

## Socio-Demographic and Clinical Profile of Patients with Pulmonary Tuberculosis in A Tertiary Care Hospital

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### Abstract

### Original Research Article

**Background:** Worldwide, tuberculosis (TB) is one of the leading causes of mortality. It is caused by bacteria and most often affects the lungs resulting in pulmonary tuberculosis (PTB). Pulmonary tuberculosis (PTB) spreads from person to person by coughing, spitting, and sneezing. Patients with active pulmonary tuberculosis (PTB) can be asymptomatic. Prior conception regarding the socio-demographic and clinical profile of patients with pulmonary tuberculosis may be helpful in the management of such cases. **Aim of the Study:** This study aimed to assess the socio-demographic and clinical profile of patients with pulmonary tuberculosis. **Methods:** This descriptive cross-sectional study was conducted in the Department of Medicine, Dhaka Medical College Hospital for the period of March 2018 to September 2020. Of all the patients admitted to the medicine department with lung infiltrates, 100 pulmonary tuberculosis patients were selected as the study population. All the necessary diagnosis was performed in Dhaka medical College Hospital (DMCH), Dhaka, Bangladesh. All final data were collected in the semi-structured and pretested case record form. After data collection, data were checked for errors, and analysis was done. **Results:** In this study, male participants were dominant in number and the male-female ratio was 2.7:1. The mean age of the participants was 42.59±12.73 years. The majority of our participants were married (88%), about one-third (30%) of our participants were service holders and only 9% were unemployed. The majority (51%) of our participants were from middle-income status. As the most common symptom, cough was found among 100% of our patients. Besides this, sputum (81%) and fever (73%) were also found in more than 50% of cases. In most of the cases, ESR was found between 50-100 mm, CRP was found between 50-100 mg/L, and the MT test was positive in 67% of cases. In chest X-rays- patchy opacity, consolidation in different lobes, and upper lobe consolidation were found at 40%, 22%, and 28% cases respectively. Besides those, pleural effusion and lymphadenopathy were found in 10% and 20% of cases respectively. **Conclusion:** The frequency of pulmonary tuberculosis among the male population is higher than that in the female population. The number of pulmonary tuberculosis (PTB) patients among middle-income status demand more attention from health professionals as well as policymakers.

**Keywords:** Socio-demographic, Clinical profile, Pulmonary tuberculosis, TB, PTB, Cough.

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## INTRODUCTION

Tuberculosis (TB) is one of the leading causes of mortality worldwide and has become a global public health emergency [1]. It is caused by bacteria (*Mycobacterium tuberculosis*) that most often affect the lungs resulting in pulmonary tuberculosis (PTB). Pulmonary tuberculosis (PTB) spreads from person to person through the air by coughing, sneezing, and spitting, affecting people of both sexes in all age groups

[2]. Patients with active pulmonary TB can be asymptomatic or can be diagnosed by clinical symptoms, chest radiography, and bacteriological examination of sputum including smear microscopy, culture of tubercle bacilli, and polymerase chain reaction (PCR) [3]. Ninety-five percent of tuberculosis cases occur in developing countries and belong to the economically active group of the population [3]. Tuberculosis (TB) is a contagious infection that can attack any part of the body, such as the lungs, abdomen,

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glands, bones, and nervous system. Patients with tuberculosis (TB) present mostly with pulmonary involvement [4] causing pulmonary tuberculosis (PTB), which is a chronic airborne infection of the lung caused by bacteria, *Mycobacterium tuberculosis* [5]. A healthy individual is infected by inhaling the droplets, which settle and grow in the lungs resulting in the development of primary infection, which usually remains asymptomatic [5]. TB infection begins when the mycobacterium reaches the pulmonary alveoli, where they invade and replicate within alveolar macrophages. Inhaled mycobacteria are phagocytized by alveolar macrophages, which interact with T lymphocytes, resulting in the differentiation of macrophages into epithelioid histiocytes [6]. Epithelioid histiocytes and lymphocytes aggregate into small clusters, resulting in granulomas. Importantly, bacteria are not always eliminated from the granuloma but can become dormant, resulting in a latent infection [7]. Depending on the circumstances, a person with a primary infection may progress after a latent period of months or years to post-primary TB resulting in extensive involvement of the lung tissue [5]. Tuberculosis is a major public health problem in Bangladesh. Bangladesh ranks 6th among countries with the highest burden of tuberculosis. Most of the patients diagnosed under the national tuberculosis program are sputum smear-positive tuberculosis. They are easily treated throughout the country. But the number of smear-negative and extrapulmonary tuberculosis patients is very low than expected.

