Original Article

Unveiling Tuberculosis through Retrospective Cross-Sectional Studies: A Prevalence Analysis

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ABSTRACT

Background: Age group and gender which are at high risk for tuberculosis and types of concomitant diseases. **Objectives:** To analysis the demographic data and concomitant illness in tuberculosis patients. **Materials and Methods:** A retrospective cross-sectional study was done on tuberculosis patients in a tertiary care hospital. A total number of 250 Patients were analyzed and selected on the basis of demographic (age, sex and body weight) and concomitant illness. **Results:** The age range of 21 to 30 years old was found to have the highest number of TB cases (38%). Male patients who smoke regularly were shown to have a higher prevalence of tuberculosis (75.2%) than female patients (24.8%). additionally, associated illnesses were discovered, such as 12.8% for TB+HIV, 58.8% for TB+DM, 15.6% for TB+HTN, 4.8% for TB+DM+HTN, and 8% for tuberculosis alone. **Conclusion:** Finally, we reached to the conclusion of those populations with unsafe housing, smoking, drug abuse and immune deficiencies likely to have a high prevalence of TB. Concomitant diseases that were determined to have the highest incidence with TB were Diabetes (58.8%) and Hypertension (15.6%). As is well known, TB is an opportunistic infection that is more common or more severe in those immune systems have been weakened, hence increasing the risk of TB in patients having HIV. We concluded from this data that men are more likely than women to contract TB (72% vs 28%).

Keywords: Tuberculosis, HIV, Diabetes, Hypertension, Opportunistic infection.

INTRODUCTION

Demographic analysis serves as a valuable tool for evaluating the age, sex, weight and concomitant disease. Its primary objective is to facilitate the prevalence of tuberculosis (He *et al.*, 2021).

Aim of this particular study was to evaluate in which age range are more affected, which gender are at high risk and which disease and disorders founded or due to immune deficiency, and effected patients body weight following various weight group which will help to calculate the dose selection for TB patients (Humayun *et al.*, 2022).

Demographic analysis conducted to gather information from MRD department of Hospital, ATT and ART centre (Chilongani *et al.*, 2019).

Our study aims to analysis the demographic details and concomitant disease. It helps to health care systems to understanding the risk population and for population or public it will help to maintain a healthy lifestyle (Vollset *et al.*, 2020).

Tuberculosis (TB) is a bacterial infections disease in human that is caused by mycobacterium tuberculosis. It mostly impacts the lungs, important to pulmonary disease as the prevailing symptom (Herrera *et al.*, 2022). Nevertheless; TB is diverse disease with the aim of can affect numerous organ systems. The respiratory system, Gastrointestinal (GI) system, lymph reticular system, skin, central nervous system, musculoskeletal system, reproductive system, and liver are among the most usually affect organ system (Gopalaswamy *et al.*, 2021).

Human residue date back thousands of years has provided evidence of the presence of TB. Despite being a person pathogen without a known ecological reason, mycobacterium tuberculosis has demonstrated remarkable adaptability and has managed to persist within human communities throughout history (Hadi *et al.*, 2022).

In latest decades, present has been a demanding global effort to eliminate TB. These efforts cover yield positive results, mostly since 2000 when the World Health Organization (WHO) estimated a dependable once a year decline of 1.5% in the global

prevalence rate of tuberculosis. Furthermore, there has been a significant and continuous reduction in mortality caused by tuberculosis. According to the world Health organization, global TB mortality has decreased by 21.3% between 2023 (Floyd *et al.*, 2018).

