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UNSEEN AND UNHEARD: PREDICTORS OF SEXUAL RISK BEHAVIOR AND HIV INFECTION AMONG MEN WHO HAVE SEX WITH MEN IN CHENNAI, INDIA

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Abstract

In India men who have sex with men (MSM) are stigmatized, understudied, and at high risk for HIV. Understanding the impact of psychosocial issues on HIV risk behavior and HIV infection can help shape culturally relevant HIV prevention interventions. Peer outreach workers recruited 210 MSM in Chennai who completed an interviewer-administered psychosocial assessment battery and underwent HIV testing and counseling. More than one fifth (46/210) reported unprotected anal intercourse in the past 3 months, 8% tested positive for HIV, and 26% had previously participated in an HIV prevention intervention. In a multivariable logistic-regression model controlling for age, MSM subpopulation (*kothi*, *panthi*, or double-decker), marital status, and religion, significant predictors of any unprotected anal intercourse were being less educated (adjusted odds ratio [AOR] = .54; $p = .009$), not having previously participated in an HIV prevention program (AOR = 3.75; $p = .05$), having clinically significant depression symptoms (AOR = 2.8; $p = .02$), and lower self-efficacy (AOR = .40; $p < .0001$). Significant predictors of testing positive for HIV infection were: being less educated (AOR = .53; .05) and not currently living with parent(s) (AOR = 3.71; $p = .05$). Given the prevalence of HIV among MSM, efforts to

reach hidden subpopulations of MSM in India are still needed. Such programs for MSM in India may need to address culturally-relevant commonly co-occurring psychosocial problems to maximize chances of reducing risk for infection.

In India, men who have sex with men (MSM) represent a group of largely invisible individuals and are referred to as a hidden population whose contribution to the HIV/AIDS epidemic in India is high. The estimates for the prevalence of HIV in MSM in India vary. For 2006, India's National AIDS Control Organization (NACO) estimated rates of HIV infection of 6.41% (NACO, 2008), though these may be lower limit estimates. In Mumbai, an HIV prevalence of 12% was found among MSM seeking voluntary counseling-and-testing services (Kumta et al., 2006; Setia et al., 2006). In Andhra Pradesh, 18% prevalence was found over 10 clinics (Sravankumar, Prabhakar, & the Mythri STI/HIV Study Group, 2006). Most of these estimates are many times those of heterosexuals from the same geographic regions of the country. The overall prevalence estimate of HIV in India is .36% (NACO, 2008).

Unlike many cultures and settings, in India having a homosexual sexual orientation, is not necessarily or typically tied to one's identity (Asthana & Oostvogels, 2001; Chakrapani et al., 2002; Humsafar Trust, 2000). Although data are limited, studies suggest that MSM behaviors occur in complex and diverse ways beyond those who self-identify as homosexual (Dandona et al., 2005; Go et al., 2004; Nandi et al., 1994; Verma & Collumbien, 2004). Subgroups of MSM include the following: *kothi* (feminine acting/appearing and predominantly receptive partners in anal sex), *panthi* (masculine appearing, predominantly insertive partners), and *double decker* (both insertive and receptive). While *kothi* tends to be an identity, *panthi* and *double-deckers* are labels given by *kothis* to their masculine partners based on their sex role and behaviors (Asthana & Oostvogels, 2001; Humsafar Trust, 2000; Joseph, 2004).

Despite being at high-risk for HIV infection, MSM in India are often hidden or silent; and due to societal and cultural pressure, many get married (Dandona et al., 2005; Go et al., 2004). In India, MSM may therefore engage in high risk behaviors with both men and women (Asthana & Oostvogels, 2001; Chakrapani et al., 2002; Dandona et al., 2005; Go et al., 2004; Humsafar Trust, 2000; Nandi et al., 1994; Setia et al., 2006; Verma & Collumbien, 2004) and may serve as an important "bridge" population to transmitting HIV in that the population of MSM are at risk but also can bridge the epidemic to heterosexual populations if MSM have both male and female partners.

