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Human Immunodeficiency Virus Infection among Tuberculosis Patients with Special Reference to Cd4 Count

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ABSTRACT

Tuberculosis (TB) has been and continues to be one of the most significant infections causing human disease. HIV infection has contributed to a significant increase in the world wide incidence of TB. The dual epidemic of HIV and TB is a concern for India where both these diseases are prevalent in epidemic proportions. In India TB is the indicator disease for HIV infection and most often the first AIDS defining disease. The objectives of the study are to determine the seroprevalence of HIV infection among TB patients and to compare the clinical profile of TB in HIV positive patients with special reference to CD4 counts. Seroprevalence of HIV among TB patients was 6.7%. Among them 32.2% were in the age group of 31-40 years. 62.5% patients had extrapulmonary TB, 32.5% were pulmonary TB. 10% were sputum positive pulmonary TB. Chest xray lesions were varied with more of infiltrative lesions (84.6%). There were 38.46% patients with upper lobe infiltrates and 61.53% patients with middle and lower zone infiltrates. Mean CD4 counts in this study was 192.10 ± 118.42 cells/ μ l. Most of the patients with extrapulmonary TB and disseminated TB had CD4 counts <200 cells/ μ l. Sputum positivity and upper zone lesions in chest x ray were seen more in patients with CD4 >200 cells/ μ l. Mortality was as high as 20% in patients who were both seropositive and TB positive. HIV seroprevalence is quite high among TB patients in Tumkur.. Extrapulmonary TB and disseminated TB were common when CD4 is <200 cells/ μ l and chest x ray findings were atypical when CD4 <200 cells/ μ l.

Keywords- TB, HIV infection, Seroprevalence, Clinical profile of TB, CD4 count

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INTRODUCTION

Since time immemorial TB has been and continues to be one of the most significant infections causing human disease. In tropical countries TB remains a leading cause of death. Poverty, overpopulation, inattention to tubercular services and the Human immunodeficiency virus / acquired immunodeficiency syndrome (HIV/AIDS) are the causes of increase in the epidemic [1].

In 1993 World Health Organisation (WHO) declared TB a "Global Emergency". The WHO has estimated between the years 2000 and 2020, one billion people will be infected with the tubercle bacillus, 200 million will develop clinical TB and 35 million will die from it [1]. Unfortunately there are parts of the world where TB has been flourishing unhindered since ages and is now forming a deadly synergy with HIV/AIDS has led to a dramatic increase in the number cases of TB worldwide [2].

In India, the overall prevalence of HIV infection is less than 1 per cent and India continues to be in the category of low prevalence countries [2]. Though India is a country with low HIV prevalence, it has the third largest number of people living with HIV/AIDS. As per HIV estimates 2008-09, there are an estimated 23.9 lakh people living with HIV/AIDS in India with an adult prevalence of 0.31 percent in 2009. The major problem that threatens the TB control is the emergence of Multi Drug Resistant TB (MDRTB) [1,3]. The immunosuppression as a result of HIV infection allows the latent Tb infection to become active and those infected are contagious spreading the bacilli in families, communities and health care settings significantly undermining TB control programs [4, 5].

The HIV epidemic has increased the burden of TB (TB) among young adults, especially in populations where the prevalence of Tb population is high. Infection with HIV is the most potent risk factor for progression to active TB. TB is the most common opportunistic infection in HIV/AIDS patients with an attack rate of 7 per 100 person – years [6].

TB may occur at any time after HIV infection, but becomes more common as the immune system weakens. The clinical presentation of TB among the HIV infected is dependent on the degree of immune suppression. Patients with relatively preserved immune function, with CD4+ T cell counts about 200 cells/ μ l/cumm are more likely to have typical symptoms, upper lobe disease and sputum smear positive for AFB. Patients who are severely immunosuppressed are more likely to have atypical clinical and radiographic features; extra-pulmonary disease including meningitis and military TB is also more common in the later stages of the disease [6].

AIMS AND OBJECTIVES

1. To determine the prevalence of HIV infection among TB patients.
2. To study the clinical profile of TB in HIV positive patients with special reference to CD4 count.

