

**Original article:**

**A cross sectional hospital based study to estimate prevalence of human immuno deficiency virus infection in pulmonary tuberculosis patients at respiratory diseases hospital, tertiary care center, Bikaner**

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**ABSTRACT**

**Introduction:** In India where prevalence of tuberculosis is high and problem of emergence of multidrug resistant strain of mycobacteria, there may be a blast in the number of patient of tuberculosis in presence of HIV infection and AIDS in the coming year.

**Objectives:** 1) To estimate the prevalence of human immunodeficiency virus infection in pulmonary tuberculosis patients. 2) To study the drug sensitivity pattern using CBNAAT in HIV-TB patient.

**Methodology:** Present study was conducted at Department of Pulmonary Medicine, S.P. Medical College, Bikaner as hospital based cross sectional study including 422 presumptive tuberculosis cases. Their sociodemographic details as well as clinical history, ATT, HIV infection details were recorded and data were analysed with help of SPSS 22.0 software.

**Results:** In the present study, among 422 patients, 301 (71.33%) were males and 121 (28.67%) were female, majority (25.36%) of the patients were in the age group of 20 to 30 years, 30(7.11%) patients reported at least 1 lifetime commercial sex experience, 91.94% of patients were recorded as sputum smear AFB positive, 97.16% of patients were HIV sero-negative. High risk behaviors (Commercial Sex Worker) were present in 4.63% of patients in the HIV sero-negatives compared to 91.67% in HIV sero-positive group (p=0.000). Among HIV sero-positive group 83.34% were showing sensitivity towards treatment with CBNAAT. Loss of weight and diarrhea symptoms was more predominant in HIV sero-positive patients compared to HIV sero-negative (p<0.05).

**Conclusion:** 2.84% TB patients were HIV sero-positive and out of them 83.34% were sensitive towards treatment therefore universal HIV testing of TB patients as well as monitoring of anti-tuberculosis drug resistance pattern is crucial for the control of HIV-TB.

**Keywords:** Pulmonary TB, HIV, Seropositivity, Drug sensitivity

**INTRODUCTION:**

Tuberculosis is an infection with Grams' positive bacilli- Mycobacterium tuberculosis which can occur in any organ of the body but specially affects pulmonary system as primary tuberculosis. It is one of the most common infectious diseases worldwide. In late 1980's tuberculosis was back in to the action in those countries (developed) where it was nearly eradicated and number of tuberculosis patient was also increased in developing

countries. The causative agent of this reversion in trend was its association with human immune deficiency virus (HIV) infection<sup>[1]</sup>

The **human immunodeficiency virus (HIV)** is a lentivirus (a subgroup of retrovirus) that causes HIV infection and over time acquired immunodeficiency syndrome (AIDS)<sup>[2,3]</sup>

Tuberculosis (TB) is the commonest opportunistic infection among HIV-infected individuals. Further it is also known that TB being a major public health problem in India accounts for 20-25% of deaths among PLHIV. It is known that nationally about 5% TB patients registered under the Revised National Tuberculosis Control Programme (RNTCP) also have HIV infection. In high prevalent states and districts, positivity among TB patients is more than 10% and is as high as 40% in selected districts. Thus, while the country is dealing effectively with HIV burden, TB associated HIV epidemic is posing a great challenge.<sup>[4]</sup>

The adult HIV prevalence at national level has continued its steady decline from an estimated peak of 0.38% in 2001-03 through 0.34% in 2007 and 0.28% in 2012 to 0.26% in 2015. The total number of People Living with HIV (PLHIV) in India is estimated at 21.17 lakhs (17.11 lakhs–26.49 lakhs) in 2015 compared with 22.26 lakhs (18.00 lakhs–27.85 lakhs) in 2007<sup>[5]</sup> People Living with HIV (PLHIV), In Rajasthan is 1.03 lakhs<sup>[5]</sup>

Though India is the second-most populous country in the world one fourth of the global incident TB cases occur in India annually. As per WHO Global TB Report, 2015, out of the estimated global annual incidence of 9.6 million TB cases, 2.2 million were estimated to have occurred in India.<sup>[6]</sup>

In India where prevalence of tuberculosis is high and problem of emergence of multidrug resistant strain of mycobacteria, there may be a blast in the number of patient of tuberculosis in presence of HIV infection and AIDS in the coming year.

