ISSN 0377-4910

ICMR BULLETIN

Vol. 42, No. 1-12 January-December 2012

In This Issue...

Editorial Board

Chairman : Dr. V.M. Katoch
Director-General, ICMR and Secretary, DHR Ministry of Health and Family Welfare, Government of India

Editor : Dr. V.K. Srivastava

Members : Dr. Bela Shah
: Dr. Rashmi Arora
: Dr. Malavika Roy
: Dr. Vijay Kumar

Publisher : Shri J.N. Mathur

HIV in Indian MSM: Reasons for a concentrated epidemic & strategies for prevention

HIV infection among men who have sex with men (MSM) has been increasing in recent years around the world, particularly in Asia[1]. This global trend is being seen in India, with the current estimated HIV prevalence among MSM ranging between 7 and 16.5 per cent[2-4]. This is in comparison with the overall adult HIV prevalence estimated to be 0.31 per cent (0.25-0.39%) in 2009[2]. This is concerning in light of recent HIV prevention intervention efforts that have been dramatically expanded across the nation, raising questions about whether additional measures are needed to arrest the spread of HIV in this population. Although findings from the Independent Impact Assessment Study[2] show that the National AIDS Control Programme (NACP) is steadily halting the HIV epidemic in India over the period 2007-2012, current prevention interventions for MSM in India involve mainly single dimension modalities including condom distribution, HIV education, voluntary HIV counselling and testing, and the treatment of sexually transmitted infections (STIs). If the NACP's goals are to be achieved, there is a need for comprehensive, multi-layered approaches to HIV prevention that address the unique needs of Indian MSM. This article seeks to elucidate the specific challenges of providing effective HIV prevention programmes for this diverse and socially marginalized risk group.

The United Nations General Assembly Special Session on HIV/AIDS Report estimates that there are about 3.1 million MSM in India[3]. Indian MSM concepts of sexual identity can be varied and fluid[4-8]. Indian MSM include self-identified gay men (Western acculturated), *kothis* (men who tend to be the receptive male partner in anal and oral sex and typically have more effeminate mannerisms), *panthis* (men who tend to be the insertive male partner in anal

and oral sex), and *double deckers* (men who are both receptive and insertive partners). While MSM may self-identify as *kothi*, the terms *panthi* and *double-decker* are generally given by *kothis* to their male partners based on their sexual roles[6,9,10]. Since individuals may change their self-perception over time and behaviours may be situational, attributing fixed behavioural attributes to these identities is limiting. In most of these constructs, same-sex behaviour does not preclude sex with women or traditional marriage[11,12]. Thus, here we use the term "MSM" to describe a behaviour rather than a sexual identity. The term 'gay' essentially has the same meanings that it does in Western countries for the educated self-identified homosexual males belonging to the middle and upper class**.**

This review paper aims to highlight the gaps in current HIV prevention efforts by providing insight into the patterns of Indian MSM behaviour and sexual partnerships, and the specific cultural and psychological context in which HIV risk is occurring. Understanding the distinct social forces that shape the HIV risk environment could maximize the effectiveness of prevention interventions and heighten the acceptability of these programmes by MSM. The current review does not include transgender individuals (*i.e.*, *Hijras*/*Aravanis*) as they represent a different sexual minority group with varied HIV prevention needs.

This review is based on research publications, reports from NGOs as well as updated surveillance reports of BSS (Behavioral Sentinel Surveillance) and HSS data (HIV Sentinel Surveillance). Since 1998, HIV sentinel surveillance has been conducted annually to track the HIV epidemic in the country. To date, three rounds of Behavioral Surveillance Surveys (BSS) have been conducted; two at the national level in 2001 and 2006 and one at State level (both rural and urban areas) in 2009.The authors are also informed by their own research which includes developing and implementing HIV prevention interventions for MSM in Chennai and Mumbai.

History of the HIV/AIDS epidemic among MSM in India

The estimates for the prevalence of HIV in MSM in India vary. Pockets of high HIV prevalence among MSM are identified in high prevalence States as well as in Delhi, Gujarat and West Bengal. Twenty eight districts have 5 per cent or more HIV prevalence among MSM according to the BSS 2009[13].

The States that have the highest mean HIV prevalence amongst MSM in 2008 are Karnataka, Andhra Pradesh, Manipur, Maharashtra, Delhi, Gujarat, Goa, Orissa, Tamil Nadu and West Bengal[14]. While overall HIV trends amongst this population group are stable in India; there is an increasing trend among south Indian States and Delhi.

The Government of India's National AIDS Control Organization (NACO) estimates an overall HIV prevalence of 6.41 per cent among MSM, although this may be a lower-limit estimate[15]. For example, in Mumbai, 12 per cent of MSM seeking voluntary counselling and testing services were HIV-infected, and 18 per cent of the MSM screened in 10 clinics in Andhra Pradesh were found to be infected[16-18]. We found an 8 per cent prevalence in a sample of 210 MSM in Chennai recruited by peer outreach workers[4]. In the context of this disproportionally high level of HIV risk, it becomes extremely important to understand the socio-cultural factors that may exacerbate sexual risk among this group.

