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Original Research Article

Seroreactivity of HIV among patients attending a tertiary care hospital in North India: a retrospective analysis

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ABSTRACT

Background: HIV (Human Immunodeficiency Virus) is the causative agent of AIDS (Acquired Immunodeficiency Syndrome). It belongs to the lentivirus subgroup of the family Retroviridae. The HIV/AIDS is spreading worldwide at an alarming rate. India has the third largest number of estimated people living with HIV/AIDS. Most common mode of HIV transmission is through heterosexual contact, blood transfusion, percutaneous, mucosal and perinatal mode. The present study was done to evaluate the seroreactivity of HIV among patients attending Integrated Counselling and Testing Centre (ICTC) of our Tertiary care hospital.
Methods: This retrospective study was conducted on data of patients who had attended ICTC and undergone HIV testing from January 2017 to January 2019. A total of 4519 patients were included in the study who gave their consent followed by pre-test and post-test counseling and were screened for HIV antibody by using rapid kit Comb-Aids.
Results: Out of 4519 samples tested, 23 were reactive to HIV screening test, hence sero-reactivity of HIV was found to be 0.50%. Higher seroreactivity was seen among males (56.5%, 13/23), and patients aged 31-40 years (39.1%, 9/23). Maximum seroreactivity was found among patients of rural areas (73.9%, 17/23), indoor patients (91.3%, 21/23) and married patients (73.9%, 17/23).
Conclusions: In this study the seroreactivity of HIV was found to be low among patients attending ICTC but still HIV continues to be a major contributor to the global burden of disease. ICTC data can be used as an important tool for planning and improving the national HIV/AIDS intervention strategy.

Keywords: Comb-Aids, Human immunodeficiency virus, Retrospective, Sero-reactivity

INTRODUCTION

The Human Immunodeficiency Virus (HIV) infection is spreading worldwide at an alarming rate. India is categorized as a low prevalence nation for HIV with seroprevalence rate of less than 1% among adult population. India has the third largest number of estimated people living with HIV/AIDS (Acquired Immunodeficiency Syndrome) in the world. In NACO (National AIDS Control Organization) Technical Estimate Report it has been reported that there are an estimated 21.17 lakhs people living with HIV/AIDS of

which 6.54% are children (<15 years) with an adult prevalence of 0.26% in India.[1]

HIV transmission is 74-82% through heterosexual route, 7.4% through homosexual route, 4-7% through blood transfusion, 4-8% intravenous drug users and perinatal route in only 1.5%. With HIV/AIDS epidemic, almost 58 million peoples throughout the world have been infected with HIV and almost 22 million peoples have died due to this disease.[2]

A child can acquire HIV infection from its mother during pregnancy, labour/delivery and during breast feeding. Three drug regimens including, Tenofavir + Lemivudine + Efavirenz to all pregnant women irrespective of CD4 count and WHO stage as directed by NACO is currently practiced in India to prevent its transmission to newborn.[3]

Globally, about 3,70,000 kids were recently infected with HIV, in 2009; the over whelming majority in Sub-Saharan Africa, largely due to mother-to-child transmission. In resource-constrained settings, with little or no antiretroviral treatment, roughly one-third common fraction of HIV infected children die before one year and 0.5% die before getting on to 2 years of age.[4]

In South Africa, where the 2008 antenatal HIV seroprevalence was 29%, the child mortality rate increased from 56 per 1000 live births in 1990 to 67 per 1000 in 2008. HIV is the main contributor to the rise in child mortality, responsible for approximately 40% of under-five mortality in 2000. Between 2001 and 2006, in a rural area of northern KwaZulu-Natal, improving maternal access to Antiretroviral Therapy (ART) and Prevention of Mother-to-Child Transmission (PMTCT) interventions resulted in a 57% decline in infant mortality.[5]

Other studies in HIV seropositive persons infected for an unknown duration have reported that fever, weight loss, cough, diarrhoea, oral thrush, skin disorders and lymphadenopathy were the most commonly observed presenting symptoms. Other symptoms include Tuberculosis, herpes zoster, toxoplasmosis and cryptococcosis infection.[6]

Manipur with hardly 0.2% of India's population is contributing in HIV positive cases nearly about 8% of India's total population, with HIV prevalence rate among pregnant ladies attending Antenatal Clinic (ANC) being 1.4%.[7]