In the U.S., there are several studies that have documented the co-occurrence of HIV risk and psychosocial health problems such as substance abuse, mental health distress, childhood sexual abuse, and partner violence (Koblin et al., 2006; Safren et al., 2007; Stall et al., 2003), as well as high levels of psychosocial stressors among MSM including victimization, harassment, fear of rejection from friends and family, and discrimination (Omoto & Kurtzman, 2005). Stall et al (2003) applied the theory of syndemics (Singer, 1994, 1996) to the issue of sexual risk taking and HIV infection in MSM in the United States. Accordingly, the issue of syndemics can characterize the interaction and amplification of health conditions and behaviors such as HIV, HIV risk behavior, substance abuse, depression, and other psychosocial concerns. The degree to which psychosocial health problems occur in the context of HIV risk in India among MSM has not been systematically studied. The purpose of the present study was therefore to examine demographic and psychosocial characteristics that may affect sexual risk behavior among MSM in Chennai, India. This data may assist in the development of a holistic, culturally-relevant intervention that could reduce psychosocial health problems and HIV risk taking among Indian MSM.

METHODS

PARTICIPANTS AND PROCEDURES

Participants were recruited through peer outreach workers at an MSM nongovernmental organization (NGO) in Chennai, called Sahodaran, a sexual health organization for Indian MSM that conducts outreach. Participants were also encouraged to recruit others, especially *panthis*. This is because *kothis* are more likely to identify as MSM and be present at NGOs, and *panthis* are sexual partners of *kothis*. Study visits occurred at the Indian Council of Medical Research (ICMR), Tuberculosis Research Centre (TRC), a governmental research institution involved in studies of HIV prevention and treatment. Participants were assessed for eligibility by trained interviewers from the TRC. After participants completed an informed consent process, TRC interviewers assisted participants in completing the study assessments detailed below. These assessment interviews were followed by HIV counseling and testing. Rapid HIV tests were performed (HIV-1 TRI-DOT; J. Mitra, New Delhi, India) on whole-blood specimens as the first test, and all positive samples were retested using Retroquic HIV-1 (QualPro Diagnostics, Goa). Results were provided to clients approximately 90 minutes after specimens were collected if the client wanted to wait; otherwise they were asked to return at their convenience in the next few days. Participants also had the option of receiving their initial test at a later date in the event that they were not prepared to do so at the time of testing (i.e., if they came with others, and were worried about confidentiality). All study procedures were approved by the Institutional Review Boards at Massachusetts General Hospital and Harvard Medical School as well as the Ethics Board at the TRC. Participants were given food as well as 200 Indian Rupees (about U.S. \$3.80) for their participation.

STUDY INSTRUMENTS

Demographics and Contextual Variables—Participants were asked about their age, MSM subpopulation identity (e.g., *kothi*, *panthi*, double decker, and other sexual identities), religion (Hindu, Christian, or Muslim), marital status and whether they had children, education level, employment status, previous participation in an HIV prevention intervention, whether they lived with their parents, and whether or not their family knew about their sexual identity.

Depression—Depressive symptoms were assessed with the Center for Epidemiologic Studies Depression Scale (CES-D) (U.S. Department of Health and Human Services, 2004), a validated survey of clinically significant distress as a marker for clinical depression (coefficient alpha = .90; Cronbach's alpha = .89; Radloff, 1977). The 20-items were scored on a 4-point Likert scale from 0 to 3, with a score of 16 or greater indicative of clinically significant depressive symptoms.

Current and Past Substance Abuse—Alcohol and other substance use were measured with a frequency scale for each substance (see Czarnecki, Russell, Cooper, & Salter, 1990; Webb et al., 1997). For substances (marijuana, cocaine, amphetamines or any injection drugs, and tobacco), a 7-point scale was used with the following descriptors: "never," "once a year or less," "once a month," "a few times a month," "1–2 times a week," "3–4 times a week," "daily or almost daily." Similar measures are frequently used in HIV prevention studies of MSM (e.g., Koblin et al., 2003).