Socio-cultural norms that challenge MSM

MSM and *hijras/aravanis* (transgendered women or male–to–female transgendered persons) have existed in India for thousands of years. This is evident from the temple carvings in Konark and Khajarao (950-1050 AD) that depict homosexuality and various treatises existing from ancient times. Homophobia was formally codified by legal code Section 377 which, until very recently, made sexual relations between two men a criminal offense (Section 377). MSM in India, therefore, experience multiple forms of social and legal discrimination[19]. It is this pervasive social intolerance along with the cultural pressure for men to engage in heterosexual marital relations that have led many MSM to marry women and have children[5,7]. Many MSM engage in unprotected anal and vaginal sex with male and female sexual partners[5-9,17,19,20]. MSM in India may play a "bridging" role in the spread of HIV into the general public.

Knowledge on HIV, HIV testing, sexually transmitted infections (STIs) prevalence among MSM

The 2009 round of BSS also reported low levels of comprehensive knowledge about HIV among MSM

including, 21 per cent in UP; 30 per cent in Manipur; 32 per cent in Tamil Nadu; 22 per cent in Karnataka; and 57 per cent in Andhra Pradesh[13]. In 2010, 39.4 per cent of MSM could correctly identify ways of preventing sexual transmission of HIV[7].

In the recent United Nations General Assembly Special Session on HIV/AIDS report the percentage of MSM who had undergone an HIV test in the past 12 months and knew their results varied widely across survey locations from 3 to 67 per cent[2]. In 2009, 46.3 per cent of MSM in Tamil Nadu had been tested for HIV in the last 12 months and knew the result[10]. The HIV prevalence in a study from Mumbai was 12.5 per cent, with 14 per cent of the men reporting STD symptoms, and only 68 per cent returning to collect all of their laboratory reports[21].

Prevalence of STI among MSM in India

Only limited data are available about STI prevalence among MSM in India. A preliminary analysis of STIs among 85 MSM attending an STI clinic in Mumbai provides the following information: 4 had clinical rectal gonorrhoea (among these 2 were culture-positive and remaining 2 were smear-positive), 4 had perianal warts, 3 had gonococcal urethritis, one case each of secondary syphilis, genital molluscum contagiosum and genital scabies. The point prevalence of HIV in this population was 15 per cent and VDRL reactivity was 16 per cent[22].

In a study from Chennai, analysis of 51 MSM who attended a community-based clinic over a period of three months revealed that the 13 (26%) MSM were clinically diagnosed to have one or more STIs[20]. The overall prevalence of gonorrhoea and/or *Chlamydia* amongst 513 MSM during 2008-2009, recruited from four clinics at two cities of Mumbai and Hyderabad MSM was 16.6 per cent (13.8% had gonorrhoea and 5.1% *Chlamydia*)[23].

Sexual behaviour- unprotected anal sex, transactional sex, vaginal sex

A report from Bangalore found that 15 per cent of MSMs were full time commercial sex workers and 63 per cent reported sex for pleasure[24]. During 2008-2009, 513 MSM were recruited from four clinics at two cities of Mumbai and Hyderabad. On the basis of multivariate analysis, the data suggested that the association of risk factors was highest amongst MSMs who were engaged in commercial sex. Other risk factors included concurrent multiple sexual partners, low condom use during last sexual act and poor health seeking[24]. A study from Chennai reported that 22 per cent of MSM respondents had unprotected anal exposure and 35.9 per cent had ever paid another man for sex[4].

A study conducted in Andhra Pradesh found that MSM reported high rates of unprotected anal sex with other men and women[5]. Behaviourally bisexual men preferred insertive anal and then vaginal sex in that order with their partners. These men may form a major bridge population between other high-risk MSM and transgender people and their regular female partners or spouses as also suggested by other studies in the past[5,20,25-27]. A study among rural men from 5 different States in India also reported that 9.5 per cent of single and 3.1 per cent of married men had anal sex with other men and had greater number of male sexual partners, and found high rates of unprotected anal sex with male partners[20].

Condom use in MSM with male and female partners

In 2010, condom use at the last occasion of anal sex with a male was reported by 57.6 per cent of MSM in Manipur and 48.9 per cent in Tamil Nadu[10]. Consistent condom use with paid male partners from BSS 2009 was low in Karnataka at 35 per cent; it was reported at 54 per cent in Tamil Nadu[15]. Over half of the men with female partners (53%) reported never using condoms with female spouses during vaginal sex and 38 per cent never using condoms with regular male partners during anal sex except for Karnataka[10].

It has also been reported that condom use by MSM with spouses tends to be low, even more so than with male partners, which suggests that through bisexual behaviour, men could link circuits of high risk male-with-male activity with the general female population[28]. It has been shown that the number of cases of women infected with HIV through heterosexual transmission within marriage is increasing in India, and that the behaviour reported by the husband was an important risk factor for infection among many of these women[29].

In a study from Bangalore[30], among a sample of 357 men reporting same sex behaviour; 41 per cent also reported sex with a woman in the past year and 14

per cent were currently married. Condom use was very inconsistent with all male partners, while 98 per cent reported unprotected vaginal sex with their wives. These findings are consistent with other research findings from India, with the proportions of MSM currently married to women ranging from 23 to 42 per cent[5,22,31].

