

## HIV Status and Clinical Profile in Tuberculosis Patients Admitted To A Tertiary Care Centre

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DOI: [10.36347/sasjm.2020.v06i03.004](https://doi.org/10.36347/sasjm.2020.v06i03.004)

| Received: 01.03.2020 | Accepted: 09.03.2020 | Published: 20.03.2020

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### Abstract

### Original Research Article

Tuberculosis and HIV together have been referred to as the “cursed duet” and HIV has been found to reduce the effectiveness of treatment of TB. The aim of the study was to determine the status of HIV infection in patients of Tuberculosis and compare with patients of TB infection alone in patients admitted to a tertiary care centre. All cases of pulmonary tuberculosis and EPTB who were started on ATT and were admitted in the Department of Medicine and its allied specialties, Dayanand Medical College & Hospital, Ludhiana, Punjab during 15 months period were enrolled in the study. All these patients were tested for HIV as per NACO guidelines. HIV in tuberculosis patients was found in 16 patients (7.66%). Of the 108 extrapulmonary tuberculosis patients, 12 (11.11%) cases were HIV positive and of the 101 pulmonary tuberculosis cases, 4 (3.96%) cases tested positive for HIV. Patients having malnutrition (BMI <18) was more in tuberculosis patients with HIV positive than with HIV negative (31.25% versus 17.62%). 18.75% patients had mantoux positivity with TB – HIV coinfection and 32.1% patients had mantoux positivity with TB alone. Sputum positive was similar in PTB – HIV co-infected patients and with TB alone. Maximum patients had normal chest x-ray both with TB – HIV coinfection or TB alone followed by pleural effusion. Miliary mottling was present in 12.5% patients with coinfection and 2.07% cases with TB alone. In patients with TB – HIV, 68.75% were discharged and 31.25% expired whereas in patients with TB alone 87.56% were discharged, 10.88% took DAMA and 1.55% expired. The outcome of TB – HIV patients was poorer than patients of TB alone. To conclude, this study gave us insight in understanding the difference in the clinical profile among TB – HIV positive patients and how they present differently from TB – HIV negative patients. Also, HIV testing should be offered to all TB patients so that no TB – HIV coinfection is missed.

**Keywords:** Pulmonary Tuberculosis, Extra Pulmonary Tuberculosis, HIV.

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## INTRODUCTION

Tuberculosis and HIV together have been referred to as the “cursed duet”. According to U.S. Global health policy, prevalence of HIV in TB cases in India is 4.2% and India ranks 56th among the world. Swaziland in Africa has highest prevalence of HIV among incident TB cases (77%). TB/HIV co-infection has also been found to reduce the effectiveness of directly observed therapy (DOT) treatment of TB. In a survey carried out among new tuberculosis patients by the Revised National TB control Program (RNTCP) in 2007, HIV sero-prevalence varied widely and ranged from 1% to 13.8% across the 15 districts (Central TB Division). The WHO recommends that routine HIV testing should be offered to all patients with

presumptive and diagnosed TB as well as to partners of known HIV-positive TB patients. Systemically collected data on the positivity of HIV infection Tuberculosis from tertiary care hospitals in Northern India was lacking.

We therefore estimated the status of HIV infection in patients admitted with Pulmonary and Extra-Pulmonary Tuberculosis to Dayanand Medical College & Hospital, Ludhiana, a tertiary care hospital of Punjab. We also studied the difference in the clinical profile of Tuberculosis in HIV positive and HIV negative patients.

## MATERIAL AND METHODS

All cases of pulmonary tuberculosis and extra-pulmonary tuberculosis who were started on ATT and were admitted in the Department of Medicine and its Allied specialties, Dayanand Medical College & Hospital, Ludhiana, Punjab during 15 months period were enrolled in the study. All these patients were tested for Anti HIV antibodies in the Department of Microbiology according to the NACO guidelines.

Complete history was recorded and clinical examination of the enrolled. The investigations needed to reach to the diagnosis of Pulmonary TB were: Ziehl Neilson stain (ZN stain) of sputum samples for Acid Fast Bacilli, Chest X- Ray, CT Chest (wherever applicable), BAL (wherever applicable) Smear/AFB Culture, Sputum AFB culture. The investigations needed to reach to the diagnosis of Extra-Pulmonary Tuberculosis were done according to the site involved. CD4 count was done in all the HIV positive patients. Mantoux test was done in all the enrolled patients.

