

## ORIGINAL RESEARCH

### "Incidence of Tuberculosis in HIV Patients and Its Co-Relation to CD4 Count" - A Retrospective Study at Art Center in Tertiary Care Hospital

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#### ABSTRACT

**Background:** Pulmonary tuberculosis is a major communicable disease worldwide. Tuberculosis and HIV is a major health problem in many parts of world. The National Tuberculosis and Leprosy Program annual report indicates that about 7% of all TB notified cases had co-infection with HIV. The incidence of Tuberculosis HIV co-infection increasing gradually.

**Materials and Methods:** The study is a Retrospective study conducted on 200 HIV reactive patients at ART center in a tertiary care hospital GGH Ongole. Data was analyzed for incidence of tuberculosis in HIV infected patients with CD4 counts and their association between them.

**Results:** Out of 200 HIV infected, 40 were detected with tuberculosis, of them 32 were pulmonary TB and 8 were extra pulmonary TB. In present study 26 (65%) of patients with CD4 count < 200 cells/ $\mu$ l developed Tuberculosis, 9 (22.5%) of patients with CD4 count 200-400 cells/ $\mu$ l and 5 (12.5%) of patients with CD4 count > 400 cells/ $\mu$ l shows less number of pulmonary and Extra pulmonary TB.

**Conclusion:** There is a strong association between Tuberculosis and HIV. Incidence of TB is more when CD4 count less than 200 cells/ $\mu$ l. So it is essential to screen HIV reactive patients for TB along with CD4 count to prevent complications and mortality. This study showed that incidence of Tuberculosis pulmonary and extra pulmonary in HIV infective patients is significantly higher with CD4 count < 200 cells/ $\mu$ l.

**Keywords:** HIV, AIDS, Tuberculosis, Pulmonary, CD4 count.

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#### INTRODUCTION

Tuberculosis is an ancient disease it is a chronic granulomatous disease infecting respiratory system and can infect any organ. Tuberculosis the disease of antiquity that has long a public health challenge in world particularly in developing countries like India. The risk of developing tuberculosis after an infectious contact has been estimated 5 to 15% per HIV infected patients. Geographically in 2020 most of TB cases were in WHO regions of south-east Asia (43%) Africa (25%) and western pacific (18%). TB incidence in 2020 is 16, 28,161 the rate is 188 per 100,000 population. The most obvious impact on TB of disruptions caused by the COVID-19 pandemic is a large drop in the number of people newly diagnosed with TB reported in 2020, compared to 2019 there was a fall of 18% between 2019 and 2020 from

7.1 million to 5.8 million.<sup>[10]</sup> Incidence of TB in 2021 is 2590,000 million cases 19% increase from the previous year and HIV-TB incidence is 53,000.<sup>[11]</sup>

In 2021 the vision of national strategic plan for elimination of tuberculosis 18 states have committed to ending by 2025.<sup>[11]</sup> TB estimated mortality is 14.2% but reported is 76,002 the mortality rate is 37 per 100,000.<sup>[11]</sup>

There is 50% decrease in tuberculosis transmission in lockdown period. The pandemic of HIV infection and acquired immunodeficiency syndrome (ADIS) has caused marked increase in some countries. Its natural reservoir is man it causes majority of deaths in HIV reactive patients.<sup>[6-8]</sup>

The incidence of TB-HIV co-infection increasing and there CD4 count is low.<sup>[1]</sup> Tuberculosis is the most common serious opportunistic infection in HIV positive patients and is the manifestation of AIDS. Ability to destroy the immune system,

HIV has emerged as the most significant risk factor for progression of dormant TB infection to clinical disease.<sup>[1]</sup>

HIV is the important risk factors associated with an increased risk of latent TB infection (LTBI) progressing to active TB disease.

## **MATERIALS & METHODS**

It is a retrospective study. Data collected from March 2021 to February 2022. It was conducted on 200 HIV reactive patients. Samples such as sputum, pleural fluid, ascitic fluid, and lymph node are collected and screened, sputum for pulmonary TB and pleural fluid, ascitic fluid, and lymph node for extra pulmonary TB screened by CB-NAAT method. Blood was collected by vein puncture and CD4 count was estimated by flow cytometry. CD4 count was used to know the injury to host immune response. The was approved by ethical committee in GMC Ongole.