Sexual Risk—Participants were asked about their total number of male and female sexual partners in the three months prior to study enrollment, as well as whether or not they engaged in any unprotected anal insertive or receptive sex with another man in the 3 months prior to study enrollment. Participants were queried on their history of sex work, including

whether or not they received any money for sex and whether or not they paid money in exchange for sex. This measure was adapted from widely used assessments of sexual risk taking in MSM in the U.S. (Chesney et al., 2003; Koblin et al., 2003).

Self-Reported Sexually Transmitted Infections (STIs)—Participants were also asked whether or not they had symptoms of an STI (e.g., itching around penis, bleeding from anus) and whether they had been diagnosed with one (including hepatitis A, B, and C; gonorrhea; chlamydia; syphilis; herpes simplex virus and genital or anal warts over the past 6 months).

Condom Use Self-Efficacy—Condom use self-efficacy was assessed using a brief self-efficacy scale (4 items) that asked about the degree to which a person believes that he can use condoms in increasingly difficult situations (Wulfert & Wan, 1995).

DATA ANALYSIS

We used SAS, Version 9.1 (Cary, NC), statistical software to perform each analysis, where statistical significance was determined at $p < .05$.

Primary Outcomes—There are two primary outcomes for this article (a) a dichotomous measure of unprotected anal sex, defined as engaging in any unprotected anal sex (insertive or receptive) in the 3 months prior to study enrollment; and (b) a dichotomous variable of participants' HIV testing outcome, defined as testing positive or negative for HIV infection.

Predictors of Interest—We examined demographic and psychosocial factors, current substance and weekly alcohol use, sexual risk, and HIV and STI history for their association to our two outcomes. We used bivariate logistic regression procedures to examine statistically significant associations between predictor variables and (a) unprotected anal sex and (b) HIV testing outcome.

Multivariable Models—We retained variables that were statistically significant in the bivariate regression analyses in the multivariable logistic regression models. Both final multivariable models controlled for age, MSM subpopulation identity, marital status, and religion regardless of their significance level in the bivariate associations.

RESULTS

DESCRIPTIVE STATISTICS

Demographic and psychosocial characteristics of the study sample by unprotected anal sex and the HIV testing outcome are outlined in Table 1.

Substance Use—Self-reported drug use among the study sample was infrequent, with only four individuals reporting weekly marijuana use, and one individual reporting ever using cocaine, amphetamines, and injection drugs. Twenty-five percent of study participants, however, reported at least weekly tobacco use. Twenty-eight percent of the sample reported that they used alcohol at least weekly

Unprotected Anal Intercourse and HIV Testing Outcome—Of 210 participants enrolled, 22% of the sample reported any unprotected anal sex in the past 3-months, and 8% tested positive for HIV (8 participants declined HIV counseling and testing). There was no difference in HIV prevalence among those with and without reported unprotected sex in the past 3 months.

STIs—The self-reported STI or STI symptoms prevalence in the past 6 months was 6.2%.

BIVARIATE AND MULTIVARIABLE LOGISTIC REGRESSION ANALYSES OF PREDICTORS OF UNPROTECTED ANAL SEX WITH ANOTHER MAN IN THE 3 MONTHS PRIOR TO STUDY ENROLLMENT

Bivariate Associations of Demographic Variables to Engaging in Any

Unprotected Anal Sex—The only demographic characteristic significantly associated with unprotected anal sex with another man in the 3 months prior to study enrollment in bivariate analyses was education, such that each increase in education level was associated with a decreased odds of engaging in unprotected anal sex (odds ratio [OR] = .68; $p = .02$; Table 2).

Bivariate Associations of Psychosocial and Substance Use Variables to

Engaging in Any Unprotected Anal Sex—Participants reporting *not* participating in an HIV prevention intervention in past year were more likely to engage in unprotected anal sex (OR = 3.60; $p = .01$), as were participants who reported weekly alcohol consumption (OR = 2.00; $p = .05$), or those having clinically significant depressive symptoms as measured by the CES-D (OR = 1.97; $p = .05$). Condom use self-efficacy was also associated with unprotected anal sex, such that with each scale-score increase in condom use self-efficacy there was an associated decrease in unprotected anal sex (OR = .52; $p < .0001$; see Table 2).

