of MSM using both the Internet and mobile Apps to seek sex with other men.¹⁴ Those who used both mobile Apps and the Internet for sex-seeking were younger and had higher incomes than those who used the Internet only.¹⁴ However, this was an online sample with a modest number of participants and may not be generalizable to the larger MSM community. In a study of mobile phone sex-seeking geosocial networking Apps (GSN; Apps that can pinpoint how far you and potential sex partners are to one another), MSM who reported using GSN were more likely to test positive for chlamydia and gonorrhea than men who met partners in-person; there were no significant differences in syphilis or HIV prevalence.¹⁵

Relatively few studies have examined mobile phone use and STI risk among black and Hispanic/Latino MSM. Results of the study linking GSN app use and STIs included a largely white sample and did not account for number of recent sex partners, a possible confounder that may be associated with greater STI prevalence.¹⁵ In a sample of 110 college students, mobile phone sex seeking app users reported more lifetime sex partners than non-app users.¹⁶ In addition, when adjusting for the amount of sex partners met online, those who reported app use had significantly more sex partners and STIs than non-app users. However, this study had a limited sample size and was participants were predominantly white.¹⁶

Given the limitations and discrepancies in prior research and consistently high rates of STIs among black and Hispanic/Latino MSM, further research is needed to understand modern risk factors such as technology and Internet usage. The main goal of the present study was to investigate the association of Internet and mobile phone sex-seeking with reported STIs. The analysis plan included three steps. First, we examined the association between demographic variables and use of computer-based Internet and/or mobile phones for predominantly sex-seeking among MSM. Second, we investigated associations between computer-based Internet and mobile phone use mostly for sex-seeking and self-reported STIs. Third, we investigated these associations for specific STIs including chlamydia, gonorrhea, and syphilis.

Materials and Methods

Participants

This is a secondary analysis of data from the *Messages4Men Study*,¹⁷ which recruited MSM through convenience sampling with online and print advertisements/flyers, referrals, and venue-based outreach in three US city-Metropolitan Statistical Areas (MSAs; Chicago, IL, Fort Lauderdale, FL, Kansas City, MO). A targeted recruitment sampling method for representation was used for the primary study purpose of message testing: 450 participants were black and 450 were Hispanic/Latino; 300 were HIV-positive, 300 HIV-negative reported condomless anal sex during prior three months (behaviorally “higher risk” for HIV acquisition), and 300 HIV-negative did not report condomless anal sex during prior three months (behaviorally “lower risk” for HIV acquisition).

Eligible participants were those who self-identified as black or Hispanic/Latino, 18 years of age or older, male sex at birth (transgender persons excluded), lived or worked within the

greater metropolitan area of each city, reported sex with a man in the past 12 months, and had not tested HIV-positive for the first time within the prior six months. HIV status was based on self-report; men who reported not knowing their HIV status (4% of sample) were coded as HIV-negative status.

Procedures

Participants were recruited and enrolled in the study June–October 2014. Each participant was screened through the Internet, telephone, or in-person to determine eligibility. Of 3518 men screened, 1759 (50%) were eligible and agreed to participate. Most of the 1759 ineligible men were excluded because they did not report having sex with a man in the past 12 months (81%), did not live or work in the study city-MSAs (77%), and/or did not identify as black/African American or Hispanic/Latino (55%). Of the 1759 men who screened eligible, 925 (53%) scheduled/attended an appointment and successfully completed the assessment. During the study visit, men were rescreened and, if eligible, provided informed consent. Participants completed a one-hour computer-based survey in English or Spanish (10% chose Spanish), and were given a \$40 gift card as a token of appreciation. Lastly, HIV prevention/care and other referrals were provided as needed (e.g., mental health counseling, requests for ART or PrEP provider information), including immediate on-site HIV testing for negative men.