## INCLUSION CRITERIA

Both new cases and re-treatment cases of tuberculosis were included. Multidrug resistant (MDR) cases were also included. Patients who were recently diagnosed as HIV positive within 3 months of enrolment were included in the study.

## EXCLUSION CRITERION

TB patients who had been declared cured/ treatment completed and admitted for other reasons, who were readmitted with treatment failure/ relapse/ default and were enrolled previously during the study period, who were previously diagnosed as case of HIV (more than 3 months from the enrolment) and were now admitted with Tuberculosis, patients who had tuberculosis but refused HIV testing and patients started on ATT empirically were excluded.

The difference in the clinical profile of Pulmonary and Extra Pulmonary Tuberculosis among HIV positive and HIV negative patients was studied. Appropriate statistical methods were applied.

## OBSERVATIONS AND RESULTS

A total of 209 tuberculosis patients were enrolled for the study out of which 108 (51.67%) patients had extra-pulmonary TB and 101 (48.32%) patients had pulmonary TB. Among the 209 cases, 16 (7.66%) patients were found to be HIV positive. Of the 108 extrapulmonary tuberculosis patients, 12 (11.11%) cases were HIV positive and of the 101 pulmonary tuberculosis cases, 4 (3.96%) cases tested positive for HIV. Out of 16 HIV positive cases two (12.5%) were females and fourteen (87.5%) were males.

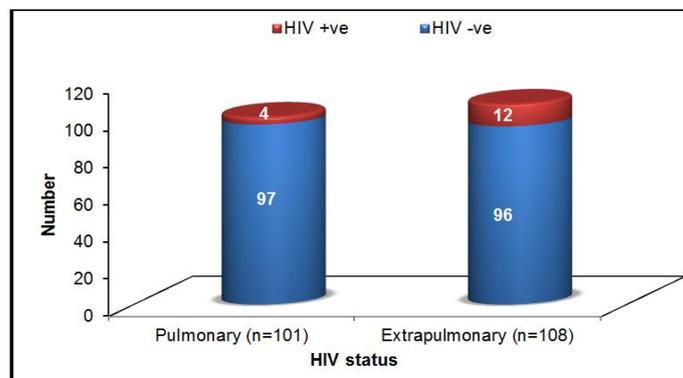


Fig-1: Number of HIV cases in Tuberculosis patients

Table-1: HIV status according to the extra pulmonary TB site

Extra pulmonary TB site	Total		HIV Status				p value
			Negative		Positive		
	No.	%	No.	%	No.	%	
Abdominal TB	6	5.56	5	5.21	1	8.33	0.656
Hydro-pneumothorax	1	0.93	1	1.04	0	0.00	0.722
Lymphadenitis	3	2.78	2	2.08	1	8.33	0.214
Miliary TB	4	3.70	2	2.08	2	16.67	0.012
Pleural effusion	48	44.44	44	45.83	4	33.33	0.411
Pott's spine	3	2.78	2	2.08	1	8.33	0.214
Tubercular meningitis	41	37.96	38	39.58	3	25.00	0.326
Tuberculomas	2	1.85	2	2.08	0	0.00	0.614
Total	108	100.0	96	100.0	12	100.0	

Miliary tuberculosis was found to be more common in HIV positive patients than in HIV negative patients. In the other EPTB sites there was no statistically significant difference when EPTB with HIV positive and EPTB with HIV negative were compared.

Maximum number of HIV positive cases in tuberculosis patients were seen in the age group of 41–50 years, 7(43.75%) whereas in HIV negative cases with tuberculosis the distribution was more uniform in all the groups.

Mean BMI in HIV positive patients was 20.047 with standard deviation of 3.0428 whereas in HIV negative patients BMI was 21.148 with standard deviation of 3.899. BMI <18 was found in 39 (18.66%) patients of the 209 tuberculosis patients. The number of patients having malnutrition (BMI <18) was more in tuberculosis patients with HIV positive than in tuberculosis patients with HIV negative (31.25% versus 17.62%)

**Table-2: Mantoux positivity in Tuberculosis patients (n=209)**

Mantoux	Total (n=209)		HIV Negative (n=193)		HIV Positive (n=16)	
	No.	%	No.	%	No.	%
Positive	67	32.1	64	33.16	3	18.75
Negative	142	67.9	129	66.84	13	81.25
p value – 0.235						

Mantoux was found to be positive in 67 (32.1%) cases of the total of 209 cases, out of which Mantoux was positive in 3 (18.75%) cases of the 16 HIV positive patients with tuberculosis while it was positive in 64 (33.16%) cases of the 193 HIV negative patients with tuberculosis.

