

# Study of HIV Status in 400 Cases of S.T.D in Shanti ID Clinic, Vadodara, Gujarat, India

## Abstract

The prospective study was carried out for detecting the prevalence of HIV in sexually transmitted diseases (S.T.D) cases at Shanti infectious diseases clinic at Vadodara, Gujarat, India from January 2010 to May 2013. Out of 400 cases of sexually transmitted diseases, 317 (79.23 %) were males and 83 cases (20.75%) were females. Screening of HIV test was done by Elisa test and was confirmed by Western blot test. Amongst 400 cases 300 cases (75.00%) were in age group of 20 to 50 years, 34 cases (8.55%) were of 0 to 20 years, 66 cases (16.25%) were above 50 years. Out of 400 cases 87 cases (21.75%) were syphilis, 45 cases (11.25%) were chancroid, 73 cases (18.25%) were gonorrhoea, 110 cases (27.50%) were genital herpes, 11 cases (2.75%) molluscum contagiosum 44 cases (11.00%) genital scabies, 9 cases (2.25%) cytomegalovirus infection and 21 cases (5.24%) were having lymphogranuloma venereum. Out of 400 cases of sexually transmitted diseases, 67 cases (16.76%) were HIV positive, amongst which 61 cases (91.04%) were HIV1 and remaining 6 cases (8.96%) were HIV2. Although there is plausible link between STI and HIV risk, intervention studies continue to be disappointing. This does not disprove a causal link but mechanisms of action and the design and implementation of interventions need to be better understood.

**Keywords:** HIV; STD/STI; HSV2; Preventive interventions; CDC

## Research article

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**Abbreviations:** STD: Sexually Transmitted Diseases; STIs: Sexually Transmitted Infections; CDC: Center for Disease Control; HIV: Human Immunodeficiency Virus; HSV2: Herpes Zoster Virus Type 2; HPV: Human Papilloma Virus

## Introduction

Rates of sexually transmitted infections (STIs) in India and in world are on the rise. Reported cases of three nationally notifiable STDs-Chlamydia, gonorrhoea and syphilis have increased for the first time since 2006, according to data published by the Center for Disease Control (CDC) in 2014 surveillance report. Research suggest that STIs can increase both a HIV negative person's risk of become infected with HIV and HIV positive person's risk of transmitting HIV to someone else. The study explores how STIs may increase the risk of sexual HIV transmission, how STIs may be undermining our HIV prevention strategies, and what we can do about it. There is strong association between bacterial and viral sexually transmitted infections and both the acquisition and transmission of HIV infection, This was first demonstrated in case series and retrospective studies that showed an association between previous sexually transmitted infections (STIs) and human immunodeficiency virus (HIV) [1,2]. Prospective study strengthen this observation by showing a link between STI and incident HIV infection, with the strongest relative risk for genital ulcer disease but potentially large attributable risk from more common inflammatory conditions such as trichomoniasis [3]. Such evidence has continued to accumulate over the decades, but has remained difficult to interpret because of confounding due to shared risk factors, particularly sexual behavior and difficulties in determine in temporal relationships [4].

In addition to epidemiological evidence, biological findings support the mechanisms for STI increasing the acquisition and transmission through mucosal disruption, recruitment of HIV cells to genital tract and increased HIV load in plasma and genital secretions. Further synergies are described whereby HIV can alter natural history of some STI [5].

These observations together with the fact that HIV itself is sexually transmitted infection, have underpinned calls for STI management to be essential part of HIV control programs. However results of interventional studies have been disappointing. In this article we review evidence about link between STI and HIV transmission and consider implications for control program. We start with summary of recent epidemiological and modeling studies that can light on association of HIV with number of STIs including those concerning mechanisms and biological plausibility. We then favor on evidence concerning the role of herpes zoster virus type 2 (HSV2) in sexual transmission of HIV which has been thought to be key to understanding some of the disparity between earlier observational and interventional studies.

## The association between STI and HIV acquisition

The new studies and met analysis confirm the association of HIV acquisition and transmission with the recent STI, although there is considerable heterogeneity between organisms and populations as previously described [6]. Evidence of the association comes from ecological, cross sectional, case control and cohort studies. Most of these designs, with exception of cohort studies, are unable to distinguish between causation, reverse causation and confounding due to common casual pathway. 4 although

some have tried to do this through using innovative design. The ecological association between HIV and STI has been reported in U.S.A where higher rates of HIV occur in African American than white or Hispanic populations [7]. which is thought to be the part due to disproportional burden of STI in this group [8]. In Belgium study there are also overlapping epidemics in men who have sex with men (MSM) where there are high number of HIV diagnose and incident STI [9]. Similar findings are reproduced in individual-based sectional studies including African American drug using women in USA on clients of female sex worker in Mexico [10,11]. Brainstein and colleagues reviewed data of HIV incidence in sub-Saharan Africa 18 of 22 studies looking at impact of current or recent STI found an increased HIV risk, the highest HIV risk was found for HSV2- seropositive [12].

