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Patterns of HIV and STI testing among MSM couples in the U.S.

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Abstract

Background—Most MSM within the U.S. acquire HIV while in a same-sex relationship. Few studies have examined HIV and STI testing rates among MSM couples. Interestingly, the patterns that MSM test for HIV while in their relationships remain largely unknown. The present study helps fill this gap in knowledge by assessing HIV testing patterns and HIV and STI testing rates from a large convenience sample of Internet-using MSM couples.

Methods—: The present study used a cross-sectional study design to collect dyadic data from 361 MSM couples who lived throughout the US. A novel recruitment strategy that included placing paid, targeted advertisements on Facebook enrolled both men in the couple to independently complete the confidential, electronic survey.

Results—Nearly half of the HIV-negative men indicated either not having been tested for HIV since their relationship started or only testing if they felt they were at risk. Few men reported testing every 3–4 months. HIV/STI testing rates varied among the sample of couples. Few men reported having been diagnosed with a recent STI. Testing patterns and rates were mostly similar, irrespective of whether UAI was practiced within and/or outside the relationship.

Conclusions—HIV testing and prevention services must target men who are at risk for acquiring HIV within MSM couples. To help accomplish this goal, additional research is needed to examine the specific barriers and facilitators to HIV and STI testing among MSM in couples.

Keywords

MSM Couples; HIV testing patterns; HIV and STI testing rates; UAI

INTRODUCTION

Men who have sex with men (MSM) represent approximately 2% to 4% of the US male population yet account for over 50% of the people living with HIV [1]. Each year, HIV incidence continues to increase among MSM [2], and 58% to 78% of these new infections occur within the context of a same-sex relationship [3]. However, relatively little research has specifically addressed the HIV risk of MSM who are in an ongoing relationship. The

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majority of studies assessing HIV risk behaviors and HIV/STI testing have focused on individual-level correlates associated with UAI and HIV/STI testing behaviors [4, 5].

MSM engage in anal sex, including unprotected anal intercourse (UAI), more frequently with their main partners than with casual partners [6, 7] and for a variety of reasons [8-12]. Recent research has begun to examine how relationship factors, including sexual agreements, trust, commitment, social support, and communication patterns, affect HIV risk among MSM couples. For example, Gomez et al. (2012) found that men in couples with higher levels of trust, communication (within the relationship), commitment, and social support were less likely to break their sexual agreement [13]. A sexual agreement is an explicit agreement made between two primary partners about which sexual behaviors may occur within and outside of their sexual relationship, with the aim of minimizing HIV risk and enhancing some aspect of their relationship [14].

Another study with 566 MSM couples showed that HIV-specific social support consistently predicted less UAI with casual sexual partners [15]. Additionally, Mitchell et al. (2012) reported that among 142 HIV-negative seroconcordant MSM couples, UAI with a casual MSM sexual partner decreased as an individual's commitment to a sexual agreement increased [16]. In contrast, other relationship factors may increase HIV risk among MSM couples, including assuming a primary partner's HIV status to be negative [10, 17], and discrepancies about and non-adherence to a sexual agreement [10,17-22].

Despite our current understanding of how some relationship factors affect the risk of HIV acquisition, HIV and STI testing rates and patterns among MSM couples remain largely unknown. Few studies, to date, have examined HIV testing rates among MSM couples. For example, Mitchell & Petroll (2012) found that less than 24% of men in HIV-negative seroconcordant MSM couples in Portland OR, or Seattle, WA had been tested for HIV within the previous three months [23]. Within this sample, testing for HIV in the previous three months was positively associated with both men in the couples having reported that they had a sexual agreement, and with one or both men in the couple reporting that they had UAI with a casual MSM partner during the same time frame [23]. Additionally, Chakravarty et al. (2012) examined HIV testing rates among men from a sample of 566 MSM couples in San Francisco, CA [24]. This study found that HIV-negative MSM in relationships were testing at low rates, even after having had UAI with a casual MSM partner of HIV-positive or of unknown status [24]. Though findings from these two studies provide some insight into MSM couples' testing behaviors, less is known about the testing patterns and rates among MSM couples who live in other areas of the US, and whether their testing patterns and rates differ by HIV status and previous engagement of UAI within and outside of the relationship.