HIV infection causes rapid depletion of immune cells in the semen. This renders HIV positive men more vulnerable to Sexually Transmitted Infections (STIs), which further increases the risk of onward HIV transmission. For an HIV negative person genital ulcer provides a portal of entry to HIV and other STIs.[8]

It is very important to identify persons who required screening for HIV infection, so that HIV- infected can be identified at the earliest for therapeutic intervention, thereby delaying the inevitable disease outcome and giving them a good quality of life.[9]

Maternal to fetal HIV transmission rate varies from 20 to 25% in absence of any interventions. HIV infected infants and children progress rapidly to AIDS. This transmission of HIV from mother to child can be prevented by appropriate measures. Prevention of parent to child transmission of HIV (PPTCT) program has been launched under the National AIDS Control Programme (NACP) in year 2002.[10-12]

HIV prevalence at national level has declined 0.41% in 2001 to 0.27% in 2011. But still, India is estimated to have the third highest number of estimated people living with HIV/AIDS, after South Africa and Nigeria.[13]

In 1978, India joined other nations in signing the World Health Organization's Alma Ata Declaration, which set the goal of "Health for All by the Year 2000." The first documented HIV infection was among sex worker in Chennai, Tamil Nadu in 1986.[14]

The NACP lays maximum emphasis on the widespread reach of information, education and communication on HIV/AIDS prevention. Changing the knowledge, attitude and behaviour of people regarding HIV transmission has been used as a prevention strategy of HIV/AIDS Control Programme.[15]

Keeping in view the above facts in mind the present study was done to find out with the help of retrospective analysis the sero-reactivity of HIV among patients attending a Tertiary Care Hospital, North India.

METHODS

A hospital based retrospective study was conducted among patients who have attended Integrated Counseling and Testing Centre (ICTC) and undergone HIV testing from January 2017 to January 2019. The study was conducted in the department of Microbiology at Integral Institute of Medical Sciences and Research, Lucknow. The study was approved by Institutional Ethical Committee (IEC).

The data of HIV testing results and demographic profiles of subjects was retrieved from records maintained at ICTC and department of Microbiology of our Institute. Records of both outdoor patients (OP) and admitted Indoor Patients (IP) who attended ICTC, have undergone pre-test and post-test counseling and gave their consent for undergoing screening for Antibody to HIV by rapid kit 1 (Comb-Aids) during the study period were included in the study.

Study subjects comprised of 4519 patients whose blood samples were screened for presence of Anti-HIV antibodies during the study period.

Blood sample was taken from each patient in a sterile vacutainer vial and allowed to stand for 30 minutes to produce clot. When the serum was separated then the test was performed using kit -1, Combs Aids-RS ADVANTAGE-ST for HIV (HIV 1+2 immunodot test kit) NACO supplies (Ministry of health and family welfare, Govt. of India, through RITES LTD). All the tests were performed as per literature of kit by Arkray healthcare Pvt. Ltd. All those found reactive were referred to State Referral Centers for further testing of HIV and starting of Antiretroviral Therapy (ART).

Statistical analysis

All the data was entered in the Microsoft Excel sheet and the percentages were calculated. Chi square test was applied to test the significance of association between the HIV seroreactivity and demographic profile of the patients and p value ≤0.05 were considered statistically significant.

RESULTS

In this study out of 4519 samples tested, 23 were found to be reactive to HIV by kit 1, hence the seroreactivity to HIV was found to be 0.5% as shown in Table 1. It was found that majority of enrolled patients were males (50.1%, 2265/4519) as compared to females (49.9%, 2254/4519). Higher reactivity to HIV was also seen among male patients (56.5%, 13/23) as compared to female patients (43.5%, 10/23). However, the difference in reactivity among male and female patients was not found to be statistically significant (p=0.538) as depicted in Table 2.

Table 1: Distribution of patients according to results of HIV test kit-1 (N=4519).

Result of HIV test kit-1	Number of patients (N)	Percentage (%)
Reactive	23	0.5%
Non-reactive	4496	99.5%
Total	4519	100%

In this study, maximum number of patients belonged to age group 21-30 years (24.2%, 1102/4519) followed by age group 31-40 years (22.5%, 1018/4519) and least number of patients belonged to age group 91-100 years (0.07%, 03/4519). However, majority of HIV seroreactivity was observed among patients belonging to age group 31-40 years (39.1%, 9/23), followed by those belonging to 21-30 years (30.4%, 7/23) and least reactive patients were obtained between age group 51-60 years and age groups 61-70 years (4.3% each, 1/23), whereas, in age groups 0-10 years, 71-80 years, 81-90 years, 91-100 years none of the patients were found to be reactive to HIV test kit-1 as shown in Table 3.

