



### Original Article

## A study of prevalence of HIV co-infection among Tuberculosis patients in Pimpri Chinchwad Municipal Corporation

Authors

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### Abstract

**Background:** Human immunodeficiency virus (HIV) is the leading cause of mortality among patients with Tuberculosis (TB) and the majority of them occur in developing countries. The aim of study is to find the prevalence of HIV status among TB patients in PCMC area.

**Materials and Methods:** The type of study was observational cross sectional study. Total 150 subjects were taken in this study. The study was conducted at the City Tuberculosis Center, Pimpri Chinchwad Municipal Corporation, Pimpri, Pune, over a period of 10 months. Subjects were taken from City TB Center, Pimpri Chinchwad Municipal Corporation, Pimpri, Pune, diagnosis was made by Serology for HIV.

**Results:** The study showed that Mean age of HIV negative was found to be 33.15, whereas HIV positive was 40.17. Frequency of HIV in TB patients was 6 out of 150 cases. Gender wise HIV negative males were 95.06%, whereas females were 97.1%, as compared to HIV positive males were 4.94%, as compared to females were 2.9%. Residential status of HIV negative was 95.51% in slum & 96.72% in urban, whereas in HIV positive 4.49% in slum & 3.28% in urban area. Treatment Category-I of TB in HIV negative was 97.03% & in Category II was 93.88%, whereas in HIV positive was 2.97% in Category I & 6.12% in Category II. There was a significant ( $p < 0.05$ ) correlation between Tuberculosis infection & HIV.

**Conclusion:** The prevalence of HIV/TB co-infection in our study was found to be 4%.

**Keywords:** HIV, Tuberculosis, Serology for HIV.

### BACKGROUND

The oldest known human remains showing signs of tuberculosis infection date back to over 9,000 years old. Tuberculosis (TB) is a specific infectious disease caused by Mycobacterium tuberculosis. The disease primarily affects lungs and causes Pulmonary TB (PTB). It can also affect intestine, meninges, bones and joints, lymph glands, skin and almost every tissues of the body. The disease is usually chronic with cardinal features like persistent cough with or without

expectoration, intermittent fever, and loss of appetite, weight loss, chest pain and hemoptysis<sup>1</sup>. However, with the discovery of sulfonamides and penicillin in the 1930s, truly effective antimicrobial therapy became a reality. Inspired by observations that soil microbes seemed capable of preventing the growth of other species<sup>2</sup>. Impressive therapeutic outcomes were seen when streptomycin, the first anti-tuberculosis drug, was introduced in 1944. There were however, many recurrences of tuberculosis thereafter, because of

the development of streptomycin-resistant bacterial strains by mono therapy <sup>3</sup>. The more widespread tuberculosis is in the patient's body, the greater the number of bacteria that are present, and the more likely it is that some of the pathogenic organisms will contain spontaneous mutations conferring drug resistance <sup>4</sup>.

In the same year, Jorgen Lehman, working in Sweden, synthesized the para-amino salt of salicylic acid (PAS). Rapidly pressed into use these two agents had clearly identifiable activity against clinical TB. Serendipitously, due to a shortage SM, the British Medical Research Council (BMRC) performed one of the first randomized clinical trials comparing PAS or SM alone with the combination of both agents. The results, which were published in 1950, demonstrated that the combination was more effective at both achieving cures and preventing acquired drug resistance <sup>2</sup>.

The need for combination therapy against tuberculosis was recognized after the introduction of Para-amino salicylic acid in 1944 and that of Isoniazid in 1952, as the rate of mutations conferring resistance to multiple drugs is very low. Furthermore, combination therapy can better reach bacteria with different levels of metabolic activity at multiple sites in the body <sup>5</sup>.

The treatment must be continued long enough to kill quiescent bacteria ("dormant persisters") as well. The next drugs to be introduced were pyrazinamide and cycloserine in 1952, capreomycin in 1960, ethambutol in 1961, and rifampicin in 1966. The introduction of rifampicin and pyrazinamide enabled a marked shortening of the duration of therapy, from 18–24 to 6 months ("short-term chemotherapy"), provided that the patient's tuberculosis is fully drug-sensitive. The recurrence rate after such treatment is less than 5% in patients who take all their medications correctly every day as prescribed <sup>5</sup>.