Among the EPTB patients, Mantoux was positive in 17 (15.74%) cases and the p value was not

significant among EPTB with HIV positive and EPTB with HIV negative.

Among the pulmonary TB patients, Mantoux was positive in 49.5% of the 101 cases. Among the pulmonary tuberculosis with HIV negativity, 50 (51.55%) of the 97 cases had Mantoux positive while no case was Mantoux positive among the 4 cases of pulmonary tuberculosis with HIV positivity. (p value <0.05).

**Table-3: Sputum for Acid Fast Bacilli in pulmonary tuberculosis patients and its relationship with HIV status**

Sputum AFB	Total (n=101)		HIV Status			
			Negative (n=97)		Positive (n=4)	
	No.	%	No.	%	No.	%
Negative	24	23.76	23	23.71	1	25.00
Positive	77	76.24	74	76.29	3	75.00
<b>Total</b>	101	100.00	97	100.00	4	100.00
p value = 0.953						

Sputum for AFB was found to be positive in 77 (76.24%) patients. Among pulmonary tuberculosis with HIV positive three (75%) cases had sputum

positive for AFB whereas in pulmonary tuberculosis with HIV negative, 74 (76.29%) cases had sputum positive AFB.

**Table-4: Chest X – ray findings in tuberculosis patients and its relationship with HIV status**

CXR	Total (n=209)		HIV Status				p value
			Negative (n=193)		Positive (n=16)		
	No.	%	No.	%	No.	%	
Normal	62	29.67	57	29.53	5	31.25	0.227
Pleural Effusion	51	24.4	48	24.87	3	18.75	0.682
Cavitation	39	18.66	38	19.69	1	6.25	0.599
Consolidation	21	10.05	20	10.36	1	6.25	0.474
Parenchymal infiltrates	12	5.74	10	5.18	2	12.5	0.584
Perihilar opacities	10	4.78	8	4.15	2	12.5	0.199
Fibrosis/ F. Lesions	6	2.87	6	3.11	0	0	0.474
Miliary mottling	6	2.87	4	2.07	2	12.5	0.012
Pneumothorax	2	0.96	2	1.04	0	0	0.185
<b>Total</b>	209	100	193	100	16	100	

**HIV Positive**

Chest X-ray showed abnormality in 11 (68.75%) cases and it was normal in 5 cases (31.25%). Abnormal chest X-ray was reported as pleural effusion in 3 (18.75%) cases, infiltrates in 2 (12.50%), cavitation and consolidation in 1 case (6.25%) each and military mottling in 2 (12.5%) cases.

**HIV Negative**

Chest X-ray showed abnormality in 136 (70.47%) cases and 57 patients had a normal chest X-ray. Abnormal chest X-ray were reported as pleural effusion in 48 (24.87%) cases, cavitation in 38 (19.69%) cases, consolidation in 20 cases (10.36%), infiltrates in 10 (5.18%) cases, perihilar opacities in 8 cases (4.15%), fibrotic lesions in 6 cases (3.11%), military mottling in 4 cases (2.07%) and pneumothorax in 2 cases (1.04%).

**Table-5: CD4 Counts in HIV positive patients with tuberculosis**

CD4 counts	HIV Positive (n=16)		Extrapulmonary (n=12)		Pulmonary (n=4)	
	No.	%	No.	%	No.	%
0-100	8	50.00	7	58.33	1	25.00
101-200	4	25.00	2	16.67	2	50.00
201-350	1	6.25	1	8.33	0	0.00
351-500	3	18.75	2	16.67	1	25.00
>500	0	0.0	0	0.0	0	0.0
TOTAL	16	100.00	12	100.00	4	100.00
p value = 0.485						

8 (50%) patients of HIV-TB had CD4 counts in the range of 0-100 followed by 4 patients, 1 patient and 3 patients having CD4 count in the range of 101-200, 201-350 and 351-500 respectively. None of the

patients had CD4 count of >500. The CD4 count mean was lower (129.75/ $\mu$ l) in patients with extrapulmonary tuberculosis than in patients with pulmonary tuberculosis who had mean CD4 count of 194.50/ $\mu$ l.

