

## Emerging trends in viral sexually transmitted infections in India

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Sexually transmitted infections (STIs) are a major public health problem in developing countries. In India, during the 1960s and 70s, bacterial infections such as syphilis, chancroid and gonorrhoea were the major STIs. Viral diseases such as herpes simplex and human papilloma virus infection were extremely rare. The spread of human immunodeficiency virus (HIV) with subsequent behavioral change since the 80s has resulted in significant alteration in epidemiological patterns; as in developed countries, there has been a significant rise in viral diseases and a relative fall in the incidence of traditional infections. The increase in viral STIs may also be attributed to greater self-reporting by patients, indiscriminate use of broad-spectrum antibiotics, effectiveness of syndromic approach of treatment and upgradation of health services at the primary level. This has forced a reappraisal of the importance of sexual and health care behavior since control of the incurable viral diseases, to a great extent, depends on societal efforts at primary prevention and counseling rather than early diagnosis and treatment, an effective strategy against curable bacterial STIs. A correct understanding of the patterns of viral STIs prevailing in different geographic regions of our country is necessary for proper planning and implementation of control strategies.

The emergence of HIV infection has increased the importance of measures aimed at controlling STIs. In 2007, following the third National Family Health Survey (NFHS-3), United Nations Joint Program on HIV/AIDS (UNAIDS) and National AIDS control organization (NACO) suggested that the national

adult HIV prevalence in India is approximately 0.36%, amounting to 2 to 3.1 million people living with HIV, almost 50% of the previous estimate of 5.2 million.<sup>[1]</sup> The high prevalence in the 15-49 years age group (88.7% of all HIV infections) indicates that HIV continues to threaten people in the prime of their working life.<sup>[1]</sup> Thirty-eight per cent of infected persons in India are women. The female-male ratio of infected people shifted from 55 females per 100 males in 2001 to 60 females per 100 males in 2005.<sup>[2]</sup> This indicates the increasing feminization of HIV/AIDS in India, suggesting increasing awareness among women.

India's highly heterogeneous epidemic of HIV is largely concentrated in six states - the industrialized south and west and the north-eastern tip (highest prevalence in the Mumbai-Karnataka corridor, Maharashtra, Tamil Nadu, coastal Andhra Pradesh and parts of Manipur and Nagaland) where HIV prevalence is four to five times higher than in other Indian states.

HIV prevalence among high-risk groups is alarming. In 2006, NACO stated that among injecting drug users (IDUs) it was as high as 8.71%; it was 5.69% and 5.38% among men who have sex with men (MSM) and female sex workers (FSWs) respectively.<sup>[3]</sup>

In India, sexual transmission is responsible for 84% of reported HIV cases.<sup>[2]</sup> HIV prevalence among sex workers in South India ranges from less than one per cent in some districts of Kerala and Tamil Nadu to more than 30% in districts of Maharashtra and Karnataka.<sup>[3]</sup> A recent cross-sectional study of clients of FSW from 12 districts in Andhra Pradesh, Maharashtra and Tamil Nadu found HIV prevalence of 2.0-10.9%.<sup>[4]</sup> There has been a significant decline in HIV prevalence among sex workers as well as in general population in the southern states where focused interventions have been implemented.<sup>[5]</sup> There has also been a fall in HIV prevalence in North India but the reduction is not as marked. A study from North India among

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STI clinic attendees reported a significant rise in HIV seropositivity from 0.2 - 5.5% in the last decade with a very rapid increase from 0.6 - 8.8 % until 2000 followed by a significant decline to 6% during 2002-2004.<sup>[6]</sup> The prevalence among FSWs from Ahmedabad also showed a similar declining trend in the last few years (11.7% in 2000, 13.2% in 2004; 3.2% in 2005).<sup>[7,8]</sup>

Very less is known about MSM and the extent to which they contribute to the HIV epidemic. NACO reported HIV prevalence of 6.8 and 9.6% among MSM in Chennai and Mumbai, respectively. A study from Mumbai had shown much higher prevalence of 17% among MSM and 68% in transgenders (TG).<sup>[9]</sup> A recent cross-sectional study of self-identified MSM in selected districts of four high prevalence states in south India showed HIV prevalence of 18.1% in TG and 15.9% in bisexuals with low condom (30-50%) usage rates.<sup>[10]</sup> Higher detection of HIV seropositivity despite decreased HIV prevalence in the general population can be explained by increased awareness and improved health seeking behavior leading to detection of submerged cases of MSM.