## METHODOLOGY

This descriptive cross-sectional study was conducted in the Department of Medicine, Dhaka Medical College Hospital for the period of March 2018 to September 2020. Of all the patients admitted to the medicine department with lung infiltrate, 100 pulmonary tuberculosis patients were selected as the study population. The purposive sampling method was used in subject selection.

### Inclusion Criteria:

- The patient's age was 18 to 65 years.
- Both sexes.
- Sputum smear microscopy positive for acid-fast bacilli (AFB). Or Xpert MTB/RIF positive.
- Radio-logically, lung parenchymal abnormalities- Any cavitory lesion, consolidation involving any lobe (mostly upper lobe), diffuse patchy opacity/consolidation involving lobe/whole lung.
- Clinical symptoms of active pulmonary TB - (any two) cough for 3 weeks or more, hemoptysis, fever, loss of appetite, weight loss, night sweats (NTP 2013) [8].

### Exclusion Criteria:

- History of previous pulmonary or extrapulmonary TB or ongoing TB treatment.
- Cases with pregnancy, menstruation, known malignancy in the body, benign gynecological lesions, pelvic inflammatory disease (PID), patients with known liver, renal or cardiac diseases, and any known pulmonary disease other than pneumonia or PTB.

Patients were counseled about the study's aim, objective, usefulness, and procedure. Informed written consent was taken from each patient. All relevant information regarding history, symptoms, and signs was documented in semi-structured and pretested case record forms. Primary enrollment was done as presumptive pulmonary TB. All the necessary diagnosis was performed in DMCH, Dhaka, Bangladesh. All final data were collected in the semi-structured and pretested case record form. During the collection of data, the highest standard of ethical measures was ensured and maintained throughout the study. These data were analyzed statistically by the standard procedure to arrive at a definite conclusion concerning the research question. The researcher was concerned about ethical issues, and the researcher followed the terms of the Helsinki Declaration. The highest possible standard and confidentiality were maintained throughout the study. Before the collection of data highest standard of ethical measures was ensured and it was maintained throughout the study. Following data collection, it was checked and verified for consistency. Collected data were encoded and inputted into SPSS software 16 for Windows 7. Categorical data were presented as frequency and percentage. Continuous data were presented as mean  $\pm$  standard deviation (SD). In all cases, p-value  $<0.05$  was considered statistically significant.

## RESULTS

In this study, among the total of 100 participants, 73% were male whereas the rest 27% were female. So male participants were dominating in number and the male-female ratio was 2.7:1. The mean age of the participants was  $42.59 \pm 12.73$  years. In distributing the participants as per marital status, we observed that the majority of our participants were married who contributed 88%. 9% were unmarried and 3% were widows/widowers. About one-third (30%) of our participants were service holders and only 9% were unemployed. Besides those, 15%, 21%, 16% and 9% were housewives, businessmen, cultivators, and students respectively. Here we observed that the majority (51%) of our participants were from middle-income status, whereas 46% were from low and the rest 3% were from high-income group. As the most common symptom, cough was found among 100% of our patients. Besides this, sputum (81%) and fever (73%) were also found in more than 50% of cases. Moreover, weight loss, chest pain, as well as shortness of breath, were observed in some cases. In this study in

the majority of the cases, ESR was found between 50-100 mm, CRP was found below 50mg/ml in 67% of cases, and MT test results were found positive in 67% of cases. Besides these, about 34% of patients had positive sputum smear microscopy examinations for AFB. In this study, in chest X-ray findings -- patchy

opacity, consolidation in different lobes, and upper lobe consolidation were found in 40%, 22%, and 28% cases respectively. Besides those, pleural effusion and lymphadenopathy were found in 10% and 20% of cases respectively.

