

## Original Research Article

# Incidence of HIV infection in eastern Uttar Pradesh: HIV counseling and testing services record based retrospective study

Amresh Kumar Singh\*, Vivek Gaur, Ankur Kumar, Jayesh Pandey, Vandana Upadhyay

Department of Microbiology, BRD Medical College, Gorakhpur, Uttar Pradesh, India

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### \*Correspondence:

Dr. Amresh Kumar Singh,

E-mail: amesh.spggi@gmail.com

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## ABSTRACT

**Background:** India has approximately 2.4 million of people living with HIV and out of these two thirds live in rural areas. This study may yield significant data to understand epidemiology of HIV/AIDS in this region that would help in designing techniques for effective implementation to prevent this infection.

**Methods:** The present study was a comprehensive retrospective hospital-based investigation of the HIV infection in eastern Uttar Pradesh, India based on a large number of clinical samples at HCTS centre, representing different geographic regions and has been functional since 2002, conducting HIV tests, counselling of patients as well as maintains proper records.

**Results:** A total of 444 HIV positive clients were registered in this retrospective study. The male and female ratio among all positive clients was 1.67:1 and the most common age group for both the genders was 35-49 years. Among 444 HIV positive clients, HIV-TB co-infection found in 72 (16.21%) cases. Out of 444 clients, 177 (40%) and 167 (38%) found extremely immunocompromised with low CD4 cells count in range between of 0-100 cells/mm<sup>3</sup> and >100-350 cells/mm<sup>3</sup> respectively. Mortality was seen in 72 (16%) out of 444 HIV positive clients.

**Conclusions:** There is an urgent need of information, education about this disease and by providing suitable occupation or to make them aware, which will markedly help in preventing the spread of HIV pandemic in this geographical region.

**Keywords:** CD4, Human Immuno deficiency virus, HIV counseling and testing services, HIV-TB co-infection, Pandemic

## INTRODUCTION

A total 36.7 million individuals living with Human Immuno deficiency virus (HIV) in the world and among this 2.1 million were newly infected with HIV in the year 2015. Despite the fact that India is a nation with low HIV prevalence zone however, it has still been counted to be the third largest number of individuals living with HIV/AIDS (Acquired immuno deficiency syndrome)

which can end up being to be potential carrier reservoir for the communication of this infection if preventive measurements are not implemented timely.<sup>1</sup> The patterns, distribution, and determinants of HIV throughout the nation still remain largely undocumented except a few clinical researches.<sup>2</sup> HIV/AIDS is intensive among highly susceptible populations and spread heterogeneously. The major factors of HIV epidemic in India are unprotected paid sex, unsafe sex between men and intravenous drug

abusers.<sup>3</sup> The common route of transmission of HIV/AIDS among 2.1 million individuals in India nearly 89% of announced cases happening because of sexually active and financially beneficial age group in between 15-45 years. Thus, it is very crucial to maintain the balance between high risk groups and the general population for targeting HIV prevention interventions in an appropriate manner.<sup>2</sup> Families and communities, workforce disturbed, and children are orphaned due to death reported in early age group. HIV counseling and testing services (HCTS) previously it was known as ICTC (Integrated counseling and testing centre) play an important role in preventing the new incidence of HIV infection by one to one counseling, outreach activity and it also enhance the awareness to increase the access of at-risk populations to HCTS in a cost-effective manner. HCTS is an entry point to care and support services, which gives an opportunity to the people taking closer to HCTS, may increase the uptake of services while reducing transportation costs and waiting times. Further, integrating HCTS into the general health system will ensure to reduce psycho-social stress, sustainability, cost-effectiveness and facilitate the mainstreaming of HCTS. This will also ensure achievement of the national objectives of eliminating HIV.<sup>4</sup> The information created by HCTS may give essential clues to comprehend the epidemiology of the disease transmission in an explicit territory, as well as pattern of risk behavior among the population.