Research that examines HIV/STI testing patterns and rates among MSM couples is needed to: 1) determine how best to increase HIV testing among at-risk men within MSM couples; 2) design novel HIV prevention interventions that target MSM couples. This study helps fill this gap by assessing HIV testing patterns and HIV and STI testing rates in a large sample of Internet-using MSM couples. We used a novel recruitment strategy to collect dyadic data from 361 MSM couples who lived throughout the US.

MATERIALS and METHODS

Recruitment, Eligibility and Procedures

Recruitment was conducted through Facebook ® banner advertising. Banner advertisements are shown to individuals who have and use personal home pages. Advertisements target individuals based on demographics that they report on their Facebook profile.

During a ten week recruitment period during 2011, advertisements were displayed to Facebook members whose profile demographics matched our study eligibility criteria: males living in the US, at least 18 years old, “interested in men,” and had a relationship status of “in a relationship, married, or engaged.” All Facebook users whose profiles met our eligibility criteria had an equal chance of being shown one of the three banner advertisements. In total, the banner advertisements were shown 8.5 million times (i.e., impressions) on potential participant profiles. The ads briefly described the purpose of the study and included a picture of a male couple. A total of 7,994 Facebook users clicked on at least one of the advertisements and were then directed to the study webpage. Among those who visited our study webpage (e.g., 7,994), 4,056 potential participants answered our eligibility questions; 722 MSM, representing both men of 361 MSM couples, qualified, enrolled, and completed the survey, and are included in this study.

The study webpage described the purpose of the study, what a participant could expect if he participated, and asked eligibility questions. Interested and eligible participants were also informed that they would be asked to invite their primary, male relationship partner to participate in the study, as well as to have to complete the survey independently and separately from their partner. Both men in the couple had to meet the following eligibility criteria to participate: be 18 years of age or older; live in the US; be in a sexual relationship with another male; and, have had oral and/or anal sex with this partner within the previous three months. Eligible participants were directed to an electronic consent form to provide consent before taking the 30-40 minute confidential survey.

Because we were interested in collecting data from both men in the couple, we embedded a partner referral system in our survey. Specifically, participants were required to input their own and their primary male partner's email address. The participant's primary male partner then received an email inviting him to participate in the study. Email addresses were also used for incentive purposes and for linking the survey responses between the two men within each couple. Every fifth couple (i.e., 5th, 10th, etc.) that completed the survey received two modest incentives via email. The Medical College of Wisconsin Institutional Review Board approved the study protocol.

Online Survey

The online survey service provider Survey Gizmo hosted our study webpage, electronic consent form, and confidential, online survey through the use of a secure access portal (i.e., <https://>). Only the primary investigator of the study and managers at Survey Gizmo had access to the study survey and data. Other than email addresses, no personal identifying information was collected, including computer Internet Protocol addresses. Email addresses were deleted after data collection and verification of the couples' relationships.

Measures

A variety of measures assessed MSM couples' demographic and relationship characteristics, sexual behaviors, HIV/STI testing rates, HIV testing patterns, and recent STI diagnoses. Participants were asked about their sociodemographic characteristics, including whether they had health insurance, and whether their primary medical doctor knew about their sexual behaviors with men. Relationship characteristics assessed included relationship duration, cohabitation duration, establishment of a sexual agreement, and the type of sexual agreement.

Sexual Behaviors—Participants were asked the number of times they had engaged in unprotected insertive and receptive anal sex with their primary partner and any casual MSM partners during the previous three months. Men who reported having sex with a casual MSM

partner were asked the number of times that they had engaged in unprotected insertive and receptive anal sex with casual MSM partners of perceived negative, positive, and unknown HIV status.

