

## Original Research Article

# Declining Trends in HIV Prevalence: A Tertiary Care Hospital Based 05 Years Retrospective Analysis

Avinash Laghawe\* and Sameer Singh Faujdar

Department of Microbiology, Maharishi Markandeshwar Medical College and Hospital, Kumarhatti, Solan, Himachal Pradesh, 173229, India

\*Corresponding author

## ABSTRACT

### Keywords

HIV Prevalence, Retrospective Analysis, Tertiary Care Hospital

The first documented HIV infection was among sex worker in Chennai, Tamil Nadu, in 1986. And now India has the greatest number of HIV infections in Asia and the second highest total number of infected persons globally. HIV infection is entirely preventable through raising awareness. This retrospective study was planned to find out the prevalence of HIV infection in patients in tertiary care hospital in Central India. Material and Methods: A hospital based retrospective study was conducted on data of samples received from 01 Jan 2007 to 31 Dec 2011. Testing and reporting was done according to algorithm for HIV testing strategy III adopted by NACO. Results: Total 41144 samples were tested during study period, out of which, 279 (0.68%) were found to be positive for HIV 1. Prevalence of HIV infection was gradually decreasing (0.88% to 0.59%) over a period of 5 years (2007-2011). More numbers of males (191) were found infected than females (88). Male to female ratio of infected persons was rising (0.25 to 0.6) from 2007 to 2011. The age groups ranging from 21 years to 50 years cover the (227/279) 81.36% of all seropositive patients. Conclusion: HIV prevalence is slowly but steady declining. There is a need to empower adolescent girls and women by increasing their knowledge about HIV. The achievements of decrease in prevalence rate warrant the need for further commitment and coordinated joint action that is guided by the best available scientific evidence and technical knowledge.

## Introduction

In 1978, India joined other nations in signing the World Health Organization's Alma Alta Declaration, which set the goal of "Health for All by the Year 2000." Although India has not realized this goal, the failure leaves valuable lessons for the health sector to learn about HIV infection. (Suniti Solomon et al, 2002) The first documented HIV infection was among sex worker in Chennai, Tamil Nadu, in 1986. (Suniti Solomon et al, 2002).

And now India has the greatest number of HIV infections in Asia and the second highest total number of infected persons globally. The Indian HIV epidemic is primarily driven by sexual transmission which accounts for more than 80% of HIV infections. (M J Mimiaga et al, 2011)

The spread of HIV in India has been uneven. Although much of India has a low rate of infection, certain places have been more

affected than others. HIV epidemics are more severe in the southern half of the country and the far north-east. As per NACO (National AIDS Control Organization Report 2008 – GoI ) the highest estimated adult HIV prevalence is found in Manipur (1.40%), followed by Andhra Pradesh (0.90%), Mizoram (0.81%), Nagaland (0.78%), Karnataka (0.63%) and Maharashtra (0.55%). (K.Kalpana et al, 2013)

Early descriptions of HIV epidemiology created a general perception that HIV infection was largely restricted to sex workers, truckers, and IDUs. The rest of the population was, and in many cases, still is, in denial; meanwhile, the infection has spread further into the general population. For example, HIV infection rates are reported to be increasing among monogamous women, through unprotected sex with infected spouses. (Suniti Solomon et al, 2002)

HIV infection is entirely preventable through raising awareness. Therefore, awareness about its occurrence and spread is very significant in protecting the people from the epidemic. It is for this reason that the National AIDS Control Programme lays maximum emphasis on the widespread reach of information, education and communication on HIV/AIDS prevention. Changing knowledge, attitudes and behavior as a prevention strategy of HIV/AIDS thus is a key thrust area of the National AIDS Control Programme. (India against AIDS, 2015)

NACO has been conducting regular thematic Mass Media campaigns on TV and Radio to cover issues of condom promotion, ICTC/PPTCT, STI treatment and services, stigma and discrimination, vulnerability of youth to HIV, ART, HIV – TB and blood safety. India has been working tremendously

hard to eradicate HIV/AIDS which poses serious health challenges to a large population living in the country. Efforts are now being made to reduce the number of HIV cases to zero and the nation has already achieved a breakthrough to stop HIV prevalence in the last few years. (India against AIDS, 2015)

This retrospective study was planned to find out the prevalence of HIV infection in patients attending OPD and IPD of Sri Aurobindo Institute of Medical Sciences and Hospital, Indore, M.P. which is a tertiary care hospital in Central India.