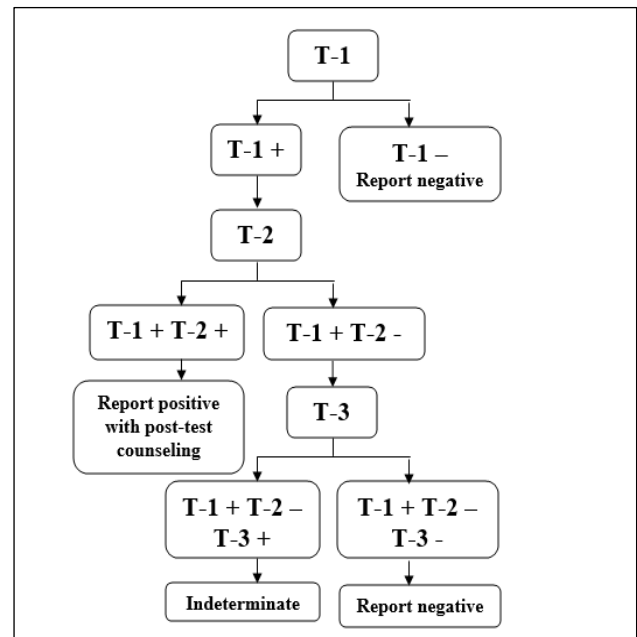
Incorporated advising and testing could be review as a cost-effective way of decreasing HIV transmission in asset of poor nation like India. Therefore, this study is embraced to know the Socio-demographic statistic profile HIV seropositive clients at HCTS centre in a tertiary care hospital in Uttar Pradesh, India. This study may yield significant data to understand epidemiology of HIV/AIDS in this region that would help in designing techniques for effective implementation to prevent this infection.<sup>1</sup>

## METHODS

The present study is a comprehensive retrospective investigation of the HIV circulating in eastern Uttar Pradesh, India based on a large number of clinical samples at HCTS centre, Department of Microbiology, Baba Raghav Das Medical College, Gorakhpur, Uttar Pradesh, India representing different geographic regions and has been functional since 2002, conducting HIV tests, counseling of patients as well as maintains proper records.

Authors analyzed a total 444 HIV positive clients from October 2016 to September 2017 and enrolled them for this study. Inclusion criteria were complete record of HIV positive clients, irrespective of age, sex, socio economic status and other demographic parameters. Exclusion criteria were incomplete record of HIV positive clients. The performa was used to collect data containing the checklist on socio-demographic characteristics of HIV

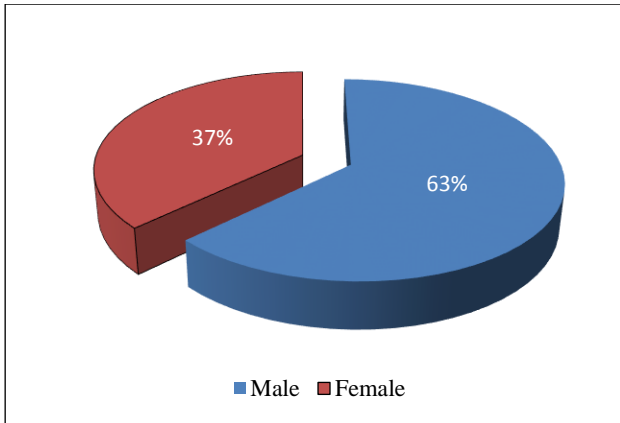
positive clients including age, sex, address, education, occupation, marital status other co-morbid conditions and parameters like HIV-TB co-infection, route of transmission, HIV status of the spouse and CD4 count at the time of registration at ART centre as per NACO guidelines.<sup>4,5</sup> HIV test was conducted at HCTS centre by using three different HIV rapid detection paper chromatography based card test as per NACO guideline.<sup>4</sup> If the patient is clinically symptomatic and suspected to have an AIDS, same blood sample is tested twice using kits with either different antigens or principles (Figure 1).<sup>6</sup> The patient is considered HIV-negative if the first test (T-1) is non-reactive and as HIV-positive when two consecutive tests (T-1 and T-2) show reactive results. When there is discordance between the first two tests (T-1 reactive and T-2 non-reactive), a third test (T-3) is done. When the T-3 is also negative individual is reported as negative. When the T-3 is reactive, it is reported as indeterminate and the individual is retested after 14-28 days.<sup>7</sup> Data was entered in excel sheet for analysis and represented in percentages, numbers and charts etc.<sup>1</sup>