HIV/STI Testing Rates and Patterns—Men were asked their HIV status as well as their primary partner's perceived HIV status. Participants also reported when their last test for HIV and STIs had occurred (in months), the number of times that they had been tested for HIV, as well as, their HIV testing pattern since they had been in their current relationship. Each participant's own and primary partner's perceived HIV status was assessed categorically with 'negative', 'positive', and 'I don't know my/his HIV status' response options. HIV testing patterns were assessed with the following categorical response options: 'I have not been tested for HIV since the relationship started', 'On average, I would get tested about once a year', 'On average, I would get tested about every 6 months', 'On average, I would get tested about every 3-4 months', and 'I would only get tested if I felt I was at risk'. Men who reported being HIV-positive were given different response options to assess their HIV testing patterns: 'I tested positive for HIV before the relationship started', 'Before I tested positive for HIV, I would get tested about once a year', 'Before I tested positive for HIV, I would get tested about every 6 months', 'Before I tested positive for HIV, I would get tested about every 3-4 months', 'Before I tested positive for HIV, I would only get tested if I felt I was at risk'.

Recent STI Diagnoses—Using a 'yes' and 'no' response format, participants were asked whether they had been diagnosed with gonorrhea, chlamydia, syphilis, human papillomavirus (HPV), or herpes within the previous three months.

Data Analysis

Dyadic data from 361 MSM couples (722 individuals) were analyzed using Stata Version 11 (StataCorp, College Station, TX). Descriptive statistics including means, standard deviations, rates, and percentages were calculated, as appropriate, for the measures. Participants' engagement of UAI, with both primary and casual MSM partners, was transformed into binary variables indicating whether an individual had engaged in those behaviors (or not) in the previous three months.

RESULTS

The mean age for the individual and couple was 33.0 years. Most men in the sample self-identified as: gay (98%); White (77%); living in an urban or suburban setting (89%); HIV-negative (84%); being employed (80%); having current health insurance (75%); and, indicated their primary medical doctor knew that they had sex with men (65%). Less than half of the men reported having at least a bachelor's degree (48%); however, almost a third of the men reported being a current student (31%). Thirty-four percent of the couples were of mixed race.

Regarding HIV serostatus, 4% of the couples were HIV-positive seroconcordant, 11% discordant, and 85% were HIV-negative seroconcordant. About a third of the sample resided in the Western region (32%) of the U.S. while the remainder of couples lived in the Northeast (17%), South (29%) and Midwest (22%) regions.

The average duration of the couples' relationships was 59.2 months. Most of the men (76%) lived with their primary partner. Over two-thirds of men (70%) stated they had a sexual agreement with their primary partner. However, only 57% of couples had both men who concurred they had a sexual agreement, while 25% of couples had men who gave discrepant reports (and disagreed) about whether they had a sexual agreement. Among the men who

reported having a sexual agreement with their partner, 56% indicated 'We only have sex with each other and no one else', 41% selected 'We have sex with each other, and we are allowed to have sex with others under certain guidelines/rules', and 3% chose 'We have sex with each other, and are allowed to have sex with others without any guidelines/rules'. Sociodemographic and relationship characteristics of the sample are provided in Table 1.

The majority of men (80%) had insertive and/or receptive UAI with their primary partner within the previous three months. However, differences in engagement of UAI within the relationship were noted by couples' HIV status: A higher proportion of HIV-negative concordant couples (83%) and HIV-positive concordant couples (86%) practiced UAI within their relationship when compared to HIV serodiscordant couples (64%). A quarter of the men (25%) had sex with a casual MSM partner within the previous three months. The majority of men who had sex outside of their relationship identified as: HIV-negative (82%); being in an HIV-negative seroconcordant relationship (74%); and having engaged in UAI (57%) with a casual MSM partner. More than half of participants in HIV-negative relationships (53%) had engaged in UAI with a casual partner perceived to be HIV-negative or of unknown HIV status. Compared to men in HIV-negative seroconcordant relationships (2%) and those in discordant relationships (18%), far more participants in HIV-positive seroconcordant relationships had had UAI with a casual partner perceived to be HIV-positive (63%). The sample's sexual behaviors are described in Table 2.