In the light of above facts, present study was planned to estimate the prevalence of human immunodeficiency virus infection in pulmonary tuberculosis patients and drug sensitivity pattern using CBNAAT in HIV-TB patients in department of pulmonary medicine, S.P. Medical College, Bikaner (Rajasthan).

#### **MATERIAL AND METHODS:**

The study was conducted in the Department Of Pulmonary Medicine, S.P. Medical College Bikaner in patients reported to hospital in OPD or admitted in ward. This was a hospital based cross sectional study. All age and sex matched presumptive tuberculosis cases (422 cases) who were diagnosed as pulmonary tuberculosis by microbiological or radiological criteria, reported to hospital in OPD or admitted in ward during study period.

Detail clinical history was elicited specially the history of anti-tubercular treatment in the past and history suggestive of HIV infection including chronic diarrhea and disproportionately ill and to categorize patient those who were at high risk for HIV infection

Every patient with history or physical finding suggestive of tuberculosis had a routine investigation such as CBC, ESR, CHEST X-ray, SPUTUM FOR AFB, and CBNAAT if required. Standard Ziehl-Nelson staining/Fluorescence staining was performed with due protocol. All smear negative and Presumptive DRTB samples were subjected to CBNAAT.

All the patients included in the study were screened for HIV antibodies. The meaning and implication of this test was explained and written consent was obtained prior to HIV testing. The diagnosis of pulmonary tuberculosis was made prior to HIV testing in all patients. For detection of HIV infection, we followed strategy II (B) of the

National HIV testing strategies. In this study we use rapid tests was based on the principle of enzyme immunoassay, immuno-chromatography (lateral flow), immuno-concentration/dot-blot assays (vertical flow). To study the sensitivity pattern, Cases show reactive results according to strategy II (B) were get a CBNAAT.