**Figure 1: Diagnosis of clinically symptomatic individual.**

## RESULTS

A total of 444 HIV positive clients were registered in this study and their details assessed by using several demographic parameters, out of which 72 (16%) were died due to opportunistic infections (bacterial and fungal), liver infection, cerebral toxoplasmosis, disseminated Cytomegalovirus infection (CMV), Pneumocystis jirovecii pneumonia (PCP), non-tuberculosis mycobacterial infections and other non-infectious and infectious diseases. The male and female distribution among all positive clients was 1.67:1 as shown in Figure 2.



**Figure 2: Male/female ratio (n=444).**

Among 444 HIV positive clients, 278 (63%) were male and remaining 166 (37%) were female, the most common age group for both the genders was 35-49 years shown in Table 1, in which seropositivity for HIV was reported maximum because this age group usually stay away from their life partners/families for long duration to feed their families or for earning and employment at different places and get involved in high risk behavior and get infected with HIV, 179 (44%) spouses found concordant seropositivity out of 403 married couples and 41 were

unmarried in which 26 belongs to the pediatric age group 0-14 years. The high incidence rate of HIV among married couples clearly indicates that most of the females get infection from their husbands.

**Table 1: Age group wise distribution of HIV positive clients (n=444).**

Characteristic	Variable	Male (278)	Female (166)
Age group	0-14	15	11
	15-24	20	06
	25-34	60	37
	35-49	138	85
	>50	45	27

**Table 2: Marital status and client referral (n=444).**

Variables	Numbers	Spouse +ve	
Marital status	Married	403	179
	Unmarried	41	NA
Referral	Hospital OPD	200	
	NGO's	120	
	Self	64	
	Private health care	60	

**Table 3: Sociodemographic distribution of HIV positive clients (n=444).**

Characteristics (n=444)		Male (278)	%	Female (166)	%
Demographic distribution	Basti	04	1.43	00	00
	Deoria	13	4.67	06	3.61
	Gorakhpur	219	78.77	142	85.54
	Gopalganj	03	1.09	03	1.80
	Sant Kabirnagar	10	3.59	04	2.40
	Kushinagar	12	4.31	05	3.01
	Maharajganj	10	3.59	03	1.80
	Siddharth nagar	02	0.71	02	1.20
	Siwan	03	1.07	01	0.60
	Other places (International border of Nepal and migrants)	02	0.71	00	00
Education	Illiterate	136	48.92	103	62.04
	Primary	118	42.44	54	32.53
	Secondary	05	1.79	03	1.80
	High school	19	6.83	05	3.01
	Bachelor or higher degree	00	00	01	0.60
Occupation	Business	07	2.51	01	0.60
	Service	19	6.83	01	0.60
	Driver	11	3.95	00	00
	Student	16	5.75	11	6.62
	Agriculture labor	19	6.83	02	1.20
	Non-Agriculture labor	43	15.46	12	7.22
	Housewife/Unemployed	15	5.39	142	85.54
	Skilled worker	136	48.92	03	1.80
	Non-skilled worker	06	2.15	00	00
Route of transmission	High risk behavior	147	52.88	96	57.84
	Regular partner	131	47.12	70	42.16
HIV TB co-infection (72)		51	18.34	21	12.65

Most of the clients referred from hospital's outpatient department (45%) like from revised national tuberculosis programme (RNTCP), department of medicine, surgery, skin and tuberculosis and chest but apart from that several local bodies, NGO's and private health care centers (private nursing homes, medical laboratories and clinicians) also contributed (41%) of the total referred clients at HCTS centre, only (14%) client's visited HCTS centre voluntarily to know their HIV status (Table 2).

