

Original Research Article

## **Prevalence of HIV Coinfection among Pulmonary Tuberculosis Patients in a Tertiary Care Hospital Setting, Chennai**

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**Abstract:** This study was undertaken to estimate the prevalence of HIV positivity and HIV negativity among TB patients at a tertiary care hospital located in the outskirts of Chennai district, Tamil nadu. This retrospective study evaluated 151 TB patients admitted over a two year period from March 2014 to April 2016. All conventional techniques for detection of Mycobacterium TB and tests for HIV were carried out as per the standard protocol. Among the 151 patients (Male 106, female 45) diagnosed positive for pulmonary tuberculosis, the prevalence of HIV co-infection along with pulmonary tuberculosis was found positive in 8 patients (5%) and HIV test tested negative in 143 (95%) pulmonary tuberculosis patients. Dominance of HIV-positivity in tuberculosis patient was seen with male gender. Subsequently HIV reactive patients were referred to Tambaram Sanatorium HIV Centre for further affirmation of HIV as per NACO guidelines, for post test counselling and for consequent completion of treatment regime. We estimated the prevalence of HIV co-infection with TB and absence of HIV among TB patients. Our investigation recommends that it is compulsory and very significant for screening of HIV in TB patients and treatment of TB/HIV co-infection among general population. Hence, early detection of co-infection is very essential to strengthen the immune status and thereby to decrease the mortality due to HIV and its superadded Opportunistic infection.

**Keywords:** HIV; TB; pulmonary tuberculosis

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### **INTRODUCTION:**

Tuberculosis (TB) is an airborne chronic infectious disease mainly caused by Mycobacterium tuberculosis (MTB). Poverty, malnutrition, overcrowded or unsanitary living conditions, low socioeconomic status, drug abuse, cigarette smoking, alcoholism, close contact with active TB cases, human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS) and increasing numbers of homeless people are the greatest risk factors for the acquisition of active TB [1].

Tuberculosis is a common infection among HIV positive individuals. Almost one third of HIV infected patients have tuberculosis concomitantly. The rate of infection differs among the population residing in different geographical regions, depending on the rate of tuberculosis in the community [2,3].

Infection with human immunodeficiency virus type-1 (HIV) has been noted to contribute to the

resurgence of pulmonary tuberculosis (TB) in several countries, and is in fact the strongest Known risk factor for the development of TB [4]. Persons with HIV-1 infection have been estimated to be over 100 times as likely to have TB as uninfected persons [5].

Tuberculosis (TB) and human immune deficiency virus (HIV) infections are two major public health problems in many parts of the world. The prevalence of TB-HIV Co-infection is higher worldwide and 90% of these co-infected cases live in developing nations. Tuberculosis is the most common opportunistic disease and cause of the death for those infected with HIV [6].

Similarly, HIV infection is one of the most important risk factors associated with an increased risk of latent TB infection progressing to active TB disease [7] in persons infected with TB only, the lifetime risk of developing TB ranges between 10% and 20% [8].

However in persons who have been co-infected with TB and HIV, the annual risk can exceed 10%. [9].

The interaction between tuberculosis (TB) and human immunodeficiency virus (HIV) infection is complex. In the individual patient, HIV infection weakens the immune system and increases the susceptibility to TB. HIV increases the likelihood of reactivation, reinfection and progression of latent TB infection to active disease. It also alters the clinical presentation of TB, complicates the follow up and compromises the response to anti-TB treatment [10].

Tuberculosis (TB) is the most common cause of death worldwide among human immunodeficiency virus (HIV) infected persons. The World Health Organization(WHO) recommends that in countries where the prevalence of HIV infection is at least 1% among adults or 5% among TB patients, all TB patients should be offered HIV testing and all HIV-infected persons should be screened for TB disease [11].

This study was undertaken to estimate the prevalence of HIV positivity and HIV negativity among TB patients at a tertiary care hospital located in the outskirts of Chennai district, Tamil nadu. This study will help to estimate the prevalence and association of HIV positive and TB, HIV negative and TB which are essential for the development of policies and strategies to improve their effective control.

**MATERIALS AND METHODS:**

**Sample collection:**

A total of 151 sputum samples were collected from clinically suspected MTB patients, among which 8 tested HIV positive and 143 were HIV negative. Initially conventional tests were done for pulmonary TB confirmation. Following which HIV detection was done in diagnosed TB patients using Standard Protocols. These procedures were carried out at Muthu Kumaran Medical college hospital and Research Institute, from March 2014 to April 2016.

This study concentrated on the prevalence of HIV infection among TB patients. Ethical clearance was obtained from Institutional Ethical Committee.

**Inclusion Criteria**

- Clinically suspected PTB cases were included in this study

**Exclusion Criteria**

- Children below 12 years
- Patient who are not willing to participate in the study
- Patients with Extrapulmonary tuberculosis (EPTB)
- PTB patients who are already on Anti Tuberculosis Treatment (ATT)

**TB-HIV co-infection analysis**

Our hospital diagnostic services include direct sputum microscopy, routine blood tests and x-rays.

**Sputum sample collection procedures**

Two sputum samples (spot and early morning) were collected from the patients in sterile wide capped containers prior to intake of food or water 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 the sputum into the container. The containers were covered with a screw cap lid to prevent leakage, and then labeled with date and time of collection [12]. Initial sputum smears demonstrated Acid Fast Bacilli (AFB) by placing direct smear sputum on microscopy using Ziehl- Nelsen stain on atleast two occasions in line with the recommendations of WHO [13]. Concentration technique used in this study was Petroff's method [14].