Table 2: Distribution of patients according to their gender and reactivity to HIV test kit-1 (N=4519).

Gender	Result of HIV test kit-1		Total	Chi-square (χ^2) and *p value
	Reactive N (%)	Non-reactive N (%)		
Male	13(0.6%)	2252(99.4%)	2265 (100%)	
Female	10(0.4%)	2244(99.6%)	2254(100%)	$X^2 = 0.378$ Df = 1 p=0.538
Total	23(0.50%)	4496(99.5%)	4519(100%)	
* P < 0.05 was considered as statistically significant. Df = degree of freedom. N = number of patients.				

Table 3: Distribution of patients according to their age group and reactivity to HIV test kit-1 (N=4519).

Age group (in yrs.)	Result of HIV test kit-1		Total
	Reactive N (%)	Non-reactive N (%)	
0-10	0(0%)	112(100%)	112(100%)
11-20	2(0.4%)	548(99.6%)	550(100%)
21-30	7(0.6%)	1095(99.4%)	1102(100%)
31-40	9(0.9%)	1009(99.1%)	1018(100%)
41-50	3(0.4%)	769(99.6%)	772(100%)
51-60	1(0.2%)	585(99.8%)	586(100%)
61-70	1(0.3%)	301(99.7%)	302(100%)
71-80	0(0%)	64(100%)	64(100%)
81-90	0(0%)	10(100%)	10(100%)
91-100	0(0%)	3(100%)	3(100%)
Total	23(0.50%)	4496(99.5%)	4519(100%)
N = number of patients.			

In this study, majority of patients belonged to rural areas (59.2%, 2676/4519) as compared to patients from urban areas (40.8%, 1843/4519). Also, higher reactivity to HIV was seen among patients from rural areas (73.9%, 17/23) as compared to those from urban areas (26.1%, 6/23). However, this difference in reactivity among patients from rural and urban areas was not found to be statistically significant (p=0.150) as shown in Table 4.

Table 4: Distribution of patients according to their residence and reactivity to HIV test kit-1 (N=4519).

Residence	Result of HIV test kit-1		Total	Chi-square (χ^2) and *p value
	Reactive N (%)	Non-reactive N (%)		
Urban	6(0.3%)	1837(99.7%)	1843(100%)	X^2 = 2.067 Df = 1 p= 0.150
Rural	17(0.6%)	2659(99.4%)	2676(100%)	
Total	23(0.50%)	4496(99.5%)	4519(100%)	
* p<0.05 was considered as statistically significant. Df = degree of freedom. N = number of patients.				

It was found that majority of enrolled subjects were indoor patients (IP, 94.2%, 4256/4519) as compared to outdoor patients (OP, 5.8%, 263/4519). Also, higher HIV reactivity was found amongst indoor patients (91.3%, 21/23) as compared to outdoor patients (8.7%, 02/23). However, this difference in reactivity among indoor and outdoor patients was not found to be statistically significant (p=0.554) as depicted in Table 5.

Table 5: Distribution of enrolled patients according to their registration status and reactivity to HIV test kit-1 (N=4519).

Registration status	Result of HIV test kit-1		Total	Chi-square (χ^2) and *p value
	Reactive N (%)	Non-reactive N (%)		
Indoor patients (IP)	21(0.5%)	4235(99.5%)	4256(100%)	X^2 =0.348 Df =1 p=0.554
Outdoor patients (OP)	2(0.8%)	261(99.2%)	263(100%)	
Total	23(0.50%)	4496(99.5%)	4519(100%)	
* p<0.05 was considered as statistically significant. Df = degree of freedom. N = number of patients.				

In the present study, authors found that majority of enrolled patients were married (74.2%, 3352/4519), followed by unmarried patients (25.2%, 1138/4519) and least number of patients were widow (0.6%, 29/4519). Higher HIV seroreactivity was found amongst patients who were married (73.9%, 17/23), followed by those who were unmarried (26.1%, 6/23), with 0% reactivity found among widow patients as shown in Table 6.

Table 6: Distribution of enrolled patients according to their marital status and reactivity to HIV test kit-1 (N=4519).