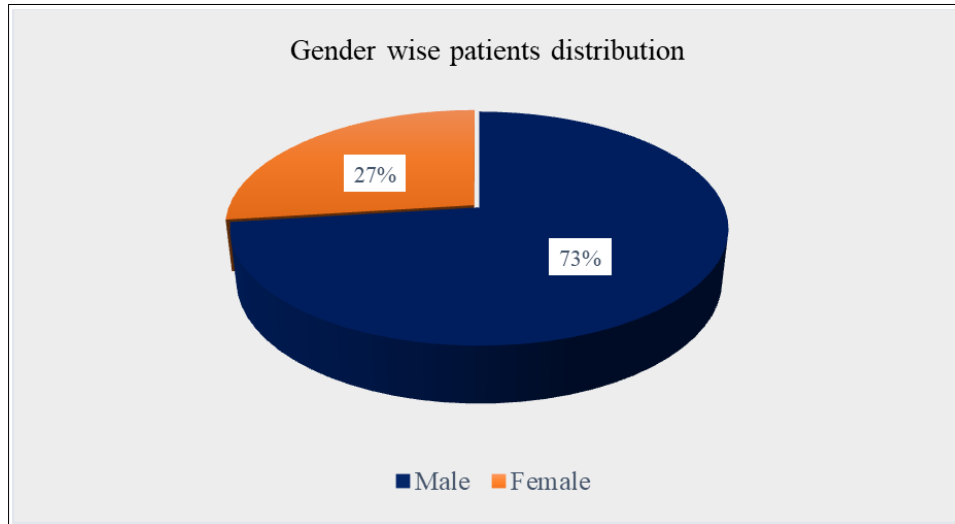


Figure I: Pie chart showed the gender distribution of participants (N=100)

Table 1: Age distribution of participants (N=100)

Age (In Year)	Frequency (n)	Percentage (%)
18-30 yrs.	18	18%
31-40 yrs.	25	25%
41-50 yrs.	30	30%
51-60 yrs.	21	21%
>60 yrs.	6	6%
Mean ±SD	42.59±12.73	

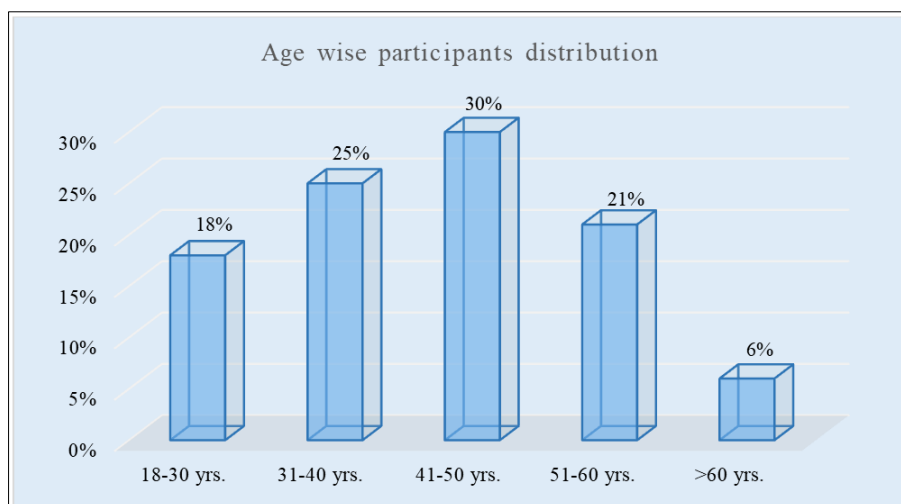


Figure II: Showed Age distribution of participants (N=100)

Table 2: Distribution of the participants as per marital status (N=100)