The frequency of bisexual behaviour among MSM, coupled with low condom use, high HIV prevalence and increased transmission efficiency of anal sex, means that the contribution of men who have sex with men and women (MSMW) to the HIV epidemic, through transmission to their female partners, could be substantial[30].

Psychosocial issues - Stigma, low self esteem, and depression

Studies have also revealed that stigma has been shown to contribute to negative self-images and low self-esteem, depression, increased sexual risk behaviour and/or decreased use of HIV prevention services[29,32-36]. Engaging in unprotected sex perhaps is related to low self esteem due to marginalization and stigma. The silence and secrecy associated with institutional stigma and discrimination may provide ideal conditions for escalation of the AIDS epidemic[37-39]. This included stigma from health providers, employers and other service providers. These challenges pose serious obstacles to effective HIV services provision as stigma, discrimination and harassment can hinder access to HIV and sexual health services and prevention programmes. An understanding of issues around stigma and discrimination would help MSM cross the barriers associated with stigma with respect to sexual risk, disclosure issues and access to health care.

In addition, there are very limited data on the prevalence of depression among MSM in India. One study found 55 per cent of 210 participants screened in for clinical depression on a self-report measure[35]. Screening in for depression was associated with having had unprotected anal sex, and higher numbers of male partners. Additionally, statistically significant bivariate predictors of meeting the screen in for depressive symptoms included sexual identity (*Kothi* > *Panthi*), not being married, not having a child, family not knowing about one's MSM identity, having been paid for sex, and perceiving that one is at risk for acquiring HIV. Given the estimated level of depression among this population, a strong mental health component should be incorporated into interventions for MSM.

Age and education

The age of first sexual act among MSM has been found to be as low as 10 years[19]. It was also observed that 44.2 per cent had their first sexual act in the age group 15-19 yr and the mean age of first such act was only 16.6 yr[40]. A report from Karnataka found that of the 3643 MSM covered, 13 per cent were below 20 and 54 per cent between 21 to 30 yr. Fifty two per cent had completed high school education and 24 per cent were illiterate[21]. MSM who presented at the VCT clinic at the Humsafar trust, a large NGO for MSM and TG in Mumbai, had a mean age of 24.8 yr with 8 per cent being illiterate[8]. It has also been reported that those who are older, educated, open about their MSM sexual behaviour, were more likely to have participated in an HIV prevention intervention[4]. Although HIV prevention interventions typically require more than education, education is an essential component[41]. Are we missing the younger MSM and those who are less educated?

Perception of sexual risk

The perception of sexual risk for HIV varies among MSM, and throughout the epidemic MSM were engaged in sophisticated decision making about what they consider to be risky[42]. Studies have reported that the reasons for continued sexual risk taking among MSM in India include *(i)* perceptions that HIV is transmitted through vaginal sex and via sex workers, resulting in individuals engaging in alternate anal and oral sexual practices as a way to avoid infection, *(ii)* stigma and denial of same sex behaviour resulting in anonymous, single-encounter sexual relationships, and *(iii)* inequalities in power dynamics that arise from Indian notions of masculinity (*e.g.*, discriminatory attitudes and exploitation of effeminate males)[43-45]. A study from Chennai reported that significant predictors of unprotected anal intercourse were being less educated, not having previously participated in an HIV prevention programme, having clinically significant depression symptoms and lower self efficacy[4].

In another study, almost half of all men (49%) who requested an HIV test did not perceive themselves to be

at any risk for HIV infection and 26 per cent indicated that they did not know if they were at risk for HIV acquisition[21]. Recent estimates however, report that MSM have higher perceptions of risk from 62 to 75.5 per cent[4]. It is hoped that this perception of risk should increase HIV testing across sites.

Substance use among MSM

As in other contexts, HIV prevention interventions among MSM in India have not yet focused on how alcohol use may increase risk, which may provide valuable insights on how best to intervene to reduce sexual risk among MSM in India.

A study from Chennai reported 28 per cent of MSM using alcohol weekly to the point of intoxication which was associated with older age, being married to a woman, weekly tobacco use and unprotected vaginal and anal sex[4].

Reviews of numerous international clinical trials and studies have demonstrated the efficacy of brief alcohol interventions to reduce the overall level of alcohol consumption, change harmful drinking patterns, prevent future drinking problems, improve health and reduce health care costs[46-50]. HIV prevention interventions may benefit from incorporating behavioural strategies that target both alcohol use and concomitant sexual risk[50-52].

Coverage of HIV prevention

A 2006 survey of the coverage of HIV interventions in 15 Asia Pacific countries estimated that targeted prevention programme reached less than 8 per cent of the estimated number of MSM, whereas 80 per cent coverage is needed to effectively reduce the incidence of HIV infections[19,32,37-53]. Substantial HIV epidemics among MSM are now well documented in urban areas across Asia, with HIV prevalence rates of 30.7 per cent in Bangkok; 15.6 per cent in Maharashtra State; 12.3 per cent in New Delhi; 8.7 per cent in Phnom Penh; and 5.8 per cent in Beijing[54-57].