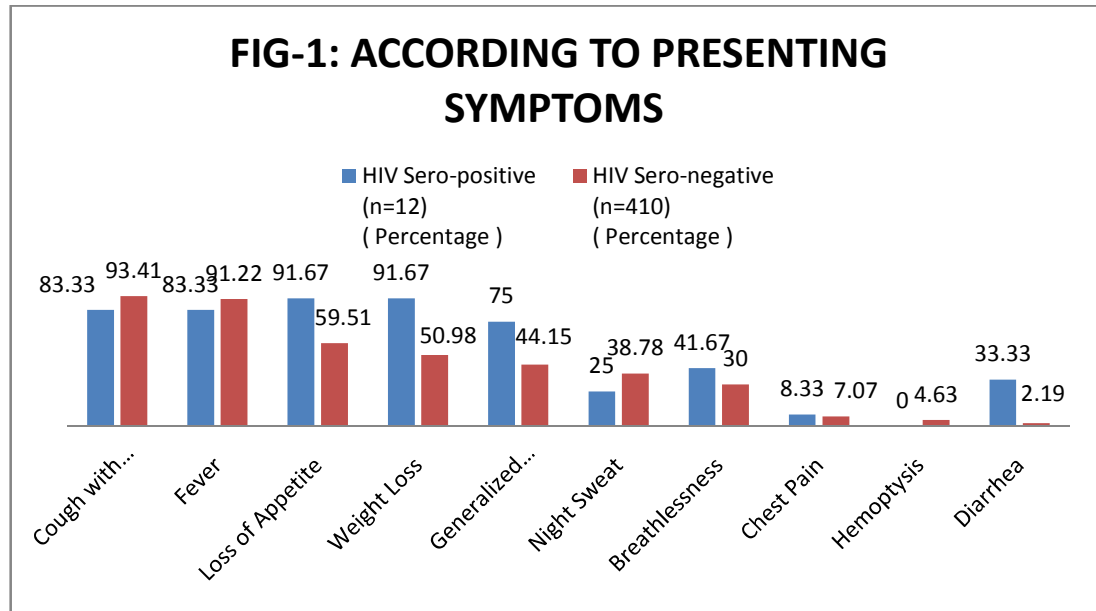
**RESULTS:**

In the present study, among 422 patients, 301 (71.33%) were males and 121 (28.67%) were female, majority (25.36%) of the patients were in the age group of 20 to 30 years. 30(7.11%) patients reported at least 1 lifetime commercial sex experience, 91.94% of patients were recorded as sputum smear AFB positive, 97.16% of patients were HIV sero-negative. High risk behaviors (Commercial Sex Worker) were present in 91.67% in HIV sero-positive group. Loss of weight and diarrhea symptoms was more prominent in HIV sero-positive patients compared to HIV sero-negative ( $p < 0.05$ ).

In the present study, there were 12 patients who were HIV sero-positive out of 422 patients. Out of 12 TB-HIV patients, 10 patients (83.34%) showed drug sensitive pattern, one patient (8.33%) showed drug resistant pattern in CBNAAT test 1 patient was not detected as he was detected as military Tuberculosis case, diagnosed by Clinical, Radiological & Tuberculin Skin test. **(Table-2)**

In the present study, male patients comprised of 70.49% in the HIV sero-negatives, 20.73% of patients were aged between 31 to 40 years in the HIV sero-negatives compared to 50% in HIV sero-positive group. This difference was statistically significant ( $p = 0.038$ ). High risk behaviors (Commercial Sex Worker) were present in 4.63% of patients in the HIV sero-negatives compared to 91.67% in HIV sero-positive group, this difference was statistically significant ( $p = 0.001$ ). 64.88% of patients among HIV sero-negative had upper zone involvement compared to 25% in HIV sero-positives, 66.67% of patients among HIV sero-positive had middle and lower lobe involvement compared to 8.29% in the HIV sero-negatives. This difference was statistically significant. ( $p < 0.05$ ). **(Table-3)**

Majority of the patients presented with cough with expectoration, fever, night sweats, loss of weight, loss of appetite and generalized weakness. Loss of weight and diarrhea symptoms was more predominant in HIV sero-positive patients compared to HIV sero-negative. This difference between the two groups was statistically significant. Loss of appetite and generalized weakness was more predominant in HIV sero-positive patients compared to HIV sero-negative. (Fig-1)



**Table-1: Prevalence of Sputum Smear Positivity & HIV Test Positivity among Pulmonary TB Patients**

Sputum Smear for AFB	No. of Patients	Percentage (%)
Positive	388	91.94
Negative	34	8.06
<b>HIV Test</b>		
Positive	12	2.84
Negative	410	97.16

**Table-2: Drug Sensitivity Pattern in TB-HIV Patients**

Drug Sensitivity Pattern	No. of Patients	Percentage (%)
Sensitive	10	83.34
Resistant	1	8.33
Not Detected*	1	8.33
Total	12	100

{\*- Miliary TB= Diagnosed by Clinical, Radiological & Tuberculin Skin test}

**Table-3: A Comparison of Clinical and Radiological Profile among HIV Sero-positive and HIV Sero-negative Patients**

Parameters		HIV Sero-positive (n=12)		HIV Sero-negative (n=410)		P Value
		Number	Percentage	Number	Percentage	
Sex	Male	12	100	289	70.49	----
	Female	0	0	121	29.51	----
<b>Age (yrs)</b>						
<20		0	0	18	4.39	0.986
20-30		2	16.67	105	25.61	0.715
31-40		6	50	85	20.73	0.038
41-50		2	16.67	77	18.78	0.849
51-60		2	16.67	63	15.37	0.777
>60		0	0	62	15.12	0.296
<b>Occupation</b>						
Farmer		3	25	146	35.61	0.652
Labourer		6	50	103	25.12	0.108
Office Worker-Govt		0	0	8	1.95	0.558
Office Worker(Pvt.)		1	8.33	7	1.71	0.558
Driver		1	8.33	12	2.93	0.825
House wife		0	0	108	26.34	0.084
Student		0	0	26	6.34	0.771
Unemployed		1	8.33	0	0	0.005
<b>Risk-Behaviors</b>						
Com. Sex Worker		11	91.67	19	4.63	0.000
Non C. Sex Worker		1	8.33	9	2.19	0.678
Blood Transfusion		0	0	28	6.83	0.727
<b>Sputum Smear for AFB</b>						

