

Sexual Behavior Among Men Who have Sex with Women, Men, and *Hijras* in Mumbai, India—Multiple Sexual Risks

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Abstract We describe the same-sex partnerships and sexual risk behavior of men attending sexually transmitted infection (STI) clinics in Mumbai, India. The HIV prevalence among 2,381 men sampled was 14%; 62% had a documented STI. Almost all men reported sex with women; additionally, 13% also reported having sex with other men, 13% reported sex with *Hijras* (male-to-female transgenders), and 11% had sex with all 3 genders. Men who had sex with men and/or *Hijras*

as well as women, reported having greater numbers of partners, including female sex workers (FSW), and were more likely to engage in insertive anal and oral sex with women. The prevalence of HIV was higher among men having sex with *Hijras* (14%) or with all 3 genders (13%) than among men having sex with men and women (8%). A high proportion of men who attend STI clinics in Mumbai are behaviorally bi- or tri-sexual and have multiple partners with whom they engage in risky sex. STI/HIV prevention programs should not assume that men only have sex with women.

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Introduction

India has an estimated 5.1 million people infected with HIV (UNAIDS, 2004). Mumbai, the capital of the western coastal state of Maharashtra and one of six high prevalence states, has some of the highest rates of HIV in the country. Results from the 2004 Indian National AIDS Control Organization (NACO) Annual Sentinel Surveillance for Mumbai, indicate that 44% of female commercial sex workers (FSW), 10% of men who have sex with men, 16% of individuals attending sexually transmitted infection (STI) clinics, 28% of intravenous drug users, and 1.1% of antenatal clinic women were infected with HIV (NACO, 2004). National surveillance data for all of India indicate that the primary route of HIV transmission is sexual behavior (86%), but whether this is

through heterosexual or same-sex contact is not specified (NACO, 2006).

Previously, information collected on reported AIDS cases did not include data on types of sexual partners. Recently, there has been greater recognition of the existence of same-sex behavior among men in India, with 2–15% of men surveyed reporting male–male sex (Aggarwal, Sharma, & Chhabra, 2000; Dwivedi & Misra, 1997; Rodrigues et al., 1995; Thomas et al., 2004). In response, three HIV sentinel survey sites were established in 2000 to provide data specifically on men who primarily have sex with other men (NACO, 2004), and in 2002, a behavioral survey was conducted among MSM in five Indian cities (NACO, 2002).

Even though public health and HIV prevention programs have only recently acknowledged the potential role of male–male sex in the HIV epidemic in India, studies have revealed the existence of many gender identities and a complexity of sexual partnerships (Aggarwal et al., 2000; Dwivedi & Misra, 1997; Go et al., 2004). Homosexuality and heterosexuality are terms that do not apply easily in India as behavior is highly varied and concepts of identity can be fluid (Asthana & Oostvogels, 2001). Asthana and Oostvogels present descriptions of at least four different constructs of men who have sex with men, distinguishing between insertive and receptive partners, as well as feminine versus masculine characteristics. Other more complicated descriptions have also been proposed (Chakrapani et al., 2002; Humsafar, 2006). In most of these constructs, MSM behavior does not preclude sex with women or traditional marriage.

In India, a third gender is also recognized; the closest western definition is a male-to-female transgender. In Maharashtra and central India, these individuals are called *Hijras*, and are biologically male but live and dress as women, and may or may not be castrated (Asthana & Oostvogels, 2001; Khan, 2001). Although in centuries past, *Hijras* held a special status in society by performing at births, certain festivals and celebrations, most now survive by begging or selling sex to men. This group is particularly vulnerable to HIV—in 2002, the HIV prevalence among *Hijras* in Mumbai was close to 70% (Kumta et al., 2002).

Our study investigated the sexual behaviors and partner types of over 2,000 Indian men seeking care at STI clinics. We describe reported sexual behaviors with other men, *Hijras*, and female commercial sex workers, and their association with HIV.

Methods

Study Design

Cross-sectional analyses were conducted on baseline data from a randomized controlled trial of an STI/HIV prevention intervention among men attending two public STI clinics in Mumbai. One recruitment site was a free-standing STI clinic near a red light area, and the second site was the outpatient clinic of the Dermatology and Venereology Department of the Lokmanya Tilak Municipal General (LTMG) Hospital, a tertiary care and teaching hospital adjacent to a large slum.

Study Participants

All men presenting to the clinic sites were consecutively screened for eligibility. Men were required to be at least 16 years old and speak Hindi or Marathi; they were recruited if they reported unprotected sex in the last 3 months, complained of symptoms of an STI, or were requesting an HIV test. Men who did not intend to remain in Mumbai for at least 12 months or trial follow-up were excluded. Of the 4,337 patients screened between March 2002 and August 2004, 2,652 (61%) were eligible; of those, 90% ($N = 2,388$) consented to enroll. Seven participants were omitted from analysis due to incomplete data. Forty-six men were missing HIV laboratory results and were not included in analyses involving HIV serostatus.