There are ranges of coverage of HIV prevention programme estimates in India. The overall BSS showed a range of 1.8-63.4 per cent coverage[10]. Other estimates include: 4 per cent of 950,000 MSM in 2005; 45 per cent in 2005-06; 57 per cent in 2007 and 78 per cent in 2010[1,29,34,37,38] NACO reported that by January 2010, 78 per cent of their targeted MSM (275,000 out of 351,000) have been reached[10]. In 2009, 25.8 per cent of 210 MSM in Chennai had participated in an HIV prevention programme[4].

Understanding factors that could influence participation in an HIV prevention intervention is helpful for identifying Indian MSM who might have had no exposure to HIV prevention information and skills building, hence allowing researchers and prevention workers to focus efforts on individuals at greatest need.

Acceptability of HIV prevention programmes

The factors that influenced participation in HIV prevention programmes in a study conducted in Chennai were MSM who were older (OR = 1.04; $P = 0.05$), *kothis* (feminine acting/appearing and predominantly receptive partners in anal sex) compared to *panthis* (masculine appearing, predominantly insertive partners; OR = 5.52, $P=0.0004$), those with higher educational attainment (OR = 1.48, $P=0.01$), being open to others about having sex with other men (OR = 4.03, $P=0.0001$), and MSM who reported ever having been paid in exchange for sex (OR = 2.92, $P=0.001$)[4]. Findings suggest that exposure to HIV prevention interventions may be protective against engaging in unprotected anal intercourse (UAS) for some MSM in India.

A qualitative study reported that respondents related a sense of boredom and dissatisfaction with HIV prevention services that focused solely on HIV risk reduction messages[58]. While most acknowledged the importance of this information, participants found these messages repetitive.

HIV prevention intervention efforts among MSM have been hampered as many countries lack information on the determinants of HIV vulnerability and transmission among MSM[45]. These factors would be an understanding of the socio-cultural norms that challenge MSM, their complex identities, the psychosocial issues, sexual behaviour patterns, condom use and the risks around alcohol and substance use.

Other barriers to participation in HIV prevention programmes

It is known that most interventions for MSM are organized by NGOs. A study from Chennai, India, reported that nearly half the respondents who

participated in an intervention indicated exposure to an MSM non governmental organization[4].

It is also important to underscore the fact that MSM outreach workers themselves have fallen prey to these abuses and threats[59]. This is often overlooked as the responsibility for effective HIV prevention intervention programmes lies with the outreach workers who can link the HIV control programme and the MSM community. Furthermore, screening for experiences of physical abuse or threats, with triage to appropriate services, may improve HIV prevention programme effectiveness.

Organizations involved in HIV prevention interventions need the co-operation of police and other local government institutions to ensure the safety of outreach workers and MSM who may otherwise avoid programme participation due to this harassment. This requires HIV prevention programmes to understand the profile of their participants if they are to reach those with lower educational attainment, as well as those who may not be open about their status of having sex with other men. For example, *kothis* in India characteristically embrace effeminate behaviour in public and are, therefore, easily identified, as compared to *panthis* and double deckers, who may choose to remain hidden and who may not want to acknowledge their MSM identity. To curb rising HIV rates, prevention programmes need to focus efforts to include all subgroups of MSM. HIV prevention programmes to understand the profile of their participants. *Kothis* are easily identified as compared to *panthis* and double deckers.

Mental health and psychosocial problems, which both disproportionately affect MSM populations and are implicated in HIV transmission risk behaviours, also likely interfere with the uptake of HIV behavioural interventions.

How syndemics potentiate HIV risk: relevance for Indian MSM

Although many studies involving MSM have shown interconnections between psychosocial factors and HIV risk, such as substance use and high-risk sex, recent studies have focused on documentation of how these diverse psychosocial issues interact to produce elevated HIV risk behaviour among MSM, a phenomenon known as a syndemic[60-63]. According to the Centers for Disease Control and Prevention, a syndemic is "two or more afflictions, interacting synergistically, contributing to excess burden of disease in a population"[64]. To address health disparities among vulnerable groups, it is necessary to understand the complex interactions between health conditions clustering together (*e.g.*, substance abuse, depression, intimate partner violence, and HIV) and the social ecology in which these conditions exist[62].

The "syndemic condition" has been documented in samples of adult and young MSM[61]. Using a probability sample of MSM in four major US cities, Stall *et al*[62] found that the more psychosocial health problems an individual endorsed, the greater was their risk for both participation in sexual risk behaviours and HIV infection. Given that mental health and psychosocial problems such as depression, substance use, and violence frequently co-occur for many MSM (*e.g.*, as syndemic conditions), what is probably needed are combination prevention efforts, or prevention "cocktails," similar to treatment "cocktails," that address the psychological and behavioural mechanisms that interact to produce elevated risk for HIV[65]. Successful prevention interventions for Indian MSM will need to address the frequent co-prevalence of traumatic life events, depression, substance use, internalized stigma, STDs and HIV, if the MSM HIV epidemic will ever be fully controlled in India.