Multivariable Logistic Regression Model Predicting Any Unprotected Anal Sex

—In addition to examining bivariate predictors, variables that had unique variance in predicting whether or not someone had engaged in unprotected anal sex in the 3 months prior to study enrollment were also examined. After controlling for age, MSM subpopulation identity, marital status, and religion, predictors of unprotected anal sex included education (adjusted OR[AOR] = .54; $p = .009$), such that more education was protective; not having previously participated in an HIV prevention program (AOR = 3.75; $p = .05$); clinically significant depressive symptoms (AOR = 2.8; $p = .023$); and lower condom use self-efficacy (AOR = .40; $p < .0001$), such that higher self-efficacy was protective (see Table 2).

BIVARIATE AND MULTIVARIABLE LOGISTIC REGRESSION ANALYSES OF PREDICTORS OF TESTING POSITIVE FOR HIV INFECTION

Bivariate Associations of Demographic Variables to Testing HIV-Positive—

Individuals who were more likely to test positive for HIV infection were: older (OR = 1.08; $p = .006$) and less educated (OR = .51; $p = .02$), such that each increase in education level was associated with a decreased odds of testing positive for HIV infection (Table 3).

Bivariate Associations of Contextual Variables to Testing HIV-Positive—

Participants reporting that they were not currently living with their parent(s) were more likely to test positive for HIV infection (OR = 3.56; $p = .02$), as were participants who reported that their family is aware of their sexual identity (OR = 3.48; $p = .02$; see Table 3)

Multivariable Logistic Regression Model Predicting HIV-Positivity—

In addition to examining bivariate predictors, we sought to examine whether there were variables that had unique variance in predicting whether or not the participant tested positive for HIV infection. After controlling for MSM subpopulation identity, marital status, and religion, predictors of testing positive for HIV infection included education (AOR = .53; $p = .05$), such that lower education was a risk factor for HIV-infection, and not currently living with parent(s) (AOR = 3.71; $p = .05$).

DISCUSSION

This study of MSM in Chennai found an HIV prevalence of 8%, which is more than 10 times the prevalence in the general adult population in India (NACO, 2008). More than one fifth (22%) of the sample engaged in recent HIV transmission risk behavior. This study also found associations of several types of social and psychological variables to HIV transmission risk behaviors and HIV infection, including not having participated in an HIV prevention program in the past year. Important variables articulated by this study to potentially address in future prevention intervention development for MSM in India may therefore include depression, alcohol use, self-efficacy, living situation, and education.

Although our study found HIV prevalence estimates within the range of rates seen in other studies in India (NACO, 2008; Kumta et al., 2006; Setia et al., 2006; Sravankumar et al., 2006), existing studies have high variability. For example, the recent Integrated Behavioral and Biological Assessment (IBBA) study (2005–2007) reported prevalence of HIV among MSM in Tamil Nadu varying from 7% to as high as 22.3%. The prevalence of STIs ranged from 12.4% to 18.8 % (IBBA, 2007). Given the cultural complexity of MSM identity in India, HIV prevalence estimates of MSM vary widely, but are consistently greater than cohorts of high risk heterosexual men.

Although the levels of HIV infection and HIV risk taking are considerable, less than a quarter of the sample reported that they had been exposed to any HIV prevention intervention in the past, and this was predictive of current unprotected anal sex. Clearly, culturally sensitive prevention interventions are needed for Indian MSM. Others have suggested that the reasons for the continuing sexual risk taking among MSM include (a) that individuals in India perceive that HIV is transmitted through vaginal sex and via sex workers, resulting in individuals engaging in other anal and oral sex as a way to avoid infection (Network of Male Indian Sex Workers, 2005); (b) stigma and denial of same sex behavior resulting in anonymous sexual situations that happen quickly (Banerjee et al., 1998); and (c) inequalities in power dynamics that arise from Indian notions of masculinity (i.e., attitudes toward effeminate males, exploitation of effeminate males [Khan, 2000]).