Despite the progress made in controlling tuberculosis and the decrease in new cases and mortality rates, the global burden of morbidity and mortality caused by TB remains substantial. Developing countries bear the majority of this trouble, among India, Indonesia, China, Nigeria, Pakistan, and South Africa alone secretarial about 66% of TB deaths in 2015 (Sandhu *et al.*, 2011). In addition to its impact on developing countries, tuberculosis continues to pose a significant threat in developed nations, particularly among individuals with weakened immune systems. Those with HIV/AIDS are especially susceptible to tuberculosis-related deaths, with TB accounting for 35% of worldwide mortality in persons with HIV/AIDS in 2015. Furthermore, children are also vulnerable to this infectious disease, as evidenced by one million cases of tuberculosis reported in children in 2015, according to the WHO (Yang *et al.*, 2022).

Approach and Techniques

The study was a retrospective study within the MRD department, ATT and ART centre of tertiary care medical college and hospital 1000 bedded for last one year in northern India. The patients with all age group (11 to 80), gender with tuberculosis, weight and concomitant disease were integrated in the analysis. A total of 250 patients' data from MRD department included in this analysis. The study was evaluated on the basis of patient's data are available in MRD department.

Statistical analysis

All value from the outcome data are enter into Microsoft excel sheet. Data was summarized in the form of size and frequent tables for categorical variables.

RESULTS

It was a retrospective study carried out on 250 patients of tuberculosis with concomitant illness. The result of analysis was shown data of (*n*=250) patients.

Patient's demographic analysis: According to result analysis, the division of tuberculosis patients on the source of the sexual category, age group, weight and concomitant illness.

Sex wise division of tuberculosis patients (Thimmanahalli et al., 2024),Results are shown of gender in no. of patients and its percentage. Total numbers of male patients were initiate to be 180 (72%) also numbers of feminine patients were 70(28%). Tuberculosis was observed to be more common in males (72%) than female (28%) Table 1.

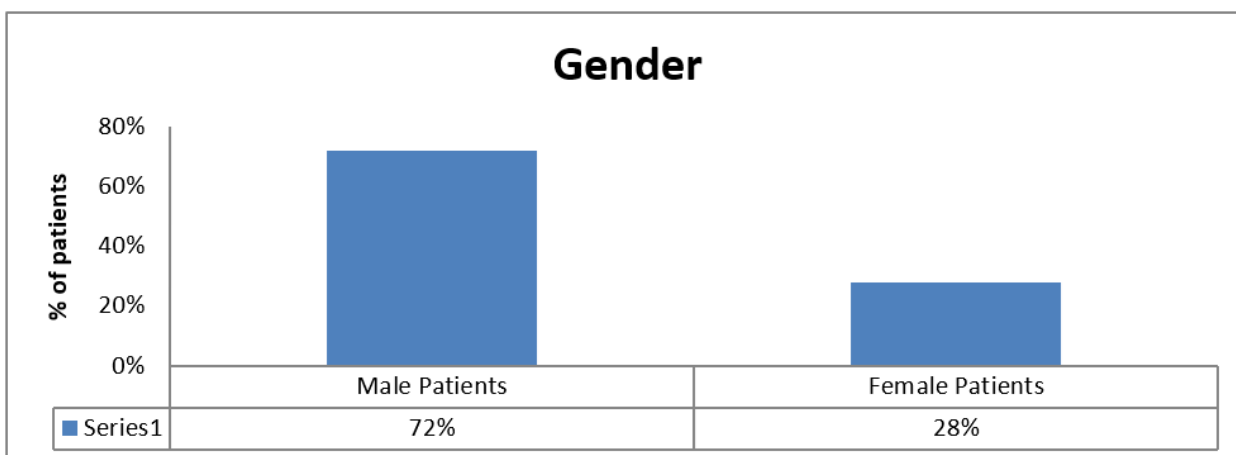Division of patients on the basis of gender Figure 1.

Age distribution of tuberculosis patients (Marçôa et al., 2018). All results are shown no. of patients and its percentage. Patients among age range 11-20 years (3.6%), 21-30 years (2.4%), 31-40 years (10.8%), 41-50 years (38.8%), 51-60 years (2%), 61-70 years (1.6%) and Above 71 found to be (0.8%). The most usually age group was found among the age range of 41-50 years Table 2.

