



**ORIGINAL RESEARCH PAPER**

**General Medicine**

**SPECTRUM OF PULMONARY TUBERCULOSIS IN HIV POSITIVE PATIENTS WITH SPECIAL REFERENCE TO CD4 COUNTS.**

**KEY WORDS:** HIV, TB, PTB, CD4 Count

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**ABSTRACT**

**INTRODUCTION:** Tuberculosis is one of the commonest opportunistic infections in HIV positive patients. Person with HIV is upto-30 times more likely to develop active TB than normal individual.  
**OBJECTIVE:** To evaluate the spectrum of PTB in HIV patients, CD4 count in PTB of HIV patients, how CD4 count affect the PTB in patients.  
**MATERIAL AND METHODE:** This is a PROSPECTIVE OBSERVATIONAL STUDY of 150 patients with age > 15 year.  
**INCLUSION CRITERIA:** All HIV positive patients with sputum positive or sputum negative PTB.  
**EXCLUSION CRITERIA:** All extrapulmonary tuberculosis.  
**RESULTS:** Middle aged 26-45years (68%) individual are most commonly affected especially the rural population (84.7%). The population which are more commonly affected is the low education status individuals (primary and high school each of 35%) but among the female uneducated group are more common. Most common mode of transmission in decreasing order are sexual (75%), blood and its product (21%), IVD users (4%). Most common symptoms are cough (93%), weight loss (81%), fever (67%). Out of 150 patients, 15% are sputum AFB positive and 45% are CBNAAT positive. In patients with CD4 count below 200, atypical involvement (bilateral, lower lobe, consolidation and miliary mottling) is more common than typical (apical region, cavitory lesion) involvement.  
**Conclusion:** There is a need for better diagnostic test to detect PTB other than sputum smear examination in HIV patient especially among CD4<200. CXR remains an important diagnostic tool for PTB in HIV patients, but in patients with CD4<200 atypical involvement of lung is common (lower zone, b/l, consolidation) than typical involvement (apical lobe, cavitory lesion). So it is necessary for the accurate and timely diagnosis of tuberculosis in HIV patient with CD4<200 sputum smear negative and atypical lung involvement

**INTRODUCTION**

Tuberculosis is one of the most common opportunistic infection in patients living with HIV (PLHIV)<sup>1</sup>. About 1 in 10,000 people in India are estimated to be HIV-TB co-infected annually<sup>2</sup>. A person with HIV is upto 30 times more likely to develop active TB than a person with healthy immune system<sup>3</sup>. The implication of HIV infection is that it activates dormant tuberculosis to rapid disease progression and death. HIV co-infection also influences the clinical phenotype of TB. Individuals who are infected with HIV and have CD4+ T cell counts in the normal range present with classic symptoms of pulmonary TB, but disease that is restricted to the lung apices is less frequent, whereas pleural effusions and lymph node disease are more likely. In advanced AIDS, M. tuberculosis frequently causes disseminated extra-pulmonary disease and mycobacteraemia. Hence, HIV-infected patients are more likely to have disseminated TB than HIV negatives<sup>4</sup>.

Prioritization of this test in all HIV patients suspected of TB has been a latest initiative taken combinedly by WHO, NACO and RNTCP to tackle the dual burden<sup>2</sup>. Recently WHO has declared 'End TB Strategy 2016-2035, with a target to have less than 10 TB cases/1,00,000 population i.e. 90% reduction in TB incidence rate by 2035<sup>5</sup>. In support of the same, Indian Government and Ministry of Health has also framed National Strategic Plan for TB elimination 2017-2025, with target of achieving the elimination rate by 2025<sup>6</sup>.

**MATERIAL AND METHODS**

The present study was undertaken in S.S. Medical College and Sanjay Gandhi Memorial Hospital, Rewa, in department of medicine.

The study group included a total number of 150 radiologically and/ or bacteriologically confirmed patients of tuberculosis either admitted in wards or attending the outpatient

department or ART center during April 2018 to June 2019, who were HIV positive or newly HIV positive.

**INCLUSION CRITERIA:**

1. All radiologically and / or bacteriologically confirmed patients of Pulmonary tuberculosis with HIV positive age 15 years and older.
2. All old or new HIV positive patients who newly diagnosed Pulmonary tuberculosis or on ATT for Pulmonary tuberculosis.
3. Patients who gave written informed consent. In patients <18yrs consent was obtained from their parents or guardians.