The main aim of this study to determine the prevalence of HIV infection. To determine the M:F ratio in reactive samples. Also, to identify the age group in which HIV infection is more common

### **Material and Methods**

A hospital based retrospective study was conducted in Department of Microbiology, Sri Aurobindo Institute of Medical Sciences, Indore, M.P. Data of samples received from 01 Jan 2007 to 31 Dec 2011 was retrieved from the medical records of Department of Microbiology. Data from all samples received from indoor as well as outdoor patients was included in this study. As a routine practice, all patients were counseled and informed consent was taken from each patient before HIV testing. Peripheral blood (5mL) was collected from each patient in plain vial (without EDTA) and screened for Human Immuno Deficiency Virus 1&2 by Tridot after separation of serum. If found positive, HIV testing was done by two more methods (Retroquic/Determine HIV1/2 and 3rd Generation ELISA) according to algorithm for HIV testing strategy III adopted by NACO. (GUIDELINES FOR HIV TESTING 2007) Interpretation was also done by using algorithm for HIV

testing. Strategy III involves (a) all samples tested with one ELISA / rapid test; (b) reactive samples from the first test tested with different antigen or principle; (c) reactive samples from the second test are again retested with third system of different antigen or principle. (Pic 1)

## **Results and Discussion**

Total 41144 samples were tested during study period, out of which, 279 (0.68%) were found to be positive for HIV 1.

Only one sample was found positive for both HIV1 and 2 and No sample was found positive for HIV2.

Number of samples were increasing (4548 to 12024) and Prevalence of HIV infection was gradually decreasing (0.88% to 0.59%) over a period of 5 years (2007-2011) (Table 1).

More numbers of males (191) were found infected than females (88).

Male to female ratio of infected persons was rising (0.25 to 0.6) from 2007 to 2011, (Table 3).

Maximum numbers of reactive samples belongs to age group 21-30 years (96) followed by 31-40 years (87) and 41-50 years (44). Least numbers of reactive samples were found in age group 11 – 20 years (9).

Most numbers of positive samples (227/279) were found in age groups of 21-50 years, (Table 4).

The present study has documented the prevalence of HIV infection among a large number (N = 41144) of patients attending ICTC in a tertiary care hospital situated in central India. Over the study period, HIV

screening was increased (4348 in 2007 to 12024 in 2011) and prevalence of HIV was decreased (0.88 to 0.59) because of our surveillance systems have expanded with an increase in the number of surveillance sites, along with improvements in the quality of laboratory tests for HIV and testing strategies. In recent years, a number of countries including India with generalized epidemics have observed a decline in HIV prevalence due to these improvements. Ramalingam Sekar et al also found declining trends in HIV infection in their study which was conducted in almost same period in Tamilnadu. (Ramalingam Sekar et al,2013). Banke Lal Sherwal et al also mentioned declining trends in prevalence rate from 5.79% in 2008 to 3.26% in 2012 in New Delhi (Sherwal, B.L et al, 2015). NACO also mentioned the declining trends in HIV prevalence from 0.41% in 2001 through 0.36% in 2006 to 0.31% in 2009. (HIV declining in India, 2009). While Nitya Vyas et al reported increasing trends in prevalence of seropositivity from period 2002 (12.2%) to 2007 (17.34%). (Vyas N et al, 2009).

It is also important to try to establish the validity of HIV surveillance data from past years. The intrinsic validity of HIV tests in recent years has improved considerably. In addition, many countries like India have instituted quality assurance schemes that increase the validity of the HIV testing for surveillance in the field. As a result of improved tests and improved quality assurance systems in countries where additional resources have become available for HIV surveillance, the HIV surveillance data in recent years have better validity than those from earlier years. Though we have found the decreasing trends in HIV prevalence, still it is higher than national prevalence rate. This becomes more alarming when this data is from a city which is a part of state MP which has a prevalence

rate of 0.19% (2009). (HIV declining in India, 2009). This tertiary care hospital is situated at outskirts of Indore and caters to urban as well rural population. Also it has industrial area nearby. Indore is an economical capital of MP and attracts large number of skilled and unskilled workers from other parts of state as well as other states. These migrants may also be responsible for this higher prevalence rate found in this study. As per the HIV fact sheets, Based on HIV Sentinel Surveillance Data in India 2003-2006 the prevalence rate for Indore was 6%. (HIV Fact Sheets, 2007).

