



Published in final edited form as:

*Psychol Health Med.* 2009 December ; 14(6): 705–715. doi:10.1080/13548500903334754.

## Depressive symptoms and human immunodeficiency virus risk behavior among men who have sex with men in Chennai, India

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### Abstract

Men who have sex with men (MSM) in India are a hidden population, facing unique environmental stressors and cultural pressures that place them at risk for depression. Depression may affect HIV risk behavior in MSM, and may affect the degree to which MSM may benefit from HIV prevention interventions. Depression in MSM in India, however, has largely been understudied. Two hundred ten MSM in Chennai completed an interviewer-administered behavioral assessment battery, which included the 20-item Center for Epidemiologic Studies Depression Scale (CES-D), demographics, sexual risk and identity, and other psychosocial variables. Over half (55%) of the sample exceeded the cutoff (CES-D = 16) to screen in for clinically significant depressive symptoms; this was associated with having had unprotected anal sex (OR = 1.97; 95% CI: 1.01–3.87) and higher number of male partners (OR = 1.04; 95% CI: 1.01–1.07). Statistically significant bivariate predictors of meeting the screen in for depressive symptoms included sexual identity (Kothi > Panthi; OR = 4.90; 95% CI: 2.30–10.54), not being married (OR = 3.40; 95% CI: 1.72–6.81), not having a child (OR = 4.40; 95% CI: 2.07–9.39), family not knowing about one's MSM identity (OR = 2.30; 95% CI: 1.18–4.90), having been paid for sex (OR = 5.10; 95% CI: 2.87–9.47), and perceiving that one is at risk for acquiring HIV (OR = 1.10; 95% CI: 1.02–1.17; continuous). In a multivariable logistic-regression model, unique predictors of screening in for depressive symptoms included not being married (AOR = 3.10; 95% CI: 1.23–7.65), having been paid for sex (AOR 3.80; 95% CI: 1.87–7.99) and the perception of increased risk for HIV (AOR = 1.10; 95% CI: 1.03–1.21; continuous); unprotected anal sex in the 3 months prior to study enrollment approached statistical significance (AOR 2.00; 95% CI: 0.91–4.48). Depression among MSM in Chennai is of concern and should be considered while developing HIV prevention interventions with this population. MSM who are not married, sex workers, and those who perceive they are at risk for acquiring HIV may be of higher risk for symptoms of depression.

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## Keywords

men who have sex with men; MSM; depression; India; HIV

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## Introduction

In the US where men who have sex with men (MSM) represent the largest risk group for HIV (CDC, 2007), there is a growing body of literature to suggest that HIV risk occurs in the context of other psychosocial problems, including symptoms of depression. Stall et al. (2003) found high rates of depression using the CES-D (US DHHS, 2004), childhood sexual abuse, partner violence, and problematic substance use among MSM, with the number of these problems leading to higher HIV risk behavior and higher HIV infection rates. Koblin et al. (2006), using a selection of items from the CES-D, found that moderate symptoms of depression was a predictor of acquiring HIV in a large scale randomized controlled trial of a primary prevention intervention targeting MSM in the US

Informed by Stall et al. (2003), the conceptual model behind the proposed set of analyses involves potential psychosocial *syndemics* interacting with HIV risk behavior in MSM in India. A *syndemic* is defined as two or more afflictions, interacting synergistically, which amplify the burden of disease in a given population. A syndemic was first described by Singer (1994) to characterize the interaction and amplification of HIV, substance abuse, and violence in lower income Americans. The concept was later applied to the US MSM population by Stall et al. (2003), who posited that psychosocial health problems (e.g. substance abuse, depression, childhood sexual abuse, partner violence, etc) interacted with and exacerbated HIV risk. In that study, 2881 MSM from four large US cities were interviewed by telephone regarding depression symptoms, drug use, partner violence, and childhood sexual abuse. Accordingly, these problems were intercorrelated, and both HIV risk behavior and HIV infections were associated with greater numbers of such problems in the sample.