Marital status	Frequency (n)	Percentage (%)
Married	88	88%
Unmarried	9	9%
Widow/widower	3	3%

**Table 3: Occupational status of participants (N=100)**

Occupation	Frequency (n)	Percentage (%)
Housewife	15	15%
Service holder	30	30%
Businessman	21	21%
Farmer	16	16%
Unemployed	9	9%
Student	9	9%

**Table 4: Sign-symptoms of the study population (N=100)**

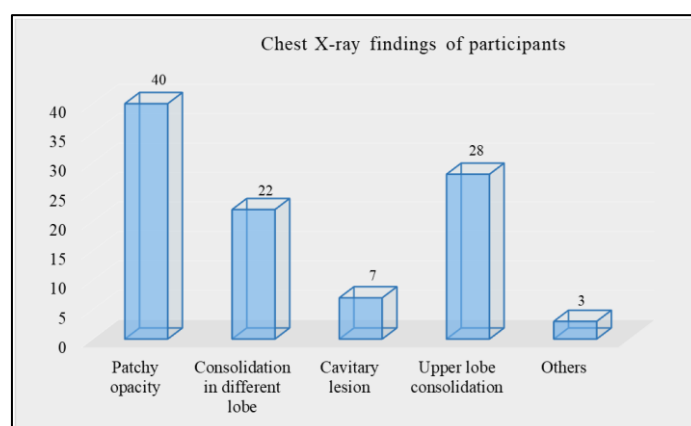
Clinical features	Frequency (n)	Percentage (%)
Cough	100	100%
Sputum	81	81%
Fever	73	73%
Weight loss	46	46%
Chest pain	24	24%
Shortness of breath	25	25%

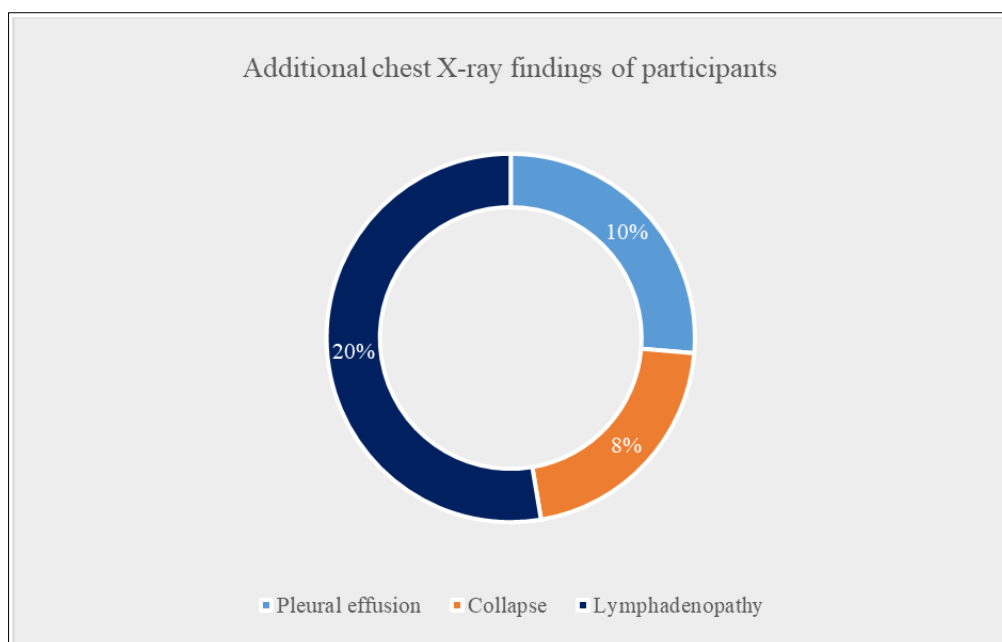
**Table 5: Laboratory findings among the study population (N=100)**

Characteristics	Frequency (n)	Percentage (%)
<50 mm	18	18%
50-100 mm	67	67%
>100 mm	15	15%
<b>CRP</b>		
<50 mg/L	67	67%
50-100 mg/L	33	33%
<b>MT test results</b>		
Positive	67	67%
Negative	33	33%