The demographical distribution, educational status, occupational patterns were district wise is summarized in Table 3.

Among 444 clients, 361 (81%) were tested and found HIV positive from district Gorakhpur and its periphery, only 83 (19%) were visited from other district or state because NACO has established multiple HCTS centers to serve in rural and sub-urban areas also. Out of 444 HIV positive clients, 239 (54%) clients were illiterate and 172 (39%) belongs to primary education, very few 33 (7.43%) received education at higher secondary or graduation level.

Among 444 HIV positive clients, HIV-TB co-infection found in 72 (16.21%) cases in which 51 (71%) were male and remaining 21 (29%) were female.

Diminished number of CD4 cell count in an individual demonstrates the progression of HIV disease. In this study, every single HIV positive client alluded to ART centre (anti-retroviral therapy centre) to know the progression of infection by estimating CD4 count. Out of 444 clients, 177 (40%) and 167 (38%) found extremely immune-compromised with low CD4 count in range between of 0-100 cells/mm<sup>3</sup> and >100-350 cells/mm<sup>3</sup> respectively. The remaining 100 (22%) clients are found immune competent with CD4 ranges between 350-500 cells/mm<sup>3</sup> or even more than that as seen in Figure 3.

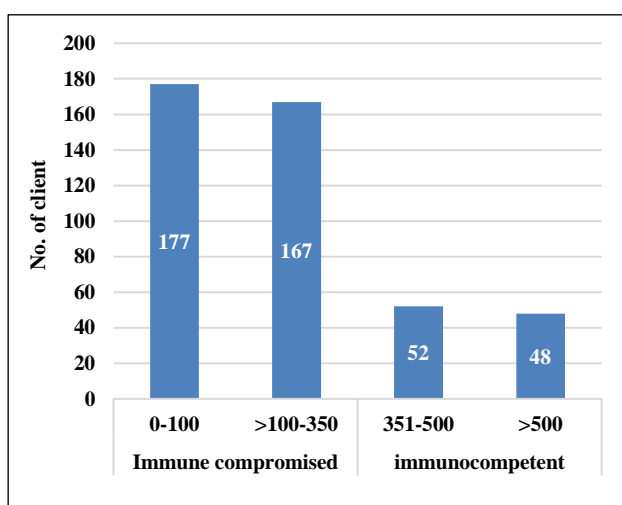


Figure 3: CD4 count (n=444).

## DISCUSSION

In present study, the mean age of HIV positive client among 444 HIV positive cases including male and female was 38 years with the predominant age group being 35-49 years which was consistent with other similar studies from India by Dutt et al, Cheenaveerappa et al, and Baig et al. Regarding mean age distribution in our study these age group are sexually active population which indicates and adverse effect on economical and reproductive age group.<sup>1,8,9</sup>

In this study, out of 444 clients, 63% were males while 37% were females with male female ratio being 1.67:1, which were similar with another HCTS, based study from Kolkata by Dutt et al.<sup>1</sup> Other studies showed prevalence of more males (73.5% in Baig et al, and 66.3% in Jha et al, than females.<sup>9,10</sup> The male preponderance can be probably explained as a result of higher incidence of risky behavior in the males in Indian scenario as well as the ignorance and stigma in female population regarding stepping forward with their health care issues.<sup>1</sup>

In present study, 444 HIV-positive clients visited to HCTS centre, BRD Medical College, Gorakhpur, Uttar Pradesh, India were counseled, in which 54% found illiterate this is more compared to other study done by Dutt et al, but found high illiteracy rate in comparison to study done by in Jha et al.<sup>1,10</sup> It may be inferred that higher education offers knowledge of prevention and awareness against HIV. Majority of positive clients among 444 belongs to rural area 316 (71%) which was similarly mentioned in other studies by Baig et al, and Cheenaveerappa et al.<sup>8,9</sup> In contrary to these findings, Jha et al, observed that most patients belonged to an urban setting (69.4%) in their study.<sup>10</sup>