Injecting drug use is the main risk factor for HIV infection in north-east India. In 2006, NACO reported HIV prevalence of 2.4-19.8% among clusters of injecting drug users in north-eastern states, 10% in New Delhi, 20.4% in Mumbai, and 16.8% in Chennai.<sup>[3]</sup> Studies published in 2008 have shown a much higher prevalence of 29.8% and 30% in Chennai and Mumbai respectively.<sup>[11,12]</sup>

Among healthy blood donors in North India, there was an initial increase in HIV seroprevalence from 0.16% in 1996 to 0.3% in 2002 followed by a decline from 0.70% in 2002 to 0.44% in 2005.<sup>[13,14]</sup>

The rise in HIV prevalence among MSM and IDU is of great concern. Given India's large population, a mere 0.1% increase in the prevalence rate would increase the number of adults living with AIDS by over half a million persons. Thus it becomes important to arrest the disease as early as possible.

HIV control is hampered by gaps in knowledge as well as cultural, legal and medical factors. Only about 10 to 20% individuals are aware of their HIV positive status. The lower status of women, limited access to human, financial and economic assets and stigma attached with HIV are the other factors which impede its

treatment and preventive efforts. Promoting changes in sexual and drug-using behavior, promoting correct and consistent use of male and female condoms, reducing the number of sexual partners, improving the management of STIs and broadening access to HIV testing and counseling are some measures which can halt the further progress of this epidemic. A comprehensive community-led intervention program for reducing sexual risk among FSW in Mysore from 2004-2006 showed a significant decline in STI prevalence, a relatively stable HIV prevalence (26 vs. 24%) and a striking increase in condom use (65 vs. 90%).<sup>[15]</sup> It suggests that increasing geographically defined coverage and micro-level outreach planning to provide services to high risk population and population-based behavior changes can help curb the number of new HIV cases in India.

Another important viral STI is genital herpes, one of the most prevalent STI globally including India presently. Its prevalence over the years has been rising significantly.<sup>[5,16,17]</sup> A study among STI clinic attendees from North India has shown a fourfold increase in genital herpes from 5.7% in early 1990s to 22.4% in 2000-2004.<sup>[5]</sup> An earlier study from Chandigarh has also shown a two-fold increase in its incidence (20.5% in 2000 vs. 11.4% in 1970).<sup>[18]</sup> A similar two-fold rise (from 16.92 to 31.26%) was found in Rohtak from 2001 to 2006.<sup>[19,20]</sup> In north-east India also, it has increased in the last 10 years. It was 5.2% in Manipur in 1996-2000<sup>[21]</sup> and 11.3% in Assam in 2002-2005.<sup>[22]</sup> The increasing trend was also noted in various states of south India. The prevalence in Kerala in 1994-1998 was 14%<sup>[23]</sup> while in 1999-2000, it was 22.4%.<sup>[24]</sup> However, a study from Andhra Pradesh showed a significant decline in prevalence from 6.78% in 2000-2002 to 3.47% in 2003-2005, but overall, the viral STIs had increased from 25.9 to 33.6%.<sup>[25]</sup>

The data on prevalence of genital herpes among other high risk groups is sparse. In 2003 in Mumbai, 26% of male sex workers were found to be HSV-2 seropositive and a recent study published in 2007 reported HSV-2 antibodies in 38% of FSW from Chennai and 57.2% from Goa.<sup>[26-28]</sup> In Mumbai in 2001, 40% of MSM and 71% of transgenders were found positive for HSV 2 IgG.<sup>[9]</sup> A study from South India reported HSV2 seroprevalence of 40% among IDU.<sup>[27]</sup>

Increasing HSV2 prevalence suggests continued transmission by large number of undiagnosed cases

and the occurrence of asymptomatic shedding. Rising trends with marked ability of genital herpes to enhance HIV transmission and acquisition, along with lack of easily accessible and affordable diagnostic methods and incurable nature of viral disease are of great concern and further necessitate encouraging community-based preventive measures to reduce high risk behavior.