Two prospective studies of MSM in USA also showed an important increase in HIV incidence associated with STI. One cohort study found that repeated recent rectal infection with gonorrhea and Chlamydia increased the risk of HIV more than 8 fold after controlling for known and measured confounders [13]. Menza and colleagues developed a risk score model for HIV acquisition among MSM based on longitudinal study in which history or current bacterial STI was one of the strongest predictors for HIV acquisition [14]. A community based cohort of MSM in Australia also found rectal infections to be associated with incident HIV with both gonorrhea and anal warts. Significantly associated after controlling for risky behavior [15].

Two further cohort studies provide evidence for possible role of human papilloma virus (HPV) in sexual transmission of HIV. Auvert and colleagues used data from male circumcision trial in South Africa to look at association between HPV and HIV incidence [16]. After controlling for other factors, there was no association between low risk HPV and HIV but there was 4 fold increased risk in men with high risk HPV and the incidence increased with number of high-risk HPV genotypes detected, a similar finding was reported among MSM in the USA where increasing numbers of anal HPV types increased HIV risk [17].

Finally, in an extensive systemic review and meta- analysis, Boilly and colleagues summarized data from 25 study populations to estimate the risk of HIV transmission per act in heterosexuals [18]. They found that current or past genital ulcers in HIV susceptible partner increased per act infectivity fivefold compared with no STI. Taken together these observational studies confirm previous findings of strong association between STI and increased risk of HIV acquisition and showed that this occurs wide range of infections and that the strength of association and the population attributable risk varies between populations and with epidemic phase.

## Materials and Methods

This prospective study included 400 cases of sexually transmitted diseases of different age groups, attended S.T.D clinic at Shanti infectious disease clinic at Vadodara in south Gujarat state, India from January 2010 to May 2013. Vadodara is industrial city in south Gujarat at border of MP and Maharashtra. All patients were examined clinically in detail. All cases were screened for HIV status by Elisa and western blot test, Detail case history and laboratory investigations for each case were maintained.

## Results

### Age distribution

Out of 400 cases of sexually transmitted diseases 300 cases (75.00%) were in age group of 20 to 50 years, 34 cases (20.75%) were of 0 to 20 years and remaining 66 cases (16.25%) were above 50 years. In our study incidence of sexually transmitted diseases maximum in age group between 20 to 50 years (Table 1).

**Table 1:** Showing age distribution of 400 STIs.

Serial Number	Age Groups	Number of STIs Cases	Percentage
1	0-20 years	34	(20.75%)
2	20-50 years	300	(75.00%)
3	50-75 years	66	(16.25%)

### Sex distribution

Amongst 400 cases, 317 (79.23) were males and 83 cases (20.75%) were females. The incidence of sexual transmitted disease was five times more in males than females (Table 2).

**Table 2:** Showing sex distribution of 400 STIs.

Serial Number	Number of Males	Percentage	Number of Females	Percentage
1	317	79.23%	83	20.75%

Out of 400 cases, 67 cases (16.75%) were HIV positive confirmed by western blot test. Amongst 67 cases (91.04%) were HIV1 and remaining 6 cases (8.96%) were HIV2. Maximum number of sexually transmitted diseases was confirmed in the age group of 20 to 50 years more in males than females, indicating high prevalence in young adult population. Amongst 400 cases, the maximum cases were of herpes genitals 110 cases. (27.50%). The below Table 3 shows detail of type of sexually transmitted infection with percentage.

**Table 3:** Showing various types of STIs with percentage.

Sr. No.	Name of STI	Number of Cases	Percentage
1	Syphilis Primary & Secondary	87	21.75%
2	Chancroid	45	11.25%
3	Gonorrhea	73	18.25%
4	Genital herpes	110	27.50%
5	Molluscum Contagiosum	11	2.75%
6	Genital Scabies	44	11.00%
7	Cytomegalovirus Infection	9	2.25%
8	Lymphogranuloma Venereum	21	5.24%

All 67 positive cases of HIV were followed up monthly, quarterly and annually and CD4 counts were repeated quarterly and viral load was done every six months. The detail analysis of 67 HIV cases was conducted for various types of STIs involvement. The following Table 4 showing various types of STIs in 67 HIV positive cases.