On average, the men last tested for HIV and STIs 37.6 and 19.1 months previously, respectively. Men had been tested for HIV approximately 3.2 times since being in their current relationship. However, testing rates for HIV and STIs varied by participants' HIV status. HIV testing patterns also varied among the participants. Among the 91 HIV-positive participants, 44% had tested positive before their current relationship. The remaining 51 HIV-positive men indicated that before they acquired HIV while in their current relationship, they would get tested for HIV: about once a year (19%); about every 6 months (16%); every 3-4 months (8%); only if they felt at-risk (13%). HIV-negative men ($n = 606$) indicated having the following HIV testing patterns since their relationship started: not been tested since the relationship started (19%); about once a year (29%); about every 6 months (17%); every 3-4 months (6%); only if they felt at-risk (28%).

Few men reported recent STI diagnoses. Overall, 4% of men ($n = 32$) were diagnosed with one or more STIs within the previous three months. Diagnoses of HPV were the most common and represented 2% ($n = 16$) of the sample while gonorrhea and chlamydia were reported by 1% of the men. Though more HIV-negative men reported recent diagnoses of one or more STIs (4%, $n = 22$), the prevalence of recent STIs was greater among HIV-positive men (10%, $n = 9$). Table 3 describes the sample's most recent STI diagnosis and provides additional information about their HIV testing patterns and HIV and STI testing rates.

HIV testing patterns were similar among HIV-negative and unknown status men who practiced UAI within their relationship, UAI outside of their relationship, and UAI both within and outside of their relationship. Overall, almost a third of the men, regardless of whether they had UAI within and/or outside of the relationship, indicated that they would get tested "about once a year" or "only if they felt at risk." Time since last HIV test, however, did differ by men's practice of UAI. Specifically, men who had UAI both within and outside of their relationship were last tested for HIV and STIs approximately 16 and 11 months ago, respectively. In contrast, men who had UAI only within their relationship were last tested for HIV and STIs about 25 and 18 months ago, respectively. Additional information is described in Table 4.

DISCUSSION

Our study is one of few studies that measured rates of HIV and STI testing among MSM couples [23, 24], and the first study to assess couples' HIV testing patterns since they have been in their relationship. We found that nearly 20% of the HIV-negative men had not been tested for HIV since they have been in their relationship, and another 28% indicated that they would only test for HIV if they felt they were at risk. Few men reported being tested every 3-4 months.

These testing rates and patterns are worrisome because the majority of couples practiced UAI within their relationship – regardless of the couples' HIV status. In addition, of the men who had sex outside of their relationship, over half had UAI with a casual sexual partner. Regardless of the couples' HIV status and partner type (primary vs. casual), reports of recent UAI were common both within and outside of these relationships.

Increasing access to and frequency of HIV testing among MSM is a priority for the National HIV/AIDS Strategy [25]. Individuals who are unaware of being HIV-positive are 3.5 times more likely to transmit the virus compared to persons who are aware of their HIV-positive status [26]. The reasons that Internet-using MSM do not test for HIV, although recruited by using different websites than this study, have recently been reported and include low perceived HIV risk, structural barriers, and fear of testing positive [27]. To increase the number of MSM in the US who know their current HIV status, novel HIV testing and prevention strategies must target men within MSM couples who are most at risk for acquiring HIV. However, to accomplish these goals, additional studies with MSM couples are needed to determine: a) which factors act as barriers and facilitators to testing; b) how perceived risk and knowledge of HIV/STIs vary by couples' HIV status and relationship type; and c) how certain relationship factors, such as types of sexual agreements and communication patterns, influence whether couples test for HIV and STIs, how frequently, and under what circumstances.