Infections caused by hepatitis B (HBV) and C virus (HCV) also show an increasing trend both in the community and among high risk groups. In 2008, among STI clinic attendees, seroprevalence of two to five per cent for HBV and HCV was reported.<sup>[17,29]</sup> In 2006, HBV and HCV prevalence among FSWs of Kerala was 3.4% and 2.6% respectively.<sup>[30]</sup> However, it was higher among MSM- 4.4% and 3.3% respectively.<sup>[30]</sup> A strikingly higher HBsAg prevalence of 90% and 20% among MSM and transgenders respectively was reported from Mumbai in 2001.<sup>[9]</sup> Hepatitis C infection is very high among IDUs, the highest being reported from the North Eastern states of the country. The prevalence of anti-HCV antibodies has been reported to be up to 90% in Calcutta and Manipur in 2000 and 2002 respectively.<sup>[31,32]</sup> A 2008 study had reported greater than 50% seroprevalence of HCV from three states- Manipur, Nagaland and Maharashtra.<sup>[33]</sup> The rates among IDU in southern states are also 50-60%.<sup>[30,34,35]</sup> However prevalence of HBsAg among IDU is variable in different parts of the country, ranging from 10.8% in Manipur, 11% in Chennai (2004-2005), 2.7% in Kerala (2006), and 17% in a recent study (2008) from North India.<sup>[29,30,32,35]</sup> This suggests that the predominant mode of transmission of hepatitis C is through contaminated injections, unlike hepatitis B, where other risk factors associated with sexual transmission also play an important role. Despite the availability of a safe and effective vaccine, prevalence of HBsAg remains high in India, mainly because hepatitis B vaccination is not a part of our national immunization schedule.

HBV and HCV are common blood borne infections, so screening of blood donors becomes essential. In 2004, overall HBsAg prevalence was one to three per cent among voluntary donors and 10-12% in commercial donors with 0.12 - 4% seroprevalence of HCV in voluntary donors.<sup>[36]</sup> Recent studies carried out in healthy blood donors, have shown a decline in seroprevalence of both hepatitis B and C. Between 2002 to 2005, Delhi blood donors showed a decrease

in hepatitis B and C prevalence (anti-HCV antibodies- from 1.01% in 2002 to 0.29% in 2005, HBsAg - from 2.42% in 2002 to 1.97% in 2005).<sup>[37]</sup> A similar declining trend was also observed in studies from South India.<sup>[38]</sup>

Disease awareness, implementation of strict pre-donation counseling and donor selection criteria have helped in excluding infected donors. However, a study from eastern India showed a statistically significant increase in the number of cases of HBV and HCV infection among blood donors in 2005 as compared to 2004 (1768 vs. 1448, and 372 vs. 314).<sup>[39]</sup>

Epidemiological data on condyloma acuminata (CA) has also shown a rising trend in past few years. A study from north India (2000-2004) showed prevalence rate of 2.9% among all STI cases and 14.2% among pediatric STI.<sup>[40,41]</sup> A study from Delhi showed increasing prevalence of genital warts (from 10.9% to 18.5%, in last decade) and then a stable trend up to 2004 (18.1%).<sup>[6]</sup> Another study from North India showed a conspicuous upward trend in prevalence of CA, from 9.17% in 1986-1990 to 19.6% in 1995-1999 and 27.3% in 2004-2006.<sup>[19,42]</sup> Prevalence of CA is less in the North East and Western India. It varies from 3.8% in Orissa (1993-94), 8.9% in Gujarat (1995-96) and 9.6% in Manipur (1996-2000).<sup>[43-45]</sup> However, the overall trend in these states also shows an escalation. Rising trend was also noted in a study from Assam from 15% in 2002 to 25% in 2005.<sup>[46,47]</sup> The prevalence in South India is comparable to North India (17.5% in Kerala in 1990-2000).<sup>[48]</sup>

The prevalence of genital molluscum contagiosum (MC) has also increased. A study from North India showed a significant rise from 1% in 1970 to 9.8% in 2000.<sup>[18]</sup> An upward trend was also noted in South India. In Andhra Pradesh, the number of genital molluscum contagiosum cases showed a two-fold rise from 11 cases (0.22%) in 2000 to 22 (0.31%) in 2005.<sup>[25]</sup>

There is considerable heterogeneity in data on viral STIs in India. But a basic pattern in the changing epidemiology is discernible. Like the developed countries, in India too, viral STIs are on an upswing. These diseases can be controlled by promoting strategies to reduce high risk behavior, encouraging condom use, strengthening STI clinics and family health awareness programs and imparting sex education and awareness regarding STI/ HIV among the masses and vulnerable population.

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