There are a number of ways in which migration may contribute to the spread of

HIV infection, and this is dependent on the number of migrants, their sexual behavior at destination and origin, the sexual behavior of non-migrating members of migrant-sending communities, the HIV prevalence among sex partners of migrants at both locations, and the frequency and duration of migration episodes. On an individual level, migration increases the risk of HIV acquisition for migrants by exposing them to potential sex partners who are drawn from communities with a higher HIV prevalence than that in the migrants' native communities; migration may also lead to an increase in levels of sexual risk behaviors among migrants. (Tanvi Rai et al, 2014).

**Table.1** Prevalence of HIV infection

Year	No. of sample tested	No. of reactive samples	Percentage
2011	12024	72	0.59
2010	11026	68	0.62
2009	8253	59	0.71
2008	5293	40	0.75
2007	4348	40	0.88
Total	41144	279	0.68

**Table.2** Distribution of samples in OPD/IPD patients

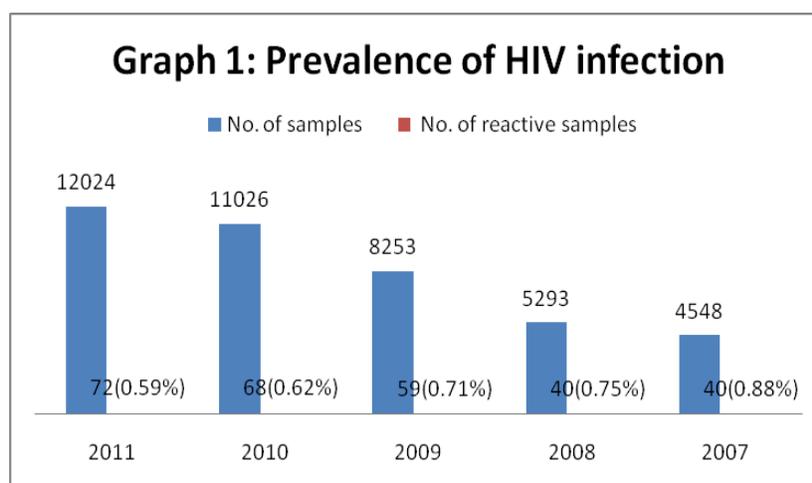
Year	OPD Patients		IPD patients	
	Total	Reactive	Total	Reactive
2011	4443	17	7581	55
2010	3806	19	7220	49
2009	2696	19	5557	40
2008	2000	5	3293	35
2007	1676	11	2872	29
TOTAL	14621	71	26523	208