**Table 6: X-ray findings among the study population (N=100)**

X-ray findings	Frequency (n)	Percentage (%)
<b>Chest X-ray findings</b>		
Patchy opacity	40	40%
Consolidation in different lobes	22	22%
Cavitary lesion	7	7%
Upper lobe consolidation	28	28%
Others	3	3%
<b>Additional chest X-ray findings</b>		
Pleural effusion	10	10%
Collapse	8	8%
Lymphadenopathy	20	20%

**Figure III: Bar chart showed chest X-ray findings of the participants (N=100)**



**Figure IV: Ring chart showed additional chest X-ray findings of the participants (N=100)**

## DISCUSSION

This study aimed to assess the socio-demographic and clinical profile of patients with pulmonary tuberculosis. The Global TB burden is declining slowly. It could be expedited by programs focusing on early diagnosis and treatment. Diagnosing pulmonary tuberculosis remains dependent upon sputum smear and culture, chest radiography, and clinical sign symptoms. Currently, 57% of global tuberculosis patients are being diagnosed bacteriologically [9]. However, in some cases of pulmonary TB, Acid Fast Bacilli stains in sputum samples may be negative or respiratory specimens may not be available, and other methods have to be used to establish the diagnosis of TB [10]. The tumor marker Cancer antigen-125 (CA-125) has been studied as a useful diagnostic tool for tuberculosis and its role to differentiate pulmonary tuberculosis from other pulmonary infections has also been studied [4]. In this study, among 100 participants, 73% were male whereas the rest 27% were female. So male participants were dominating in number and the male-female ratio was 2.7:1. The mean age of the participants was  $42.59 \pm 12.73$  years. A hospital-based study in India found that about 72.5% of patients of PTB were above 40 years of age [11]. Another study in India showed that 61.7% patients of pulmonary tuberculosis were within the age group of 15-34 years [12]. Among infected persons, the incidence of tuberculosis was highest during late adolescence and early adulthood the reasons are unclear [13]. In a previous study, the differences in socio-demographic characteristics in two periods, from the very beginning of the 21st century and 10 years after, were examined. In both observed periods, male people suffered from tuberculosis more frequently [14]. Among hospitalized pneumonia patients studied by Shah *et al.*, (2010) [15] found the

majority of patients were male. In this study, the most common symptom was cough which was found among 100% of our patients. Besides this, sputum (81%) and fever (73%) were also major symptoms. Moreover, weight loss, chest pain, as well as shortness of breath, were observed in some cases. Sajith *et al.*, (2015) [12] found in their study about clinical features of tuberculosis that cough with expectoration is prevalent in 96.5% of patients followed by weight loss (80.7%), fever (73.7%) and loss of appetite (54.4%). We found ESR between 50-100 mm in 67% of participants, CRP was less than 50 mg/ml in 67% of cases and the MT test was positive in 67% of cases. Besides these, about 34% of patients had positive sputum smear microscopy examination for AFB. In this study, common chest X-ray findings among all the patients were patchy opacity (40%), consolidation in different lobes (22%), and upper lobe consolidation (28%). Besides those, pleural effusion (10%) and lymphadenopathy (20%) were also found. So, cough, fever, patchy opacity, pleural effusion, and lymphadenopathy may be considered as some potential diagnostic findings among patients with pulmonary tuberculosis (PTB).

### Limitations of the Study

This was a single-centered study with small-sized samples. Moreover, the study was conducted for a short period. So, the findings of this study may not reflect the exact scenario of the whole country.

## CONCLUSION & RECOMMENDATION

The frequency of pulmonary tuberculosis among the male population is higher than that in the female population. The number of pulmonary tuberculosis (PTB) patients among the middle-income group demand more attention from health professionals as well as policymakers. Cough, fever, patchy opacity,

pleural effusion, and lymphadenopathy may be considered as some potential diagnostic findings among patients with pulmonary tuberculosis (PTB).

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