Measures

Participants responded to a series of assessment questions on demographics, Internet and mobile phone use, sexual behaviors, and STI history. For the present analysis, demographics included self-reported race/ethnicity, sexual orientation (i.e., gay, bisexual, heterosexual, other), HIV status, age, educational attainment, and city. Internet use was measured using questions as employed in previous research.¹⁸ Participants who reported having reliable Internet access were asked to select all of their most common activities when using computer-based Internet using checkboxes (i.e., email, Facebook, Twitter, dating or hookup sites, information and news, Skyping and live video communication, or other). Similarly, participants who reported having a mobile phone were asked to select all of the ways of how they “mostly used” their phone (i.e., phone calls, texting, Facebook, Twitter, dating or hookup sites, information and news, Skyping and live video communication, or other). “Mobile phone” is a term that is inclusive of smartphones. Indicator variables were created for (a) Internet use mostly for sex-seeking (yes/no), (b) mobile phone use mostly for sex-seeking (yes/no), and (c) either, (d) neither, and (e) both methods mostly for sex seeking. Sexual risk behavior was defined as condomless anal sex with a male partner in the prior three months. Bacterial STIs including chlamydia, syphilis, gonorrhea, urethritis, and/or unknown in prior 12 months were assessed by self-report.

Analysis

Data were coded and analyzed using SAS 9.3 (Cary, NC). Demographic variables were coded as age (18–19 [referent], 30–39, and 40+ years), education (high school diploma/equivalent education [referent], some college training, and four-year college degree or more education), race/ethnicity (black [referent] or Hispanic/Latino), HIV status (HIV-negative [referent] or HIV-positive), sexual self-identification (gay [referent] or bisexual), city

(Chicago [referent], Fort Lauderdale, or Kansas City), and male sex partners (none [referent], one, two, three, four to nine, or greater than nine). Partner-seeking method was recoded to represent (a & b) each single independent method of sex-seeking (i.e., Internet = yes, mobile phone = no, and the reciprocal) and (c) both methods of sex-seeking (i.e., Internet = yes, mobile phone = yes), with (d) participants who reported neither method (i.e., Internet = no, mobile phone = no) as the referent group. Descriptive statistics and chi-square analyses were performed at the bivariate level. Logistic regression was employed for multivariable analysis of the association of mobile phone and computer-based Internet use for mostly sex-seeking and any reported STIs in the past year [Model 1] and specific infection types (chlamydia, gonorrhea, syphilis, and other STIs [Models 2–5]). The “Other STI” category includes urethritis and having a STI but not knowing the name. Bivariate selection criteria included consideration of common sociodemographic variables (i.e., race/ethnicity, education level, age, and city), sexual behavioral variables drawn from previous literature (i.e., number of recent male sex partners and HIV status), and the main exposure and outcome variables (i.e., Internet and mobile phone use mostly for sex-seeking, and STIs). Multivariable models were analyzed with a simultaneous procedure of variable entry of demographic variables and sex-seeking technology.

Results

The analytic sample (n=853) consisted of participants with complete data on key demographic and behavioral variables; 46% were black and 54% were Hispanic/Latino (Table 1). Approximately two-thirds (66%) self-reported HIV-negative status, and 81% self-identified as gay. Nearly one-quarter of MSM self-reported at least one STI within the prior year, including chlamydia (7%), gonorrhea (9%), syphilis (10%), and “other STI” (5%). HIV-positive MSM were more likely to report an STI within the prior 12 months compared to HIV-negative MSM (33% vs. 18%, $p < .05$), and MSM with multiple recent sex partners were more likely to report an STI ($p < 0.05$).