Consistently, various studies conducted in the US have documented high levels of psychosocial stressors among MSM including victimization, harassment, fear of rejection from friends and family, and discrimination (e.g. Bradford et al., 1994; Gonsiorek, 1996; Faulkner & Cranston, 1998; Herek, Gillis, Cogan, & Glunt, 1997; Mays & Cochran, 2001). In addition, analyses of population-based mental health surveys have found evidence for higher rates of major depression, anxiety, panic, eating disorders, substance-use disorders, childhood emotional and physical maltreatment, and suicidality in individuals disclosing same-sex sexual behavior or identifying as gay (Cochran & Mays, 2000a, b; Gilman, Cochran, Mays, Hughes, Ostrow, & Kessler, 2001; Mays & Cochran, 2001; Safren & Heimberg, 1999). Finally, an association between mental health problems and HIV infection in MSM populations has been demonstrated (Ciesla & Roberts, 2001; Cruz & Peralta, 2001; Doll et al., 1992; Koblin et al., 2006).

In India, psychosocial problems among MSM are understudied. MSM in India, however, are an identified and recognized risk group for HIV. The Indian National AIDS Control Organization (NACO) for example, estimates an overall HIV prevalence rate of 0.36% in the country, but their estimate for MSM is 6.41% (NACO, 2008), which may be a lower limit estimate. Psychosocial problems such as depression are of particular importance because MSM in India are a hidden and stigmatized population, and face multiple and complex challenges such as stigma, homophobia, criminalization, and discrimination (Chakrapani, Newman, Shunmugam, McLuckie, & Melwin, 2007). There is strong societal pressure to marry, and hence some MSM may engage in unprotected sex with their wives

while remaining at high risk for HIV infection through sex with men (Humsafar Trust, 2000; Venkatesan & Sekar, 2001). Additionally, there are safety concerns in some parts of India with respect to MSM finding sexual partners. In a survey of MSM outreach workers, we found that 85% of the sample experienced varying levels of harassment from police, and 86% reported varying levels of harassment from others (Safren et al., 2006).

In a prior analysis, with a sample of 210 MSM in Chennai, our group found an HIV prevalence of 8%, and depression (assessed via the CES-D) was a predictor of HIV risk behavior and HIV infection (Thomas et al., in press). We sought to study this further because of the impact of depression on one's quality of life, and the potential impact of depression on the ability to benefit from HIV risk reduction programs. Accordingly, the purpose of the present study was to provide a more detailed analysis of the frequency of screening in for depressive symptoms among MSM in Chennai, and associations of demographic and psychosocial variables to screening in for depressive symptoms in this sample.

## Methods

### Participants and procedures

Participants were recruited through outreach workers at an MSM NGO in Chennai, called Sahodaran. The study visits occurred at the Indian Council of Medical Research (ICMR) Tuberculosis Research Centre (TRC). Participants were interviewed using trained research staff from the TRC utilizing the study instruments detailed below. The interview was followed by HIV counseling and testing. We used the rapid test (HIV-1 TRI-DOT – J. Mitra, New Delhi, India) on whole-blood specimens as the first test, and all positive samples were re-tested using Retroquic HIV-1 (QualPro Diagnostics, Goa) as a confirmatory test. For this result, participants would return 2 weeks later. The 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). Inclusion criteria were that all subjects must (1) have been men who had reported that they have had sex with another man in the past 6 months who (2) have resided in Tamil Nadu, India. Regarding the sexual inclusion criterion, the sex could have been either be insertive or receptive anal intercourse. The subjects would have been excluded if they were unable to complete or understand informed consent and/or if they were under the age of 18 years. Participants were given food as well as 200 Indian rupees (about \$3.80 in US dollars) for their participation. Note – although this was a testing study, we did not require that participants self-report as HIV-negative or untested to join the study. All study procedures were approved by the Institutional Review Board (IRB) at Massachusetts General Hospital as well as the Ethics Board at the TRC and the IRB at Harvard Medical School.

### Study instruments

**Demographics and contextual variables**—Participant age, MSM subpopulation identity (Kothis: feminine acting/appearing and predominantly receptive partners in anal sex; Panthis: masculine appearing, predominantly insertive partners; and Double-Deckers: both insertive and receptive and often bisexual), religion (Hindu, Christian, or Muslim), marital status and whether they have children, education level, employment status, weekly alcohol consumption, previous participation in an HIV-prevention intervention, whether they live with their parents, and openness about sexual identity to family were assessed.