Participants returned 2 weeks following baseline evaluation to receive their test results. Only HIV uninfected men were randomized into the trial, and HIV seropositive patients were referred for care. The trial arms compared HIV counseling and testing (C&T) plus STI diagnosis and treatment (control) to a behavioral intervention plus HIV C&T and STI treatment (intervention). The behavioral intervention was comprised of an all-day information and skills building workshop, individual client-centered counseling, and booster sessions every 3 months.

Measures

All participants completed an interviewer-administered questionnaire that had been translated into Hindi and Marathi (the local languages) and extensively field-tested and revised before being administered. Interviewers were required to be fluent in Hindi or Marathi, undergo training, regular supervision, and periodic quality control evaluation. All questions

regarding sexual behavior were developed using explicit local language to minimize confusion.

The interview included questions about socio-demographics, HIV knowledge and attitudes, and sexual behavior. Information was collected about the following six different “partner types”: female commercial sex workers (FSWs), regular female partners—either a girlfriend or second spouse, casual female partners—a woman who was not a wife, regular partner, or FSW, wife, male partners, and *Hijras*—male-to-female transgenders. Men were asked to recall their sexual behaviors with these partners over a lifetime and during the 3 months prior to the interview. For the lifetime recall period, data were collected on total numbers of each partner type, type of sex (vaginal, receptive oral, insertive and receptive anal sex), and the proportion of times condoms were used with each partner type. Information about behavior during the past 3 months included numbers of partners of each type, the number of episodes of sex, and the number of times that a condom was used with each partner type.

STI and HIV Evaluation

Following the interview, men received a complete STI exam by a physician accompanied by laboratory screening and diagnostic testing, detailed procedures of which are described elsewhere (Madhivanan et al., 2005). Treatment was provided in accordance with US Centers for Disease Control guidelines (Center for Disease Control and Prevention, 2002).

Diagnostic tests for STIs and HIV were conducted in the microbiology laboratory at LTMG Hospital. Sera were tested for antibodies to HIV1 and 2 using an ELISA test (Biokit Elisa, LabSystems, Helsinki, Finland), and confirmed by Western Blot (Chiron RI-BA*HIV-1/HIV-2 SIA Ortho Clinical Diagnostics, Emeryville, California). All men underwent serologic evaluation for syphilis using the Venereal Disease Research Laboratory (VDRL) test and the *Treponema pallidum* (TP) Haemagglutination Assay (TPHA) (Immutrep TPHA, Omega Diagnostics, Alloa, Scotland); Herpes Simplex Virus-2 (HSV2) IgG serology (HerpeSelect 2 Elisa, Focus Technologies, Cypress, California). Urine was collected from all men for Polymerase Chain Reaction (PCR) detection of *Neisseria gonorrhoea* (GC) and *Chlamydia trachomatis* (CT) (Amplicor CT/NG, Roche Diagnostics, Indianapolis, Indiana). Men with genital ulcers or vesicles were swabbed for detection of *Treponema pallidum*, HSV2 and *Hemophilus ducreyi* using a home-brew multiplex PCR test (Roche Amplicor reagents). Men

with urethral discharge provided a specimen for Gram stain and culture of GC on Thayer Martin plates using standard procedures. For men presenting with dysuria and having no discharge, a urine specimen was collected and the spun sediment was evaluated for the presence of white blood cells.

Men were identified as having an STI based on an algorithm that combined confirmatory laboratory testing and clinical evaluation (Madhivanan et al., 2005). In this analysis, participants were considered to have an STI if at least one of the following conditions applied: a positive TPHA or HSV2 IgG test, confirmed diagnosis of primary syphilitic chancre, secondary syphilis, HSV2, *H. ducreyi*, gonorrhoea (GC), chlamydia (CT) or non-gonococcal urethritis (nGC); or clinical evidence of condyloma acuminata, lymphogranuloma venereum (LGV), or an unspecified genital ulcer.

Data Analyses

Data were entered in MS Access and cleaned onsite by trained staff. Data management occurred both onsite and at the University of California, San Francisco (UCSF). Female partners were defined as female commercial sex workers, regular female partners, casual female partners, and wives. Condom use over a lifetime and during the last 3 months was evaluated for all partner types (females, men, *Hijras*). Lifetime condom use was categorized as: ‘Always’; ‘inconsistent’—used condoms more than half the time, half the time, or less than half the time; or “never”. We calculated the number of unprotected episodes of sex during the last 3 months, by asking about the total number of sexual episodes, and subtracting the number of times that a condom was used. Participants were categorized for analysis according to the type of sexual partners they reported over their lifetime. Men who had sex only with females (MSF), men who had sex with men and females (MSM), men who had sex with *Hijras* and females (MSH), men who had sex with men, *Hijras* and females (MSM + H), and men who had sex with men only, or with men and *Hijras*, but had never had sex with females (MSM only).