Drug resistance was first recognized as a major problem in 1992, when 12% of the tuberculosis patients in New York City were found to have MDR tuberculosis <sup>6</sup>. MDR tuberculosis spread

around the world because of the lack or inadequacy of tuberculosis control programs, insufficient resources, and in - adequate protective measures against infection, as well as delayed diagnosis of tuberculosis <sup>7</sup>. The special risk factors for MDR tuberculosis includes prior incomplete treatment with anti-tuberculosis drugs, Immigration from an area where MDR tuberculosis is highly prevalent, or contact with MDR tuberculosis patients, Imprisonment and Possibly, HIV infection <sup>8</sup>.

The DOTS (Directly Observed Treatment Short Course) strategy of tuberculosis treatment recommended by WHO was based on clinical trials done in the 1970s by Tuberculosis Research Centre, Chennai, India. The World Health Organization (WHO) declared TB a global health emergency in 1993, and the Stop TB Partnership developed a Global Plan to Stop Tuberculosis that aims to save 14 million lives between 2006 and 2015.<sup>9</sup>

Acquired Immunodeficiency Syndrome (AIDS) has emerged as one of the most serious public health problems in the country after reporting of the first cases in 1986. TB is a leading cause of death in HIV infected persons and HIV infection is the most potent risk factor for developing active TB disease from a latent TB infection. TB-HIV coinfection and drug resistant tuberculosis aggravate the TB situation globally. Of the 9.4 million incident cases in 2009, an estimated 1.1 million (12%) were HIV positive. Of these HIV positive cases, 78% were in the African region and 13% were in the South-East Asia region.

A better understanding of risk factors among HIV-TB patients would be useful to provide better case management. The prevalence of TB-HIV co infection is variable and periodic estimates of the same help in assessing the disease burden and in effective implementation of the control strategies.

## MATERIALS AND METHODS

The present study was conducted in the City Tuberculosis Center, Pimpri Chinchwad Municipal Corporation, Pimpri, Pune, a city of

Maharashtra State in southern part of the country of India. The city is divided into six prabhag zones and there are 4 Tuberculosis Units (TU) in the city. It was a Retrospective study. The study was carried out after clearance from the Ethical Committee. Study Population consisted of TB cases registered under City TB Center, Pimpri Chinchwad Municipal Corporation, Pimpri, Pune who are on RNTCP DOT Regime. Total 150 subject case sheets who were registered in City Tuberculosis Center, Pimpri Chinchwad Municipal Corporation, Pimpri, Pune were reviewed retrospectively from case sheet record. Data Collection - Secondary data. Study method: A list of TB patients registered under DOTS was obtained from City TB Center, Pimpri Chinchwad Municipal Corporation, Pimpri, Pune after obtaining permission from the concerned authority (CTO). Socio-Demographic characteristics such as age, gender & residential status was recorded. Risk factor such as HIV status was recorded & Treatment Category of patients was also recorded. Data collected was entered in Microsoft Excel and Epi info software, Analysis was done by using Epi

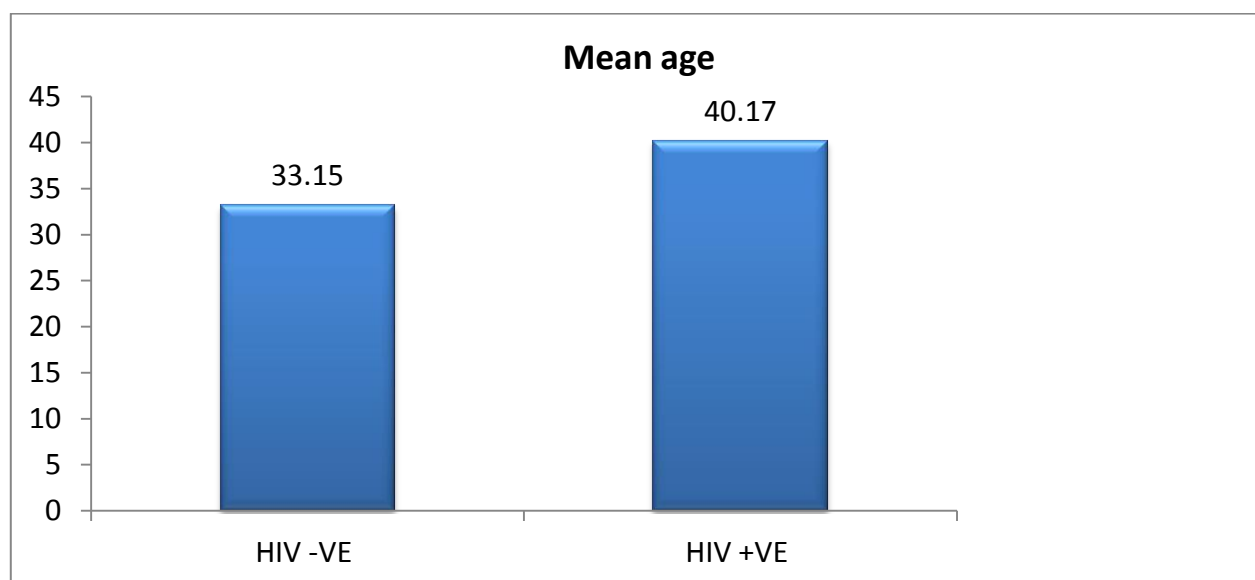
info software and by applying tests of significance.