MATERIAL AND METHODS

Study design

A prospective cohort study was undertaken for studying the seroprevalence of HIV among TB patients and to study the clinical profile of TB among HIV positive patients with special reference to their CD4 count.

Source of data

All cases of any age and sex admitted to Sree Siddhartha Medical College (Tumkur, Karnataka, India) diagnosed both TB and HIV positive by RNTCP. To calculate seroprevalence the total number of Tb patients admitted in Sree Siddhartha Medical Collage was collected from RNTCP.

Duration of Study

18 months.

Inclusion criteria

Patients diagnosed to be TB positive and seropositive under RNTCP.

Case definition

Pulmonary TB smear positive

- Cough for two weeks
- Two sputum smear examinations
- One or two smear positive, treated as smear positive pulmonary Tb and given full course of Anti Tb therapy

Pulmonary TB, smear negative

- Cough for 2 weeks
- Two sputum smear negative, still suspicious a course of antibiotics for 10-14 days
- Symptoms persist repeat sputum smear examination done if negative, follow it with radiological examination, if suggestive of TB start with Anti Tb therapy.

Extrapulmonary TB

Tb of organ other than lung such as

- Pleura (TB pleurisy), lymph node, abdomen, genitor urinary tract, skin, joint and bone, tubercular meningitis, tuberculoma of brain, military TB etc.

Diagnosis based on

- One culture positive specimen from extrapulmonary site
- Strong clinical evidence consistent with active extrapulmonary TB, followed by medical officer's decision to treat with full course of Anti Tb therapy.

Exclusion criteria

All patients who are HIV positive but tested negative for Tb by RNTCP.

Method of collection of data

All patients of any age and sex diagnosed to be both Tb and HIV positive under RNTCP were included in the study. Detailed history regarding the illness was recorded. A thorough physical examination of all the systems was carried out. Appropriate laboratory and radiological investigation details were recorded. All patients were assigned as per RNTCP.

Following statistical methods were applied in the present study

1. Descriptive statistics
2. Frequencies and percentages
3. Student t test

{ All the statistical operations were done through SPSS for windows, SPSS INC, New York}

RESULTS

A total of 40 patients who were diagnosed to be TB-HIV positive under RNTCP were included in the study. Total number of TB cases during this period was collected from RNTCP results. Seroprevalence was 6.7% in the study. Seroprevalence was 5.1% and 9.4% among men and women respectively. Majority of the patients were in the age group 31-40 years. Most common presenting symptom was weight loss (77.5%) and fever (75%). Most common associated clinical finding were anemia (47.5%), oral candidiasis (37.5%). Most patients were mal nourished with a BMI below 18.5 kg/m^2 . Most common TB was extrapulmonary TB (62.5%). Tubercular meningitis (36%) was most common extrapulmonary TB followed by Tubercular lymphadenitis (24%). Most common pulmonary TB was sputum PTB (22.5%). Sputum positivity was seen only in 10% of patients. Among the X ray findings infiltrative lesions (84.6%) were more common and among that (61.53%) middle / lower zone infiltrates. Mean CD⁴ count in this study was $192.10 \pm 118.42 \text{ cells}/\mu\text{l}$. Most of the patients 62.5% had CD⁴ count $<200 \text{ cells}/\mu\text{l}$. Mean CD4 count in patients with sputum positive TB was 333.75 ± 90.78 , sputum negative TB was 245.44 ± 66.97 , extrapulmonary TB was 159.84 ± 115.29 and disseminated TB was 68 ± 48.08 . All patients with upper zone lesions with chest X ray had Cd4 cell count $>200 \text{ cells}/\mu\text{l}$. Mortality rate was as high as 20% and more in lower CD4 counts.