**Table 4:** Showing types of STIs in 67 HIV positive cases.

Sr. No	Type of STI	Number of HIV Positive Cases	Percentage
1	Syphilis	18	26.86%
2	Gonorrhea	10	14.92%
3	Genital Herpes	31	46.26%
4	Chlamydial Infection	8	11.94%

It was observed that 31 HIV positive cases were having recurrent herpes genitalize (46.92%), 18 cases (26.86%) were having primary & secondary syphilis, 10 cases (14.92%) were having gonorrhea and remaining 8 HIV positive cases (11.94%) were having genital chlamydial infection. On further analysis amongst 67 HIV positive cases in our study 27 cases (40.29%) were HIV negative in beginning with various types of STIs and they became infected with HIV during the course of follow up. Out of these 27 HIV negative cases 17 cases were having genital herpes, 6 cases were having primary & secondary syphilis and remaining 4 cases were having gonorrhea. The following Table 5 showing HIV status amongst 400 STIs.

**Table 5:** Showing number of HIV positive cases amongst 400 STIs.

Sr. No	Number of STIs Cases	Number of HIV +Ve Cases	Percentage
1	400	67	16.75%

The following Table 6 shows types of HIV1 and HIV2 amongst 67 HIV positive cases.

**Table 6:** Showing types of HIV1 & HIV2 Amongst 67 HIV Positive Cases.

Sr. No.	Number of HIV +Ve Cases	Number of Cases HIV1/HIV2	Percentage
1	67	61/6	91.04% & 8.96%

The above table shows 67 cases (16.75%) were HIV positive amongst 400 STIs .out of 67 HIV positive cases 61 cases (91.04%) were HIV1 and remaining 6 cases (8.96%) were HIV2.

## Discussion

### How do STIs cause inflammation?

To understand how STIs increase the risk of HIV transmission, we need to understand what STIs do once they come in contact with our mouth, genitals or rectum. Sexually transmitted infections are caused by bacteria, viruses and parasites, also known as

germs. When germs enter the body, and they are recognized by the immune system, which, as part of body's response to infection, starts a process known as inflammation. This leads to symptoms associated with many STIs, such as redness, swelling and pain. The inflammatory process "activates" our immune cells to fight germs and recruits more immune cells to the site of infection, helping the body clear the germs. For example, if someone has vaginal STI, the inflammatory response will recruit more immune cells to the lining of vagina.

### How do STIs increase the risk of becoming infected with HIV?

Research suggest that HIV- negative individuals with an STI may be at increased risk becoming infected with HIV through anal sex, frontal sex (a term used by some trans people to refer to sex using genitals on the front of body) and oral sex [19]. But how do STIs increase someone's risk of HIV infection?

Scientists believe that inflammation plays an important role Inflammation increases the concentration of "activated" immune cells in the area infected with a STI. Although the inflammatory response is meant to help fight the sexually transmitted infection, HIV likes to infect some of these recruited immune cells, also known as CD4 cells. Also, HIV finds it easier to infect, and replicate in, CD4 cells that are "activated". Therefore, if someone has an STI in mouth, genitals or rectum, and that area is exposed to HIV, the higher concentration of "activated" CD4 cells facilitates HIV infection, replication and spread throughout body.

All types of STIs cause inflammation and therefore they may increase the risk of becoming infected with HIV in this way, Also , some types of STIs increase the risk of HIV infection through ulcers, which create "holes" or ways for HIV to enter the body through the mouth, genitals or rectum.

### How do STIs increase the risk of transmitting HIV?

Research suggests that HIV positive individuals with an STI may be at risk of passing HIV to someone else through anal, vaginal and frontal sex [20]. But how do STIs someone' risk of transmitting HIV?

Again, it comes down to inflammation. If a person living with HIV has an STI, then inflammation will "activate" and recruit more immune cells to the infected genitals or rectum. Some of immune cells in a person living with HIV are already infected with HIV; therefore the inflammatory response brings more HIV (contained in the infected immune cells) to the site of the STI in the genitals or rectum. Consequently, more HIV enters the body fluids in that area. For example, a vaginal STI increases the amount of virus (viral load) in vaginal fluid. Research shows that the more virus there is in the body fluids of a person living with HIV the higher the risk of passing HIV to someone else [21]. HIV also replicates, or makes more HIV, quicker in immune cells that immune cell that have been 'activated' through inflammation, compared to immune cells that are not "activated".