## RESULTS

- The study showed that Mean age of HIV negative was found to be 33.15, whereas HIV positive was 40.17.
- Gender wise HIV negative males were 95.06%, whereas females were 97.1%, as compared to HIV positivemales were 4.94%, & females were 2.9%.
- Frequency of HIV in TB patients was 6 out of 150 cases.
- Residential status of HIV negative was 95.51% in slum & 96.72% in urban, whereas in HIV positive 4.49% in slum & 3.28% in urban area.
- Treatment Category-I of TB in HIV negative was 97.03% & in Category II was 93.88%, whereas in HIV positive was 2.97% in Category I & 6.12% in Category II.
- There was a significant ( $p<0.05$ ) correlation between Tuberculosis infection & HIV.

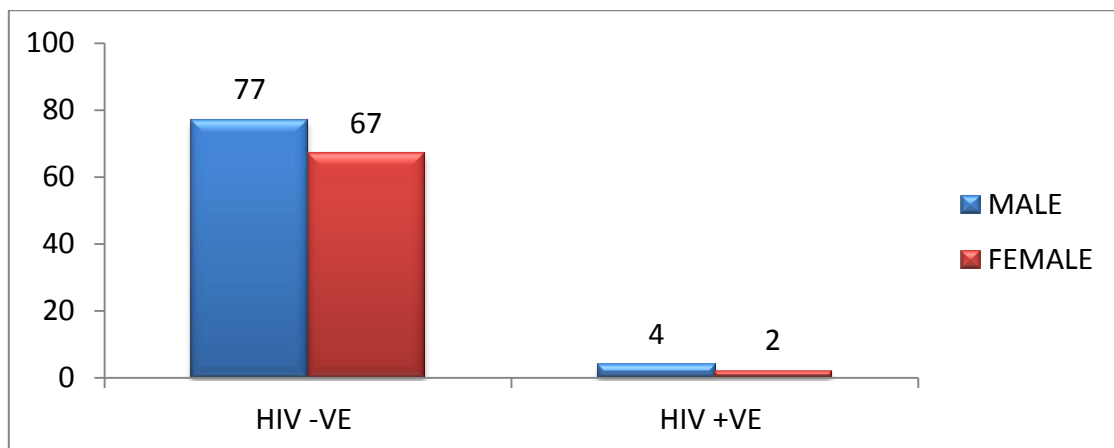
### 1. MEAN AGE AMONG STUDY POPULATION

GROUP	MEAN	STD. DEVIATION
HIV negative (144)	33.15	15.04
HIV positive (6)	40.17	11.65
Total(150)	33.43	14.95

