

## HIV co-infection among Pulmonary Tuberculosis infected persons in and around District of Kancheepuram, Tamil Nadu, India

Vijayalakshmi T<sup>1,\*</sup>, Nithyalakshmi J<sup>2</sup>, Sumathi G<sup>3</sup>, Selvaraj Stephen<sup>4</sup>

<sup>1</sup>Tutor, <sup>2</sup>Associate Professor, <sup>3</sup>Professor, Sri Muthukumaran Medical College, Hospital & Research Institute, Tamil Nadu,

<sup>4</sup>Professor & HOD, Dept. of Microbiology, Mahatma Gandhi Medical College Hospital & Research Institute, Puducherry

**\*Corresponding Author:**

Email: viji.lakshmi00@gmail.com

### Abstract

Despite the implementation of a widely adopted strategy to control tuberculosis (TB), the disease remains a major public health problem particularly in developing country, like India. The objective of the study was to find out the prevalence of HIV co infection among pulmonary tuberculosis patients in and around District of Kancheepuram, Tamil Nadu, India. A total of 305 sputum samples were collected from clinically suspected pulmonary tuberculosis patients aged between 20-55 yrs, in a Tertiary care hospital and Research Institute Kancheepuram District, Tamil Nadu, for a study period of 1 year. Among the 305 pulmonary TB suspects, a total of 58 (19%) were identified as pulmonary tuberculosis based on culture results. All culture positive samples were subjected for HIV testing. Out of 58 TB patients, 6(10.34%) patients were reactive for HIV infection. Of the 06 serum positive samples, 3 (5.2%) males and 3 (5.2%) females had HIV and TB co infection. We recommend TB/HIV co infected patients should receive focused intervention as HIV seropositive status may influence the treatment outcome.

**Keywords:** Pulmonary Tuberculosis, HIV Co-infection, Kancheepuram, Sputum AFB smear, Sputum culture, HIV screening.

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### Introduction

India has an excellent national Tuberculosis control programme but still the disease is a burden to us. Despite the implementation of a widely adopted strategy to control tuberculosis (TB), the disease remains a major public health problem particularly in developing countries.<sup>(1)</sup> In 2011, there were 2.2 million new cases of TB (range 2.0–2.5 million) with case detection rates of less than 60%<sup>(2)</sup>. Whereas, in 2013, an estimated 9 million individuals developed TB and 1.5 million died from the disease. While TB prevalence has remained stable, TB incidence continues to rise.

The increasing rate of Human Immunodeficiency Virus (HIV) infection in many countries has had an impact on tuberculosis epidemiology. Human immunodeficiency virus and Mycobacterium tuberculosis are chronic communicable disease agents which often lead to impaired system in patients.<sup>(3,4)</sup> One third of tuberculosis patients also have HIV infection. Both the diseases interact on each other and worsen the prognosis and increase the mortality<sup>(5)</sup>.

It may be difficult to diagnose the patients with HIV and TB if the HIV status of the patient is not known. Symptoms such as fever, night sweat and recent weight loss may be noticed in the patients but are not

specific for TB. The co infection of HIV and TB in India varies widely and many studies have been reported increasing rates reflecting the spread of HIV in the general population<sup>(6,7,8)</sup>. Detection of HIV infection among TB patients offers the opportunity to deliver prompt HIV care, such as cotrimoxazole prophylaxis and antiretroviral treatment, which can reduce suffering and death. Hence, precise estimation of the burden of HIV among TB patients is thus critical to effectively monitor TB-HIV interventions. The objective of the study was to find out the prevalence of HIV co infection among pulmonary tuberculosis patients in and around District of Kancheepuram, Tamil Nadu, India.

### Materials and Methods

A total of 305 sputum samples were collected from clinically suspected pulmonary tuberculosis patients aged between 20-55 yrs, in a Tertiary care hospital and Research Institute Kancheepuram District, Tamil Nadu, India for a study period of 1 year. The study was approved by the Institutional Ethical committee (IEC) and informed consent was obtained from each patient before enrollment for the study.

**Sputum sample collection procedures:** Two sputum samples (spot, early morning) were collected from the patients in sterile wide capped containers before eating or drinking. The subjects were asked to breathe in and out deeply 2 to 4 times, to give a series of low deep coughs to raise sputum from the lungs and deposit material into the container. The containers were covered with a screw cap cover to prevent leakage, and then labeled with date and time of collection. The

sputum specimens were collected from subjects for two days each morning with 2 separate containers<sup>(9)</sup>.