Positive	5	41.67	383	93.41	
Negative	7	58.33	27	6.59	
<b>X-ray finding</b>					
Infiltration/ Exudation	10	83.33	284	69.27	0.468
Cavitation	2	16.67	202	49.27	0.053
Fibrosis	0	0	127	30.98	0.047
Miliary Mottling	1	8.33	4	0.98	0.333
Hilar Adenopathy	4	33.33	28	6.83	0.004

**DISCUSSION:**

The current study found a low rate of HIV infection among TB patients registered at PBM hospital. The HIV/TB co-infection rate in this study was lower than those reported from Brazil (19 %), and the national co-infection rate (11.0 %).<sup>[7,8,9]</sup> This data indicating that PBM area is among low HIV-prevalent settings, which are characterized by HIV prevalence of lower than 5 % among tuberculosis patients.<sup>[10]</sup> The lower prevalence of HIV–TB co-infection in PBM could be related to a higher proportion of rural dweller in the study population due to a relatively small size of the town compared to the metro-cities. In this study, HIV–TB co-infection rate was slightly higher in male patients than females. This finding is inconsistent with a number of studies that showed females to be more prone to HIV infection than their male counterparts.<sup>[11,12,13]</sup>

In the present study, on sputum smear examination, 93.41% of patients in the HIV sero-negatives were positive compared to 41.67% in HIV sero-positive, 1 patient was undetected due to military tuberculosis (Table 2). This is comparable to study done by Aurobindo Behera<sup>[14]</sup> et al in Burla, Odisha showed that Sputum positive status of HIV Sero-Positive Pulmonary TB patients was 30% whereas in HIV Sero-Negative group was 80%.

Our study revealed that there was a declining trend of HIV prevalence among TB patients which is in agreement with the national HIV prevalence trend. This could be attributed to the expansion of health education on HIV as well as TB prevention and control in the area via deployment of health education worker. However, given that we have analysed the trend of only 1 year, we recommend further investigations which incorporate HIV–TB co-infection data of several years before a firm conclusion is drawn. This study has some limitations including lack of inclusions of important variables such as education level, economic status, marital status, and CD4 count which might affect their status with respect to these infections. Despite the limitations, the results of this study provided a useful data on the prevalence of HIV among TB patients at PBM hospital. This finding may have an implication for policy makers and TB program managers to address the health care need of these vulnerable populations in this part of India.

Our study showed that HIV has no influence on the anti-tubercular resistance pattern. A study done by Mycal Pereira.<sup>[15]</sup> et al in Pune observed that, the prevalence of drug resistant M. tuberculosis isolates among HIV sero-

positive tuberculosis patients was similar to that of HIV sero-negative TB patients. The issue of whether infection with HIV is a risk factor for drug resistant tuberculosis still remains unanswered since results of some studies supported this hypothesis while some did not. We did not find any significant association between TB-HIV and drug resistance pattern. **(Figure-1)** In view of the conflicting results from other studies and high prevalence of HIV-TB in our country, we feel that time to time monitoring of anti-tuberculosis drug resistance pattern in TB patients in general and HIV sero-positive tuberculosis patients in particular would provide important data, which may be crucial for the control of tuberculosis.

#### **CONCLUSION:**

This study found that monitoring of anti-tuberculosis drug resistance pattern and concerted efforts and interventions methods are crucial for the control of tuberculosis.

#### **ACKNOWLEDGEMENTS:**

We acknowledge the PBM Hospital physicians, counseling nurses and laboratory staff for their kind cooperation during data collection.

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