The mean age of MSM reported in this study is 28.9 years, during which time there is strong societal pressure for men to marry and have children, and a refusal of an arranged marriage is interpreted as a lack of love or respect for parents. Limited research suggests that most MSM in India do marry and may engage in high-risk behaviors with their wives while remaining at high risk for HIV infection through sex with men (Humsafar Trust, 2000; Venkatesan & Sekar, 2001).

The fact that psychosocial problems, like in U.S. studies (Safren et al., 2007) appear to be associated with ongoing HIV risk and HIV infection among MSM in Chennai also speaks to the importance of addressing such problems in future prevention interventions. For example, depression and self-efficacy were all independent predictors of HIV risk taking even in multivariable models that accounted for effects of demographics and of whether or not the person had participated in a prior HIV prevention intervention. Given the social and contextual situation for MSM (i.e., isolation, pressure to marry, criminalization of homosexuality in India), one can understand how there are likely multiple syndemics (Stall et al., 2003) affecting Indian MSM that co-occur with HIV risk taking. Additionally, the findings can be seen within the context of the environment in which Indian MSM live. The ecological systems model (Bronfenbrenner, 1979), for example, posits that an individual is influenced by four environmental systems: the microsystem (i.e., family members, peers), mesosystem (connections between microsystems), exosystem (external settings where individuals and groups gather), and macrosystem (the larger cultural context). Variables

identified in the present study are consistent with this model in that there appears to be multiple systems contextualizing risk behavior in MSM, potentially including NGO involvement as a mesosystem variable, the influence and support of family and friends as microsystem or exosystem variables, and variables related to South Indian culture as a macrosystem variable. The success of HIV prevention intervention development with MSM in India may be dependent on the recognition of these types of cultural and contextual variables.

The study findings should be interpreted in the context of its design. First, this is a cross sectional study, and hence causality cannot be inferred. Second, it is based on self-report and the degree to which social desirability, demand characteristics, and accuracy of memory influenced the responses with respect to details of substance abuse, alcohol and condom use is not known. Accordingly, the validity of the measures with this population per se has not been previously established. Third, although efforts were made to recruit a wide range of participants, it is a convenience sample, with multiple methods for recruiting. Hence, generalizability is limited. Fourth, the study examined only HIV prevalence, not HIV incidence. HIV incidence studies among MSM are needed as a basis for interventions with an HIV end point. Despite these limitations, salient psychosocial factors that are associated with risky behaviors in MSM in India emerged, and these are important considerations for further testing and for future intervention programs.

UNAIDS (2006) has reported that a serious epidemic among MSM is currently being uncovered in India. To maximize effectiveness, HIV prevention interventions must reach infected individuals and those at high risk for HIV acquisition who are particularly likely to engage in transmission risk behaviors (Holtgrave, McGuire, & Milan, 2007). If ongoing sexual risk taking among MSM is occurring in the context of psychosocial problems such as depression and alcohol use, targeting both the HIV risk taking and the concurrent psychosocial problems may be the way to address risk taking in the most risky groups, yielding the highest potential for intervention success.

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TABLE 1

Demographics and Psychosocial Factors by Any Self-Reported Unprotected Anal Sex (UAS) With Another Man in the Three Months Prior to Study Enrollment (N = 210) and HIV Testing Outcome (N = 202)

	Unprotected Anal Sex (N = 210)		HIV Testing Outcome (N = 202)	
	Yes UAS (n = 46)	No UAS (n = 164)	HIV-Positive (n = 16)	HIV-Negative (n = 186)
Age -- Mean (SD)	28.3 (8.5)	29.2 (7.6)	34.3 (7.6)	28.4 (7.7)
Condom use self-efficacy -- Mean Score (SD)	5.27 (2.0)	6.72 (0.9)	6.6 (0.9)	6.4 (1.4)
Number of male sex partners in the past 3 months -- Mean (SD)	9.93 (11.9)	12.22 (37.1)	15.56 (16.8)	11.43 (34.9)
Number of female sex partners in the past 3 months -- Mean (SD)	1.78 (2.72)	1.13 (2.44)	0.80 (1.93)	1.37 (2.60)
	%	%	%	%
MSM subpopulation identity				
Pantheri	43.48	35.98	18.75	39.78
Kothi	19.57	27.44	37.50	24.73
Double decker	36.96	36.59	43.75	35.48
Religion				
Hindu	78.26	80.49	81.25	79.57
Christian	19.57	10.37	18.75	11.83
Muslim	2.17	9.15	0.00	8.60
Marital status				
Married	21.74	22.56	25.00	22.58
Not married	78.26	77.44	75.00	77.42
Children				
Yes	19.57	19.51	25.00	19.35
No	80.43	80.49	75.00	80.65
Education				
Graduate or Professional Degree	2.17	1.83	0.00	2.69
College Degree	4.35	10.37	6.25	12.37
High School Degree	26.09	45.73	12.50	25.81
Middle School	41.30	25.00	43.75	45.70
Elementary	19.57	14.63	31.25	11.29
No Formal Education	6.52	2.44	6.25	2.15