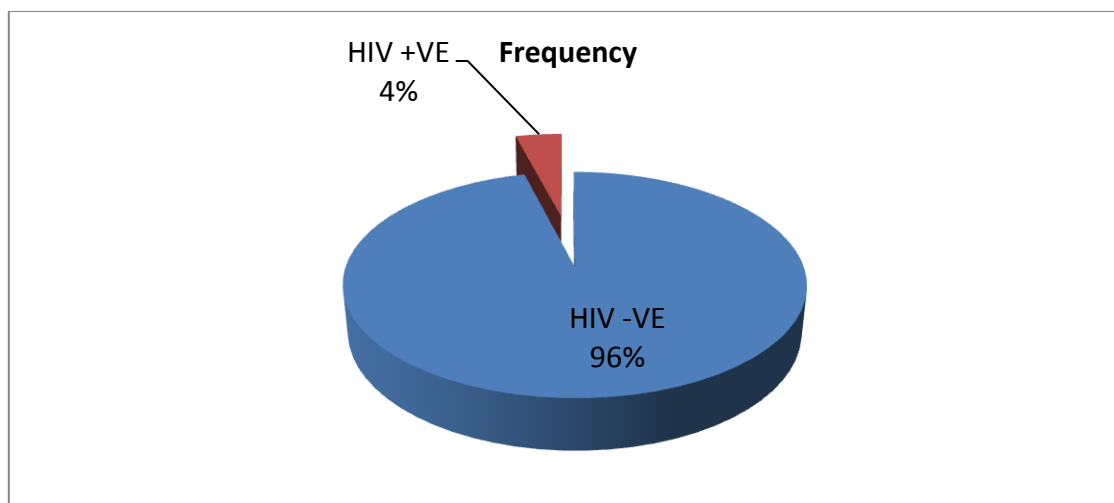


**2. GENDER WISE HIV CASES AMONG TB PATIENTS**

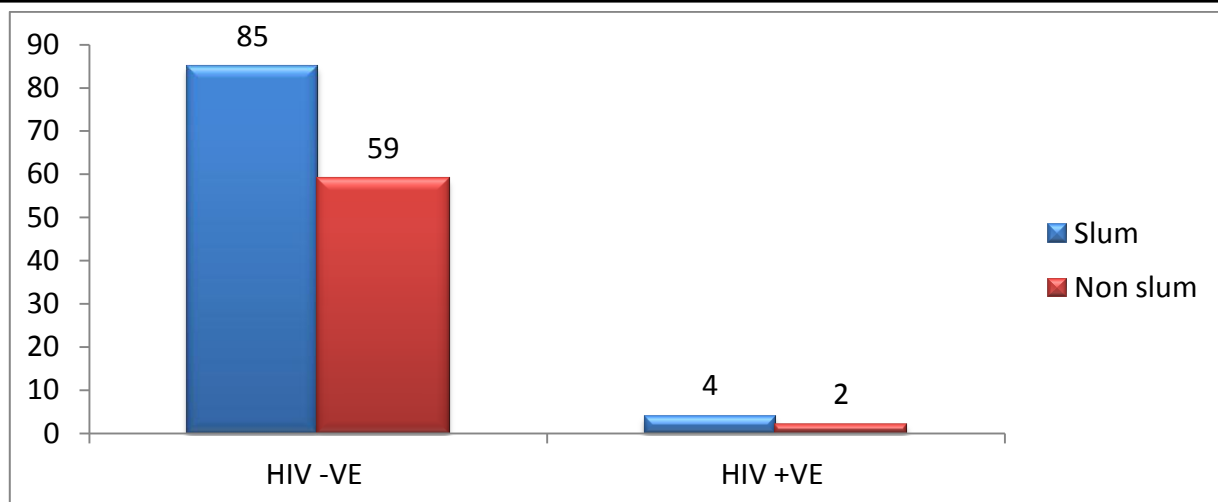
GROUP	MALE	FEMALE
HIV negative	77(95.06%)	67(97.1%)
HIV positive	4(4.94%)	2(2.9%)
TOTAL	81(100%)	69(100%)

**3. HIV STATUS AMONG TB PATIENTS**

GROUP	FREQUENCY	PERCENTAGE
HIV negative	144	96 (%)
HIV positive	6	4 (%)
TOTAL	150	100 (%)

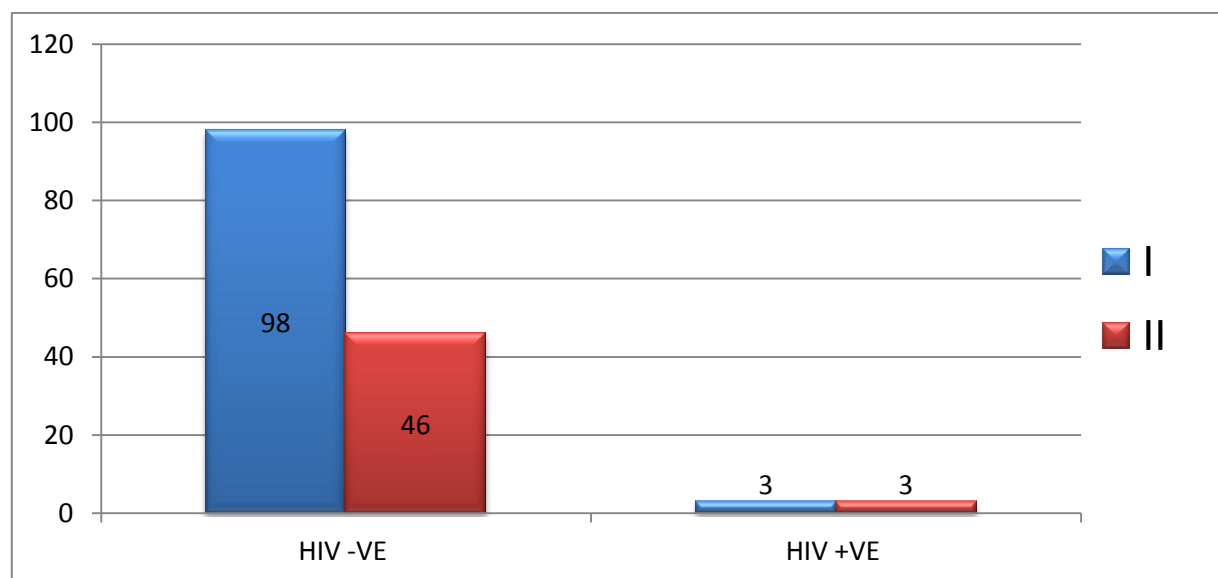
**4. RESIDENTIAL STATUS AMONG TB PATIENTS**