**Table-6: Final outcome in tuberculosis patients and their relationship with HIV status (n= 209)**

Outcome	HIV Negative (n=193)		HIV Positive (n=16)	
	No.	%	No.	%
Discharged	169	87.56	11	68.75
DAMA	21	10.88	0	0.00
Expired	3	1.55	5	31.25
Total	193	100.00	16	100.00
p value = 0.0001				

Among the 16 tuberculosis patients who were HIV positive, 11 were discharged and 5 expired (No patient went DAMA); as compared to 193 tuberculosis patients with HIV was negative in whom 169 were discharged, 21 went DAMA and 3 expired (p value = 0.0001).

**DISCUSSION**

This study describes the status of HIV positivity in Tuberculosis patients admitted in Department of Medicine and its Allied Specialities of Dayanand Medical College and Hospital, Ludhiana. Also the difference in clinical profile among tuberculosis patients with HIV positive and HIV negative was described. The study was conducted for 15 months and 209 indoor patients were enrolled. Of the 209 cases, 108 were extra-pulmonary tuberculosis patients and 101 were pulmonary tuberculosis patients.

Our study estimated the HIV positivity in 16 (7.66%) patients among the 209 indoor tuberculosis patients. Of the 108 extra-pulmonary tuberculosis

patients, 12 (11.11%) cases were HIV positive and of the 101 pulmonary tuberculosis cases, 4(3.96%) cases tested positive for HIV.

A study done by Manjareeka Magna *et al.*, in Eastern India found the prevalence of HIV infection to be 12.3% in tuberculosis patients in a referral hospital in South Eastern Railway, India [1]. There was a trend of increasing HIV prevalence in TB patients in Aligarh (from 0.8% to 2.8%) from 1996 to 2001. A similar result was observed in Goa, indicating a rising trend in HIV prevalence from 2.01% in 1995 to 10.91% in 2000. Piramanayagam *et al.*, demonstrated that the HIV seroprevalence among TB patients presenting to the outpatient medical clinic or the inpatient wards of the AIIMS hospital from 2003-2005 was 8.3 per cent [2], as compared to previous reports of 0.4 per cent in 1995-99 and 9.4 per cent in 2000-2002 in the same setting. This data suggests that the rate of HIV positivity continues to be high and was possibly increasing among TB cases at AIIMS.

The persistently high HIV seroprevalence in this patient population is of concern both in terms of patient management and public health perspective. Low prevalence (0.4%) during 1995-1999 was probably due to infancy of the potential devastating HIV epidemic and also because it initially started from the southern part of India. Higher rates of 9.4 and 8.3 per cent observed over the subsequent years represent the rapidity with which the epidemic has spread in the whole of country. The trend observed over the years highlights the importance of continuous surveillance and in-time appropriate preventive measures.

The HIV positivity in our study (7.66%) is similar to the studies done by Piramanayagam *et al.*, [2], Sharma VY *et al.*, [3] and Gupta *et al.*, from Udaipur. The HIV seropositivity in a study from Pune and Chennai were 15.0% and 17% respectively which were much higher as compared to our study due to the fact that these are high HIV prevalence areas and North India is a low HIV prevalence area.

In our study, miliary tuberculosis was found to be more common in HIV positive patients. Shafer RW *et al.*, showed that the HIV-infected patients were more likely than the control patients to have either disseminated, genitourinary, intra-abdominal, mediastinal, or concurrent pulmonary TB [4]. Ragini Ghiya *et al.*, found that 23.1% cases presented with disseminated TB involving both pulmonary and extrapulmonary sites [5].

Out of 209 cases, 54 (25.84%) cases had a past history of tuberculosis. Further, among HIV positive cases 7 (43.75%) had past history of tuberculosis and among HIV negative cases 47 (24.35%) had past history of tuberculosis. A study done by Ragini Ghiya *et al.*, showed that 14.2% had past history of tuberculosis [5].

Study done by Kassu *et al.*, showed that 67.3% of the patients had a BMI of <18.5 kg/m<sup>2</sup> and it was more pronounced and more frequent among HIV-positive TB patients as compared to HIV-negative ones. Severe malnutrition (BMI <15.9 kg/m<sup>2</sup>), moderate malnutrition (BMI = 16- 16.9 kg/m<sup>2</sup>), and mild malnutrition (BMI = 17-18.4 kg/m<sup>2</sup>) were observed in 20.6%, 17.1%, and 29.6% of the patients, respectively [6]. The number of patients having malnutrition (BMI <18) was more in tuberculosis patients with HIV positive than in tuberculosis patients with HIV negative (31.25% versus 17.62%) which is in accordance with Kassu *et al.*, [6].