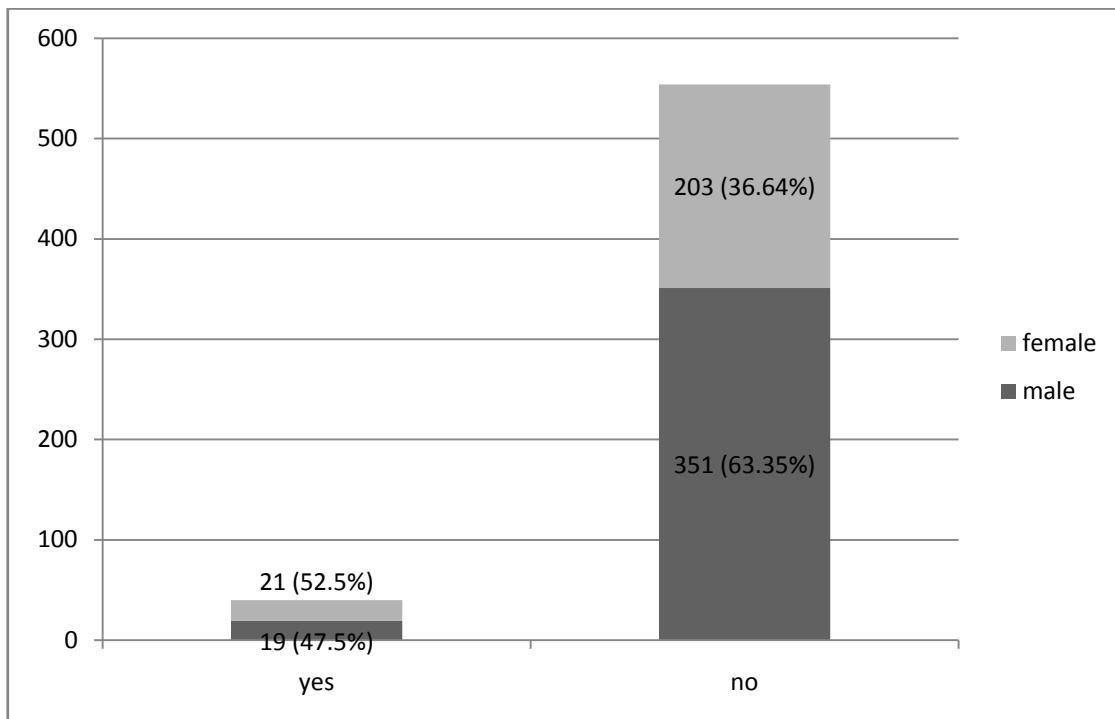


Figure 1 : Seroprevalence of HIV in TB patients in Male and Females.