The future of combination prevention for Indian MSM

Over the past year, studies have demonstrated the efficacy of antiretroviral chemoprophylaxis to prevent HIV transmission in South African women and in a multinational cohort of MSM have dramatically increased the opportunities for effective HIV prevention globally[66,67].

The use of the antiretrovirals tenofovir ± emtricitabine as pre-exposure prophylaxis (PrEP) is a novel biomedical HIV prevention strategy which has been shown to decrease HIV spread among MSM in 11 international sites in conjunction with risk reduction counselling in the iPrEx study. The trial included an Asian site in Chiang Mai, Thailand, but there are no sites in India for the heterosexual or MSM studies[67]. PrEP could be an acceptable option for high-risk MSM and *Hjiras* in India.

The recent trials in HIV-uninfected men and women have demonstrated that PrEP is safe and well-tolerated, but demonstration projects are needed to understand the feasibility of scaling up this biomedical intervention for specific high risk populations. However, before offering PrEP to Indian MSM or *Hjiras*, the feasibility of recruiting and retaining a high-risk cohort needs to be determined to understand more about their patterns of sexual risk, including sex frequency and planning behaviours, and to ascertain HIV incidence among this group.

Suggestions and recommendations

Non-governmental organizations and community-based organizations (CBOs) are the front line in HIV/AIDS prevention and service delivery through targeted interventions. Since the beginning of the HIV/AIDS epidemic HIV prevention interventions have been conducted in the absence of evidence-based research. CBOs need support to evaluate interventions within at risk communities, demonstrate efficacy, and improve effectiveness research[68].

Among MSM in India it appears that sexual risk taking co-occurs within a variety of other contextual factors and psychosocial problems. Both individual and structural interventions are therefore, required to assist with the particular problems in their particular contexts[68].

Most HIV prevention programmes are geared towards adults and older men. MSM tend to be initiated into sex very early during their lives and therefore, early life interventions may be helpful in enabling youth to develop stable adult sexual identities. Homophobic attacks directly made against or witnessed by boys may result in their growing up to be sexual minority men, who will be at higher risk for depression, substance abuse, or revictimization, which can lead to increased levels of risk for HIV and other sexually transmitted diseases[65]. Finding ways to address young boys on these multiple psychosocial and sexual conditions, so that they support HIV risk reduction, may well increase the effect size of HIV prevention interventions.

It is also important to focus on increasing condom use rates with the female partners of MSM, who are generally perceived as low risk. This may be difficult to achieve and sustain, however, because the desire for children may compete with the concern to protect partners from HIV infection. Bridging to the general population will, however, continue to contribute to the HIV epidemic unless condom use with higher-risk partners becomes more consistent.

According to the most behavioural models of health care, if the barriers to obtaining care are greater than the benefits, then it is unlikely that individuals will avail themselves of health care services[69-71]. Convergence of NACP III with NRHM (National Rural Health Mission) is a key strategy for ensuring decentralization of the programme as district and sub-district level public health systems are managed within a framework developed in 2005 for the health and family welfare sector. This framework set in place by the NRHM proposes to address gaps in effective health care[4]. This could include sensitization of health services to include MSM friendly services which could work towards destigmatization of MSM and increase HIV and STI testing to facilitate early diagnosis and treatment which is crucial for HIV/AIDS control.

Conclusions

HIV prevention for Indian MSM could benefit from conceptualization of risk from the individual to a wider consideration of psychosocial cultural and interpersonal determinants. If HIV/AIDS control programmes among MSM are going to be effective, the focus has to shift from targeting them as vectors of HIV transmission to understanding how societal intolerance enhances risk, requiring combination prevention interventions, that use new biomedical interventions aligned with culturally tailored behavioural approaches, and that consider mental health and psychosocial concerns. Interventions should incorporate a holistic framework to address the sexual health and overall well being of MSM. Addressing co-occurring psychosocial risk factors is needed to improve effect sizes of current HIV prevention interventions and allow for more effective uptake by MSM.

References

1. van Griensven F, de Lind van Wijngaarden HS. A review of the epidemiology of HIV infection and prevention responses among MSM in Asia. *AIDS* 2010; *24* (Suppl 3): S30-40.
2. *United Nations General Assembly Special Session on HIV/AIDS, India 2010*. New Delhi: National AIDS Control Organization; 2010.
3. *Independent Evaluation of National AIDS Control Programme*. Jaipur: Indian Institute of Health Management Research; 2007.