We examined the distributions of demographic variables and sexual risk behavior and compared these across sexual behavior groups. Differences were evaluated using Pearson’s χ^2 statistic, with a *P*-value < .05 considered statistically significant. We also evaluated the bivariate association of demographics and sexual behavior with HIV serostatus. We used multivariable logistic regression analysis to produce adjusted odds ratios and 95% confidence intervals, and included variables that were significantly associated with HIV in

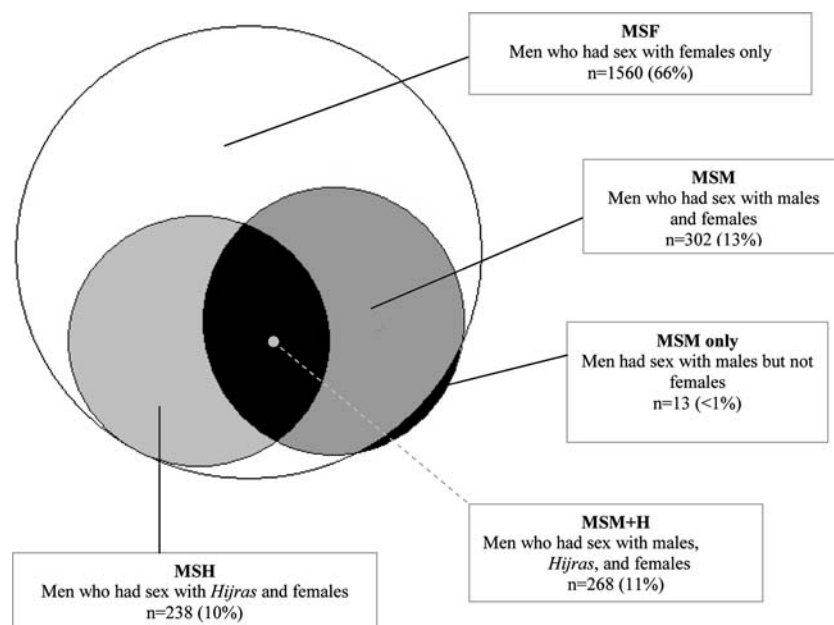
bivariate analysis or were considered important. Stepwise backward elimination was employed to determine the most parsimonious model from the full model. For categorical variables, multilevel degree of freedom statistical tests were used to determine the significance of a variable in the model at the 0.1 level. The full model included the following variables: age, marital status, religion, education, living situation, birth place, diagnosed STI, sexual behavior group, number of FSW partners, receptive oral, insertive anal, and unprotected sex with an FSW. To evaluate the associations between sexual behaviors with men and *Hijras* and HIV, we conducted a sub-group analysis among men who had sex with men and/or *Hijras*. Logistic regression analysis was used to produce unadjusted odds ratios and 95% confidence intervals for the following behaviors reported over a lifetime and during the last 3 months: insertive and receptive anal sex, and receptive oral sex with a man, number of male partners, unprotected sex with a man; insertive and receptive anal sex, and oral sex with a Hijra, number of Hijra partners, unprotected sex with a Hijra. We also evaluated receiving money, goods or services in exchange for sex with a man.

Results

Study Population

We categorized men according to the types of sexual partners they reported over a lifetime (see Fig. 1).

Fig. 1 Distribution of study population based on lifetime history of sex with partners of different genders ($N = 2381$)



Almost all men in the sample (99%) had sex with women in the past. In total, 66% had had sex *only* with women, 238 (13%) had sex with men and women (MSM), 230 (10%) had sex with *Hijras* and women (MSH), and 271 (11%) had sex with men, women and *Hijras* (MSM+H). Taking into account the overlap between groups, 26% of all men reported having sex with other men, and 21% reported sex with *Hijras*. Thus, more than one-third (36%) of the sample had sexual relationships with more than one gender. A very small number, only 13 (<1%), reported never having sex with women; all these men had sex with men, and three also had sex with *Hijras*.

The demographic characteristics of the sample and differences among groups are shown in Table 1. Men in the study sample were young, half between the ages of 16 and 25; about one-third had less than 4 years of school, 70% lived in slums or on footpaths, and 70% were born outside the state of Maharashtra. Of the 30% who were married, less than half lived with their wives in Mumbai; most spouses were living elsewhere throughout India. There were some demographic differences among the groups. In general, men who had sex only with women were somewhat older, more likely to be Hindu, married, educated, and live in more stable housing.

Prevalence of HIV and STIs

The prevalence of HIV in the overall sample was 14%, and 62% had a confirmed STI (see Table 1). Men having sex with men and women (MSM) were least

Table 1 Demographic characteristics, HIV and STI prevalence among all men and by history of sexual partners reported over a lifetime ($N = 2381$)