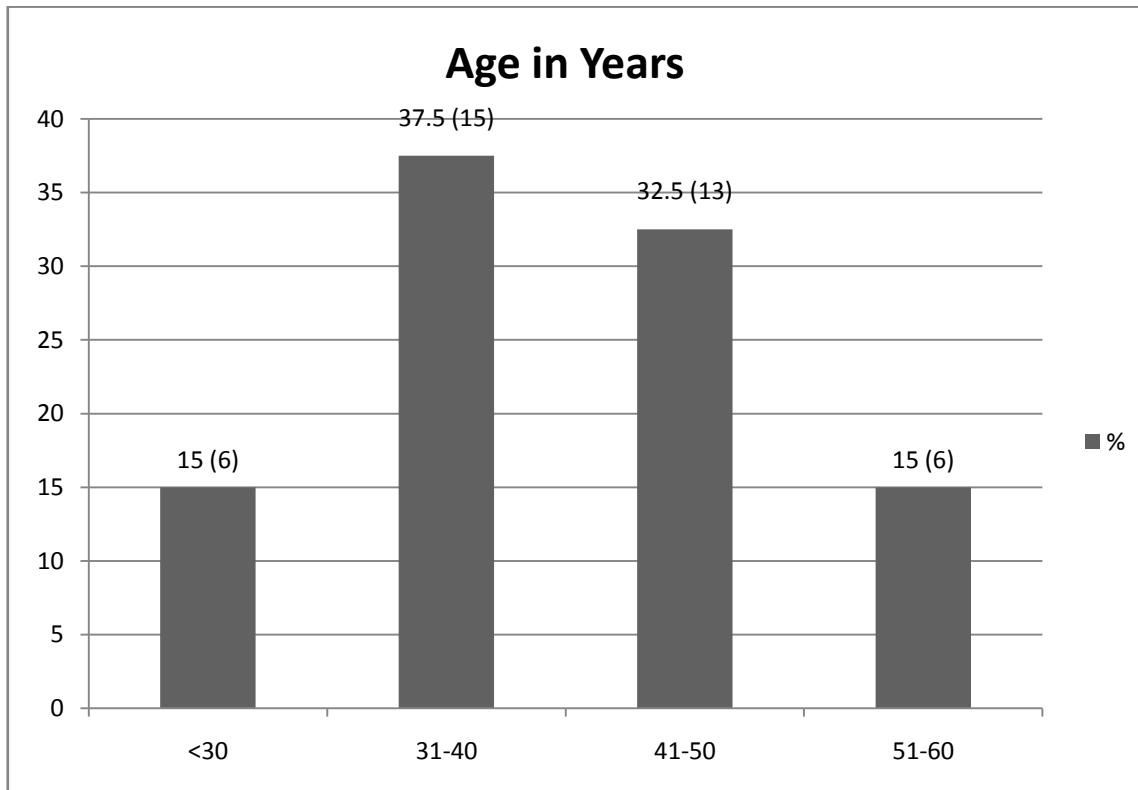


Figure 2: Age distribution of patients studied.