4. Thomas B, Mimiaga MJ, Menon S, Chandrasekaran V, Murugesan P, Swaminathan S, *et al*. Unseen and unheard: predictors of sexual risk behavior and HIV infection among men who have sex with men in Chennai, India. *AIDS Educ Prev* 2009; *21* : 372-83.
5. Dandona L, Dandona R, Gutierrez JP, Kumar GA, McPherson S, Bertozzi SM; ASCI EPP Study. Sex behavior of men who have sex with men and risk of HIV in Andhra Pradesh, India. *AIDS* 2005; *19* : 611-9.
6. Asthana S, Oostvogels R. The social construction of male 'homosexuality' in India: implications for HIV transmission and prevention. *Soc Sci Med* 2001; *52* : 707-21.
7. Go VF, Srikrishnan AK, Sivaram S, Murugavel GK, Galai N, Johnson SG, *et al*. High HIV prevalence and risk behaviors in men who have sex with men in Chennai, India. *J Acquir Immune Defic Syndr* 2004; *35* : 314-9.
8. *A baseline study of knowledge, attitude, behavior and practices among men having sex with men at selected sites in Mumbai.* Mumbai: Humsafar Trust; 2002.
9. Nandi J, Kamat H, Bhavalkar V, Banerjee K. Detection of human immunodeficiency virus antibody among homosexual men from Bombay. *Sex Transm Dis* 1994; *21* : 235-6.
10. *India MSM Country Snapshots – Country Specific Information on HIV, men who have sex with men (MSM) and transgender people (TG)*: Joint United Nations Programme on HIV/AIDS; 2010.
11. Setia MS, Brassard P, Jerajani HR, Kumta S, Ekstrand M, Mathur M, *et al*. Men who have sex with men in India: a systematic review of the literature. *J LGBT Health Res* 2008; *4* : 51-70.
12. Venkatesan C, Sekar B. Demographic and Clinical Characteristics of males who have sex with males (MSM) attending a community-based STD clinic in Chennai. *Poster Presentation at the 3rd International Conference on AIDS*. Chennai, India; 2001.
13. *National Behavioral Surveillance Survey Executive Summary 2009*: National AIDS Control Organisation; 2009.
14. *HIV Sentinel Surveillance and HIV Estimation in India 2008.* New Delhi, India: National AIDS Control Organization; 2008.
15. *Annual Report 2009-10.* New Delhi: Department of AIDS Control; National AIDS Control Organization; 2010.
16. Kumta S, Lurie M, Weitzen S, Jerajani H, Gogate A, Row-akavi A, *et al*. Sociodemographics, sexual risk behaviour and HIV among men who have sex with men attending voluntary counseling and testing services in Mumbai, India. *16th International AIDS Conference*. Toronto, Canada; 13th-16th August 2006.
17. Setia MS, Lindan C, Jerajani HR, Kumta S, Ekstrand M, Mathur M, *et al*. Men who have sex with men and transgenders in Mumbai, India: an emerging risk group for STIs and HIV. *Indian J Dermatol Venereol Leprol* 2006; *72* : 425-31.
18. Sravankumar K, Prabhakar P. Mythri STI/HIV Study Group. High risk behaviour among HIV positive and negative men having sex with men (MSM) attending Myrthi clinics in Andhra Pradesh, India. *16th International AIDS Conference*. Toronto, Canada; 13th-16th August 2006.
19. Chakrapani V, Kavi AR, Ramakrishnan LR, Gupta R, Rappoport C, Raghavan SS. *HIV prevention among men who have sex with men (MSM) in India: review of current scenario and recommendations*: SAATHI (Solidarity and Action Against The HIV Infection in India) Working Group on HIV Prevention and Care among Indian GLBT/Sexuality Minority Communities; 2002.
20. Verma RK, Collumbien M. Homosexual activity among rural Indian men: Implications for HIV interventions. *AIDS Educ Prev* 2004; *18* : 1834-7.
21. Kumta S, Lurie M, Weitzen S, Jerjani H, Gogate A, Row-kavi A, *et al*. Bisexuality, sexual risk taking, and HIV prevalence among men who have sex with men accessing voluntary counseling and testing services in Mumbai, India. *J Acquir Immune Defic Syndr* 2010; *53* : 227-33.
22. Setia M, Jerajani HR, Kumta S, Mathur M, Kavi AR. A preliminary analysis of the population at a clinic for MSMs. *13th International AIDS Conference*. Durban, South Africa; 2000.
23. Gurung A, Prabhakar P, Narayanan P, Mehendale S, Risbud A, Das A. Prevalence of asymptomatic gonorrhea and chlamydia among men having sex with men (MSM) in India and associated risk factors. Paper presented at: 18th International AIDS conference, 2010; Vienna, Austria.
24. Phillip AE, Boily MC, Lowndes CM, Garnett GP, Gurav K, Ramesh BM, *et al*. Sexual identity and its contribution to MSM risk behavior in Bagaluri (Bangalore), India: the results of a two-stage cluster sampling survey. *J LGBT Health Res* 2008; *4* : 11-126.
25. Gangakhedkar R, Bentley M, Divekar A. Spread of HIV infection in married monogamous women in India. *J Am Med Assoc* 1997; *273* : 2090-2.
26. Hernandez A, Lindan CP, Mathur M, *et al*. Sexual behavior among men who have sex with women, men, and hijras in Mumbai, India-multiple sexual risks. *AIDS Behav* 2006; *10* (Suppl 4) : S5-S16.
27. Neumann S, Sarin P, Kumarasamy N. Marriage, monogamy and HIV: a profile of HIV infected women in South India. *Int J STD AIDS* 2000; *11* : 250-3.
28. Schneider JA, Saluja GS, Oruganti G, Dass S, Tolentino J, Laumann EO, *et al*. HIV infection dynamics in rural Andhra Pradesh south India: A sexual network analysis exploratory study. *AIDS Care* 2007; *19* : 1171-6.
29. Meyer IH, Dean L. Internalized homophobia, intimacy, and sexual behavior among gay and bisexual men. In: Herek GM, editor. *Stigma and sexual orientation: Understanding prejudice against lesbians, gay men, and bisexuals.* Thousand Oaks, CA: Sage Publications; 1998. p. 160-86.
30. Phillips AE, Lowndes CM, Boily MC, Garnett GP, Gurav K, Ramesh BM, *et al*. Men who have sex with men and women in Bangalore, South India, and potential impact on the HIV epidemic. *Sex Transm Infect* 2010; *86* : 187-92.
31. Kumar B, Ross M. Sexual behaviour and HIV infection risks in Indian homosexual men: a cross-cultural comparison. *Int J STD AIDS* 1991; *2* : 442-4.
32. *Men who have sex with men: The missing piece in national responses to AIDS in Asia and the Pacific.* Geneva, Switzerland: Joint United Nations Programme on HIV/AIDS; 2007.
33. Diaz RM, Ayala G, Bein E. Sexual risk as an outcome of social oppression: Data from a probability sample of Latino gay men in three U.S. cities. *Cultur Divers Ethnic Minor Psychol* 2004; *10* : 255-67.

