Research Article

Late detection of human immunodeficiency status: An urgent need to promote early diagnosis

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Received: October 27, 2017; **Accepted:** November 22, 2017

ABSTRACT

Background: People living with human immunodeficiency (HIV) was estimated to be 21.17 lakhs in India. Early diagnosis and early treatment with antiretroviral therapy (ART) have significant effect in reducing the morbidity and mortality in these patients and also have a crucial role in reducing the occurrence of new infections in the community. **Objectives:** (1) To find the prevalence of late presentation among newly diagnosed HIV reactive, (2) to identify factors associated with late presentation, and (3) to provide recommendations to improve early diagnosis. **Materials and Methods:** A retrospective record-based study was conducted in the Integrated Counseling and Testing Centre (ICTC) center in a tertiary care teaching hospital. Details of the individuals who have undergone HIV testing in the ICTC center between January and December 2016 were noted. All the identity details of the clients were kept confidential by creating coding for each of them. The data were analyzed using descriptive statistics, and the results were presented in the form of percentages. **Results:** A total of 777 individuals were tested for their HIV status in the year 2016, and 8.36% were found to be reactive for HIV. Majority (36.9%) of the HIV reactive individuals were in the age group of 36–45 years. 35 positive clients (53.8%) were females and the rest (46.2%) were males. 58 (7.46%) individuals were newly detected as having HIV, and the rest 7 have already undergone HIV testing in other centers and knew their HIV status. Among the newly detected HIV reactive, 82.3% had their CD4 count <500 cells/cumm and were eligible to receive ART. **Conclusion:** Late presentation to the health facility was high (82.3%) among newly detected patients and hence improving early detection has to be given importance along with other prevention strategies so as to ensure early treatment for HIV.

KEY WORDS: Delay; Diagnosis; Human Immuno Deficiency; Treatment

INTRODUCTION

Human immunodeficiency (HIV) virus infection has led to an epidemic worldwide with 36.7 million people living with HIV (PLHIV) in 2015 and death of 1.1 million in the same year due to HIV related health problems.[1] Estimated number of PLHIVs in India was 21.17 lakhs in 2015 and the prevalence in reproductive age (15–49 years) was 0.26%.[2,3] After the availability of the first commercial test to detect HIV, it was used initially for screening blood units before transfusion. Later, when drugs for the treatment of HIV were shown to be effective in delaying the HIV related illness and mortality, HIV testing was introduced for the diagnostic purpose also to make decisions to start treatment with antiretroviral drugs. Tests currently available to diagnose HIV includes screening tests such as ELISA and other rapid tests, supplemental tests like western blot, indirect immunofluorescence and radioimmunoprecipitation assay, and detection of specific antigen and nucleic acid.[4] Other investigations which are indirect predictors of HIV infection

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Website: http://www.ijmsph.com	**Quick** Response code
DOI: 10.5455/ijmsph.2018.1029322112017	

are CD4 count, beta 2 microglobulin.[5] Positive predictive value of any test is low in a population with low prevalence of that disease, and hence the World Health Organization and Government Of India has evolved different strategies for diagnosing HIV in different population groups. One test strategy is used for ensuring donation safety for blood/blood products, organs and tissue transplantation. Two test strategy is followed mainly for surveillance purposes where the sample is reported as reactive when test 1 and 2 both are positive. In Strategy III, a third reactive ELISA test is required to report the sample as positive to HIV infection.[6] HIV testing in India is a voluntary process, and once an individual gives consent for HIV testing after pretest counseling, the client will be tested using National AIDS Control Organization protocol. The current testing strategy is three tests using three different systems. Once the test result is available, the result will be informed to the client after post-test counseling. If the result is negative, the individual will be counseled regarding risk reduction and behavior change. If the result is positive, information on lifestyle, nutrition, facility for treatment will be provided. The client will then be referred for CD4 test and further for initiation of HAART. CD4 testing also provides an idea to the health-care provider whether an individual is prone to develop opportunistic infections.[7] Early diagnosis and treatment also play a role in reducing new infections in the community. Since there is a link between early diagnosis, early initiation of treatment and prognosis of the patient and prevalence of new infections in the community, the present study was conducted to find the prevalence of late presentation among newly diagnosed HIV reactive and to identify factors associated with late presentation and provide recommendations to improve early diagnosis.