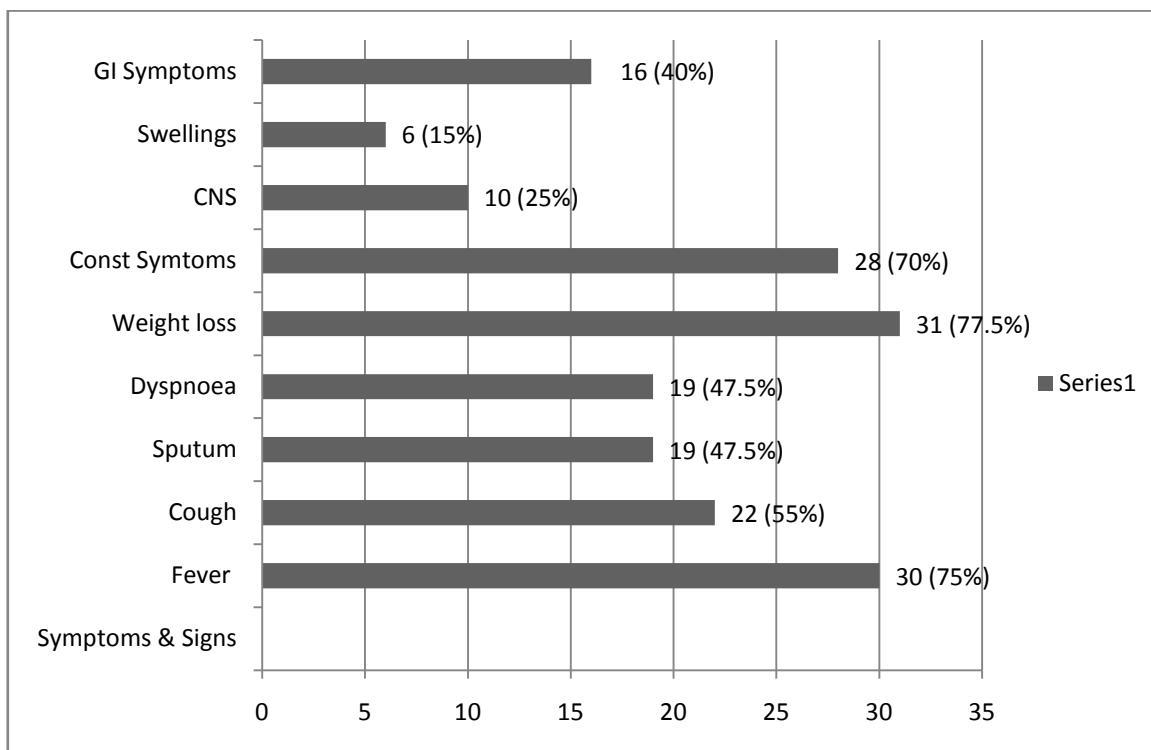


Figure 3: Clinical symptoms & signs of patients studied

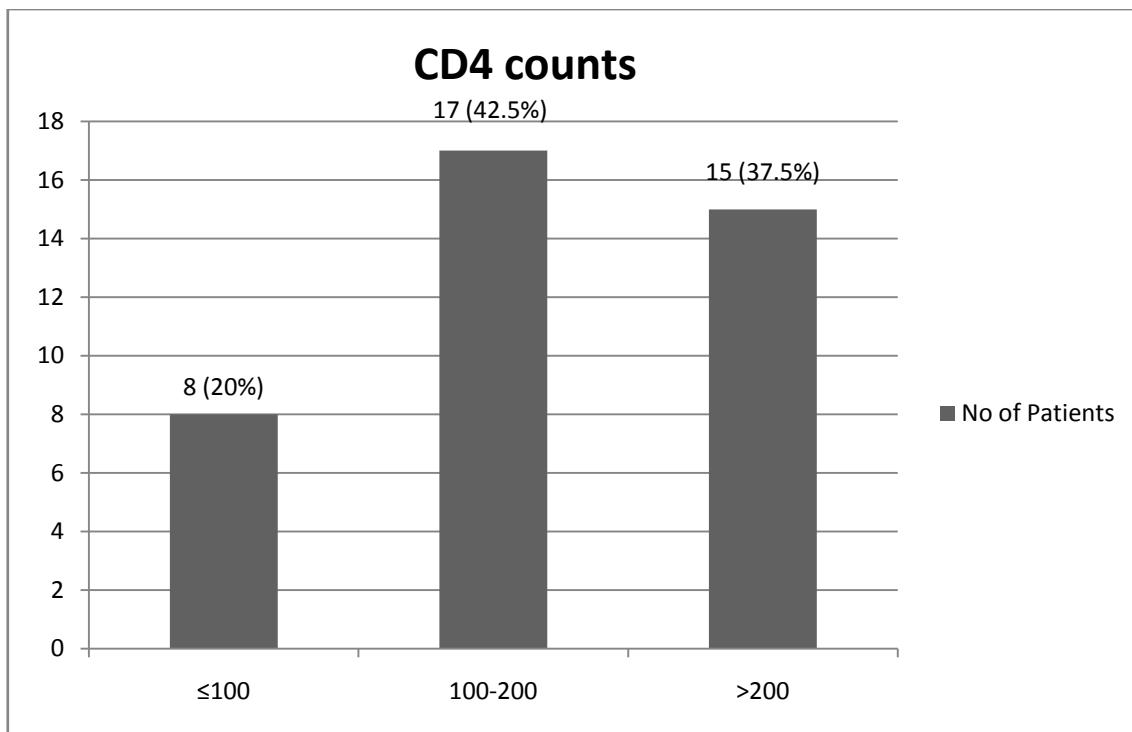


Figure 4: CD4 counts of patients studied

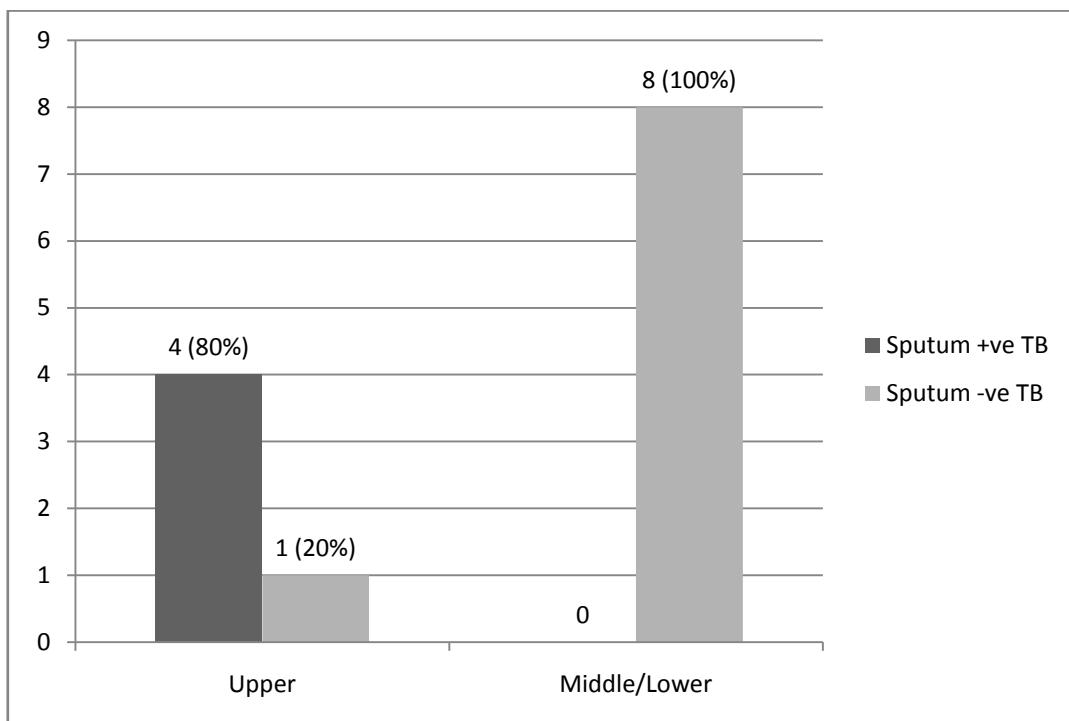


Figure 5: Sputum positive and X ray zones

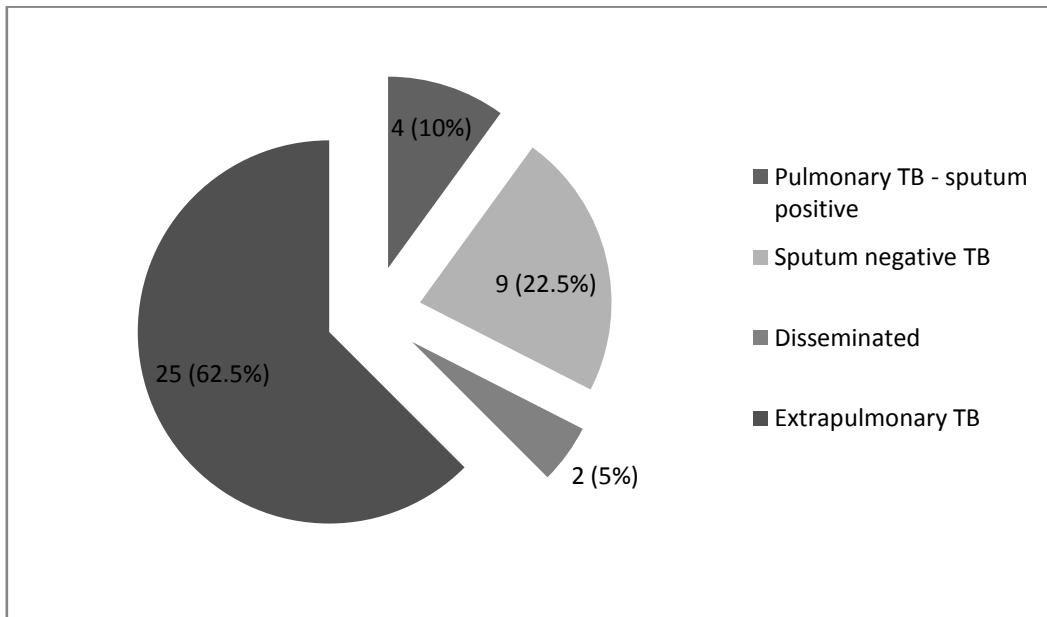


Figure 6: Diagnosis of the patient studied

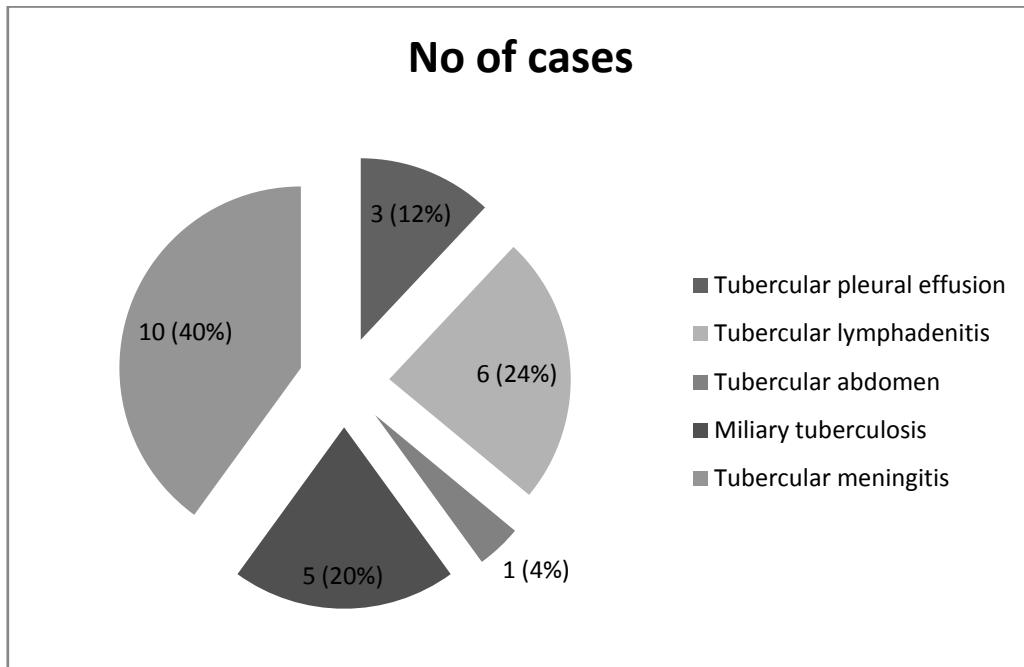


Figure 7: Types of Extrapulmonary TB

DISCUSSION

40 patients were diagnosed to be seropositive and TB positive under RNTCP giving an overall sero prevalence of 6.7% in our study. This is in comparision with the study done by Sowmya Swaminathan et al [7].

The study found that seroprevalence among women (9.4%) to be more than men (5.1%), this is in comparison with the study – Identification of risk factors for extrapulmonary TB by Yang 2004 [8].