The study done by Sharma VY *et al* Tuberculin test reactivity wise results showed 82 % MT were positive in HIV negative individuals compared to 27 % in HIV reactive individuals [3]. Our study showed that 67 (32.1%) patients out of 209 had mantoux positive. Only 3 of the 16 (18.75%) HIV reactive had

mantoux positive while it was positive in 33.16% of the 193 TB patients without HIV infection.

Our study showed that 77 out of 101 (76.24%) patients had sputum positive for acid fast bacilli. Sputum smear positivity was highly variable in different studies. The study done by Sharma VY *et al* showed around 24% in HIV negative individuals and 27.28 % in HIV positive individuals having sputum positivity.[3] Smith *et al.*, also observed no differences in the frequency of positive smears between HIV infected and noninfected individuals [7].

Of the 16 HIV positive patients in our study 11 (68.75%) showed x-ray findings while 5 (31.25%) had normal chest x-ray. Maximum patients had pleural effusion (18.75%) followed by perihilar opacities, miliary mottling and infiltrates in 12.5% each, cavitation and consolidation in 6.25% each. Study conducted by Swaminathan S showed that HIV seropositive patients with pulmonary TB were having normal chest radiographs in 14.2% cases, Miliary TB in 10% cases, pleural effusion in 16.6%, cavitation in 17.8%, while maximum number of cases (65%) showed infiltrates [8]. Similarly the study conducted by Perlman DC *et al.*, also showed infiltrates in maximum number of cases (43.75%) of HIV positive pulmonary tuberculosis.

Our study showed that the CD4 count mean was lower (129.75/ $\mu$ l) in patients with extrapulmonary tuberculosis than in patients with pulmonary tuberculosis who had mean CD4 count of 194.50/ $\mu$ l. Maximum patients numbering 8 (50%) had CD4 counts in the range of 0-100. In the EPTB group maximum patients (7/58.33%) had CD4 in the range of 0-100 while in the PTB group 2 patients (50%) had CD4 count in 101-200 range. Brenda E Jones *et al.*, also showed that extrapulmonary tuberculosis was present in 30 (70%) of 43 patients with <100 CD4 counts [9].

Among the 16 tuberculosis patients who were HIV positive, 11 were discharged and 5 expired (No patient went DAMA); as compared to 193 tuberculosis patients with HIV was negative in whom 169 were discharged, 21 went DAMA and 3 expired. (p value = 0.0001). Hannock Tewya *et al* showed that HIV negative patients had slightly better TB outcomes compared to HIV-positive patients. Of HIV-negative patients, 88% had successful treatment outcomes compared to 85% of HIV-positive patients. More HIV-infected TB patients died (6%) compared to HIV-negative patients (3%) (p = 0.034)] [10]. Suresh Shastri *et al.*, studied the outcome in TB patients in the RNTCP program compared with those for HIV TB co-infected patients. Treatment success were similar among co-infected TB patients compared to those with only TB within the National TB program (OR = 0.9, 95% CI = 0.88-0.92). However, death rates were expectedly

higher in the co-infection group (OR = 2.22, 95% CI = 2.03-2.38).

Out of 101 pulmonary tuberculosis patients, 4 were HIV positive and all these 4 cases were discharged as compared to HIV negative cases in which 81 got discharged, 14 went discharge against medical advice and 2 expired. (p value not statistically significant) Out of 108 extrapulmonary tuberculosis, 12 were HIV positive amongst which 7 (58.33%) cases were discharged and 5 (41.67%) expired as compared to HIV negative cases in which 88 (91.67%) got discharged, 7 (7.29%) went discharge against medical advice and 1 (1.04%) expired. (p value = 0.001). Thus, EPTB-HIV coinfection has worse outcome than Pulmonary TB-HIV coinfection.

To summarize, this study has helped us knowing the prevalence of HIV positivity among TB patients admitted to a tertiary care centre of Punjab. Of the total tuberculosis patients, HIV was found in 7.66%, in extrapulmonary tuberculosis patients, 11.11% cases were HIV positive and in pulmonary TB cases, 3.96% cases were HIV positive. The outcome of TB – HIV patients was poorer than patients of TB alone which was more so in the EPTB group. To conclude, this study gave us the insight in understanding the difference in the clinical profile among TB – HIV positive patients and how they present differently from TB – HIV negative patients. We are of the opinion that HIV testing should be offered to all TB patients so that no TB – HIV co-infection is missed.

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