Overall, 29% of the sample reported using a mobile phone and 28% reported using computer-based Internet mostly for sex seeking, neither of which varied significantly by race/ethnicity or HIV-status ($p > .05$). Twenty-two percent of the men reported using both mobile phones and computer-based Internet for sex-seeking, 12% reported using either computer-based Internet or a mobile phone exclusively, and 66% no technology usage mostly for sex seeking (Table 2). Gay-identified MSM were more likely than bisexually-identified MSM to report mobile phone (31% vs. 18%, $p < .05$) and computer-based Internet use (30% vs 20%, $p < .05$, Table 2) for mostly sex-seeking; men who reported use of both mobile phone and computer-based Internet for sex-seeking were more likely to identify as gay than bisexual (24% vs. 14%, $p < .05$). Compared to MSM who did not use either type of technology mostly for sex-seeking, MSM who reported mobile phone, computer-based Internet, and use of both methods, independently, reported a greater number of partners in the past three months ($p < .05$). Men with education beyond high school (post-high school and college degree or more) were more likely to report mobile phone use mostly for sex-seeking than men with a high school education or less ($p < .05$). Men in Ft. Lauderdale were more likely to report mobile phone use than men in Chicago and Kansas City ($p < 0.05$).

STIs in the prior 12 months were associated with mobile phone use, use of computer-based Internet, and use of both methods ($p's < .05$).

In multivariable logistic regression analysis with STIs as the outcome (Table 3), men reporting both computer-based Internet and mobile phone use for mostly sex-seeking had significantly greater odds than men not using either method to report any STI in the past 12 months (Adjusted Odds Ratio [AOR] = 2.15, 95% Confidence Interval [CI] = 1.43–3.23), including chlamydia (AOR = 2.18, 95% CI = 1.15–4.15), gonorrhea (AOR = 2.00, 95% CI = 1.52–4.65), and syphilis (AOR = 2.56, 95% CI = 1.48–4.45). The associations between use of both methods for sex-seeking and reported STIs were consistent across all major STI subtypes (excluding “other STIs”), even when controlling for number of male sex partners. MSM with three or more male sex partners had significantly greater odds of reporting an STI than men reporting no male sex partners ($p < .05$). Generally, men with a higher number of male sex partners had greater odds of reporting gonorrhea ($p < .05$). Regression models comparing use of either computer-based Internet and mobile phone for mostly sex-seeking (versus neither method) did not find singular method use to be associated with reported STIs ($p's > .05$).

In terms of other significant predictors of STIs in the multivariable models, HIV-positive MSM had significantly greater odds than HIV-negative MSM to report any STI, gonorrhea, and other STIs ($p < .05$). There was no significant association between HIV status and self-reported chlamydia and syphilis. Men with a college degree or higher education had lower odds of reporting chlamydia, and those from Kansas City had greater odds of reporting some other STI.

Discussion

In this large sample of black and Hispanic/Latino MSM in three US cities, nearly a quarter of the men reported having an STI within the prior year. This finding is consistent with other studies of racial/ethnic minority MSM.^{19–21} Also consistent with other studies, STI prevalence was particularly high among HIV-positive MSM,^{22–23} and similar to other samples of black and Hispanic/Latino MSM.^{19–21} Almost one-quarter of black and Hispanic/Latino MSM reported use of both computer-based Internet and a mobile phone for mostly sex-seeking purposes. This indicates a high level of engagement in and utilization of technology-aided sex-seeking among many black and Hispanic/Latino MSM. This persistent exposure to online sex-seeking environments may place black and Hispanic/Latino MSM at a greater risk for STIs. It also appears that minority gay-identified MSM may utilize technological sex-seeking more than bisexual-identified MSM. Although STI prevalence was similar for gay and bisexual minority men, there may be differences in how men seek sex. Possible differences in technology-aided sex-seeking between gay and bisexual-identified MSM may be due to feelings of stigma among bisexual men in online sex-seeking situations, an effect of having more female partners than gay individuals, or perhaps simply a difference in partner seeking method. However, this reasoning is speculative and possible differences in sex-seeking behavior between gay and bisexual MSM should be investigated further.

Reports of an STI within the prior year, including chlamydia, gonorrhea and syphilis, were associated with combined use of computer-based Internet and mobile phone mostly for sex seeking. These associations were present even when adjusting for number of male sex partners, addressing a limitation of previous research. Having three or more male sex partners in the prior three months was also associated with having any STI. This is an important finding because use of both methods of sex-seeking is a risk factor for STIs even when controlling for the number of recent male sex-partners.