The study also shows most common age group is 31-40 years at 37.5%. This is in comparison with the study done by Deivanayagam CN et al [9] in which 74.94% of patients belong ti 21-40 years. This age group reflects that the sexually active age which is more commonly affected by the disease.

In the present study mortality was higher among patients with TB and HIV co infection (20%) which is comparable with the study done by Upasana Agarwal et al [12] with mortality of 17.8%.

CONCLUSION

High level of clinical suspicion is required in diagnosis of TB in HIV infected especially when they are in the later stages of disease which is indicated by CD4 counts <200 cells/ μ l. Treatment of TB and HIV together requires continuous monitoring for compliance and side effects of the drugs.

Table 1: Comparison of symptoms with other authors

Symptoms	Present study	Deivanayagam et al ⁹	Sowmya Swaminathan ⁷	Jaryal et al ¹⁰	Bhartwal MS ¹¹
Fever	75%	63.06%	79%	-	79%
Weight loss	77.5%	49.69%	94%	-	58%
Cough	55%	85.43%	97%	-	29%
Breathlessness	47.5%	61.31%	68%	-	25%
Gi symptoms	40%	33.81%	-	-	-
CNS symptoms	25%	-	-	25.28%	-
Swellings	15%	-	29%	-	21.53%

Symptoms were comparable with almost all of the studies.

Table 2: Comparison of findings in comparison to other studies

	Present study	Sowmya Swaminathan ⁷	Deivanayagam et al ⁹	Jaryal et al ¹⁰
% of pulmonary TB	32.5%	72%	83.88%	25.23%
% of sputum positive pulmonary TB	10%	15%	72%	31.81%
Radiological manifestations- Upper zone	38.46%	-	34.8%	63.63%
Middle / Lower zone	61.53%	-	41.53%	36.36%
Fibrocavitatory	15%	-	17.7%	-
TB meningitis	36%	-	5.94%	33.84%
TB lymphadenitis	24%	29%	7.88%	21.53%
TB pleural effusion	12%	12%	6.88%	18.46%
Abdominal TB	4%	-	-	26.15%
Mean CD4 count	192.10±118.42	192±172	-	123

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