**EXCLUSION CRITERIA:**

1. HIV positive with Pulmonary tuberculosis patients <15 years of age.
2. Extrapulmonary tuberculosis patients.
3. Patients who refused to give consent.
4. HIV patient with old Pulmonary tuberculosis not on ATT.

**DIAGNOSIS OF PULMONARY TUBERCULOSIS:**

Apart from clinical manifestation and history the diagnosis of PTB was based on (1) chest-XRAY (2) Sputum AFB (3) CBNAAT

**RESULTS:**

This study was conducted on 150 PTB/HIV patients out of 150 PTB/HIV patients, 108 (72%) were male and 48 (28%) were female. The mean age in this study was 37.59 and the sex ratio is 2.5:1. Middle aged 26-45 years (68%) individual were most commonly affected especially the rural population (84.7%). The population more commonly affected is the low education status individuals (primary and high school each about 35%) but in female uneducated group were more common. Out of 150 cases maximum no. of cases belongs to in order as farmers 49 (32.66%), housewives 33 (22%), labourers 30 (20%), truck drivers 24 (16%).

Most common mode of transmission in decreasing order as sexual (75%), blood and its product (21%), IVD users (4%). In this study CD4 count was done in every individual in which we found the mean of CD4 count was 197.94, with range of 12 to 840, out of 150 cases maximum no. of cases comes under CD4≤200 i.e. 73 (48.66%), followed by CD4 201-350 i.e. 54 (35.33%), then the CD4>500 i.e. 13 (8.6%) and the least in CD4 351-500 i.e. 11 (7.33%). In our study we get 23 cases out of 150 i.e. 15.33% sputum smear positive, sputum smear positivity more among CD4>200, 17 out of 23 cases as compare to CD4≤200, 6 out of 23 case. In patients with CD4 count below 200, atypical involvement (bilateral, lower lobe, consolidation and miliary mottling) was more common than typical (apical region, cavitary lesion) involvement.

**Table-1. Distribution Of Cases According To Sex**

Sex	No. of cases	Percentage
Male	108	72%
Female	42	28%
Total	150	100%

**Table-2. Distribution Of Cases On The Basis Of Residential Area**

Residence	Number of cases				Total	%
	Male	%	Female	%		
Rural	95	87.9%	32	76.2%	127	84.66%
Urban	13	12.1%	10	23.8%	23	15.33%
Total	108	100%	42	100%	150	100%

**Table-3. Distribution Of Cases According To Age And Sex Group**

Age Group (in Years)	Male		Female		Total	%
	No.	%	No.	%		
15-25	10	9.25%	9	21.42%	19	12.66%
26-35	34	31.48%	11	26.19%	45	30%
36-45	40	37.03%	17	40.47%	57	38%
46-55	20	18.51%	4	9.52%	24	16%
56-65	3	2.27%	1	2.38%	4	2.6%
66-75	1	0.92%	0	0%	1	0.66%
Total	108	100%	42	100%	150	100%

**Table-4 Distribution Of Cases According To Educational Status**

.Education	Number of Cases				TOTAL %	
	Male		Female		No.	%
	No.	%	No.	%		
Uneducated	13	12.03%	22	52.38%	35	23.33%
Primary	41	37.96%	12	28.57%	53	35.33%
High school	46	42.59%	7	16.66%	53	35.33%
Graduation	8	7.40%	1	2.38%	9	6%
Total	108	100%	42	100%	150	100%

**Table-5 Distribution Of Cases According To Occupation Status**

Occupation	No. of cases	Percentage
Farmer	49	32.66%
Labourer	30	20%
Housewife	33	22%
Service class	12	8%
Truck Drivers	24	16%
Student	1	0.66%
Prisoner	1	0.66%
Total	150	100%

**Table-6. Distribution Of Cases According To Mode Of Transmission**

MODE OF TRANSMISSION	NUMBER OF CASES				TOTAL
	MALE		FEMALE		
	No	%	No	%	
SEXUAL	78	72.22%	34	80.95%	112 (74.66%)
BLOOD AND ITS PRODUCTS	24	22.22%	8	19.05%	32 (21.33%)
IVD USERS	6	5.60%	0	0%	6 (4%)

CXR FINDING	CASES	%
INFILTRATION	64	42.66%
CONSOLIDATION	41	27.33%
CAVITARY LESION	26	17.33%
MILIARY MOTTLING	15	10.00%
NONE	4	2.66%
TOTAL	150	100%