MSM who used either of the sex-seeking methods but not both were no more or less likely than men who report neither to report any STI, chlamydia, gonorrhea, and syphilis. This suggests that it is use of both methods -- and not just one -- that accounts for the effect; persistent use, perhaps. The associations between HIV-positive status with any STI, gonorrhea, and other STIs are not particularly surprising given the high comorbidity of STIs among HIV-positive MSM.^{22–23} The association between syphilis and using both methods of sex-seeking is noteworthy given previous findings which did not detect a relationship between mobile phone app use for sex-seeking and syphilis.¹² This may be due in part to the selection of MSM who are “app-users” in the previous study as opposed to MSM who report use of their technology (mobile phone or computer-based Internet) mostly for the purpose of sex-seeking. Additional research is needed to replicate this finding given its inconsistency with some prior studies.

There are several limitations of this study. It was cross-sectional by design, and thus only associations were assessed. Participants were recruited via convenience sampling in three US cities, which may not be generalizable to the black and Hispanic/Latino MSM population across the US. However, the relatively large sample size and collection of data from racial/ethnic minority MSM residing in multiple locations are strengths. The present methods relied on self-reported STIs and are subject to recall bias for both STIs within the prior 12 months and male sex partners within the prior three months. Laboratory testing of STIs would have been preferable to self-report, but was not feasible in the present research due to availability and cost issues. Further, only bacterial infections within the past year were assessed, and may not represent associations between technology use and viral STIs. Bacterial STIs were assessed because of the typical temporal connection of infection contact and symptom detection. Measures on STIs also did not assess the history of the infection (i.e., first-time or recurrent), but rather at least one occurrence within the past 12 months. Technology-aided sex seeking questions were worded to capture what the technology was “mostly” used for, but did not capture actual frequency of partners met through this medium. For example, participants may have reported use of technology for mostly sex-seeking, but may not be actually having sex with partners met through this modality.

Research-informed efforts can be undertaken to better educate vulnerable MSM populations about condom use benefits for STI prevention, particularly among MSM who primarily use computer-based Internet and mobile phones for sex-seeking. Targeting MSM who use technology for sex-seeking may allow for prevention efforts to identify and educate those at high risk for STIs. Tailoring existing prevention programs targeted at MSM to include technological components may allow for greater STI prevention ability given how relatively commonplace technology aided sex-seeking is among MSM. Education and training for

prevention staff regarding technology use for sex-seeking may be beneficial for those administering currently existing STI prevention programs. Further, awareness of heightened risk for STIs among MSM who use technology may be an entry point to initiate discussion of sexual health and risk reduction with prevention specialists and healthcare providers.

Partnerships with websites and app developers may allow for prevention and healthcare information to be provided at the point of access. Such partnerships may also allow users to be informed about not only the possible health risks associated with persistence of meeting men through these technologies (the Internet and mobile phones), but also about potential STI testing and treatment options. Mobile phone apps like “Healthminder”, an Android-based app designed for individual-specific HIV risk management and prevention, may be a vehicle to disseminate educational information on technology-aided STI risk.²⁴ Through partnerships and apps, consumer prevention information may be general (for all users) or target black and Hispanic/Latino populations that experience a high prevalence of STIs, aiming to reduce sexual health disparities among these groups. For black and Hispanic/Latino MSM, the present findings suggest use of both computer-based Internet and mobile phone for mostly sex-seeking is relatively common, stable across age groups and education levels, and increases risk for STIs and associated health impacts. Given that technology use for sex-seeking is relatively commonplace among MSM, education and prevention programs for reducing STI risk should consider incorporating technology-based prevention for this population.