34. Herek GM, Capitanio JP. AIDS stigma and HIV-related beliefs in the United States: Results from a national telephone survey. Paper presented at: 12th International Conference on AIDS, 1998; Geneva, Switzerland.

35. Safren SA, Thomas BE, Mimiaga MJ, Chandrasekaran V, Menon S, Swaminathan S, *et al*. Depressive symptoms and human immunodeficiency virus risk behavior among men who have sex with men in Chennai, India. *Psychol Health Med* 2009; *14* : 709-15.

36. Stokes JP, Peterson JL. Homophobia, self-esteem, and risk for HIV among African American men who have sex with men. *AIDS Educ and Prev* 1998; *10* : 278-92.

37. Mann JM. The World Health Organization's global strategy for the prevention and control of AIDS. *West J Med* 1987; *147* : 732-4.

38. Mann JM. AIDS - A global perspective. *N Engl J Med* 1988; *319* : 302-3.

39. Mawar N, Sahay S, Pandit A, Mahajan U. The third phase of HIV pandemic: Social consequences of HIV/AIDS stigma and discrimination and future needs. *Indian J Med Res* 2005; *122* : 471-84.

40. Deb S, Dutta S, Dasgupta A, Biswas B. Sexual Practice and Perception of HIV/AIDS Amongst Men who have Sex with Men in Kolkata. *Indian J Community Med* 2009; *34* : 206-11.

41. Fisher WA, Fisher JD, Harman J. The Information-Motivation-Behavioral Skills Model: A General Social Psychological Approach to Understanding and Promoting Health Behavior. In: Suls J, Wallston KA, editors. *Social psychological foundations of health*. Malden, MA: Blackwell; 2003. p. 82-106.

42. Williams AM. Condom risk and responsibility. Paper presented at: HIV Prevention Summit; June, 2000; Half Moon Ba, CA.

43. *Pilot Study on Male Sex Workers in India: Study of MSW in Kolkata, Ahmedabad, and Vijayawada. Kolkata.* Kolkata, India: Network of Male Indian Sex Workers; 2005.

44. Banerjee A, Sengupta S, Bhattacharya S. Social and individual constraints underlying the emergence of "Gay" identity and "Gay" support groups in India. Paper presented at: 12th International AIDS Conference, June 28th- July 3rd, 1998, Geneva, Switzerland

45. Khan S, Bondyophadhyay A. *From the front line: The impact of social, legal and judicial impediments to sexual health promotion, and HIV and AIDS related care and support for males who have sex with males in Bangladesh and India: A study report.*: NAZ Foundation International; 2005.

46. Bien T, Miller WR, Tonigan JS. Brief interventions for alcohol problems: a review. *Addiction* 1993; *88* : 315-36.

47. Burke BL, Arkowitz H, Menchola M. The efficacy of motivational interviewing: a meta-analysis of controlled clinical trials. *J Consult Clin Psychol* 2003; *75* : 843-61.

48. Kahan M, Wilson L, Becker L. Effectiveness of physician-based interventions with problem drinkers: a review. *Can Med Assoc J* 1995; *152* : 851-9.

49. Moyer A, Finney J, Swearingen C, Vergun P. Brief interventions for alcohol problems: a meta-analytic review of controlled investigations in treatment-seeking and non-treatment seeking populations. *Addiction* 2002; *97* : 279-92.

50. Vasilaki EI, Hosier SG, Cox WM. The efficacy of motivational interviewing as a brief intervention for excessive drinking: a meta-analytic review. *Alcohol* 2006; *48* : 328-35.

51. Shoptaw S, Frosch D. Substance abuse treatment as HIV prevention for men who have sex with men. *AIDS Behav* 2000; *4* : 192-203.

52. Wilk A, Jensen N, Havighurst T. Meta-analysis of randomized control trials addressing brief interventions in heavy alcohol drinkers. *J Gen Intern Med* 1997; *12* : 274-83.

53. *Executive Summary- Redefining AIDS in Asia - Crafting an effective response.* New Delhi, India: Commission on AIDS in Asia; 2008.