Marital status	Result of HIV test kit-1		Total
	Reactive N (%)	Non-reactive N (%)	
Married	17(0.5%)	3335(99.5%)	3352(100%)
Unmarried	6(0.5%)	1132(99.5%)	1138(100%)
Widow	0(0%)	29(100%)	29(100%)
Total	23(0.5%)	4496(99.5%)	4519(100%)

DISCUSSION

Authors have conducted a retrospective study based on the records of patients who have attended ICTC and got screened for Anti-HIV antibodies by HIV test kit-1. The Global HIV seroprevalence rate is 0.8%. In India prevalence rate of HIV infection is around 0.3%.[1] In this study, total numbers of enrolled patients were 4519. Seroreactivity of HIV was found to be 0.5% (23 out of 4519). Another study from West Bengal reported seroprevalence of HIV to be about 0.56%.[16] Similarly, a study done from Loni, Maharashtra reported prevalence

of HIV to be 0.41%.[17] A study from Andhra Pradesh reported the prevalence of HIV to be about 0.45%.[18] Another study from Dhule, Maharashtra, reported the prevalence of HIV to be 0.44%.[19] These findings were comparable to our study. In contrast to my finding studies done from Nanded, Maharashtra and Punjab reported higher seroprevalence of HIV to be 0.76% and 1.03% respectively.[20,21]

In this study, higher seroreactivity to HIV was seen among male patients (56.5%, 13/23) as compared to female patients (43.5%, 10/23). Another study from Indore, Madhya Pradesh reported higher seropositivity among males (68.5%, 191/279) as compared to females (31.5%, 88/279).[22] This finding corroborates this study.

In present study, higher HIV seroreactivity was observed among patients belonging to age group 31-40 years (39.1%, 9/23), followed by those belonging to 21-30 years (30.4%, 7/23) and least reactive patients were obtained between age group 51-60 years and age groups 61-70 years (4.3% each, 1/23). Authors observed that similar study done in New Delhi reported maximum sero-reactivity of HIV among patients belonging to 35-49 years age group (39.2%).[23] Another study from Maharashtra reported that majority of the HIV seropositivity was seen among patients in the age group of 25-29 years (47.22%), followed by 20-24 years (30.56%) and least in the 35 years and more age group (2.78%).[24] Yet another study from Maharashtra reported that maximum number of clients tested seropositive for HIV in the age group of 31-40 years (39.09%), followed by the age groups of 21-30 years (23.11%), 41-50 years (20.37%), above 50 years (9.62%) and less than 20 years (7.85%) respectively.[25]

This study reported that majority of enrolled subjects were indoor patients (IP, 94.2%, 4256/4519) as compared to outdoor patients (OP, 5.8%, 263/4519). Also, higher HIV reactivity was found amongst indoor patients (91.3%, 21/23) as compared to outdoor patients (8.7%, 02/23). Similarly, a study from Madhya Pradesh also reported higher HIV seropositivity among indoor patients (74.6%, 208/279) as compared to outdoor patients (25.4%, 71/279).[22]

In this study authors reported that higher number of HIV seroreactive patients belonged to rural areas 59.2%, as compared to those from urban areas 40.8%. Also, higher reactivity to HIV was seen among patients from rural areas (73.9%, 17/23) as compared to those from urban areas (26.1%, 6/23). A study from Maharashtra reported that most of the HIV seropositive patients belonged to rural areas (71.1%, 27/38) as compared to those from urban areas (28.9%, 11/38) urban areas 1.35%.[21] This finding was comparable to this study.

In the present study, authors found that maximum HIV seroreactivity was found amongst patients who were married (73.9%, 17/23), followed by those who were unmarried (26.1%, 6/23), with 0% reactivity found among widow patients. A similar study from Akola, Maharashtra reported that majority of HIV seropositive clients were married (62.3%, 1339/2150), followed by those who were unmarried (13.0%, 280/2150) and widow patients (12.6%, 270/2150).[25]

CONCLUSION

The present study was done to detect the seroreactivity of HIV among patients attending ICTC of our Institute. This seroreactivity was computed for 2 years retrospectively among patients undergoing screening for HIV test. Overall HIV seroreactivity was found to be 0.5%. Maximum HIV seroreactivity was found among patients from rural areas probably due to their less knowledge about the disease. HIV seroreactivity was also found to be more among patients who belonged to sexually active age group of 31-40 years, followed by 21-30 years. Hence, there is a need for continuous efforts in the form of imparting education and promotion of safe sexual behaviours among people of this age group for the prevention and control of HIV infection. Also, data from ICTC can be used as an important tool for planning and improving the national HIV/AIDS intervention strategy.

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