MATERIALS AND METHODS

A hospital based retrospective record-based study was conducted at the Integrated Counseling and Testing Centre (ICTC) located in a tertiary care teaching hospital in Tiruchirappalli district of Tamil Nadu. The hospital provides health-care services for a large sector of the population living in the rural and urban areas located nearby. The study was conducted between January and December 2016. All the clients tested for HIV status in the ICTC were included in the study. Provider-initiated, client initiated and antenatal mothers were the different types of clients who were tested for HIV in the ICTC. As per NACO guidelines, clients were given pretest and post-test counseling. Acceptance for the test was 100% voluntary and informed written consent was obtained from all the clients. Antenatal mothers were also given pretest counseling and were explained on the possibility to prevent mother to child transmission if the mother is reactive for HIV. They were also provided with the right to opt out, and informed consent was obtained. The testing strategy followed was III test procedure as per NACO guidelines. As per the institutions policy, the individuals whose report came as positive for HIV were referred to the antiretroviral therapy (ART) center in the Government Medical College Hospital located in the district headquarters of Tiruchirappalli district for further testing of the CD4 count and ART. Repeated follow-up of the clients was done through telephonic communication with them by the ICTC staff to ensure timely treatment for them. From the ART center, information regarding the CD4 counts of the patients will be sent to the ICTC center. All the records of HIV testing of the clients including personal information, their HIV status was always kept confidential. For the purpose of this study, all the personal information such as name, address of the clients, and contact number were removed, and a code number was assigned for each patient's personal information by the ICTC staff unrelated to this study before analysis to ensure confidentiality of the reports. Descriptive analysis of the data was performed, and the results are presented in the form of proportion.

RESULTS

A total of 777 individuals were tested for HIV during the study period of 1-year duration. Out of those who were tested, 65 clients (8.36%) were found to be reactive. Majority (36.9%) of the HIV reactive individuals were in the age group of 36–45 years. Almost one-fourth (26.1%) of the reactive individuals were illiterates, and the rest three-fourth were literates. Among the literate clients, majority have completed secondary school education. Literacy rate was low among females (65.7%) compared to males (83.3%). Except for a small group of reactive individuals (10.8%) all others were employed either in the form of self-employment or employed in an organizational setting. 58 (89.2%) HIV positive individuals were ever married, and 61.5% were living along with their spouse at the time of HIV testing and diagnosis [Table 1]. 35 positive clients (53.8%) were females and the rest (46.2%) were males [Figure 1].

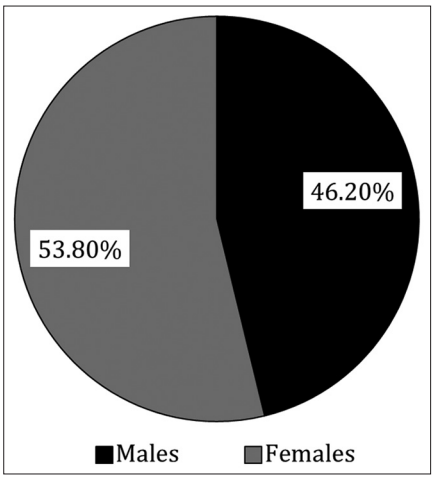

Figure 1: Gender distribution of the human immunodeficiency reactive

Among the individuals whose HIV test was positive, 7 (10.8%) have undergone HIV testing, and their HIV status was already known to them, and they were on treatment. The rest 58 (89.2%) were newly detected as HIV positive, i.e., proportion of HIV positives among the individuals tested for HIV in the ICTC was 7.46%. 58 individuals who were newly diagnosed as HIV positive were referred to ART center for next level of follow-up and treatment with drugs and supportive measures. 93% of the referred individuals have reached ART center and got registered. There were four deaths which happened among the clients. One individual died due to head injury as a result of road traffic accident, three others have gone for ART center for a further level of management and died due to opportunistic infections. Of the total 65 individuals tested for HIV status in the ICTC center, CD4 count was available for 55 (51 newly detected HIV positives and 4 already detected HIV reactive). Out of the CD4 counts available for 51 newly detected clients, 42 individuals (82.3%) had their CD4 count <500 cells/cumm and were eligible to receive ART since the NACO guideline for HAART therapy has recommended treatment for HIV positive individuals with CD4 count <500 cells/cumm for clinical Stage I and II and ART for clinical Stage III and IV irrespective of CD4 count.[8] CD4 count was <350 cells/cumm for a large group of newly diagnosed individuals (68.5%) and 66.6% had very low CD4 count of <200 cells/cumm [Table 2]. All newly diagnosed patients were referred to RNTCP division in the Government Medical College, and one patient was diagnosed to have pulmonary tuberculosis, and anti-tuberculosis treatment was started.