Concomitant illness with tuberculosis (Sundaram et al., 2025). The above table shows, tuberculosis having various concomitant illness. Study found concomitant illness, HIV (12.8%), Diabetes

Table 1: Sex wise division of tuberculosis patients (Thimmanahalli *et al.*, 2024).

Gender	Total no of patients	% of patients
Male	180	72%
Female	70	28%

Results are shown of gender in no. of patients and its percentage.
Total numbers of male patients were initiate to be 180 (72%) also numbers of feminine patients were 70(28%).
Tuberculosis was observed to be more common in males (72%) than female (28%).

Figure 1: Division of patients on the basis of gender (Sarpal *et al.*, 2015).

Table 2: Age distribution of tuberculosis patients (Marçôa *et al.,* 2018).

Sl. No.	Age Group	No. of Patients	% of patients
1	11 to 20	9	3.6%
2	21 to 30	6	2.4%
3	31 to 40	27	10.8%
4	41 to 50	97	38.8%
5	51 to 60	5	2%
6	61 to 70	4	1.6%
7	Above 71	2	0.8%

All results are shown no. of patients and its percentage.
Patients among age range 11-20 years (3.6%), 21-30 years (2.4%), 31-40 years (10.8%), 41-50 years (38.8%), 51-60 years (2%), 61-70 years (1.6%) and Above 71 found to be (0.8%). The most usually age group was found among the age range of 41-50 years.

Table 3: Concomitant illness with tuberculosis (Sundaram *et al.,* 2025).

Sl. No.	Concomitant illness	No. of patients	% of concomitant illness
1	Tuberculosis with HIV	32	12.8%
2	Tuberculosis with Diabetes	147	58.8%
3	Tuberculosis with Hypertension	39	15.6%
4	Tuberculosis with Hypertension with Diabetes	12	4.8%
5	Tuberculosis	20	8%

HIV=Human Immunodeficiency Virus.
The above table shows, tuberculosis having various concomitant illness. Study found concomitant illness, HIV (12.8%), Diabetes (58.8%), HTN (15.6%), TB+HTN+DM (4.8%) and TB (8%) respectively.

Table 4: TB Patients distributes according to weight (G Hall *et al.,* 2015).

Patients weight Group	No. of patients	% of patients
25-40 Kg	28	11.2%
41-54 Kg	123	49.2%
55-69 Kg	86	34.4%
70 and above	13	5.2%

Patient with weight group 25-40 Kg were 11.2%, 41 -54 Kg were 49.2%, 55-69 Kg were 34.4% and above 70 are 5.2%. Tuberculosis was observed to be more in 41-54 Kg weight group (49.2%).

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TB Patients distributes according to weight (G Hall et al., 2015) Patient with weight group 25 – 40 Kg were 11.2%, 41 -54 Kg were 49.2%, 55 – 69 Kg were 34.4% and above 70 are 5.2%. Tuberculosis was observed to be more in 41 – 54 Kg weight group (49.2%) Table 4.

DISCUSSION

The national TB prevalence survey highlighted that 70.3% of TB patients were male, while 76% were female (T Rotich *et al.,*) However, in the current analysis, the proportion of male TB patients has risen to 72%, while female patients have decreased to 28%. This marked shift from the earlier survey underscores a considerable drop in female TB patients and a concurrent increase in male TB patients. Interestingly, previous surveys had indicated a higher likelihood of TB among female patients. Still, the current analysis contradicts this trend by showing a higher prevalence of TB among male populations.

The national TB prevalence survey showed the highest prevalence among individuals aged 45-54 years at 90.5%, followed by those aged 35-44 years at 89.1% (T Rotich *et al.,*) In contrast, the current analysis reveals a concentration of TB prevalence among individuals aged 41-50 years, comprising 38.8% of TB patients, with the 31-40 years age range following at 10.8%. The change in age-wise TB prevalence signifies a shift in the demographics of TB-affected populations over time. Earlier surveys indicated higher prevalence rates among older age groups (45-54 and 35-44 years), whereas the current analysis points to a higher prevalence among individuals aged 41-50 and 31-40 years. This change underlines evolving patterns in TB division across different age range.