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Table 1
 Sample Characteristics and Bivariate Analysis of Associations with Reported STIs in the Past Twelve Months among Black and Hispanic/Latino MSM, Messages4Men Study, 2014

Characteristic	Overall n (%)	STI n/n (%)	Gonorrhea n/n (%)	Chlamydia n/n (%)	Syphilis n/n (%)	Other STI n/n (%)
Overall Sample (n=853)	N/A	192/853 (23)	78/853 (9)	59/853 (7)	81/853 (10)	46/853 (5)
Race/ethnicity						
Black	394 (46)	79/394 (20)	35/394 (9)	33/394 (8)	30/394 (8)	18/394 (5)
Hispanic/Latino	459 (54)	113/459 (25)	43/459 (9)	26/459 (6)	51/459 (11)	28/459 (6)
HIV status						
Negative	567 (66)	99/567 (17) *	28/567 (5)	34/567 (6)	45/567 (8)	24/567 (4)
Positive	286 (34)	93/286 (33)	50/286 (17)	25/286 (9)	36/286 (13)	22/286 (8)
Sexual self-identification						
Gay	689 (81)	158/689 (23)	70/689 (10)	45/689 (7)	67/689 (10)	40/689 (6)
Bisexual	164 (19)	34/164 (21)	8/164 (5)	14/164 (9)	14/164 (9)	6/164 (4)
Age group (years)						
18–29	315 (37)	60/315 (19)	22/315 (7)	22/315 (7)	23/315 (7)	16/315 (5)
30–39	233 (27)	58/233 (25)	13/233 (6)	23/233 (10)	30/233 (13)	13/233 (6)
40+	305 (36)	74/305 (25)	43/305 (14)	14/305 (5)	28/305 (9)	17/305 (6)
Education level						
<=HS diploma	275 (32)	66/275 (24)	31/275 (11)	25/275 (9)	28/275 (10)	13/275 (5)
Post-HS	308 (36)	67/308 (22)	28/308 (9)	22/308 (7)	31/308 (10)	13/308 (4)
>=College degree	270 (32)	59/270 (22)	19/270 (7)	12/270 (4)	22/270 (8)	20/270 (7)
Male sex partners (prior 3 months)						
0	113 (13)	16/113 (14) *	6/113 (5)	5/113 (4)	6/113 (5)	5/113 (4)
1	287 (34)	42/287 (15)	10/287 (3)	16/287 (6)	21/287 (7)	11/287 (4)
2	125 (15)	29/125 (23)	12/125 (10)	6/125 (5)	12/125 (10)	7/125 (6)
3	106 (12)	32/106 (30)	19/106 (18)	7/106 (7)	12/106 (11)	6/106 (6)
4–9	152 (18)	44/152 (29)	16/152 (11)	18/152 (12)	18/152 (12)	12/152 (8)
10+	70 (8)	29/70 (41)	15/70 (21)	7/70 (10)	12/70 (17)	5/70 (7)
City						
Chicago	295 (34)	65/295 (22)	34/295 (12)	16/295 (5)	27/295 (9)	12/295 (4)

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Characteristic	Overall n (%)	STI n/n (%)	Gonorrhea n/n (%)	Chlamydia n/n (%)	Syphilis n/n (%)	Other STI n/n (%)
Ft. Lauderdale	279 (33)	70/279 (25)	24/279 (9)	15/279 (5)	37/279 (13)	17/279 (6)
Kansas City	279 (33)	57/279 (20)	20/279 (7)	28/279 (10)	17/279 (6)	17/279 (6)

Note: HS, High school diploma or less; Post-HS, some post-high school training or college; Mobile, reported mobile phone use for mostly sex-seeking purposes; Internet, reported Internet use for mostly sex-seeking purposes; N/A, not applicable

* p<.05 for chi-square test; Chi-square test for overall is within characteristics.