Research suggests that STIs are particularly prevalent among people living with HIV. A recent review of 37 studies found that, on average, 16.3% of people living with HIV were co-infected with another STI [22]. Included in the review was a Canadian study,

which enrolled people living with HIV from infectious disease clinic in Edmonton, Quebec City and Toronto; of those participants, 54% were co-infected with genital herpes [22]. Researchers also estimate that up to half of new syphilis cases in Canada occur in people living with HIV [23].

### Biological plausibility

There are several biological mechanisms thought to account for the synergy between HIV and STI epidemics. Infections that disrupt the epithelial surface of genital tract may increase acquisition through facilitate the access of establish a systemic infection. Ulcers in both partners can facilitate blood to blood contact and thereby transmission while STI in HIV infected partners can increase viral shedding in genital tract. 5 HIV1 to target cells under epithelial surface thus increasing the probability that HIV1 is able to establish a systemic infection. Ulcers in both partners can facilitate blood to blood contact and thereby transmission while STI in HIV infected partner can increased viral shedding in genital tract [5].

### The role of HSV2 in the acquisition transmission and control of HIV

Much of the recent evidence about the role of STI in transmission and control of HIV is specifically concerned with HSV2 as a major driver of some HIV epidemics. Interestingly HSV2 was not found to increase the detection of HIV in genital tract but to increase the concentration of HIV [24]. Mathematical model have indicated a major role of HSV2 in HIV transmission in Africa with PAR% of between 15 to 30% [25]. This is thought to be due to combination of HSV increasing the risk of HIV1 acquisition and once people are dually infected they become more infectious for HIV thereby fuelling the epidemic.

### Concurrent STIs and HIV acquisition

It does not really matter as the mode of transmission and many of risk factors are same. There are many advantages gained from incorporation of STI control into HIV program or rather from providing a major integrated approach preventive interventions for reproductive and sexually transmitted infections of which HIV is just one [26,27].

### Improving the control of STIS- what can we do?

Regardless the role of STIs play in HIV transmission, the management of STIs is critical. STIs can be painful, unpleasant and, in some cases, cause serious complications, such as anal and cervical cancer and infertility. Some STIs can also cause problems during pregnancy and be transmitted from pregnant women to her baby during birth.

Community-based organizations have a key role to play in preventing the spread of STIS and encouraging people to get tested and treated. Community- based organizations can contribute to control of STIs in various ways.

### Awareness campaigns

Campaigns that increase people 'awareness of the risks, symptoms and spread of STIs and of the importance of STI treatment, may help reduce the behaviors that put the people at risk and encourage regular STI testing.

### Counseling and educational workshops

During counseling and group workshops, community-based organizations can communicate key messages about the prevention and management of STIs for example:

- Condoms (female and male condoms), when used properly, are the most effective method of preventing the transmission of STIs and HIV
- If a person is involved in any type of sexual activity, it's important to get tested regularly for HIV and STIs.
- If a person test is positive for HIV they should be tested for STIs, and vice versa.
- If person suspects they are infected with STI, they must get tested and, if their test is positive, seek treatment as soon as possible. Leaving an STI untreated may not only increase their risk of HIV and STI transmission, but also make the STI more difficult to treat and may lead to other complications.
- Only some STIS are curable, they are all treatable. Management of incurable STI- such as herpes and genital warts-through treatment may help reduce inflammation and other symptoms, as well as the risk of HIV and STI transmission

### Advocacy

Advocacy may be needed to improve access to appropriate and non-judgmental sexual health services, particularly for marginalized populations and people who live in rural area.

### Conclusion

The present study indicates that screening of HIV test must be done in every STI infection, As amongst 67 cases of HIV, 61 cases (91,04%) were HIV1 and remaining 6 cases (8.96%) were HIV2. Maximum number of HIV positive cases was seen in the genital herpes (46.26% and primary, secondary syphilis (26.86%) Amongst 67 HIV positive cases 27 cases were HIV negative in beginning and later on during follow up they become infected and became HIV positive. The study concludes incidence of HIV is high in STI cases. Our study confirmed the incidence of 67 cases of HIV positive (16.75%) and HIV1 (91.04%) is more common than HIV2 in sexually transmitted infections. STIs are on rise in India, and remain an important public health problem. There is plenty of evidence to suggest that they can contribute to an overall increase in HIV transmission. Although there is mixed evidence on whether the management of STIs is an effective HIV strategy, there are several ways in which community- based organizations can help to prevent the continuing rise of STIs in this country.

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