**Sputum processing:** Sputum was collected and examined for the presence of acid fast bacilli by conventional Ziehl-Neelsen staining technique and culture method using Lowenstein- Jenson medium were used to diagnose pulmonary tuberculosis.<sup>(9,10)</sup>

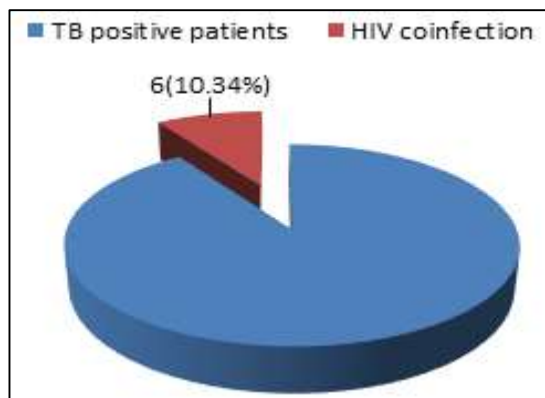
**Collection of blood samples:** Purpose and motive of subjecting blood samples for HIV test was informed to all 58 patients whose samples were smear and culture positive. After counseling, informed consent prior to sample collection was obtained. 2 ml of blood was collected aseptically and allowed to clot .Serum was separated by centrifugation and tested for antibodies to HIV by using commercial ELISA kits. Samples of all patients were retested by EIA comb kit to avoid false positive result.

**Results**

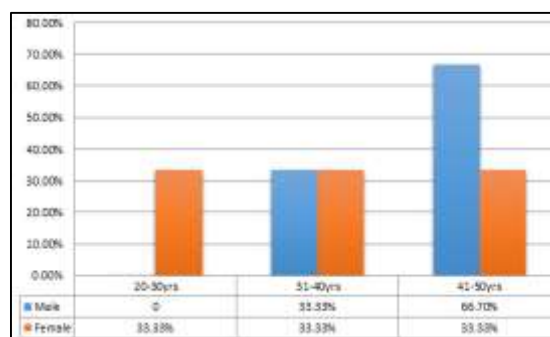
Among the 305 pulmonary TB suspects, a total of 58 (19%) were identified as pulmonary tuberculosis based on culture results. All culture positive samples were subjected for HIV testing. As given in Fig. 1, out of 58 TB patients, 6(10.34%) patients were reactive for HIV infection. Of the 06 serum positive samples, 3 (5.2%) males and 3 (5.2%) females had HIV and TB co infection. Our study shows that 6 (10.34%) patients had PTB and HIV co-infection. Comprehensive analysis of data according to gender and different age groups revealed that both male (33.3%) and female patients (33.3%) were found to have equal prevalence in age group 31-40 yrs. We observed high prevalence of co infection among males in the age group of 41-50yrs when compared to females of same age group (Fig. 2)

**Table 1: Prevalence of pulmonary tuberculosis in and around Kancheepuram**

S. No	Age (in yrs)	No. of Tb Positive cases (n=58)
1	20-30	12 (20.68%)
2	31-40	25 (43.10%)
3	41-50	21 (36.20%)
4	>51	0(0%)



**Fig. 1: Prevalence of HIV co-infection among pulmonary TB patients**



**Fig. 2: Gender wise distribution of HIV co-infection among pulmonary TB patients**

**Discussion**

In the recent past, HIV co-infection with mycobacterium tuberculosis has increased in several folds especially in sub-African countries. There is ample literature worldwide that have documented the growing association between HIV and TB<sup>(11,12,13)</sup>. TB, a public health problem, estimated to affect 3 million people every year. The prevalence of pulmonary tuberculosis in this study was 19%. This finding is in agreement with the results of a retrospective study which showed 17%<sup>(14)</sup>. Though it appears low, since the risk of spread in the community is high, this rate is considerable.

Our study shows 10.34% had HIV and Pulmonary TB co infection. This prevalence rate is comparable to a study done by Chacko *et al.*,<sup>(15)</sup> who observed 16%. A similar study in 2009 also reported 16.7% of co infection which is consistent with our findings<sup>(16)</sup>. However, HIV co-infection among TB patients in a recent study at Erode was higher (42.10%) with the co-infection rate in the current study<sup>(17)</sup>. Though we observed low rate, the prevalence of TB-HIV co-infection among the study population is still significant and worrisome.

Demographic data analysis showed 41-50 age groups of both the sexes had highest percent distribution of 50% (3 cases). However, the peak HIV prevalence in males was at 41-50 years compared with

females of same age group. This observation is consistent with the results of previous study by Ogbonnaya Anwara.<sup>(18)</sup> In contrast to our results, Dhungana *et al.*,<sup>(19)</sup> reported high TB cases in HIV positive persons with 21-30 age group.

Though, the exact mechanism and interaction by which tuberculosis accelerates the progression of HIV disease remain unclear. However, the success rate of outcome of TB treatment is significantly lower among HIV co infected than the HIV seronegative individuals<sup>(20)</sup>. It is evident from previous study that initiating antiretroviral therapy reduces the number of deaths from tuberculosis that is related to HIV infection<sup>(21)</sup>. So, knowledge about the status of HIV co infection among TB patient is necessary to initiate therapy at the earliest.

### Conclusion

This study shows that there was 10.39% of pulmonary TB patients are co infected with HIV. We recommend TB/HIV co infected patients should receive focused intervention as HIV sero positive status may influence the treatment outcome.