	All Participants	Men who had with females only (MSF)	Men who had sex with men & females (MSM)	Men who had sex with <i>Hijras</i> & females (MSH)	Men who had sex with men & <i>Hijras</i> & females (MSM + H)	Men who had sex with men and/or <i>Hijras</i> only MSM only
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
All Participants ^a	2381 –	1560 –	302 –	238 –	268 –	13 –
<i>Age</i> **						
16–25	1178 (50)	688 (44)	191 (63)	117 (49)	171 (64)	11 (85)
26–35	774 (33)	534 (34)	88 (29)	82 (34)	68 (25)	2 (15)
36+	429 (18)	338 (22)	23 (8)	39 (16)	29 (11)	0 (0)
<i>Marital status</i> **						
Married	718 (30)	543 (35)	75 (25)	59 (25)	41 (15)	0 (0)
Unmarried	1663 (70)	1017 (65)	227 (75)	179 (75)	227 (85)	13 (100)
<i>Religion</i> **						
Hindu	1588 (67)	1110 (71)	168 (56)	153 (64)	150 (56)	7 (54)
Moslem	604 (25)	323 (21)	114 (38)	69 (29)	94 (35)	4 (31)
Other	189 (8)	127 (8)	20 (7)	16 (7)	24 (9)	2 (15)
<i>Education (years)</i> **						
<4	869 (37)	519 (33)	118 (39)	106 (45)	120 (45)	6 (46)
4+	1511 (63)	1040 (67)	184 (61)	132 (55)	148 (55)	7 (54)
<i>Living situation</i> **						
Slum and other	1672 (70)	1020 (65)	235 (78)	189 (79)	221 (82)	7 (54)
Flat/chawl	708 (30)	539 (35)	67 (22)	49 (21)	47 (18)	6 (46)
<i>Birth place</i> **						
Maharashtra	722 (30)	544 (35)	69 (23)	56 (24)	50 (19)	3 (23)
Another State	1658 (70)	1015 (65)	233 (77)	182 (76)	218 (81)	10 (77)
<i>HIV infection</i> **						
Yes	332 (14)	242 (16)	23 (8)	33 (14)	34 (13)	0 (0)
No	2002 (86)	1284 (84)	274 (92)	200 (86)	232 (87)	12 (100)
<i>STI infection</i>						
Yes	1480 (62)	994 (64)	172 (57)	143 (60)	165 (62)	6 (46)
No	901 (38)	566 (36)	130 (43)	95 (40)	103 (38)	7 (54)

Overall chi-squared P values refer to differences in categories across all groups * $P < .05$ ** $P < .01$

^aDifferences in N due to missing values

likely to be HIV infected (8%) compared to the other groups (13–16%, $P = .03$); they were slightly less likely to have an STI (57% vs. 60–64%, $P = .07$). HIV infection rates among those who had sex with women only, with women and *Hijras*, or with all three genders were similar. Twelve of the 13 men who reported no sex with females consented to HIV testing, and none were seropositive; 6 (46%) had a confirmed STI.

Sexual Behaviors with Women

The prevalence of female sexual partners, behavior, and condom use among groups is shown in Table 2 (data for men who had sex only with men are not presented here). The vast majority of men (>90%) reported visiting female commercial sex workers (FSW) in their life; 35% also had casual female partners and 60% had regular female sexual partners other than wives. Men having sex with men and/or *Hijras* as well as women reported higher numbers of

female partners than men who were behaviorally heterosexual. They were also more likely to engage in insertive anal sex with women and to have received oral sex, both over a lifetime and during the last 3 months. Overall, men having sex with all three genders reported the greatest number of female partners of all types, and were most likely to have insertive anal and oral sex. These differences were most striking when compared to men who had sex only with women. There were no significant differences among groups in frequency of condom use; approximately 40% said that they never used them with FSWs. Men who had sex with more than one gender were more likely to have had sex for the first time when they were very young: up to one-third were 13 years of age or less.

Sexual Behaviors with Other Men

We examined sexual behaviors with other men (see Table 3) among the 583 participants who reported

Table 2 Sexual behavior with different partner types, reported over a lifetime and during the prior 3 months ($N = 2368$)^a

	Men who had sex with females only (MSF)	Men who had sex with men & females (MSM)	Men who had sex with <i>Hijras</i> & females (MSH)	Men who had sex with men & <i>Hijras</i> & females (MSM + H)
	n (%)	n (%)	n (%)	n (%)
All participants	1560 –	302 –	238 –	268 –
<i>Sexual behaviors, lifetime</i>				
>10 partners, all genders**	717 (46)	182 (61)	177 (75)	228 (86)
Sex with FSWs**	1415 (91)	288 (95)	234 (98)	264 (99)
>10 FSW partners***b	591 (42)	124 (43)	139 (59)	182 (69)
Receptive oral sex**b	228 (16)	78 (27)	85 (36)	102 (39)
Insertive anal sex**b	97 (7)	64 (22)	64 (27)	95 (36)
<i>Condom use**b</i>				
Always	198 (14)	46 (16)	22 (9)	15 (6)
Inconsistent	629 (45)	123 (43)	109 (47)	164 (62)
Never	586 (41)	119 (41)	103 (44)	85 (32)
Sex with other females**c	888 (57)	219 (73)	175 (74)	218 (82)
<i>Sexual behavior, past 3 months</i>				
Sexually active in past 3 months, all genders**	1212 (78)	258 (85)	212 (11)	247 (13)
2+ Partners**d	735 (61)	198 (77)	174 (82)	226 (92)
2+ Unprotected sex acts**	683 (56)	184 (72)	161 (76)	195 (79)
Sex with FSWs**d	1109 (71)	215 (71)	201 (84)	222 (83)
2+ FSW partners**e	675 (61)	151 (70)	151 (76)	192 (97)
2+ Unprotected sex acts with FSW***e	599 (54)	133 (62)	144 (72)	158 (72)

Overall chi-squared P -values refer to differences in categories across all groups * $P < .05$ ** $P < .01$

^aMen who had sex with males but not females (MSM only) are not included

^bReported only among those who had sex with FSWs

^c'Other females' includes regular and casual female partners and excludes FSWs and wife

^dReported only among those who had sex in the past 3 months

^eReported only among those who had sex with FSWs in the past 3 months

male–male sex sometime in the past. The most frequently reported behavior was insertive anal sex; only 11–23% reported receptive anal sex. Men having sex with all gender types reported the greatest number of male partners and were more likely to have insertive anal sex (99%) and receive oral sex (63%) with other men, compared to the other groups shown. Condom use was uniformly low; approximately 90% never used them. Twenty-three percent of men who had sex with men had sold sex to other men, either for money or other goods; this behavior was more frequent among men having sex with all genders (39%, $P < .05$). Ninety percent of men denied using condoms during commercial sex encounters.