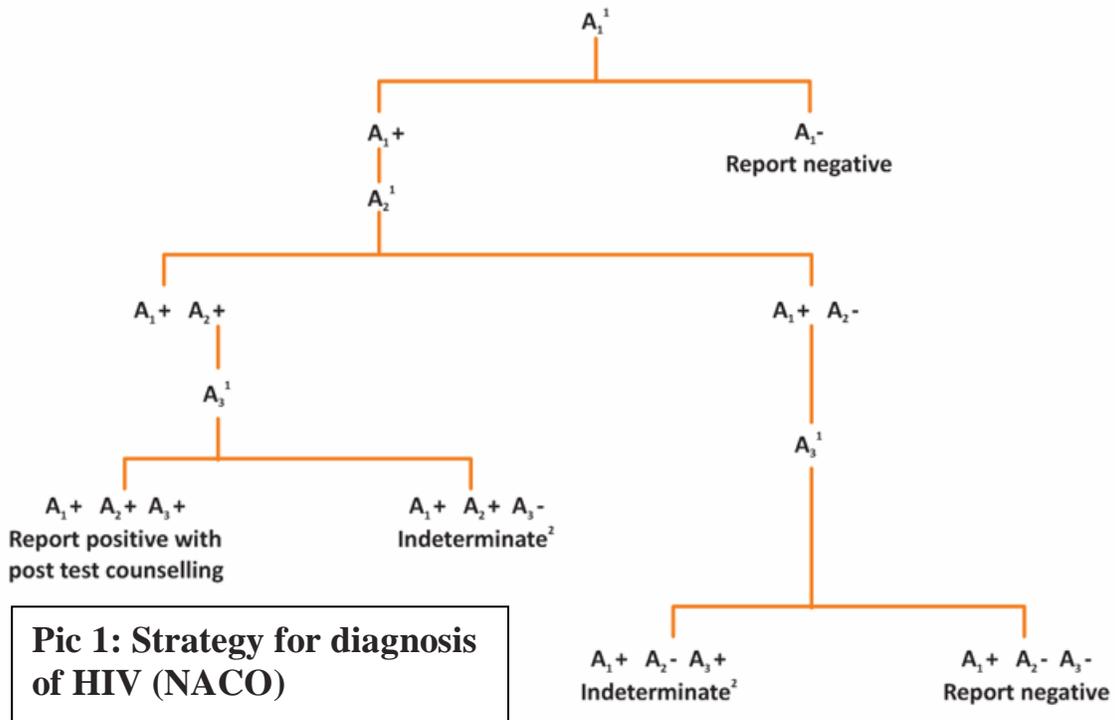
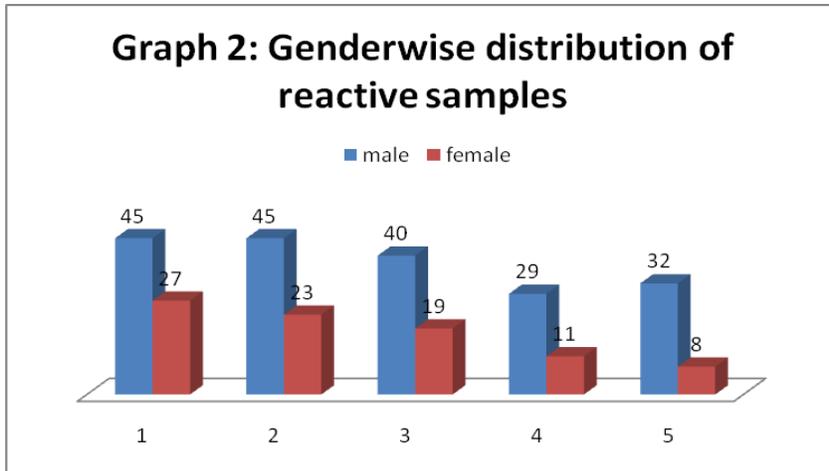
**Table.3** Genderwise distribution of reactive samples

	No. of samples	No. of reactive samples	male	female	M:F ratio
2011	12024	72	45	27	1:0.60
2010	11026	68	45	23	1:0.51
2009	8253	59	40	19	1:0.47
2008	5293	40	29	11	1:0.38
2007	4548	40	32	8	1:0.25
total	41144	279	191	88	1:0.46

**Table.4** Age wise distribution of Reactive samples

Age (Yrs)	2011	2010	2009	2008	2007	Total
< 10	3	6	2	1	1	13
11 - 20	2	1	3	1	2	9
21 – 30	22	24	18	13	19	96
31 – 40	22	21	18	15	11	87
41 – 50	14	9	12	6	3	44
51 - 60	4	3	5	4	3	19
61 & above	5	4	1	0	1	11
Total	72	68	59	40	40	279