**Collection of blood samples---- HIV Test**

Purpose of collecting blood samples for HIV test was informed to all patients. The study participants who wanted to know their HIV status were advised to attend the voluntary counseling and a written informed consent was obtained from all patients who were willing to participate in this study. Two ml of blood was collected aseptically and allowed to clot. Serum was separated by centrifugation and tested for antibodies to HIV 1 and 2 by using commercial ELISA ERBA Comb kits. Samples of all patients were again retested and HIV reactive patients were referred to Tambaram sanatorium [15].

**RESULTS:**

**Table-1: Prevalence of HIV positivity and HIV negativity in TB patients:**

HIV +ve and -ve patients with TB	No of patients	Percentage
HIV POSITIVE	<b>8</b> Male = 5 Female = 3	<b>5%</b> 62.5% 37.5%
HIV NEGATIVE	<b>143</b> Male = 101 Female = 42	<b>95%</b> 71% 29%

**Total samples: 151. Total male: 106, female: 45**

Of the 151 patients (Male 106, female 45) with TB admitted during the study period from March 2014 to April 2016 maximum number of patients belonged to the age group 25-50yrs.

During the study period, 5% (8) of patients with pulmonary TB were positive for HIV-1 coinfection and 95% (143) of patients were negative for HIV. Most HIV-positive patients with TB were men. The highest frequency of TB, both testing positive for HIV (Male-5) (62.5%) and negative for HIV (Male-101) (71%) coinfection, where dominant in male gender, whereas in female patients 3(37.5%) of them tested positive for HIV and 42(29%) were tested HIV negative.

The results of this work show the burden of HIV/TB co-infection. Samples of all patients were retested and HIV reactive patients were referred to Tambaram Sanatorium HIVcentre for further affirmation of HIV as per NACO guidelines, for posttest counselling and for consequent completion of treatment regime.

#### **DISCUSSION:**

HIV co-infection among TB patients is well recognized as a major public health problem. In this study, the prevalence of HIV co-infection among TB patients was 5%, and the prevalence of HIV negativity among TB patients was 95%.

However our finding, the prevalence of HIV co-infection among TB is lower than that of studies conducted in northwest Ethiopia (25%), Cambodia (12%), Nigeria (32.8%) and India (19.2%)[16-19].

This study was higher than that reported from other study carried out in India (2.96%) [20]. Whereas several published reports show rates of seroprevalence of HIV among patients with TB to be highly variable [21].

There was a comparatively high prevalence of HIV+TB in the 25- to 50-year old age group, and the prevalence of TB without HIV co-infection was also highest in this age group. Previous studies have also reported the highest prevalence of HIV infection and TB in this age group [22, 23].

In this study, the prevalence of TB with HIV (Male 62.5%, Female 37.5%) and without HIV (Male 71%, Female 29%) co-infection was higher in men than in women, and this is consistent with other studies [24, 25]. Previous studies have identified risk factors for TB, such as immigrants, HIV, poverty, incarceration, smoking and alcohol use [26,27].

In contrast to our study, other studies which reported higher rates of HIV infection among smear-negative cases as compared to smear-positive cases [19, 28, 29].

Generally, HIV prevalence surveys in Africa, Asia and Pacific showed HIV prevalence in TB patients to be many times higher than that was seen in the general population [30]. Similar to the report from Cameroon, surveillance of HIV infection in TB patients could be used as an estimate of the rate of HIV infection in the general population [31].

The dual burden of TB/HIV in populations at risk of or affected by both diseases, the World Health Organization (WHO) published a document on priority research questions in 2010 and an updated policy on collaborative TB/HIV activities in 2012, which emphasize the importance of surveillance of HIV among TB patients and surveillance of active TB patients among people living with HIV in all countries [32].

Hence, regular surveillance of HIV infection in TB patients and the general population would also help in understanding the spread of the dual infections and monitoring the performances of TB and HIV control activities [33].

According to the new UNAIDS and WHO policy released in June 2004, diagnostic HIV testing is indicated whenever a person shows signs or symptoms that are consistent with an HIV-related disease or AIDS. This concludes that HIV testing is advisable for patients with TB as part of their routine management, and the new policy in fact provides a mandate to expand testing among TB patients [34].

#### **CONCLUSION:**

Our investigation recommends that it is necessary to give importance for screening TB/HIV co-infection among general population which is also emphasized by World Health Organization that all TB patients should be offered HIV testing and all HIV-infected persons should be screened for TB disease.

Antiretroviral therapy is much helpful for treatment of both TB/HIV co-infections; therefore HIV-infected patients should receive antiretroviral therapy as early as possible. Therefore early detection of co-infection is very essential to strengthen the immune status and thereby to decrease the mortality due to HIV and its superadded Opportunistic infection.

However, knowledge about the prevalence of HIV infection in the general population and its correlation

with and without the HIV infection in TB patient is partial in our locality.

This study will help in preventing spread of TB and HIV in the community. It is preferable that TB/HIV patients should receive focused intervention as HIV seropositive status may influence the treatment outcome and should continuously struggle towards improving preventive and control measures to reduce risk of transmission of tuberculosis among general population.

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