54. *Annual HIV Sentinel Surveillance 2006.* New Delhi, India: National AIDS Control Organization; 2007.

55. Ma X, Zhang Q, He X, Sun W, Yue H, Chen S, *et al*. Trends in prevalence of HIV, Syphilis, Hepatitis C, Hepatitis B and sexual risk behavior among men who have sex with men: Results of consecutive respondent-driven sampling surveys in Beijing, 2004 through 2006. *J Acquir Immune Defic Syndr* 2007; *45* : 581-7.

56. Phalkum M, Morineau G, Neal JJ, Saphom V, Vun Chhi M. HIV, sexually transmitted infections and related risk behavior among Cambodian men who have sex with men. Paper presented at: 8th International Congress on AIDS in Asia and the Pacific 2007; Colombo, Sri Lanka.

57. Pliplat T, Kladsawas K, van Griensven F, Wimonsate W. Results of the HIV surveillance among men who have sex with men (MSM) in Bangkok, Chiangmai and Phuket. Paper presented at: Proceedings for the Department of Disease Control Annual Conference, Ministry of Public Health, 2008; Bangkock, Thailand.

58. Thomas B, Mimiaga MJ, Mayer KH, Johnson CV, Closson EF, Menon S, *et al*. Ensuring it works: A community-based approach to HIV prevention intervention development for men who have sex with men in Chennai, India. Forthcoming; 2012.

59. Safren SA, Martin C, Menon S, Greer J, Solomon S, Mimiaga MJ, *et al*. A survey of MSM HIV prevention outreach workers in Chennai, India. *AIDS Educ Prev* 2006; *18* : 323-32.

60. Hirshfield S, Remien RH, Humberstone M, Walavalkar I, Chiasson MA. Substance use and high-risk sex among men who have sex with men: a national online study in the USA. *AIDS Care* 2004; *16* : 1036-47.

61. Mustanski B, Garofalo R, Herrick A, Donenberg G. Psychosocial health problems increase risk for HIV among urban young men who have sex with men: Preliminary evidence of a syndemic in need of attention *Ann Behav Med* 2001; *34* : 37-45.

62. Stall R, Mills TC, Williamson J, Hart T, Greenwood G, Paul J, *et al*. Association of co-occurring psychosocial health problems and increased vulnerability to HIV/AIDS among urban men who have sex with men. *Am J Public Health* 2003; *93* : 939-42.

63. Stall R, Paul JP, Greenwood G, Pollack LM, Bein E, Crosby GM, *et al*. Alcohol use, drug use, and alcohol-related problems among men who have sex with men: The Urban Men's Health Study. *Addiction* 2001; *96* : 1589-601.

64. *Syndemic Prevention Network: Spotlight on Syndemics*. Atlanta, GA: Centers for Disease Control and Prevention; 2008.

65. Safren SA, Reisner SL, Herrick A, Mimiaga MJ, Stall RD. Mental health and HIV risk in men who have sex with men. *J Acquir Immune Defic Syndr* 2010; *55* : S74-S77.

66. Abdool Karim Q, Abdool Karim SS, Frohlich JA, Grobla C, Baxter CM, L E, *et al*. Effectiveness and safety of tenofovir gel, an antiretroviral microbicide, for the prevention of HIV infection in women. *Science* 2010; *329* : 1168-74.

67. Grant RM, Lama JR, Anderson PL, McMahan V, Liu AY, Vargos L, *et al*; Pr Ex Study Team. Preexposure chemoprophylaxis for HIV prevention in men who have sex with men. *N Engl J Med* 2010; *363* : 2587-99.

68. Painter TP, Ngalame P, Lucas B, Lauby JL, Herbst JH. Strategies used by community-based organizations when evaluating their locally developed HIV prevention interventions for minority populations: lessons learned from CDC's Innovative Interventions Project. *AIDS Educ Prev* 2010; *22* : 387-401.

69. Andersen RM. *Revisiting the behavioral model and behavior: An introduction to theory and Research*. Reading, PA: Addison-Wesley; 1995.

70. Mimiaga MJ, Reisner SL, Bland S, Skeer M, Cranston K, Isenberg D, *et al*. Health system and personal barriers resulting in decreased utilization of HIV and STD testing services among at-risk black men who have sex with men in Massachusetts. *AIDS Patient Care STDS* 2009; *23* : 825-35.

71. Rosenstock IM. Historical origins of the health belief model. *Health Educ Monogr* 1974; *2* : 328-35.

This write-up contributed by Dr. Beena Thomas, National Institute for Research in Tuberculosis (NIRT), Chennai; Dr. Matthew J. Mimiaga, Harword Medical School, USA; Dr. Senthil Kumar and Dr. Saumya Swaminathan, NIRT, Chennai, Dr. Steven A. Safren, Harward Medical School, USA; and Dr. Keneth H. Mayer, The Fenway, Fenway Health, USA, has been adapted from Indian Journal of Medical Research. Volume 134, December 2011. pp. 920-929.

Published by Division of Publication & Information on behalf of Director-General, Indian Council of Medical Research, New Delhi 1100 29
R.N. 21813/71