Table 2
 Bivariate Analysis of Associations between Mobile Phone and/or Internet Use for Mostly Sex-Seeking (Both, Either, and Neither) with Demographic, Behavioral, and Recent STI Variables among Black and Hispanic/Latino MSM, Messages4Men Study, 2014

Characteristic	Both n (%)	Either n (%)	Neither n (%)
Overall Sample (n=853)	188 (22)	104 (12)	561 (66)
Race/ethnicity			
Black (n=394)	86 (22)	38 (10)	270 (69)
Hispanic/Latino (n=459)	102 (22)	66 (14)	291 (63)
HIV status			
Negative (n=567)	118 (21)	76 (13)	374 (66)
Positive (n=286)	71 (25)	28 (10)	187 (65)
Sexual self-identification			
Gay (n=689)	164 (24)**	91 (13)	434 (63)
Bisexual (n=164)	24 (15)	13 (8)	127 (77)
Male sex partners (prior 3 months)			
0 (n=113)	16 (14)***	7 (6)	90 (80)
1 (n=287)	25 (9)	25 (9)	237 (83)
2 (n=125)	29 (23)	15 (12)	81 (65)
3 (n=106)	31 (29)	12 (11)	63 (59)
4-9 (n=152)	55 (36)	30 (20)	67 (44)
10+ (n=70)	32 (46)	15 (14)	23 (33)
Age group (years)			
18-29 (n=315)	65 (21)	38 (12)	212 (67)
30-39 (n=233)	62 (27)	26 (11)	145 (62)
40+ (n=305)	61 (20)	40 (13)	204 (67)
Education level			
<=HS diploma (n=275)	51 (19)	30 (11)	194 (71)
Post-HS (n=308)	74 (24)	39 (13)	195 (63)
>=College degree (n=270)	63 (23)	35 (13)	172 (64)
City			
Chicago (n=295)	57 (20)***	49 (17)	189 (64)
Ft Laud (n=279)	76 (27)	36 (13)	167 (60)

Characteristic	Both n (%)	Either n (%)	Neither n (%)
Kansas City (n=279)	55 (20)	19 (7)	205 (73)
STI			
Yes (n=192)	70 (36)*	24 (13)	98 (51)
No (n=661)	118 (18)	80 (12)	463 (70)
Chlamydia			
Yes (n=59)	23 (39)*	7 (12)	29 (49)
No (n=794)	165 (21)	97 (12)	532 (67)
Gonorrhea			
Yes (n=78)	31 (39)*	10 (13)	37 (47)
No (n=775)	157 (20)	94 (12)	524 (68)
Syphilis			
Yes (n=81)	34 (42)*	10 (12)	37 (46)
No (n=772)	154 (20)	94 (12)	524 (68)
Other STI			
Yes (n=46)	15 (33)	6 (13)	25 (54)
No (n=807)	173 (21)	98 (12)	536 (66)

Note: Either, reported use of either the Internet or a mobile phone for mostly sex-seeking with MSM, but not both. Both, reported use of both the Internet and a mobile phone for mostly sex-seeking with MSM. Neither, reported use of neither mobile phone nor Internet for mostly sex-seeking. HS, High school diploma or less; Post-HS, some post-high school training or college.

* p<.05 for chi-square test.

Table 3
Multivariable Analysis of Specific STIs as a Function of Partner Seeking Method, and Demographic and Behavioral Variables among Black and Hispanic/Latino MSM, Messages4Men Study, 2014