**Pic 1: Strategy for diagnosis of HIV (NACO)**

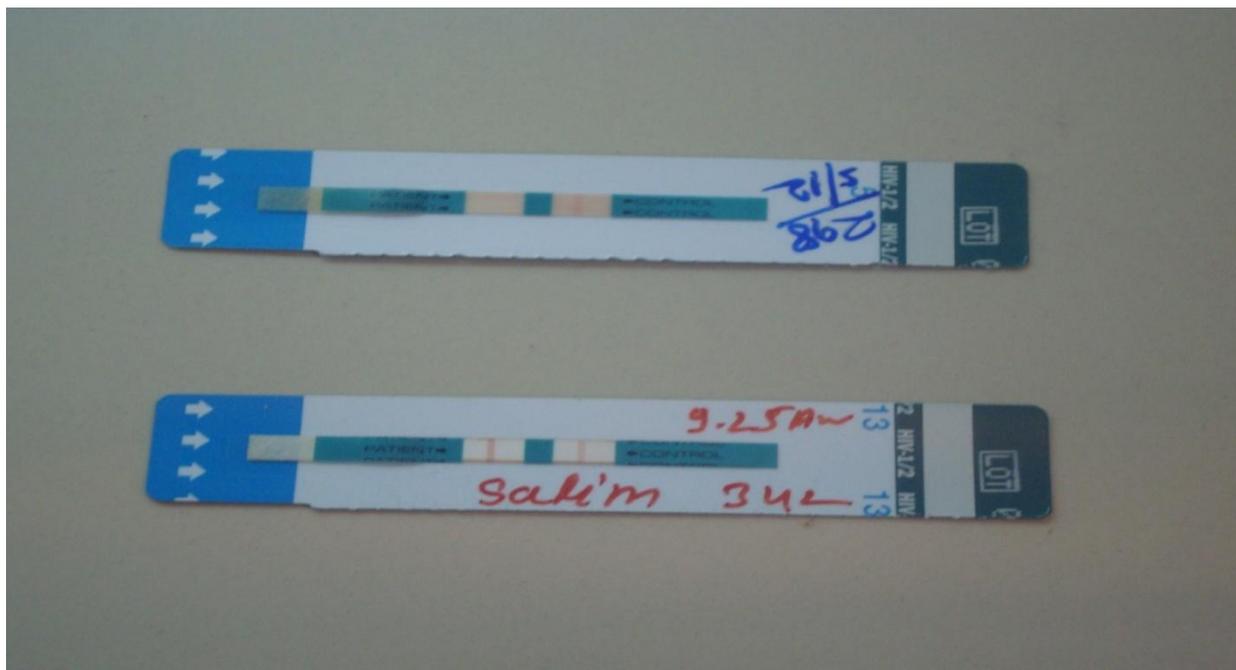
**Pic.2 ELISA**



**Pic.3 HIV TRIDOT**



**Pic.4 DETERMINE HIV ½**



In our study, we have observed that there is significant gradual increase in the percentage of reactive female patients as compare to male over a period of five years. The percentage increased from 8 out of 40 (20%) in 2007 to 27 out of 72 (37.5%) reactive samples. Similar type of trend also observed by Banke Lal Sherwal et al. (Sherwal, B.L et al, 2015) and Nitya Vyas et al (Vyas N et al, 2009). This may be attributed to either increased awareness about the disease; lesser stigma associated with it nowadays, expanded coverage and better available diagnostic facilities. Sex-wise distribution of estimated HIV infected female population in India was found to be 39%. (Basanta K et al, 2006; www.worldbank.org). There are a number of factors-biological, socio-cultural and economic, which make women and young girls more vulnerable to HIV and AIDS. The major source of infection is through heterosexual transmission and as compared to men; women are at a biological disadvantage in contracting HIV. HIV is

more easily transmitted from men to women than women to men; male-to-female transmission during sex is about twice as likely as female-to male transmission (Basanta K et al, 2006)

In this study, higher percentage of seropositivity (34.41%) was found in age group 21-30 years followed by age group 31-40 years (31.2%). The age groups ranging from 21 years to 50 years cover the (227/279) 81.36% of all seropositive patients. Sherwal et al ( Sherwal, B.L et al, 2015) found 69.2% while Nitya Vyas et al (Vyas N et al, 2009) found it 85.99% - 90.55% in age group of 15 – 49 years. As per our national figure, it is also observed that about 89% of the cases occur among sexually active persons aged 20 - 49 years. (Lal S. 2003; Park K. 2002). The Government of India estimates that about 2.40 million Indians are living with HIV (1.93 - 3.04 million) with an adult prevalence of 0.31% (2009). Children (<15 yrs) account for 3.5% of all infections, while

83% are the in age group 15-49 years. (www.worldbank.org).