**Depression**—Depressive symptoms were assessed with the Center for Epidemiologic Studies Depression Scale (CES-D) (US DHHS, 2004), a validated survey of clinically significant distress as a marker for clinical depression (coefficient  $\alpha = 0.90$ ; Cronbach's  $\alpha =$

0.89) (Hann, Winter, & Jacobsen, 1999; 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 screening positive for clinically significant depressive symptoms.

**Sexual risk**—The participants were asked about their total number of male sexual partners in the 3 months before the 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 before study enrollment. The participants were queried on their history of sex work, and whether or not they received or paid money for sex. This measure was adapted from widely used assessments of sexual risk taking in MSM in the US (Chesney et al., 2003; Koblin et al., 2003).

**Perception of HIV risk**—Self-perception of individual risk for HIV was assessed using the following question: ‘How much do you consider yourself to be at risk for getting HIV someday?’ Participants were asked to rate their degree of perceived risk on a scale from 1 (not at all at risk) to 10 (at extreme risk).

**Condom use self-efficacy**—Condom use self-efficacy was assessed using a brief self-efficacy scale [4 items, which a range from 1 (least confident) to 7 (most confident)] that ask about the degree to which a person believes that they can use condoms in increasingly difficult situations (Wulfert & Wan, 1995).

## Data analysis

SAS version 9.1 (Cary, NC) statistical software was used to perform each analysis, where statistical significance was determined at the  $p < 0.05$  level.

**Primary outcome**—Clinically significant depressive symptoms as measured by a CES-D scale score of  $>16$ .

**Predictors of interest**—Demographic and psychosocial factors, weekly alcohol use, sexual risk, and HIV history were examined for their association with clinically significant depressive symptoms. Bivariate logistic regression procedures were employed to examine statistically significant associations between predictor variables and the outcome.

**Multivariable model**—Variables, which were statistically significant in the bivariate regression analyses, were retained in the multivariable logistic regression model. The final multivariable model controlled for age. In this analysis, the multicollinearity was assessed; intercorrelation among the independents above 0.80 were considered to be problematic. For significant bivariate predictors that were multicollinear with each other, the variable thought to be theoretically most important in the analysis was chosen and retained in the final multivariable model, whereas the others were dropped. Because of multicollinearity with other variables, whether or not the participant had children and number of male sexual partners in the 3 months prior to study enrollment were not retained in the final multivariable model.

## Results

### Descriptive statistics

Demographic and other characteristics of the study sample by clinically significant depressive symptoms are outlined in Table 1.

The mean age was 28.9 years old (SD = 7.83); MSM described themselves as Kothi (25.7%), Panthi (37.6%), and Double-decker (36.7%). Eight percent tested positive for HIV, as previously reported by Thomas et al. (in press). More than one-fifth (46/210) of the sample reported unprotected anal intercourse in the past 3-months, and only 26% had participated in an HIV prevention intervention in the earlier year to study enrollment. The self-reported sexually transmitted infection (STI) or STI symptoms prevalence in the past 6 months was 6.2%.

CES-D scores ranged from 0 to 58, with a mean of 19.6 (SD = 11.1). Over half (55%) of the sample exceeded the cutoff for depressive symptoms.

### **Bivariate and multivariable logistic regression analyses of predictors of clinically significant depressive symptoms (N = 210) (Table 2)**

**Bivariate associations of demographic and contextual variables to clinically significant depressive symptoms**—Demographic characteristics significantly associated with clinically significant depressive symptoms were MSM subpopulation identity, where identifying as Kothi relative to Panthi is of greater risk (OR = 4.90; 95% CI: 2.30–10.54), not being married (OR = 3.40; 95% CI: 1.72–6.81), and not having children (OR = 4.40; 95% CI: 2.07–9.39).

**Bivariate associations of sexual variables to clinically significant depressive symptoms**—Sexual variables significantly associated with clinically significant depressive symptoms included: number of male sexual partners in the 3 months prior to study enrollment (OR = 1.04; 95% CI: 1.01–1.07), such that with each additional sexual partner there is an associated 4% increase in having depressive symptoms; engaging in any unprotected anal (either receptive or insertive) sex with another man in the 3 months prior to study enrollment (OR = 1.97; 95% CI: 1.01–3.87); perception of self-risk for acquiring HIV in the future (OR = 1.10; 95% CI: 1.02–1.17; such that each unit increase in perception of risk for HIV is associated with a 10% increase in depressive symptoms); family not knowing about one's MSM subpopulation sexual identity (OR = 2.30; 95% CI: 1.18–4.90); and having engaged in transactional sex (for money or other goods) in the past (OR = 5.10; p 95% CI: 2.87–9.47).