Characteristic	Any STI		Chlamydia		Gonorrhea		Syphilis		Other STI	
	AOR (CI)	AOR (CI)	AOR (CI)	AOR (CI)	AOR (CI)	AOR (CI)	AOR (CI)	AOR (CI)	AOR (CI)	
Partner seeking method										
Neither (n=561, ref)										
Either (n=104)	1.25 (0.73–2.15)	1.33 (0.54–3.26)	1.32 (0.60–2.92)	1.36 (0.63–2.93)	1.27 (0.48–3.34)					
Both (n=188)	2.15 (1.43–3.23)	2.18 (1.15–4.15)	2.00 (1.52–4.65)	2.56 (1.48–4.45)	1.52 (0.73–3.16)					
Male Sex Partners (prior 3 months)										
0 (n=113, ref)										
1 (n=287)	1.12 (0.59–2.11)	1.21 (0.43–3.46)	0.64 (0.22–1.86)	1.56 (0.60–4.04)	1.01 (0.34–3.03)					
2 (n=125)	1.67 (0.83–3.36)	1.14 (0.32–3.98)	1.43 (0.49–4.15)	1.68 (0.60–4.77)	1.29 (0.38–4.36)					
3 (n=106)	2.23 (1.11–4.46)	1.28 (0.38–4.33)	3.00 (1.09–8.22)	1.85 (0.65–5.26)	1.27 (0.36–4.45)					
4–9 (n=152)	2.09 (1.07–4.05)	2.46 (0.84–7.17)	1.64 (0.58–4.59)	1.92 (0.71–5.20)	1.73 (0.56–5.38)					
10+ (n=70)	3.47 (1.63–7.38)	2.33 (0.66–8.29)	3.37 (1.98–5.76)	2.38 (0.80–7.06)	1.60 (0.42–6.16)					
Race/ethnicity										
Black (n=394, ref)										
Hispanic/Latino (n=459)	1.31 (0.77–2.22)	1.09 (0.46–2.58)	0.81 (0.38–1.71)	0.80 (0.37–1.71)	2.41 (0.91–6.43)					
HIV status										
Negative (n=567, ref)										
Positive (n=286)	2.21 (1.54–3.16)	1.49 (0.84–2.66)	3.37 (1.98–5.76)	1.53 (0.94–2.51)	2.08 (1.09–3.96)					
Sexual Self-Identification										
Bisexual (n=164, ref)										
Gay (n=689)	0.93 (0.59–1.47)	0.80 (0.40–1.59)	2.14 (0.96–4.79)	0.81 (0.42–1.56)	1.40 (0.56–3.53)					
Age Group (years)										
18–29 (n=315, ref)										
30–39 (n=233)	1.27 (0.81–2.00)	1.92 (0.98–3.74)	0.60 (0.28–1.30)	1.57 (0.85–2.88)	1.00 (0.45–2.23)					
40+ (n=305)	1.08 (0.69–1.69)	0.77 (0.35–1.67)	1.37 (0.72–2.61)	1.04 (0.55–1.97)	1.09 (0.49–2.42)					
Education level										
<=HS diploma (n=275, ref)										

Characteristic	Any STI		Chlamydia		Gonorrhea		Syphilis		Other STI	
	AOR (CI)		AOR (CI)		AOR (CI)		AOR (CI)		AOR (CI)	
Post-HS (n=308)	0.82 (0.54-1.25)		0.75 (0.40-1.40)		0.72 (0.40-1.29)		0.82 (0.47-1.45)		0.88 (0.39-1.98)	
>=College degree (n=270)	0.90 (0.58-1.40)	0.46 (0.21-0.99)			0.60 (0.31-1.18)		0.65 (0.35-1.22)		1.82 (0.84-3.96)	
City										
Chicago (n=295, ref)										
Fort Lauderdale (n=279)	1.06 (0.65-1.73)		0.80 (0.33-1.93)		0.91 (0.44-1.85)		1.60 (0.79-3.21)		1.03 (0.44-2.46)	
Kansas City (n=279)	1.36 (0.80-2.31)		1.97 (0.85-4.55)		0.90 (0.41-1.97)		0.62 (0.28-1.33)		3.24 (1.17-9.02)	

Note: Bolded estimates are significant at p<.05; Neither, neither mobile nor Internet; either, either reported mobile or Internet; both, both reported mobile and Internet; HS, High school diploma or less; Post-HS, some post-high school training or college; Mobile, reported mobile phone use for mostly sex-seeking purposes; Internet, reported Internet use for mostly sex-seeking purposes; AOR, adjusted odds ratio; CI, 95% confidence interval; HIV, human immunodeficiency virus. Other STI includes urethritis or an unknown STI.