Currently, one such novel service, couples-based voluntary HIV testing and counseling (CVCT), is being provided to MSM couples in certain large cities in the US. [28]. However, not all MSM couples live in urban environments, and thus, other HIV and STI testing services are needed for those who live outside of these urban areas.

Limitations

The use of a cross-sectional study design with dyadic data from a convenience sample precludes us from making casual inferences and generalizing our findings to all MSM couples who live in the US, as well as, those who do and do not use the Internet and/or Facebook. Although we did not collect identifying information, participation, social desirability, and recall biases may have influenced the men to inaccurately report information about their HIV status, sexual behaviors, and testing rates and patterns. In addition, participants may have completed the survey with their main partners, despite our request for them to complete it independently and separately, and therefore potentially causing some bias. We also did not assess couples' knowledge of HIV transmission-related behaviors and perceived risk. Future research that examines testing behaviors among MSM couples should specifically address these limitations. Despite these limitations, our study obtained dyadic data from a large, geographically and educationally diverse sample of Internet-using MSM couples.

Because few studies have examined MSM couples' testing behaviors, findings from our study provide essential data about how often men test while in their relationship, as well as how their HIV testing rates and patterns differ by HIV status and recent engagement of UAI.

New and novel HIV testing and prevention services are needed to target MSM who are most at risk for acquiring HIV and STIs, particularly those within MSM couples. In order to increase HIV testing, including CVCT, among MSM couples, future research must address the reasons why MSM couples do and do not test.

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SUMMARY

A study with 361 MSM couples found men's HIV testing patterns and testing rates for HIV and STIs varied, irrespective of their engagement of UAI within and/or outside the relationship.

TABLE 1

Sociodemographic and Relationship Characteristics of 722 MSM Representing 361 MSM Couples

Characteristic	N	%
Sexual orientation		
Gay	709	98
Bisexual	13	2
Race/ethnicity		
White	559	77
Hispanic or Latino	67	9
African American	28	4
Mixed race	36	5
Other [*]	32	5
Highest education level		
Some graduate school or completion of adv. degree(s)	172	24
Bachelors degree	172	24
Some college, associate degree, or trade cert.	298	41
Some H.S., H.S. diploma, or G.E.D.	80	11
Employment status		
Full- or part-time employed	574	80
Unemployed	148	20
Geographic area of residence		
Urban or suburban	644	89
Rural	78	11
Health insurance		
Yes	545	75
No	177	25
Self-reported HIV status		
Negative	606	84
Positive	91	13
Do not know	25	3
Self-reported having a sexual agreement with primary partner		
Type of sexual agreement [†]		
Only have sex with primary partner	284	56
Sex with each other and allowed to have sex with others under certain guidelines/rules	206	41
Sex with each other and allowed to have sex with others without any guidelines/rules	16	3
<hr/>		
	Mean	SD
Participant's age [‡]	33.0	10.8
Relationship duration [‡]	59.2	65.8
Duration of couple living together [‡]	47.0	65.7

MSM indicates men who have sex with men; HIV, human immunodeficiency virus; SD, standard deviation.

* Other included MSM who self-identified as Asian, Native American Indian, Native Hawaiian/Pacific Islander, or having another race not listed.

[†]Types of sexual agreements are based on men (n = 506) who reported having an established sexual agreement with their primary partner.

[‡]Measured in months.

TABLE 2
Recent Engagement of UAI by Partner Type and Couples' HIV Status Among 361 MSM Couples

	Couple HIV Status					
	HIV-Negative Seroconcordant		Discordant		HIV-Positive Seroconcordant	
	n	%	n	%	n	%
Sample size: 361 couples	275 couples		58 couples		28 couples	
Sex within the relationship—primary partner						
Insertive and/or receptive UAI	228	83	37	64	24	86
No UAI	47	17	21	36	4	14
Sample size: 722 MSM	550 MSM		116 MSM		56 MSM	
Sex outside the relationship—casual MSM partner (n = 179 MSM) [*]	132	24	28	24	19	34
Insertive and/or receptive UAI [†]	70	53	14	50	18	95
UAI with HIV-negative or unknown status MSM [†]	70	53	12	43	12	63
UAI with HIV-positive MSM [†]	3	2	5	18	12	63

UAI indicates unprotected anal intercourse; MSM, men who have sex with men; HIV, human immunodeficiency virus.