A substantial number of men with past male sex partners also reported same sex behavior during the last 3 months (40%). The 13 men who never had sex with women were most likely to be sexually involved with other men during this period (62%). Men having sex with all 3 genders reported the highest number of recent male partners; 29% had had sex with at least 2 men compared to 11–15% in the other groups ($P < .01$).

Sexual Behavior with Hijras

We also examined sexual behavior with *Hijras* among the 509 men in the cohort who had sex with transgenders. Overall, the number of reported *Hijra* partners was lower than female or male partners; 90% of these men had less than 11 transgendered partners in a lifetime. About half had engaged in receptive oral sex, but the majority reported engaging in insertive anal sex with *Hijras*.

Perceived Risk and Knowledge

Several questions were asked about perceived risk, knowledge of male–male HIV transmission, and attitudes towards condom use. Of those who had had sex with men, 73% were aware that it is possible to acquire HIV from having sex with another man. Among all men, 74% perceived themselves to be at risk of HIV infection. Although condom use was low with other men, 19% of men who had sex with men and women, and 13% of men who had sex with men woman and

Table 3 Sexual behaviors with other men ($N = 583$)

	Men who had sex with men (MSM) N (%)	Men who had sex with men and hijras (MSM + H) N (%)	Men who had sex with men and/or Hijras only MSM Only N (%)
All participants	302 –	268 –	13 –
Sexual behaviors, lifetime ^c			
Number of male partners ^{**}			
1	138 (46)	50 (19)	5 (38)
2–10	135 (45)	166 (62)	6 (46)
11+	29 (10)	52 (19)	2 (15)
Received oral sex ^{**}	145 (48)	170 (63)	5 (38)
Insertive anal sex ^{**a}	294 (97)	265 (99)	12 (92)
Receptive anal sex ^b	33 (11)	33 (12)	3 (23)
Condom use [*]			
Never	279 (95)	232 (89)	11 (85)
Inconsistent	10 (3)	21 (8)	1 (8)
Always	6 (2)	8 (3)	1 (8)
Would insist on using a condom with a male partner	52 (19)	32 (13)	2 (20)
Received money, goods, or services in exchange for sex with a man [*]	85 (28)	105 (39)	2 (15)
Sexual behaviors, past 3 months ^c			
Male sex partner, past 3 months ^{**}	103 (34)	121 (45)	8 (62)
2+ Partners, insertive anal sex ^{**}	33 (34)	77 (63)	2 (25)
1+ Partners, receptive anal sex	13 (13)	6 (5)	2 (25)
Received money, goods, or services in exchange for sex with a man ^{*d}	22 (21)	42 (40)	2 (67)

Overall chi-squared P values refer to differences in categories across all groups $*P < .05$ $**P < .01$

^aStudy participant was the insertive partner

^bStudy participant was the receptive partner

^cCategories do not include participants if the corresponding data was missing

^dOnly 3 participants in the 'MSM only' responded to this question

Hijras said that they would insist on using a condom with a male partner.

Predictors of HIV Infection

We evaluated the association of demographics, numbers of partners and sexual behavior with HIV infection, using bivariate and multivariable analyses. This analysis was performed using data from the entire cohort. The association of all factors described above were examined. Those variables that were significantly associated with HIV or were of particular interest are presented in Tables 4 and 5.

Factors associated with HIV by bivariate analysis included age (26–35 years old), being non-Muslim, living in a slum or unstable housing, and having a documented STI. Having an STI was the strongest predictor (OR = 6.2, 95% CI 4.3–8.9). Men having sex with women and *Hijras* (MSH), and men having sex only with women (MSF) were significantly more likely to be HIV infected than those having sex with men and women (MSM). Men who practiced oral sex with FSW (12% HIV positive) were slightly less likely

to seropositive than those who did not (15% HIV positive, $P = .06$ and $P = .01$, respectively). There was no relationship between age of first sexual experience and HIV.

We also examined the relationship of 3-month behaviors and HIV risk. Men who were not sexually active in the last 3 months were more likely be HIV seropositive (18% vs. 13% $P < .05$). Among those who had partners in the recent past, however, there was no consistent association between HIV infection and sexual behavior or condom use. Men who had no episodes of unprotected sex were not more likely to be HIV infected than those who had one or more unprotected sex acts (14% vs. 13%, $P = .6$).

