



Original Research

Retrospective Study Of Tuberculosis Incidence Among Patients Attending A Tertiary Care Hospital

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ABSTRACT

Background: Pulmonary Tuberculosis (TB), caused by *Mycobacterium tuberculosis*, mainly affecting the lungs. It remains the biggest problem worldwide affecting people of all age groups and ethnicity despite advanced diagnostics and treatment modalities. It still remains a heavy burden in India, both in terms of morbidity and mortality. **Objective:** To estimate the incidence of Pulmonary Tuberculosis among patients attending Jan Sewa Hospital in Sri Ganganagar, Rajasthan. **Method:** The study was conducted retrospectively at Jan Sewa Hospital, Sri Ganganagar, Rajasthan for the duration of one year (Jan 2024 to Dec 2024). The data was calculated for all the pulmonary TB confirmed cases by acid-fast staining method and Gene Xpert method. **Result:** The total samples received for suspected Pulmonary Tb were 1401 out of which only 210 (15%) were found to be positive. The number of samples tested by Acid Fast staining method were 1209 out of which 142 (11.7%) were acid-fast bacilli (AFB) smear-positive. Samples tested by Gene Xpert method were 192 out of which 68 (35.5 %) were confirmed positive for Tb bacilli. **Conclusion:** In our study 210 (15%) patients were found to be Pulmonary Tuberculosis positive suggesting high TB load in our Hospital. It indicates an urgent and spontaneous need for implicating better and more rapid screening methods for diagnosing and treating Pulmonary Tuberculosis. There is an abrupt need to educate community about the disease. Overall, early detection is very crucial for effective disease management.

Keywords: Acid Fast staining; Pulmonary TB; Gene Xpert method; *Mycobacterium tuberculosis*

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INTRODUCTION

Tuberculosis (TB) is caused mainly by *Mycobacterium tuberculosis*. It is a highly infectious disease that spreads through multiple routes especially respiratory route from human to human. Small droplets released through cough, sneeze, or talking contain enormous amount of TB bacilli. However, TB is not limited to the lungs—it can also affect other parts of the body and lead to serious complications if not diagnosed and treated in time.¹ Despite advances in both diagnosis and treatment, TB remains a major global health concern. World Health Organization (WHO) data suggests about 10.8 million people developed TB in 2023.² India still has the highest no. of TB cases in the world. Rajasthan being one of the largest state-faces its own challenges, particularly in

tertiary care hospitals where pulmonary TB cases are commonly seen. As per the National Tuberculosis Elimination Programme, around 19.3 million people were tested for TB in 2023, and over 583,000 cases were found to be confirmed positive.³ WHO has set End TB Strategy aiming to reduce TB-related deaths by 95% by the year 2035.^{2,4} Hence, the present study was carried to study the incidence of pulmonary tuberculosis among patients attending Jan Sewa Hospital in Sri Ganganagar, Rajasthan.

MATERIAL AND METHOD

The present retrospective observational study was conducted in the Department of Microbiology at Jan Sewa Hospital, Sri Ganganagar, Rajasthan. Data were collected over a period of one year from



January 2024 to December 2024. The study included all patients who were investigated for suspected pulmonary tuberculosis during the study period. Laboratory records of confirmed pulmonary tuberculosis cases were reviewed and analyzed.

Inclusion Criteria • All respiratory samples tested for pulmonary tuberculosis by Acid Fast Bacilli (AFB) staining and/or GeneXpert method.

Exclusion Criteria • Extrapulmonary tuberculosis cases • Inconclusive or incomplete laboratory reports

The diagnosis of pulmonary tuberculosis was established using two microbiological methods routinely employed in the hospital laboratory: 1. Ziehl–Neelsen Acid Fast Bacilli (AFB) staining 2. Cartridge-Based Nucleic Acid Amplification Test (CBNAAT/GeneXpert)

Demographic details such as age and gender along with laboratory findings were recorded and analyzed.

RESULT

For Tb confirmation two methods were in used in Jan Sewa Hospital i.e Acid fast staining method and Gene Xpert method. The data suggests total number of samples processed were 1401 and confirmed positive were 210 samples.