In a previous study with a population of 105 (*n*=105) individuals, researchers found tuberculosis prevalence along with other diseases such as diabetes (7.6%), hypertension (1.9%), AIDS (0.9%), and adverse effect of ATT (2.8%) (Jhaj *et al.*, 2018). However, in a recent analysis with a larger population of 250 (*n*=250) individuals, tuberculosis was found to be more prevalent with diabetes (58.8%), hypertension (15.6%), and HIV (12.8%).

fascinatingly, among HIV patients, there was a higher incidence of TB likely due to the use of ATT treatment and its potential adverse effects.

The earlier study on patient weight found that the majority within the 40-54 kg range (81%) and the 55-69 kg range (27%) (Pandurangan *et al.*, 2020). In compare, the recent analysis founded TB prevalence in the 41-54 kg range (49.2%) and the 55-69 kg range (34.4%). These findings indicate a significant increase in tuberculosis prevalence among individuals with comorbidities like diabetes, hypertension, and HIV in the recent analysis compared to the previous study. It's important to note a notable shift in the distribution of TB patients across different weight categories, particularly with a higher percentage now observed in the 41-54 kg weight range. This shift underscores the need to understand these changes for improving TB management strategies and optimizing patient outcomes.

CONCLUSION

Finally, we reached to the conclusion of those populations with unsafe housing, smoking, drug use and immune deficiencies likely to have a high prevalence of TB. Concomitant diseases that were determined to have the highest incidence with TB were Diabetes (58.8%) and Hypertension (15.6%) and HIV (12.8%). As is well known, TB is an opportunistic infection that is more common or more severe in those immune systems have been weakened, hence increasing the risk of TB in patients having HIV. We concluded from this data that men are more likely than women to contract TB (72% vs. 28%).

ABBREVIATIONS

TB: Tuberculosis; **HIV:** Human Immune deficiency Virus; **AIDS:** Acquired immunodeficiency syndrome; **DM:** Diabetes mellitus; **HTN:** Hypertension; **ATT:** Anti tuberculosis treatment; **ART:** Anti-Retroviral Therapy; **WHO:** World Health Organization; **MRD:** Medical record Department.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

SUMMARY

A retrospective study analyzed data from 250 Tuberculosis (TB) patients at a tertiary care medical college and hospital in northern India. The study aimed to evaluate the demographic profile and concomitant illnesses of TB patients. The results showed that:

- TB was more common in males (72%) than females (28%).
- The most affected age group was 41-50 years (38.8%), followed by 31-40 years (10.8%).

- Concomitant illnesses were common, with diabetes being the most prevalent (58.8%), followed by hypertension (15.6%), and HIV (12.8%).
- TB patients with weight between 41-54 kg were the most affected (49.2%).

The study found a significant shift in the demographics of TB-affected populations compared to previous surveys. The proportion of male TB patients increased, while female patients decreased. The age-wise prevalence of TB also shifted, with a higher prevalence among individuals aged 41-50 years.

The study highlights the importance of understanding the changing patterns of TB prevalence and concomitant illnesses. The findings suggest that TB management strategies should be optimized to address the growing burden of comorbidities like diabetes, hypertension, and HIV. The study's results can inform healthcare policymakers and practitioners to develop targeted interventions and improve patient outcomes.

KEY FINDINGS

- TB is more common in males and those aged 41-50 years.
- Diabetes is the most prevalent concomitant illness among TB patients.
- TB patients with weight between 41-54 kg are the most affected.
- There is a need to understand the changing patterns of TB prevalence and concomitant illnesses to optimize TB management strategies.

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