**Multivariable logistic regression model predicting clinically significant depressive symptoms**—In addition to examining bivariate predictors, we sought to examine whether there were variables that had unique variance in predicting whether or not someone had screened positive for clinically significant depressive symptoms. After adjusting for age, significant predictors of depressive symptoms included perception of self-risk for acquiring HIV in the future (adjusted OR = 1.10; 95% CI: 1.03–1.21; such that each unit increase in perception of risk is associated with a 12% increase in depressive symptoms), not being married (adjusted OR = 3.10; 95% CI: 1.23–7.65), and ever engaging in sex for money or other goods (adjusted OR = 3.82; 95% CI: 1.87–7.99). Having unprotected anal sex with another man in the three months prior to study enrollment approached significance (adjusted OR = 2.04 CI: 0.91–4.48).

## **Discussion**

In this sample of MSM in Chennai, India, the number of individuals screening in for depressive symptoms was quite high, with over one-half of the sample exceeding the cutoff on the CES-D. Unique predictors of exceeding this cutoff for depressive symptoms included not being married, having engaged in transactional sex, and perception of risk of acquiring HIV. Bivariate predictors included number of male partners, engaging in any unprotected

anal sex, perception of HIV risk, family not knowing about one's sexual identity, and having engaged in transactional sex (for money or other goods) in the past. These data document that, similar to US studies of MSM (e.g. Koblin et al., 2006; Stall et al., 2003) environmental and contextual variables are associated with mood symptoms in this sample of MSM in Chennai, and suggest that a psychosocial intervention for MSM in Chennai should address the unique context of being an MSM in this setting.

The prevalence of depressive symptoms found in this sample should be viewed in the context of the degree to which MSM are stigmatized and are a hidden population in India (Chakrapani et al., 2007; Humsafar Trust, 2000). Interestingly, being married was protective against depression, and earlier papers have documented that many MSM are married to woman (Humsafar Trust, 2000; Venketasan & Sekar, 2001). One hypothesis for the protective effects of being married is that those who are married, and those with children, are able to successfully conform to their societal role, while possibly separating their sexual behavior with men from their identity. Hence, they may be avoiding societal pressures and stress related to their sexual orientation. Conversely, those who have engaged in transactional sex may feel more exploited, be a more marginalized and economically challenged population, be less integrated into their societal roles, and hence experience greater depressive symptoms. These relationships require further study.

There are limitations to the present study which bear mention. First, the data collected were cross sectional and therefore causal inferences cannot be made. Second, data were collected via interviewer-administered techniques, and hence social desirability and/or demand characteristics may have influenced the results. Third, the sample is one of convenience, and generalizability may be limited. Fourth, we asked participants whether they had ever engaged in transactional sex, but did not specify a time frame for when this may have occurred. Accordingly, one cannot draw conclusions about currently engaging in transactional sex *versus* a history of engaging in transactional sex in the past, in terms of its ability to predict current depressive symptoms.

Future longitudinal studies that incorporate both qualitative and quantitative assessments of depression may help with respect to a better understanding of the frequency and context of depression among MSM in India, as well as the causal association of depression to HIV risk in this population. Despite the limitations, the present study is the only one we know of to examine depression and its correlates among MSM in India, and can be a basis for future research. The findings suggest that an important next-step of research addressing psychosocial concerns among MSM in Chennai would be to develop and pilot test an intervention that would address such concerns in the context of reducing HIV risk behaviors.

## Acknowledgments

The authors thank Christine Cooper-Vince for her help with technical aspects of the manuscript. They also thank the staff of Sahodran for their assistance with recruitment and community outreach. Funding for this project was supported by a supplement to parent grant P30A1060354 on which Bruce Walker, MD is the PI, and Steven A. Safren, Ph.D. was the PI of the supplement. Support for some staff (KHM) was from the Lifespan/Tufts/Brown University Center for AIDS Research grant: NIH no. P30 AI42853. Support for analysis and write-up was from 1R21MH085314 (Safren).