^{*} Row percentages represent the proportion of men in the sample who had sex with a casual MSM partner outside of their relationship by couples' HIV status.

[†] Row percentages represent the proportion of men who had sex with a casual MSM partner outside of their relationship, and of these men, those who also had UAI with a casual MSM partner.

TABLE 3
 HIV Testing Patterns, Time Since Last HIV/STI Test, and Recent STI Diagnoses by HIV Status of Men Within 361 MSM Couples

	HIV Status							
	N = 722		N = 606		N = 91		N = 25	
Sample size	MSM		MSM		MSM		MSM	
	n	%	n	%	n	%	n	%
HIV testing pattern								
Tested positive before relationship started	—	—	—	—	40	44	—	—
Not been tested since relationship started	176	24	118	19	—	—	15	60
Approximately once a year	187	26	176	29	17	19	1	4
Approximately every 6 mo	122	17	105	17	15	16	0	0
Every 3–4 mo	50	7	36	6	7	8	0	0
Only if felt at-risk	187	26	171	28	12	13	9	36
Time since last test	M	SD	M	SD	M	SD	M	SD
Last HIV test in months*	37.6	64.7	23.6	45.3	81.7	81.7	91.6	100.8
Last STI test in months	19.1	38.0	20.0	39.7	13.91	28.5	16.2	22.7
Times tested for HIV since relationship started [†]	3.2	5.9	3.2	5.9	6.0	7.9	0.2	0.4
Recent STI diagnosis	n	%	n	%	n	%	n	%
Herpes	5	[It]1	3	[It]1	2	2	0	0
HPV	16	2	14	2	2	2	0	0
Chlamydia	8	1	6	1	2	2	0	0
Gonorrhea	9	1	5	1	3	3	1	[It]1
Syphilis	3	[It]1	2	[It]1	1	1	0	0
One or more STIs	32	4	22	4	9	10	1	[It]1

HIV indicates human immunodeficiency virus; MSM, men who have sex with men; STI, sexually transmitted infection.

* Time since last HIV test for HIV-positive MSM excluded the 40 men who tested positive before their relationship started; data only includes the 51 remaining HIV-positive men.

[†] Among the 25 MSM with unknown HIV status, 20 men had not been tested since their relationship started and 5 reported that they were tested once.

HIV Testing Patterns and Other HIV/STI Characteristics of 631 HIV-Negative and Unknown Status MSM Who Recently Engaged in UAI Within and/or Outside of Their Primary Relationship

TABLE 4

	UAI					
	Within Relationship N = 511 MSM		Outside Relationship N = 79 MSM		Within and Outside Relationship N = 67 MSM	
	n	%	n	%	n	%
Sample size: 631 HIV-negative and unknown status MSM						
Testing pattern						
Not been tested since the relationship started	111	22	8	10	6	9
Approximately once a year	145	28	24	30	22	33
Approximately every 6 mo	86	17	18	23	14	21
Every 3–4 mo	30	6	4	5	4	6
Only if felt at-risk	139	27	25	32	21	31
Time since last test	M	SD	M	SD	M	SD
Last HIV test in months	25.3	48.1	15.8	38.4	16.4	41.2
Last STI test in months	18.1	36.0	11.0	16.4	11.0	17.1
Times tested for HIV since relationship started	2.8	5.1	6.2	8.7	6.3	9.2

HIV indicates human immunodeficiency virus; MSM, men who have sex with men; STI, sexually transmitted infection; SD, standard deviation; M, mean.