GROUP	SLUM	NON SLUM
HIV negative	85(95.51%)	59(96.72%)
HIV positive	4(4.49%)	2(3.28%)
TOTAL	89(100%)	61(100%)



### 5. TREATMENT CATEGORY AMONG TB PATIENTS

GROUP	I	II
HIV negative	98(97.03%)	46(93.88%)
HIV positive	3(2.97%)	3(6.12%)
TOTAL	101(100%)	49(100%)



### DISCUSSION

About 150 subject case sheets registered in City Tuberculosis Center, PCMC, Pimpri, Pune were reviewed retrospectively from case sheet record. The main finding was that Frequency of HIV in TB patients was found to be 6 out of 150 cases. Gender wise HIV negative males were 95.06%, whereas females were 97.1%, as compared to HIV positive males were 4.94%, as compared to females were 2.9%. HIV was found to be strongly associated with Tuberculosis. Patients infected

with HIV also have higher rates of mortality from the disease.<sup>10</sup> Mukesela observed that a significant association was observed between HIV/AIDS and TB<sup>11</sup>.

Eriki et al<sup>12</sup> found that 66% newly diagnosed tuberculosis patients in Kampala (Uganda) were HIV seropositive. Elliott et al<sup>13</sup> reported 60% seroprevalence among tuberculosis patients in Zambia. But, Onorato and McCray<sup>14</sup> had reported that 3.4% of the 3,077 tuberculosis patients had

HIV co-infection in U.S.A. In India too, wide variations in HIV sero-prevalence among tuberculosis patients have been observed.

Solomon et al<sup>15</sup> found 0.77% of tuberculosis patients HIV positive, in 1991 and a higher sero-prevalence, in 1993 (3.35%). Banavaliker et al<sup>16</sup> found 0.5% HIV seropositive in hospitalized tuberculosis cases while Jayaswal et al<sup>17</sup> reported 4.0% sero-prevalence in Military Hospital, Pune.

HIV – TB co infection is on the rise more so in the developing countries like India. TB accounts for about a third of deaths among patients with AIDS.<sup>18</sup> HIV infection causes a gradual depletion of cell mediated immunity and thus offers an opportunity for activation of the latent TB infection. HIV infection is found more frequently in patients with TB in comparison to non-tuberculosis chest diseases. The dual HIV & TB epidemic poses a great therapeutic challenge for the clinicians. Early diagnosis of these individual infection and screening for detection of the co infection is a crucial step in arresting the progress of these deadly dual infections by initiation of appropriate treatment. The relatively low prevalence of dual infection in our study reflects on the effective implementation of the HIV & TB control programme envisaged by the govt. of India and executed by the regional programme officers of the state of Puducherry. Further the rate is far less than in other regions of the country. A sustained effort by the people & Govt. including N.G.O.'s can bring down the rates further down to achieve the goals of the govt. of India & WHO.

### LIMITATIONS

The sample size of our study was small and comprised of only indoor patients making extrapolation to the community scenario difficult.

### CONCLUSION

The impact of dual infection of HIV & TB on the economy and public health is enormous with increased morbidity & mortality. Screening of all T.B patients for HIV & vice versa will help in

early detection and initiation of appropriate treatment at an early stage thus reducing the mortality rate.

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**CONFLICTS OF INTEREST:** There are no conflicts of interest.

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