Factors included in the initial and final models are presented in Table 4. Variables that remained associated with HIV included age 26–35 years, living in a slum or footpath, being non-Muslim, having an STI, and seeing more than 10 female sex worker partners. Men having sex only with females (adjusted OR 2.1 95% CI 1.3–3.5), or with *Hijras* and females (adjusted OR 2.0 95% CI 1.0–3.6) were significantly more likely to be HIV infected than MSM.

Table 4 Associations of demographic characteristics and risk behaviors with HIV status among the whole cohort ($N = 2322$)^a

Characteristic ^b	Total <i>N</i> (%)	HIV <i>N</i> (%)	HIV unadjusted OR OR (95% CI)	HIV adjusted OR ^c OR (95% CI)
<i>Age</i>				
16–25	1146 (49)	125 (11)	1.0	1.0
26–35	757 (33)	157 (21)	2.2 (1.7–2.8)	1.8 (1.3–2.4)**
36+	419 (18)	50 (12)	1.1 (.8–1.6)	0.9 (.6–1.3)
<i>Marital status</i>				
Married	703 (30)	106 (15)	1.1 (.9–1.4)	–
Unmarried	1619 (70)	226 (14)	1.0	–
<i>Religion</i>				
Moslem	586 (25)	48 (8)	1.0	1.0
Hindu and Other	1736 (75)	284 (16)	2.2 (1.6–3.0)	2.5 (1.7–3.6)**
<i>Education</i>				
< 4 years	844 (36)	139 (16)	1.3 (1.0–1.7)	1.2 (.9–1.6)
4+ years	1477 (64)	192 (13)	1.0	1.0
<i>Living situation</i>				
Slum and Other	1630 (70)	252 (15)	1.4 (1.1–1.8)	1.4 (1.0–2.0)*
Flat/chawl	691 (30)	80 (12)	1.0	1.0
<i>Birth place</i>				
Maharashtra	709 (31)	94 (13)	1.0	1.0
Other State	1612 (69)	237 (15)	0.9 (.7–1.2)	0.8 (.6–1.0)
<i>Current STI</i>				
Yes	1446 (62)	297 (21)	6.2 (4.3–8.9)	6.0 (4.0–8.8)**
No	876 (38)	35 (4)	1.0	1.0
<i>Category based on gender of past sexual partners^d</i>				
MSM	297 (13)	23 (8)	1.0	1.0
MSH	233 (10)	33 (14)	2.0 (1.2–3.6)	2.0 (1.0–3.6)*
MSM + H	266 (11)	34 (13)	1.8 (1.0–3.1)	1.7 (.9–3.1)
MSF	1526 (66)	242 (16)	2.3 (1.5–3.6)	2.1 (1.3–3.5)
<i>>10 Partners, total</i>				
Yes	1281 (56)	193 (15)	1.2 (.9–1.5)	–
No	1019 (44)	137 (13)	1.0	–
<i>>10 FSW partners^e</i>				
Yes	1018 (47)	162 (16)	1.3 (1.0–1.6)	1.3 (1.0–1.7)
No	1139 (53)	148 (13)	1.0	1.0
<i>Oral sex with FSW^e</i>				
Yes	490 (23)	57 (12)	0.7 (.5–1.0)	0.8 (.5–1.1)
No	1662 (77)	251 (15)	1.0	1.0
<i>Anal sex with FSW^e</i>				
Yes	316 (15)	39 (12)	0.8 (.6–1.2)	–
No	1835 (85)	268 (15)	1.0	–
<i>Condom use with FSW^e</i>				
Never-inconsistent	1879 (87)	281 (15)	1.5 (1.0–2.2)	–
Always	276 (13)	29 (11)	1.0	–

P values refer to multilevel degree of freedom χ^2 for variable in final model * $P < .05$ ** $P < .01$

^aForty-six participants were missing HIV laboratory results and were omitted from analysis, as well as the 13 men who did not have sex with women

^bCategories do not include participants if the corresponding data was missing

^cFinal model was determined by backwards elimination retaining variables at a significance level of 0.1

^dBased on lifetime history of sexual partners: MSM had sex with males and females, MSH had sex with hijras and females, MSM + H had sex with males, hijras, and females, MSF had sex with females only

^eReported only among those who had sex with FSWs ($n = 2201$)

An evaluation of factors associated with HIV was performed among the 808 men who had sex with men in the past and had HIV test results (Table 5). Among men having sex with men, only insertive anal sex was associated with HIV infection. Men who had

sex with men but never had insertive anal sex (2%) were more likely to be infected (27% vs. 10%, $P < .05$). None of the following variables were associated with HIV: numbers of male partners, ever having receptive anal sex, or condom use. However,

Table 5 Association of lifetime sexual risk behaviors with HIV status among men who had sex with men and/or *Hijras* (MSM, MSH, MSM + H, MSM Only) ($N = 808$)^a