Table 1: Sociodemographic characteristics of the HIV positive clients

Parameters	Male	Female
Age (years)		
<15	Nil	Nil
15–25	1	3
26–35	10	4
36–45	9	15
46–55	6	10
56–65	4	3
>65	Nil	Nil
Education status		
Primary school	5	5
Secondary school	14	11
Higher secondary	5	6
Graduates	1	1
Illiterates	5	12
Occupation		
Skilled worker	1	1
Semiskilled worker	2	6
Self employed	7	1
Agricultural laborers and landholders	9	8
Non-agricultural laborers	1	7
Government/private institution employees	5	5
Truck drivers	5	-
Unemployed	-	7
Marital status		
Married and living with spouse	22	18
separated/divorce	1	2
Widowers	1	14
Unmarried	6	1
Total	30	35

HIV: Human immunodeficiency

DISCUSSION

Among the individuals visited ICTC for testing, 8.36% were found to be reactive. Majority of the HIV positive individuals (64.6%) were in the reproductive age group between 15 and 45 years. In the present study, the proportion of females were high (53.8%) compared to males (46.2%). Literacy rate among female HIV reactive (65.7%) was lower than males in this study. Unmarried clients with positive HIV test were 10.8%. In this study, 65.5% had CD4 count of <200 cells/cumm.

High proportion of HIV positive reactive among clients tested in ICTC in this study was due to HIV testing done in microbiology laboratory and blood bank also. One test strategy was followed in microbiology department and blood bank following which the individual will be referred to ICTC for confirmation using three test strategies. This method of utilizing a central laboratory reduces stratification of clients from other patients visiting the health center and hence reduces stigma. Thus, it can be used as one of the strategies to improve early diagnosis of HIV. 64% of the HIV positive individuals were in the reproductive age group. Although this is less than the findings reported by Singh and Jindwani[9] they belong to economically productive age group and late diagnosis of HIV infection among them would affect the prognosis of the disease. This indirectly affects the family level economy due to loss of wages and other indirect expenses for treatment and cure. Proportion of females was higher than males. In contrary to this other studies have reported higher proportion of male reactive.[9-12] The level of illiteracy

Table 2: CD4 counts of the reactive patients

CD4 count	Number of clients (%)
>500	9 (16.4)
401–500	9 (16.4)
301–400	1 (1.8)
201–300	12 (21.8)
101–200	16 (29.1)
50–100	7 (12.7)
<50	1 (1.8)
Total	54 (100)