Acid-fast bacilli staining (AFB) was done for 1209 samples out of them 142 (11.7%) were found to be positive and for Gene Xpert 192 samples were processed and 68 (35.5%) were confirmed positive. Only 11 samples were found to be positive for both Acid Fast staining and GeneXpert.

Male patients found were 994 in no. out of which 181 samples were positive with average age of 52 years and females were total 407 out of which 29 were positive for Pulmonary Tb with an average age of 40 years.

Table 1: Total Positive

Name	Total No.	Total Positive (%)
Total samples	1401	210 (15%)
AFB Stain	1209	142 (11.7%)
Gene Xpert	192	68 (35.5%)

Table 2: Gender wise

Samples	Males	Females
Total samples	994	407
Total positive	181	29

DISCUSSION

The present study revealed a significant burden of pulmonary tuberculosis among clinically suspected patients, with higher positivity found among adult male patients. A higher detection rate was

demonstrated with GeneXpert as compared to conventional acid-fast staining, reporting its superior sensitivity for early diagnosis of pulmonary TB.

The incidence of pulmonary tuberculosis (TB) was found to be 15% among patients tested for suspected pulmonary TB at Jan Sewa Hospital, Sri Ganganagar, based on GeneXpert and Acid-Fast Bacilli (AFB) staining positivity. Most of the samples were processed by Ziehl–Neelsen acid-fast staining, accounting for 1209 samples, of which 142 (11.7%) were positive. GeneXpert testing was performed on 192 samples, among which 68 (35.5%) were positive. The higher positivity rate with GeneXpert may be attributed to its greater sensitivity and rapid detection capability for Mycobacterium tuberculosis, especially in paucibacillary cases.

The findings of the present study are comparable with earlier reports. World Health Organization reported that nearly 10 million people develop TB globally every year, with India contributing approximately 25% of the global TB burden.^{2,3} Similarly, Chadha et al⁵ reported an estimated TB prevalence of 22.6% among individuals older than 15 years in India. The lower incidence observed in the present study may be due to regional variations, shorter study duration, and differences in sample size.

In the present study, the majority of TB-positive cases were observed among males and individuals above 17 years of age. The observations of present study were in concordance with Bhat et al.,⁶ study who found a higher prevalence of pulmonary TB among adult males. Kumar S et al⁷ conducted a study in Haryana involving 4267 clinically suspected TB patients, among whom 528 (12.37%) were smear positive. Among these positive cases, 76.14% were males and 23.86% were females, which supports the findings of the present study. Kumar S et al. also observed the highest positivity in the 41–50 years age group and emphasized the need for strengthening TB control measures and epidemiological surveillance. Male predominance may be attributed to occupational exposure, smoking and delayed healthcare-seeking behavior.

Similarly, Dhanaraj et al⁸ reported the highest prevalence of bacteriologically confirmed pulmonary TB in the 55–64 years age group. Bhat et al⁶ observed the highest proportion of pulmonary TB cases in the 35–44 years age group, whereas Rao et al⁹ and Bhat et al⁶ demonstrated that TB prevalence progressively increased with age. These observations are consistent with the present study, where higher incidence was noted among adults and elderly individuals.



Alateah SM et al¹⁰ reviewed 58,141 records over a 17-year period in Saudi Arabia and reported 2% positivity for Mycobacterium tuberculosis, with pulmonary specimens accounting for 55% of positive cases. Males above 15 years constituted 60% of the positive cases, which is comparable with the demographic findings of the present study. However, the lower prevalence reported by Alateah SM et al¹⁰ may reflect better healthcare infrastructure, effective TB control measures, and regional epidemiological differences.

The present study had certain limitations. Since the study was conducted over only one year, the sample size may not accurately represent the overall incidence of pulmonary TB in the entire city population. The findings of the present study emphasize the importance of increasing awareness regarding TB, strengthening screening programs, and ensuring early diagnosis among high-risk groups. Active surveillance and timely treatment initiation remain essential for reducing the burden of pulmonary tuberculosis in India.

CONCLUSION

The high Pulmonary TB load emphasizes the need for enhanced awareness and implementation of rapid screening methods for all patients with suspected pulmonary TB. Further studies are recommended for early diagnosis and prevention measures to combat TB.

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