### **Inclusion criteria:**

- TB in HIV reactive cases of all age groups and both sex.
- Chronic cough with low grade fever cases.
- Extra pulmonary symptoms of TB.
- CD4 count less than 600 cells/ $\mu$ l.

### **Exclusion criteria:**

- Known bacterial, viral, fungal infections.
- Known Tuberculosis cases
- HIV non-reactive cases

## **RESULTS**

Out of 200 HIV reactive patients 120 were males and 80 were females. Out of 200 samples 40 were detected as TB (20%). Out of which 32 (80%) were pulmonary TB. 8 (20%) were extra pulmonary TB. Out of 40 tuberculosis positive patients 28(70%) are males and 12 (30%) are females. 32(80%) are pulmonary TB, 8(20%) Extra pulmonary TB of them 5 is lymph node 2 are pleural fluid, 1 is ascitic fluid. Blood is collected and CD4 count was estimated by Flow cytometry.

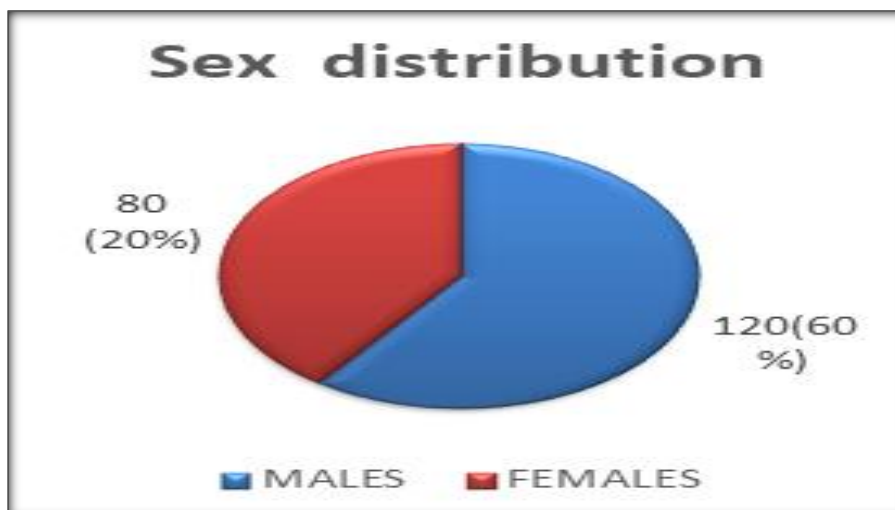


Figure 1: Sex Distribution

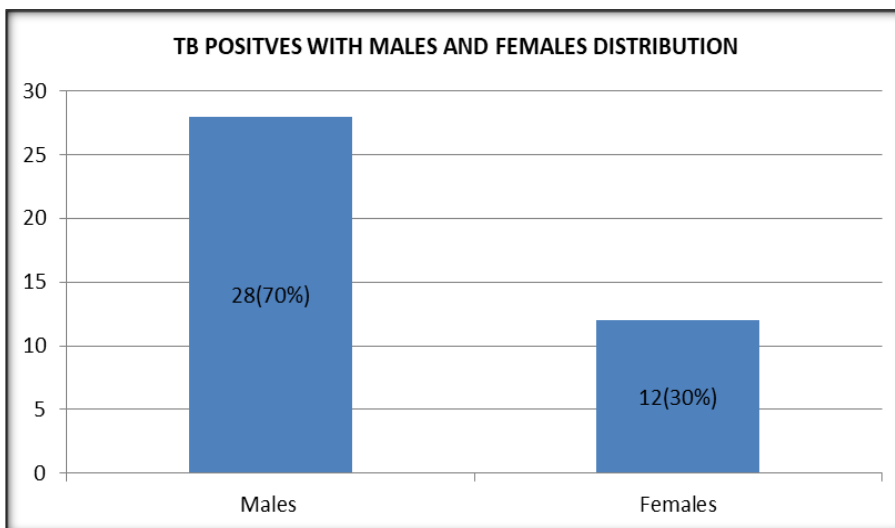


Table 1: TB Positive with males and females distribution

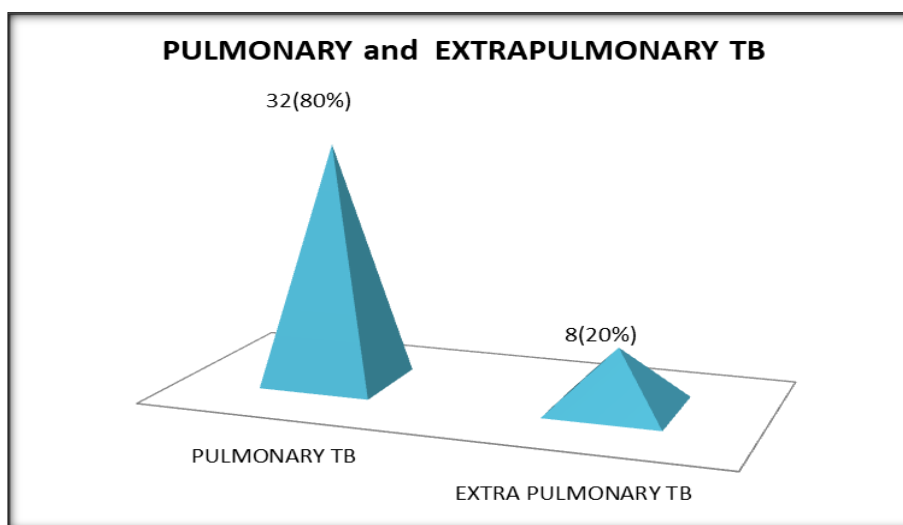
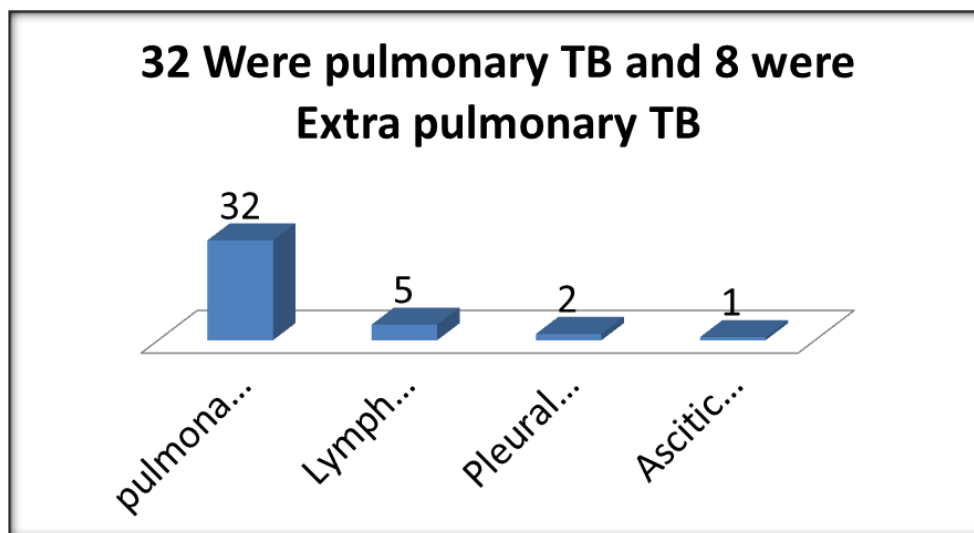
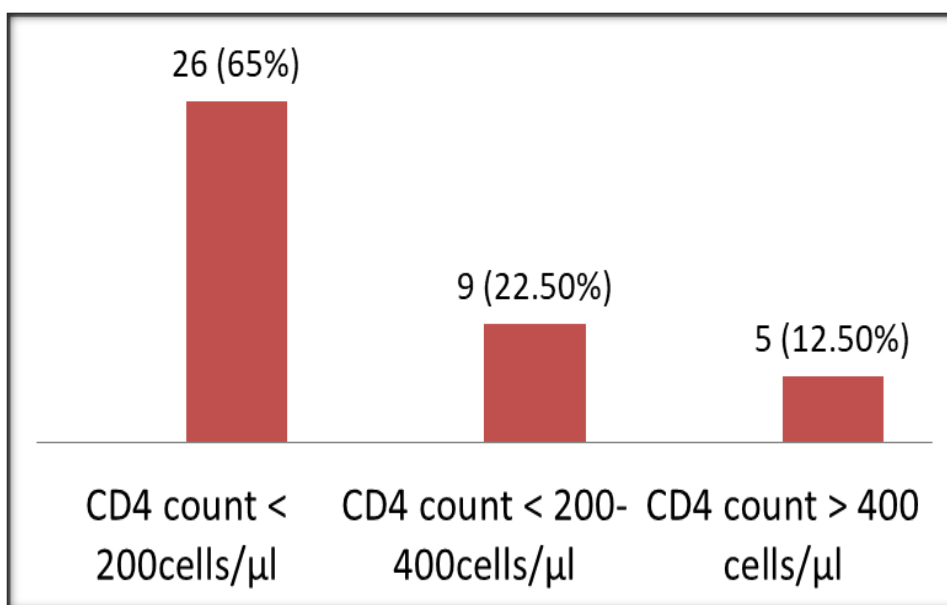