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**Table 1**Demographics and psychosocial factors by clinically significant depressive symptoms ( $N = 210$ ).

	Clinically significant depressive symptoms ( $N = 210$ )	
	Yes, $N = 115$ (54.8%)	No, $N = 95$ (45.2%)
	Mean (SD)	
Age	28.88 (7.74)	29.08 (7.98)
Condom use self-efficacy (scale score)	6.35 (1.41)	6.45 (1.39)
Number of male sexual partners in the 3 months before study enrollment	15.52 (43.63)	7.13 (10.25)
Self perception of risk for acquiring HIV (scale score)	6.97 (3.96)	5.53 (4.04)
	Percentage (%)	
MSM subpopulation identity		
Pantheri	25.22	52.63
Kothi	34.78	14.74
Double decker	40.00	32.63
Religion		
Hindu	80.00	80.00
Christian	12.17	12.63
Muslim	7.83	7.37
Marital status		
Married	13.04	33.68
Not married	86.96	66.32
Children		
Yes	9.57	31.58
No	90.43	68.42
Education		
Graduate or Professional Degree	1.74	3.16
College degree	10.43	14.74
High school degree	26.09	24.21
Middle school	47.83	41.05
Elementary	9.57	15.79
No formal education	4.35	1.05
Employment status		
Fulltime	66.96	86.32
Part-time	15.65	4.21
Full- or part-time and in school	6.96	5.26
Neither work nor in school	8.70	3.16
Disabled	0.87	0.00
Other	0.87	1.05
Participation in any HIV prevention interventions in the past year		

	<b>Clinically significant depressive symptoms (N = 210)</b>	
	<b>Yes, N = 115 (54.8%)</b>	<b>No, N = 95 (45.2%)</b>
	<b>Mean (SD)</b>	
Yes	29.57	22.11
No	70.43	77.86
Living with parents		
Yes	60.87	60.00
No	39.13	40.00
Family knows about sexual identity		
Yes	26.96	13.68
No	73.04	86.32
Weekly alcohol consumption		
Yes	28.70	26.32
No	71.30	73.68
HIV testing outcome		
HIV-infected	8.93	6.67
HIV-uninfected	91.07	93.33
Ever been paid money for sex		
Yes	63.48	25.26
No	36.52	74.74
Unprotected anal sex with another man in the 3 months prior to study enrollment		
Yes	26.96	15.79
No	73.04	84.21

**Table 2**

Bivariate and multivariable logistic regression analyses of predictors of clinically significant depressive symptoms ( $N = 210$ ).

	<b>Unadjusted odds ratio (95% CI)</b>	<b>P</b>	<b>Multivariable model adjusted odds ratio (95% CI)<sup>a</sup></b>	<b>P</b>
Number of male sexual partners in the 3 months prior to study enrollment (Continuous)	1.04 (1.01–1.07)	0.02	–	–
Self perception of HIV risk (continuous scale score)	1.10 (1.02–1.17)	0.01	1.12 (1.03–1.21)	0.006
MSM subpopulation identity				
Panthi	1.0	–	1.0	–
Kothi	4.92 (2.30–10.54)	0.001	2.82 (0.88–7.83)	0.12
Double decker	2.56 (0.37–4.97)	0.64	1.71 (0.78–3.80)	0.96
Marital status				
Married	1.0	–	1.0	–
Not married	3.40 (1.72–6.81)	0.0005	3.10 (1.23–7.65)	0.02
Children				
Yes	1.0	–	–	–
No	4.40 (2.07–9.39)	0.0001	–	–
Family knows about sexual identity				
Yes	1.0	–	1.0	–
No	2.30 (1.18–4.90)	0.02	1.45 (0.48–3.64)	0.48
Ever been paid money for sex				
Yes	5.10 (2.87–9.47)	0.0001	3.82 (1.87–7.99)	0.0003
No	1.0	–	1.0	–
Unprotected anal sex with another man in the 3 months prior to study enrollment				
Yes	1.97 (1.01–3.87)	0.047	2.04 (0.91–4.48)	0.07
No	1.0	–	1.0	–

<sup>a</sup>Final multivariable model included all significant bivariate predictors and controlled for age. Children and number of male sexual partners in the 3 months prior to study enrollment were not retained in the final multivariable model due to their multicollinearity with other variables.