### References

1. WHO (2014). Global tuberculosis report. Geneva: WHO. [Cited 10 March 2015].
2. World Health Organization (2012) Global Tuberculosis Report 2012. WHO, Geneva, Switzerland.
3. Brown TT, Tassiopoulos K, Bosch RJ, Shikuma C, McComsey GA (2010). Association between systemic inflammation and incident diabetes in HIV-infected patients after initiation of antiretroviral therapy. *Diabetes Care*.33:2244-2249.
4. Houben E, Nguyen L, Pieters J (2006). Interaction of pathogenic mycobacteria with the host immune system. *Curr. Opin. Microbiol.*9(1):76-85.
5. Bevilacqua, S., C. Rabaud and May, T. 2002. HIV-tuberculosis co-infection. *Ann. Med. Interne.*153:113-118.
6. Chakaya, J., M. Uplekar, J. Mansoer, A. Kutwa, G. Karanja, V. Ombeka, D. Muthama, Kimuup, J. Odhiambo, H. Nijiru, D. Kibuga and Sitienei, J. 2008. Public-private mix for control of tuberculosis and TB-HIV in Nairobi, Kenya: outcomes, opportunities and obstacles. *Int. J. Tuberc Lung Dis.*12:1274-8.
7. Khare, K.C., 2001. HIV seropositivity in pulmonary tuberculosis patients in Indore, Madhya Pradesh. *Ind. J. Tub.* 48:153.
8. Paranjape, R.S., S.P. Tripathy, P.A. Menon, S.M. Mehendale, P. Khatavkar, D.R. Joshi, U. Patil, D.A. Gadkari and Rodrigues, J.J. 1997. Increasing trends of HIV seroprevalence among pulmonary tuberculosis patients in Pune. *India. Indian. J. Med. Res.* 106:207-211.
9. WHO (1998). Laboratory services in tuberculosis control: microscopy. Part II. Geneva: WHO.
10. WHO (1998). Laboratory services in tuberculosis control: culture. Part III. Geneva: WHO.
11. Ahmed BA, Abubakar I, Delpech V, Lipman M, Boccia D, Forde J, Antoine D, Watson JM (2007). The growing impact of HIV infection on the epidemiology of tuberculosis in England and Wales: 1999- 2003. *Thoracic* 62:672-676.
12. Thuy TT, Shah NS, Anh MH, Nghia DT, Thom D, Linh T, Sy DN, Duong BD, Chau LTM, Mai PT, Wells CD, Laserson KF, Varma JK (2007). HIV-Associated TB in an Giang Province, Vietnam, 2001-2004: Epidemiology and TB Treatment Outcomes. *PLoS one* 2(6):e507.
13. Nsubuga P, Johnson JL, Okwera A, Mugerwa RD, Ellner JJ, Whalen CC (2002). Gender and HIV-associated pulmonary tuberculosis: Presentation and outcome at one year after beginning anti-tuberculosis treatment in Uganda. *Pulm. Med.* 2:4.
14. Imam, T.S., Oyeyi, T.I., Retrospective study of Pulmonary Tuberculosis (PTB) Prevalence amongst patients attending infectious diseases hospital (IDH) In Kano, Nigeria *BAJOPS* Vol.1 number 1 December, 2008.
15. Chacko, S., T.J. John, P.G. Babu, M. Jacob, A. Kaur and Mathai, D. 1995. Clinical profile of AIDS in India: a review of 61 cases. *J. Assoc. Physici. India.*43:535-538.
16. Grace R, Pennap, Joseph N. Giyan, Angela T, Eleboda. Prevalence of Pulmonary tuberculosis among people living with HIV/AIDS (PLWHA) in Keffi and its environs.
17. John Prabakaran., M. Alagusundaram, H. Vanitha Malar, 2013. Pulmonary Tuberculosis co-infection among HIV infected persons in and around District of Erode, Tamil Nadu, India. *ISSN: 2319-7706* Volume 2 Number 5 (2013) pp. 1-7.
18. Ogbonnaya Anwara1\*, Manafa Patrick2, Chucks Edeogu3, Okeke Kelechi3, Alo Moses4 and Godwin Oka5 The prevalence of diabetes mellitus in human immunodeficiency virus seropositive subject's co-infected with mycobacterium tuberculosis.
19. Dhungana, G.P., P. Chimire, S. Sharma and Rijal, B.P. 2008. Tuberculosis co-infection in HIV infected persons of Kathmandu. *Nepal. Med. Coll. J.*10:96-99.
20. Narain, J.P., E. Pontali and Tripathy, S. 2002. Epidemiology and control strategies. *Ind. J. Tub.*49:3-6.
21. Wagley U1, Bhatta DR1, Rijal KR1, Ghimire G Distribution of *mycobacterium* species present in sputum of suspected pulmonary tuberculosis patients. *SAARC J TUBER LUNG DIS HIV/AIDS* 2014.
22. Williams, B.G., R. Granich, L.S. Chauhan, N.S. Dharmshaktu and Dye, C. 2005. The impact of HIV/AIDS on the control of tuberculosis in India. *Proc. Natl. Acad. Sci.*102:9619-9624.

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