Figure 2: Pulmonary and Extra pulmonary TB



**Figure 3: 32 were pulmonary TB and 8 were extra pulmonary TB**

26(65%) patients with CD4count < 200cells/ $\mu$ l developed Tuberculosis, 9(22.5%) of patients are with 200-400cells/ $\mu$ l and 5(12.5%) of patients with > 400cells/ $\mu$ l. Extra pulmonary tuberculosis CD4 count is < 200 cells/ $\mu$ l and pulmonary tuberculosis CD4 count is 18 were < 200 cells/ $\mu$ l and 14 were showing CD4 count > 200 cells/ $\mu$ l to >400 cells/ $\mu$ l.



**Figure 4: TB Positives Co-Relation with CD4 Count**

CD4 count < 200 cells/ $\mu$ l show more number of TB cases than CD4 Count < 200-400 cells/ $\mu$ l and CD4 Count > 400 cells/ $\mu$ l shows less number of TB cases.

## DISCUSSION

Tuberculosis with HIV is a major health problem in the world.<sup>[9]</sup> It is a common opportunistic infection in HIV. TB is more common in HIV it can occur at any stage so it is essential to screen TB in HIV reactive patients because as the immune system of patient is decreased. CD4 counts is < 200 cells/ $\mu$ l shows more number of TB cases. So Study was done on 200 HIV reactive patients - 40 were detected as TB. Out of which 32(80%) were

pulmonary TB and 8(20%) were extra pulmonary TB. Out of 40 cases 28 (70%) are males and 12(30%) are females, which is similar to the study conducted Dr.Prabodh Panchadhyaye et al at Midnapore Medical College Hospital CD4 count was < 200 Cells/ $\mu$ L shows more no of patients with TB.<sup>[1]</sup>

Another study was done by Mollel EW, et al Tb incidence is higher in males than females Over all TB incidence rate 2.08 per 1000 person per year compared to CD4 count of < 350 cells/ $\mu$ l a high CD4 count was associated with lower TB incidence. Patients with poor nutrients develop more TB than moderately poor nutrients taking.<sup>[2]</sup> Jutang Babat Ain Tiewsoh et al, study is closely related males are more than females and CD4 counts < 220cells/ $\mu$ l shows less number of Extra pulmonary TB than pulmonary TB.<sup>[3]</sup> In another study Males were commonly affected than females similar other study conducted by Kumar p et al high male to female ratio 9:1.<sup>[4]</sup>

There was a trend towards higher mortality in patients who developed TB compared to those who did not.

## CONCLUSION

Incidence of extra pulmonary TB is more with CD4 count < 200cells/ $\mu$ l than pulmonary TB. The CD4 count 200-400cells/ $\mu$ l and > 400cells/ $\mu$ l shows only pulmonary TB. In HIV reactive patients there is increased incidence of TB. To decrease the burden of tuberculosis it is essential to screen HIV reactive patients for TB along with CD4 count to prevent complications and mortality.

It is essential that patients with diagnosed tuberculosis are screened for HIV and patients diagnosed as HIV infected be screened for Tuberculosis early stage detection is to reduce mortality and morbidity among PLHA.

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