Characteristic	Total N (%)	HIV n (%)	HIV Unadjusted OR OR (95% CI)
<i>Sex with men</i>			
Yes	575 (71)	57 (10)	0.7 (.4–1.1)
No	233 (29)	33 (14)	1.0
<i>>10 Male partners^b</i>			
Yes	79 (14)	7 (9)	0.86 (.4–2.0)
No	496 (86)	50 (10)	1.0
<i>Received oral sex^b</i>			
Yes	316 (55)	30 (9)	0.9 (.5–1.5)
No	259 (45)	27 (10)	1.0
<i>Insertive anal sex^{*b}</i>			
Yes	564 (98)	54 (10)	0.3 (.07–1.1)
No	11 (2)	3 (27)	1.0
<i>Receptive anal sex^b</i>			
Yes	67 (12)	6 (9)	0.9 (.4–2.2)
No	508 (88)	51 (10)	1.0
<i>Condom use^b</i>			
Never-Sometimes	546 (97)	55 (10)	–
Always	15 (3)	0 (0)	–
<i>Sex with Hijras[*]</i>			
Yes	501 (62)	67 (13)	1.8 (1.1–3.0)
No	307 (38)	23 (7)	1.0
<i>>10 Hijras partners^c</i>			
Yes	44 (9)	3 (7)	0.4 (.1–1.5)
No	455 (91)	64 (14)	1.0
<i>Receptive oral sex^c</i>			
Yes	246 (49)	31 (13)	0.9 (.5–1.4)
No	252 (51)	36 (14)	1.0
<i>Insertive anal sex^{**c}</i>			
Yes	449 (90)	64 (14)	2.5 (.8–8.4)
No	49 (10)	3 (6)	1.0
<i>Condom use^{*c}</i>			
Never-Sometimes	441 (98)	57 (13)	–
Always	8 (2)	0 (0)	–
<i>Received money, goods, or services in exchange for sex with a man</i>			
Yes	188 (33)	16 (9)	0.8 (.4–1.4)
No	387 (67)	41 (11)	1.0
<i>>10 Partners^{*d}</i>			
Yes	13 (7)	3 (23)	3.7 (.9–15)
No	175 (93)	13 (7)	1.0
<i>Insertive anal sex^d</i>			
Yes	179 (95)	15 (8)	0.7 (.09–6.4)
No	9 (5)	1 (11)	1.0
<i>Condom use^d</i>			
Never-Sometimes	176 (94)	15 (9)	1.0 (.1–8.6)
Always	12 (6)	1 (8)	1.0

Overall chi-squared P values refer to differences in categories across all groups * $P < .05$ ** $P < .01$ *** $P < .001$

^aThirteen participants were missing HIV laboratory results and were omitted from analysis

^bReported only among those who had sex with Men ($n = 575$)

^cReported only among those who had sex with *Hijras* ($n = 501$)

^dReported only among those who had sex with for pay with men ($n = 188$)

men who had engaged in commercial sex with other men and who had more than 10 clients were more likely to be HIV infected (23% vs. 7%, $P < .05$). Among all 808 men, those who also had sex with a *Hijra* were more likely to be infected with HIV (13% vs. 7%, $P < .05$). Among the 501 who reported sex

with a *Hijra*, having insertive anal sex was associated with HIV infection (14% vs. 6%, $P < .05$). There was no association between numbers of *Hijras* partners, receptive oral sex, and HIV infection. No men who had used condoms with *Hijras* were HIV infected.

Discussion

In this study we evaluated Indian men who were at high risk for HIV and were attending public STI clinics; most were long-term migrant workers living for extended periods of time in Mumbai. We were surprised to find that even though virtually all men (99%) were sexually active with women, a high proportion (36%) also had sex with men and/or *Hijras*, and 11% reported having sex with all three genders. Very few, only 13 (<1%), had sex exclusively with men. We did not ask men about their preferred sexual orientation or identity, and do not know whether they would identify themselves as “heterosexual” or “bisexual,” constructs which may not apply in the Indian context in any case.

The prevalence of male–male sex was much higher than that found in other surveys of Indian men (Aggarwal et al., 2000; Dwivedi & Misra, 1997; Go et al., 2004; Rodrigues et al., 1995; Thomas et al., 2004), although the data for comparison are limited. A recent study of men recruited from slums in Chennai, Tamil Nadu reported that only 5.9% acknowledged having sex with another man (Go et al., 2004). A study from 10 years ago in Pune among clients of STI clinics indicated that 13% of men described themselves as “bisexual” (Rodrigues et al., 1995). The lack of data on male–male sex may be due partly to the failure to include survey questions about same sex behavior in evaluations of the general population (Bentley et al., 1998; Bryan, Fisher, & Benziger, 2001; Rao, Pilli, Rao, & Chalam, 1999). In contrast, the increasing number of studies that focus on specifically identified MSM, indicate that bisexual behavior is common among these men (Chakrapani et al., 2002; Dandona et al., 2005; NACO, 2002). A recent study from south India of more than 6,000 MSM found that 42% were married and 68% had had sex with women in the past (Dandona et al., 2005). These findings may be a consequence of the pressure for marriage in Indian society and the stigma associated with declaring same-sex orientation.