**Table-7. DISTRIBUTION OF CASES ACCORDING TO CXR FINDING**

CXR FINDING	CD4 ≤200	CD4>200
INFILTRATION	29(39.72%)	35(45.45%)
CONSOLIDATION	23(31.50%)	18(23.37%)
CAVITARY LESION	7(9.58%)	19(24.67%)
MILIARY MOTTLING	11(15.06%)	4(5.19%)
NONE	3(4.10%)	1(1.29%)
TOTAL	73	77

**Table-8. CORRELATION OF CXR FINDINGS WITH CD4 COUNT**

DISCUSSION:
Tuberculosis seen among HIV infected individuals is the most common opportunistic infection <sup>7</sup> . The clinical radiological and bacteriological manifestation vary with the level of immunosuppression and Cd4 counts <sup>8,9</sup> .
This study was conducted on 150 PTB/HIV in which 108 (72%) were male and 48 (28%) were female. Middle aged group 26-45year (68%) individuals were most commonly affected. Shrikant Reddy <i>et al</i> (July 2013) <sup>10</sup> found 76.92% PTB/HIV patients were in 21-40 years age group. P Giri <i>et al</i> (June 2013) <sup>11</sup> found 58.10% In S.Jindal <sup>12</sup> <i>et al</i> (2018) it was (81%).
In the present study transmission of HIV was mainly due to the routes as follows: sexual route (74.66%), blood and its product (21.33%), IVD users (4%). Pratima Gupta <i>et al</i> (2006) <sup>13</sup> who found transmission of HIV in PTB patients was mainly through heterosexual route (66.67%). Ghiya <i>et al</i> (2009) found heterosexual route (65%) and through blood transfusion (13.8%).
In the present study, out of 150 sputum smear positive cases only 23 (15.33%) and 123 (84.66%) were sputum smear negatives. Zuber Ahmad <i>et al</i> (2005) <sup>15</sup> found 24.04% had sputum positive. Peter E.J. <i>et al</i> <sup>16</sup> found 40% sputum positive for AFB. Vaibhav Gharat <i>et al</i> <sup>17</sup> they observed 10.08%. Ashish Koshti <i>et al</i> (Apr 2013) <sup>18</sup> 8.1% had positive sputum smear.
Out of 23 sputum smear positive case higher no. of sputum smear positive were among in CD4 above 200 i.e. 17 (73.91%) and lower among CD4 below 200 i.e. 6 (26.08%). These observations were comparable to Singhal S <i>et al</i> (2011) <sup>19</sup> they found Acid-fast smear positivity to negativity in CD4 count between 0-200 was almost 1:1 whereas it was 3:1 in case of CD4 count above 200. S Jindal <i>et al</i> <sup>12</sup> found sputum AFB negativity was greater than positivity (51.72% versus 48.27%) among PTB cases. With CD4>200 positivity was higher and with CD4<200 negativity was higher.
In the present study, bilateral involvement in (49.33%), unilateral involvement in (48.66%) and no lesion in (2.66%). Correlation of CXR findings with CD4 count among CD4≤200 out of 73 cases the commonest CXR finding was infiltration in 29 (39.72%), followed by consolidation in 23 (31.50%), miliary mottling in 11 (15.06%), cavitary lesion in 7 (9.58%) and nil xray finding in 3 (4.10%).
Among CD4>200 out of 77 cases commonest finding was

infiltration in 35 (45.45%), followed by cavitory lesion in 19 (24.67%), followed by consolidation in 18 (23.37%), followed by miliary mottling in 4 (5.19%) and no finding in 1 (1.29%). This study shows similarity with following studies. Mahesh Padyana (2012)<sup>20</sup> observed in patients having CD4 count <200/ $\mu$ L infiltration was in 39%, consolidation was in 30%, cavity was in 11% of PTB/HIV co-infection patients. In patients having CD4 count >200/ $\mu$ L infiltration was in 37.5%, miliary lesion was in 25%, cavity was in 25% of PTB/HIV co-infected patients.

**CONCLUSION:**

There is a need for better diagnostic test to detect PTB other than sputum smear examination in HIV patient especially among CD4<200. CXR remains an important diagnostic tool for PTB in HIV patients, but in patient with CD4<200 atypical involvement of lung is common (lower zone, b/1, consolidation) than typical involvement (apical lobe, cavitory lesion). So it is necessary for the accurate and timely diagnosis of tuberculosis in HIV patient with CD4 count<200.

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