	Unprotected Anal Sex (N = 210)		HIV Testing Outcome (N = 202)	
	Yes UAS (n = 46)	No UAS (n = 164)	HIV-Positive (n = 16)	HIV-Negative (n = 186)
Employment status				
Full-time	67.39	78.05	75.00	76.34
Part-time	17.39	8.54	18.75	10.22
Full- or Part-time and in School	8.70	5.49	0.00	5.38
Neither Work nor in School	6.52	6.10	6.25	6.45
Disabled	0.00	0.61	0.00	0.54
Other	0.00	1.22	0.00	1.08
Participation in any HIV prevention interventions in the past year				
Yes	10.87	30.49	37.50	24.73
No	89.13	69.51	62.50	75.27
Living with parents				
Yes	60.87	60.37	31.25	61.83
No	39.13	39.63	68.75	38.17
Ever paid another man for sex				
Yes	43.48	29.88	37.50	32.80
No	56.52	70.12	62.50	67.20
Ever was paid in exchange for sex				
Yes	43.48	46.95	62.50	43.55
No	56.52	53.05	37.50	56.45
Family knows about sexual identity				
Yes	19.57	21.34	43.75	18.28
No	80.43	78.66	56.25	81.72
Weekly alcohol consumption				
Yes	39.13	24.39	31.25	27.42
No	60.87	75.61	68.75	72.58
Clinically significant depressive symptoms (CES-D)				
Yes	67.39	51.22	62.50	54.84
No	32.61	48.78	37.50	45.16

TABLE 2

Bivariate and Multivariable Logistic Regression Analyses of Predictors of Unprotected Anal Sex with Another Man in the 3 Months Prior to Study Enrollment ($N = 210$)

	Odds Ratio (Unadjusted Bivariate Models)	<i>p</i> -Value	Odds Ratio (Adjusted Multivariable Model) ^a	<i>p</i> -Value
Education (treated as continuous)	0.68	.02	0.54	.009
Participation in any HIV prevention interventions in the past year				
Yes	1.00	—	1.00	—
No	3.60	.01	3.75	.05
Weekly alcohol consumption				
Yes	2.00	.05	3.56	.07
No	1.00	—	1.00	—
Clinically significant depressive symptoms (CES-D)				
Yes	1.97	.05	2.80	.02
No	1.00	—	1.00	—
Condom use self-efficacy (continuous scale)	0.52	<.0001	0.40	<.0001

^aFinal multivariable model controlled for age, men who have sex with men subpopulation identity, marital status, and religion.

TABLE 3

Bivariate and Multivariable Logistic Regression Analyses of Predictors of Testing Positive for HIV Infection ($N = 202$)

	Odds Ratio (unadjusted bivariate models)	<i>p</i> -Value	Odds Ratio (adjusted multivariable model) ^a	<i>p</i> -Value
Age (treated as continuous)	1.08	0.006	1.05	0.16
Education (treated as continuous)	0.51	0.02	0.53	0.05
Living with parents				
Yes	1.00	--	1.00	--
No	3.56	0.02	3.71	0.05
Family knows about sexual identity				
Yes	3.48	0.02	3.04	0.18
No	1.00	--	1.00	--

^aFinal multivariable model controlled for men who have sex with men subpopulation identity, marital status, and religion.