in the present study was similar to the report by Singh and Jindwani.[9] Literacy rate among female HIV reactive was lower than males in this study. This would have been the reason why higher proportion of late diagnosis was noticed more among females. Lower literacy status among females was reported by another study.[9] Since HIV prevalence in general population is <1% in India, prevention has been given prime importance as core strategy for HIV/AIDS under NACP over years from NACP I till NACP IV.[3,13] In this study, 42 (82.3%) clients were eligible to receive ART based on the CD4 count. The proportion of individuals with CD4 count <500 cells/cumm was significantly higher than those who had a good CD4 count of more than 500 cells/cumm. It was observed that when HIV infection was detected, already they were in the late stage of the disease, i.e., low CD4 count. The HIV positive clients with CD4 <500 cells/cumm were less than other reports.[12] In this study, 65.5% had CD4 count of <200 cells/cumm which was much higher than reports by Alvarez-Uria *et al*.[14] and Singh and Jindwani.[9] Early diagnosis and initiation of ART at early stage of infection have been proved to reduce the prevalence of occurrence of new infection in general population also. Studies have shown that unawareness of their HIV status among positive individuals has higher risk of engaging in unprotected sexual practices which has implications in HIV transmission.[15] Reduction in new HIV infection at community level has been noticed when the viral load was low among HIV positive individuals in the community.[16] Rate of mortality was found to be high among individuals diagnosed at a stage when CD4 count was very low and late presentation was high among newly diagnosed individuals.[17,18] Positive clinical outcomes, i.e., reducing the occurrence of opportunistic infections, reduction in mortality and improving the survival and quality of life of infected persons and also reduction of transmission of new infection to HIV negative individuals occurred when the disease was diagnosed at an early stage and treatment was started at the earliest which improved CD4 count.[19,20] Early diagnosis is also given due importance by GOI and NACO. Since the inception of HIV testing facilities multiple changes have been adapted by GOI to improve the testing for HIV. The strategies include decentralization of the testing facilities to reach peripheral level health facilities and increasing the testing centers by 88% through facility integrated ICTC, stand-alone ICTC, mobile ICTC and public-private partnership ICTC.[21] In spite of all these efforts for expansion of testing facilities, the present study has showed presentation of newly diagnosed HIV positive individuals to ICTC at late stage of the disease process. This could have happened due to inadequate utilization of health facilities and ICTC centers for HIV testing services. Unlike other diseases like leprosy where the classical clinical feature of hypopigmented anesthetic patch is used to promote early diagnosis, HIV does not produce any specific sign/symptom at early stages of the disease process. At present HIV awareness messages focuses on information on modes of spread and reducing stigma and discrimination. Risk factor approach for early diagnosis in the form of stressing individuals with risk behaviors of HIV to get tested for their HIV status, e.g. "If you have the following risk factors, go to the nearest ICTC/health facility and get your blood tested for HIV," will be a useful approach for early diagnosis.

The results of the present study were the reflection of the data available at the tertiary level health-care facility. The pattern of presentation at other levels of health-care system and general community may be different from the findings of the study.

Recommendations

1. The procedure of getting informed consent may be relaxed since the clients are coming forward for testing voluntarily.
2. Promoting individuals with risk behaviors to approach testing centers to get their blood checked for HIV status.
3. Policy decision to do HIV testing for vulnerable populations such as prison inmates, residents of mental homes, and street children. Because early diagnosis and initiation of early treatment are beneficial to the individual and society as a whole.
4. For pregnant women, HIV testing may be made as a routine investigation like blood venereal disease research laboratory test.
5. HIV testing can be done as a routine investigation like testing of blood sugar for diabetes which can promote testing of HIV by liberalizing the test procedure.

CONCLUSION

With the existing system, HIV prevalence among adults is estimated at 0.26% in 2015. India has successfully achieved MDG goal of halting and reversing HIV epidemic, and HIV has become a chronic manageable disease such as diabetes and hypertension. Prevention by treatment will be achieved only when early diagnosis is done. Initiation of HAART at early stage will reduce morbidity and mortality. Relaxation of testing procedures will make us to achieve the target of 90-90-90.

REFERENCES

1. World Health Organization. Global Health Observatory Data. HIV/AIDS. Global Situation and Trends.
2. India HIV Estimations. Technical Report. National AIDS Control Organization and National Institute of Medical Statistics, ICMR. Ministry of Health and Family Welfare. Government of India; 2015 Available from: http://www.naco.gov.in/sites/default/files/India%20HIV%20Estimations%202015.pdf. [Last accessed on 2017 Apr 27].
3. Annual Report 2015-2016. National AIDS Control Organization. Department of Health and Family Welfare. Ministry of Health and Family Welfare. Government of India. Available from: http://