In conclusion, HIV prevalence is slowly but steady declining. The HIV situation in India may not have been alarming at first glance; however, a small percentage-point rise in HIV incidence must be viewed in absolute numbers as a multiple of a billion inhabitants. The HIV infection in India is no longer confined to high-risk population such as the intravenous drug users, men who have sex with men, truck drivers and commercial sex workers. The infection is gradually spreading from urban to rural areas and from high-risk groups to women who are mostly in monogamous marriages.

There is a male preponderance over female from sexually active age group of 21 - 40 years of age. Hence we should focus on this age group especially male group for the prevalence of high rate of HIV transmission. There is a need to empower adolescent girls and women by increasing their knowledge about HIV.

India's response to the HIV epidemic and the broad social mobilization of stakeholders has achieved significant results in controlling the HIV epidemic. The achievements warrant the need for further commitment and coordinated joint action that is guided by the best available scientific evidence and technical knowledge.

## References

- Suniti Solomon and Aylur Kailasam Ganesh, HIV in India. International AIDS Society–USA Topics in HIV Medicine, Volume 10 Issue 3 July/August 2002.
- M J Mimiaga, B Thomas, K H Mayer, S L Reisner, S Menon, et al, Alcohol use and HIV sexual risk among MSM in Chennai, India. *Int J STD AIDS*. 2011 March ; 22(3): 121–125.
- K.Kalpna, Saraswati Raju Iyer, *IOSR Journal Of Humanities And Social Science (IOSR-JHSS) Volume 8, Issue 4 (Mar. - Apr. 2013), PP 29-36*
- India against AIDS: Aspiring for "AIDS Free India" | National Portal of India, www.india .gov.in, 02/01/2015
- GUIDELINES FOR HIV TESTING 2007@ National AIDS Control Organisation. Ministry of Health and Family Welfare National AIDS Control Organisation March 2007
- Ramalingam Sekar, Murugesan Amudhan, Moorthy Sivashankar, Manoharan Mythreyee, Recent trends in HIV prevalence in a remote setting of southern India: Insights into arranging HIV control policies, *J Infect Dev Ctries* 2013; 7(11):838-843.
- Sherwal, B.L., Gupta, P., Nayak, R., Gogoi, S., Suri, S. and Dutta, R. (2015) Prevalence of HIV in a TertiaryCare Centre in Delhi: A Five-Year ICTC Based Study. *World Journal of AIDS*, 5, 1-9.
- HIV declining in India; New infections reduced by 50% from 2000-2009; Sustained focus on prevention required. Government of India Ministry of Health & Family Welfare, Department of AIDS Control, National AIDS Control Organisation, Press Release, 01 Dec 2010
- Vyas N, Hooja S, Sinha P, Mathur A, Singhal A, Vyas L. Prevalence of HIV/AIDS and prediction of future trends in north-west region of India: A six-year ICTC-based study. *Indian J Community Med* 2009;34:212-7
- Basanta K. Pradhan, Ramamani Sundar, Gender Impact of HIV and AIDS in India, National AIDS Control Organisation (NACO), National Council of Applied Economic

- Research (NCAER), United Nations Development Programme (UNDP), 2006
- Lal, S. (2003) Surveillance of HIV/AIDS in India (Editorial). *Indian Journal of Community Medicine*, 27, 3-9.
- Park, K. (2002) *Park's Text Book of Preventive and Social Medicine*. 17th Edition, M/s Banarsidas Bhanot, Jabalpur, 259-267, 314-316.
- <http://www.worldbank.org/en/news/feature/2012/07/10/hivaidsindia>
- HIV Fact Sheets Based on HIV Sentinel Surveillance Data in India 2003-2006, National AIDS Control Organization Ministry of Health and Family Welfare November 2007
- Tanvi Rai, Helen S. Lambert, Annick B. Borquez, Niranjana Saggurti, Bidhubhushan Mahapatra, and Helen Ward S556 *JID* 2014:210 (Suppl 2)