The reasons for identifying a higher prevalence of male–male sex compared to other studies of similar populations may be due to several factors. Men in our study may have been more comfortable reporting same-sex relationships. We trained all study staff, including screeners, interviewers, counselors, and physicians to be sensitive to issues of male–male and male–*Hijra* sex. We included questions about sex with *Hijras*, which most other studies have not explored. Finally, men from different regions of India may not share the same cultural, demographic, or social char-

acteristics and thus it is difficult to generalize about “Indian men.” Long-term migrant workers in Mumbai may be very different from men living in slums in Chennai, and the circumstances of men in Mumbai may foster sex with multiple types of partners. Most men in our study were from outside the state, single, and living without family; or if married, almost all lived apart from their wives for extended periods of time. Having sex with other men may be cheaper, more readily available and easier to negotiate than paying to visit a female sex worker.

The importance of these findings from a public health perspective are that STI/HIV prevention and treatment programs cannot assume that male clients only have sex with women. Information, counseling, and clinical evaluation addressing risk behavior with other men and with *Hijras* must be provided. It is important to note that men who were behaviorally bisexual or had sex with all three genders, reported more risk behavior than men who only had sex with women. Not only did they have more sexual partners overall, but they reported more encounters with female sex workers (FSW) and less frequent condom use. The men who had sex with all 3 genders were the most likely of all groups in the sample to report risky behavior, and were also more likely to have sold sex. Thus, it is important to recognize that men having partners of multiple genders may be in particular need of information and skills to prevent HIV/STI transmission and acquisition.

The difference we observed in sexual behavior did not translate into differences in the prevalence of HIV. Men having sex only with women were more likely to be HIV infected (16%) than men who had sex with men as well as women (8%). However, men who had sex with *Hijras* had comparable HIV rates (14%) to men having sex with women only. These results may be due to a constellation of factors, including differences in the prevalence of HIV among partners, the type of sexual acts in which men engage (e.g. anal, vaginal, or insertive sex), and the frequency of unprotected sex. According to recent sentinel surveillance data, the HIV prevalence among FSWs, *Hijras*, MSM, and male STD patients in Mumbai was 50%, 65%, 10%, and 16%, respectively. Thus, men are more likely to be exposed to HIV by having sex with either FSWs or *Hijras*, than by having sex with other men.

Oral sex with women, particularly female commercial sex workers, may also reduce HIV risk. We found that those who had sex with more than one gender were more likely to report anal and oral sex with women. Bivariate and multivariable analyses revealed

that oral sex with an FSW was associated with lower HIV prevalence. The risk of HIV acquisition from men and Hijras may be reduced to the preponderance of insertive anal sex, which was reported almost exclusively with these partners. Condom use was highest with female commercial sex workers but almost non-existent with other men and Hijras.

Overall, the most likely explanation of our findings is that the lower HIV prevalence among the men having sex with men is due to a lower prevalence of HIV among male partners, more frequent protective behaviors with high-risk partners (i.e. more oral sex with FSWs), and preponderance of insertive sex with men. Men having sex with Hijras may be at greater risk than men having sex with men because the prevalence of HIV among transgenders is high and their use of condoms with FSWs and Hijras was lower. In India, it may be that being exposed to sex workers carries the most risk of HIV infection, regardless of the gender of the sex worker. Data on the small number of men who sold sex in this study indicate that they are at higher risk of infection.

There are few publications from India in which detailed information on sexual partnerships has been collected. However, a study in Phnom Penh, Cambodia found that MSM who reported recent unprotected sex with an FSW were three times more likely to be HIV-infected than other MSM. It was postulated that men who had sex with FSWs may have introduced HIV into MSM sexual networks (Girault et al., 2004). The same situation may be occurring in India: men having sex with multiple genders create a complex network of HIV transmission from high risk women and Hijras to other men, as well as to female partners and spouses.

We have very limited information from our study on men who exclusively had sex with men. We identified only 13 such men in our sample and no meaningful comparisons could be made with the remainder of the cohort. None of the 12 who underwent HIV testing were seropositive. Data on HIV prevalence among MSM in India obtained from sentinel surveillance are highly varied. There are currently three sentinel sites in Mumbai, Chennai, and Goa and reported HIV prevalence fluctuates widely between sites and within sites by year (NACO, 2004). This probably reflects changes in sampling and variation in the clientele who seek services at male sexual health NGOs where surveillance takes place.

This study had several limitations. Since we recruited patients who were presenting for care at STI clinics, the findings are not generalizable to non-STI populations. Also, it is possible that because our

primary sample is from a high risk population, STI patients, we have a higher proportion of men with high number of partners, which could also increase the chance that one of these partners was male or Hijra. Sex with men and Hijras is a stigmatized behavior in India and may have resulted in under reporting of these types of behavior leading to an underestimation of these behaviors. Additionally, we asked patients to respond to questions about their lifetime as well as recent sexual behavior, which may have resulted in a certain amount of inaccuracy in the data.

Our findings suggest that male STI patients in Mumbai engage in a variety of sexual partnerships, and are not exclusively heterosexual. Intervention programs and counselors need to address the possibility of sex with multiple genders, and stress that all sexual contacts should be protected. Condom use was very low overall, but was reported most often with FSWs, which may reflect the impact of national and local campaigns targeting FSW. Although having insertive anal sex with FSWs and Hijras may result in lower risk for men, it places their receptive partners at a greater risk of becoming infected. As 60% of men had a documented STI, condom use should not only be promoted not for men, but also for the benefit of their partners.

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