www.naco.gov.in/sites/default/files/Annual%20Report%20 2015-16.pdf. [Last accessed on 2017 Aug 28].
4. Sharma A, Marfatia YS. Laboratory diagnosis of HIV. Indian J Sex Transm Dis 2008;29:42-5.
5. Tsoukas CM, Bernard NF. Markers predicting progression of human immunodeficiency virus-related disease. Clin Microbiol Rev 1994;7:14-28.
6. National Guidelines for HIV Testing. National AIDS Control Organization. Ministry of Health and Family Welfare. Government of India; 2015. Available from: http://www.naco.gov.in/sites/default/files/National_Guidelines_for_HIV_Testing_21Apr2016.pdf. [Last accessed on 2017 May 07].
7. Mala E, Oberai A. Opportunistic infections in relation to CD4counts in human immunodeficiency virus seropositive patients in a tertiary care hospital in North India. CHRISMED J Health Res 2015;2:199-202.
8. National AIDS Control Organization. ART treatment. Available from: http://www.naco.gov.in/treatment. [Last accessed on 2017 May 12].
9. Singh K, Jindwani K. Clinical and demographic profile of newly detected HIV positive patients registered at anti-retroviral therapy centre of a medical college. J Clin Diagn Res 2012;6:1167-70.
10. Sarna A, Pujari S, Sengar AK, Garg R, Gupta I, Dam Jv, *et al.* Adherence to antiretroviral therapy & its determinants amongst HIV patients in India. Indian J Med Res 2008;127:28-36.
11. Jagdish C, Varsha G, Manpreet K, Nidhi S. Clinico-epidemiological profile of human immunodeficiency virus infection over a period of 3 years in a north Indian tertiary care hospital. Indian J Med Microbiol 2013;31:316.
12. Bishnu S, Bandyopadhyay D, Samui S, Das I, Mondal P, Ghosh P, *et al.* Assessment of clinico-immunological profile of newly diagnosed HIV patients presenting to a teaching hospital of eastern India. Indian J Med Res 2014;139:903-12.
13. National AIDS Control Programme. Phase IV. Strategy Document. Department of AIDS Control. Ministry of Health and Family Welfare. Government of India. Available from: http://www.naco.gov.in/sites/default/files/Strategy_Document_NACP%20IV.pdf. [Last accessed on 2017 Apr 23].
14. Alvarez-Uria G, Midde M, Pakam R, Kannan S, Bachu L, Naik PK, *et al.* Factors associated with late presentation of HIV and estimation of antiretroviral treatment need according to CD4 lymphocyte count in a resource-limited setting: Data from an HIV cohort study in India. Interdiscip Perspect Infect Dis 2012;2012:293795.
15. Marks G, Crepaz N, Senterfitt JW, Janssen RS. Meta-analysis of high-risk sexual behavior in persons aware and unaware they are infected with HIV in the United States: Implications for HIV prevention programs. J Acquir Immune Defic Syndr 2005;39:446-53.
16. Das M, Chu PL, Santos GM, Scheer S, Vittinghoff E, McFarland W, *et al.* Decreases in community viral load are accompanied by reductions in new HIV infections in san Francisco. PLoS One 2010;5:e11068.
17. Davis DH, Smith R, Brown A, Rice B, Yin Z, Delpech V, *et al.* Early diagnosis and treatment of HIV infection: Magnitude of benefit on short-term mortality is greatest in older adults. Age Ageing 2013;42:520-6.
18. Mocroft A, Lundgren JD, Sabin ML, Monforte Ad, Brockmeyer N, Casabona J, *et al.* Risk factors and outcomes for late presentation for HIV-positive persons in Europe: Results from the collaboration of observational HIV epidemiological research Europe study (COHERE). PLoS Med 2013;10:e1001510.
19. Anglemyer A, Rutherford GW, Easterbrook PJ, Horvath T, Vitória M, Jan M, *et al.* Early initiation of antiretroviral therapy in HIV-infected adults and adolescents: A systematic review. AIDS 2014;28 Suppl 2:S105-18.
20. Assen A, Molla F, Wondimu A, Abrha S, Melkam W, Tadesse E, *et al.* Late presentation for diagnosis of HIV infection among HIV positive patients in south Tigray zone, Ethiopia. BMC Public Health 2016;16:558.
21. National HIV Counseling and Testing Services (HCTS) Guidelines. National AIDS Control Organization. Basic Services Division. Government of India; 2016.

How to cite this article: Deivam S, Kumarasamy H. Late detection of human immunodeficiency status: An urgent need to promote early diagnosis. Int J Med Sci Public Health 2018;7(1):53-57.

Source of Support: Nil, **Conflict of Interest:** None declared.