Majority (65%) of subjects were employed in which 139 were skilled worker while 76 belongs to agricultural and non-agricultural group and labourer and 35% were unemployed, these findings were consistent with the observations of Jha et al, as reported the largest group of patients in his study in terms of occupation was employed but in Baig et al, only 14.50% of study individuals were unemployed which was very low as compared to this study. Low level of employment and education and lack of spouse may be reason for high incidence of HIV among them.<sup>9,10</sup>

Different Indian studies conducted by Jha et al, Cheenaveerappa et al, and Dutt et al, the proportion of married clients was largest in the study sample which were similar to this study where more than 90% study individuals are married.<sup>1,9,10</sup> Out of 403 married couples, 179 (44%) spouses found concordant which is towards lower side in comparison to study conducted by Jha et al.<sup>10</sup>

Among all the attendees, 64 (14%) study individuals visited voluntarily, while 260 (59%) were referred to the HCTS by various clinical departments and health care centers and 120 (27%) referred by non-government organizations (NGOs) which was discordant from other study done by Cheenaveerappa et al, showed 11%, 89% and 3.94% respectively.<sup>8</sup> In present study, prevalence of HIV-TB co-infection was 16.23% and 13% respectively among male and females which was very low in comparison to another study done by Dutt et al, in Kolkata in year 2017 where in the HIV-TB co-infection was found 34.4% in male and 24% female.<sup>1,11</sup>

The possible most common route of transmission of HIV was high risk behavior (55%) than regular partner (45%) as seen in both male and female positive clients (Table 2) which was very low in comparison to the study conducted by Cheenaveerappa et al, in 2011 wherein high risk behavior was 77% in both male and female.<sup>8</sup>

Majority of positive clients 40% and 38% found immunocompromised with low CD4 count in between 0-100/cumm and 100-350/cumm respectively, very few clients (22%) had high CD4 count (>350) because younger patients had a better chance of achieving these outcomes as they have good immunological response, which was more or less similar to the study done by Torti et al.<sup>12</sup> In this study, mortality rate was reported 16% (72), which was high in comparison to the study done by Dutt et al, (11.29%) and the article published in Avert Global information and education on HIV and AIDS (3.22%) in India, 2017.<sup>1,13,14</sup>

## CONCLUSION

In the present study, a total 444 HIV positive cases registered in this studies, out of which 418 were in the financially productive as well as in reproductive age group, male and female ratio was 1.67:1, which showed a male preponderance and this may lead to an incredible misfortune for the country's economy. It is very important to work on the literacy which helps in the improvement of socio-economic status of an individual as well as to understand the mode of transmission, preventive measure, severity and technicality of this disease. There is an urgent need to stop migration by providing them suitable occupation or to make them aware, which will help in preventing the spread of this pandemic.

NACO (National AIDS control organization), SACS (state AIDS control society), NGOs, local administrative bodies and local health care officials must reinforce the administrations at each point for the migrant drivers, skilled, non-skilled and labourers. Post marital relationship itself becomes a major factor for transmission of infection in those spouses who get infected by their HIV positive partner there by transmitting the disease prenatally also. The most common mode of transmission of infection was heterosexual contact with high risk behavior. It is the

need to fortify our Information training and correspondence (IEC) strategies to prevent HIV/AIDS. Thus, reinforcing on IEC, behavior change communication (BCC) must be underlined with respect to awareness especially in those high-risk group population. HIV discordant partners should be advised about physical and chemical barrier methods as well as counseling on risk behavior.

This study was conducted from the hospital-based record of HCTS from a Medical College that is situated in district Gorakhpur, Uttar Pradesh, India and clients from any area can come and get the services at free of cost. A community-based study would have been better to avoid demographic bias. Information on ART and drug resistance would have made this study more interesting.

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