

Research Article

An Observational Study of Demographic Factors among Patients with Pulmonary Tuberculosis

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Received Date: 09/08/2026

Revised Date: 11/09/2026

Accepted Date: 10/10/2026

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ABSTRACT

Objective: To evaluate the demographic characteristics of patients with pulmonary tuberculosis.

Methods: This prospective observational study was conducted from 1 January 2010 to 31 December 2010 in the Department of Biochemistry and the Directly Observed Treatment (DOT) Centre of a tertiary health care center in Bangladesh. A total of 76 participants, aged 15–60 years, were included. Of these, 46 were newly diagnosed sputum smear-positive pulmonary tuberculosis patients (cases), and 30 age-matched healthy individuals served as controls. **Results:** The mean age was 33.41 years (range, 16–55 years) among cases and 34.57 years (range, 18–55 years) among controls. Most patients were male (63%), and 41.3% had completed primary-level education. Smoking was reported in 36.96% of patients, while 21.74% used tobacco leaf. Mean body weight increased from 41.76 ± 5.53 kg at diagnosis to 43.02 ± 5.48 kg after two months of anti-tuberculosis treatment. Mean BMI increased from 17.08 ± 1.87 kg/m² to 17.56 ± 1.88 kg/m². **Conclusion:** Pulmonary tuberculosis remains an important public health problem in Bangladesh. Accurate diagnosis,

prevention, and effective control measures are essential.

Keywords: Pulmonary tuberculosis; Mycobacterium tuberculosis; demographic characteristics.

INTRODUCTION

Tuberculosis (TB) is a major global public health problem in Bangladesh. Nearly one-third of the global population is infected with Mycobacterium tuberculosis and is therefore at risk of developing the disease.¹ More than nine million people develop active TB each year, and approximately two million die from the disease. Furthermore, more than 90% of global TB cases and deaths occur in developing countries, where 75% of cases affect the most economically productive age group.²

Tuberculosis is caused by infection with Mycobacterium tuberculosis, which belongs to a complex of organisms that also includes M. bovis and M. africanum.³ It remains a major cause of disability and mortality worldwide. In 2009, the estimated global burden of TB was 9.4 million incident cases and 14 million prevalent cases.⁵ During the same year, approximately 1.7 million people died from TB. Among the 22 high-burden countries, Bangladesh ranked sixth.⁴ A high proportion

(81%) of notified TB cases in Bangladesh were sputum smear-positive.⁵ Early diagnosis and completion of treatment are therefore essential for achieving cure and preventing transmission within the community.

The present study aimed to evaluate the demographic characteristics of patients with pulmonary tuberculosis.

Objective

To assess the demographic characteristics of patients with pulmonary tuberculosis.

MATERIALS AND METHODS

Study design

This was a prospective observational study.

Study setting and period

The study was conducted from 1 January 2010 to 31 December 2010 in the Department of Biochemistry and the Directly Observed Treatment (DOT) Centre of a tertiary health care center in Bangladesh.

Study population

A total of 76 participants, comprising males and females aged 15–60 years, were included. Of these, 46 were newly diagnosed sputum smear-positive pulmonary tuberculosis patients (cases), and 30 age-matched healthy individuals served as controls. Cases were purposively selected from the DOT Centre after confirmation of newly diagnosed sputum smear-positive pulmonary tuberculosis. Controls were healthy volunteers.

Patients with sputum smear-negative pulmonary tuberculosis, those with a history of anti-tuberculosis drug treatment, and patients with pulmonary tuberculosis associated with connective tissue disorders were excluded.

Data collection and laboratory methods

Detailed clinical histories, clinical examination findings, and laboratory data were recorded. Written informed consent was obtained, and blood samples were collected from all participants. Serum C-reactive protein (CRP) levels were measured at baseline. After two

months of anti-tuberculosis therapy, patients returned for follow-up, during which laboratory investigations were repeated and blood samples were collected for assessment of erythrocyte sedimentation rate (ESR) and CRP. CRP was assessed only once in the healthy control group. Serum CRP concentration was measured using the immunonephelometric method, whereas ESR was determined using the Westergren method.

Assessment of treatment response

Sputum microscopy for acid-fast bacilli (AFB) was performed before treatment initiation and after two months of therapy. Smear results were classified as follows:

- Scanty: 1–9 AFB per 100 oil-immersion fields; the exact number was reported.
- 1+: 10–100 AFB per 100 oil-immersion fields.
- 2+: 1–10 AFB per oil-immersion field.
- 3+: More than 10 AFB per oil-immersion field.

Statistical analysis

Data were analyzed using SPSS for Windows, version 15. Appropriate statistical tests, including Student's t-test and Pearson's correlation analysis, were applied to assess differences and associations between variables. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Newly diagnosed smear-positive pulmonary tuberculosis patients and healthy volunteers were selected for the study. Patients with smear-negative pulmonary tuberculosis, those with a history of anti-tuberculosis drug treatment, and patients with pulmonary tuberculosis associated with connective tissue disorders were excluded.

The mean age of the cases was 33.41 years (range, 16–55 years), while the mean age of controls was 34.57 years (range, 18–55 years). Most patients were male (63%).

Table 1: Distribution of participants according to demographic characteristics

Group	Mean age $\pm$ SD (years)	Age range (years)	t-value	p-value
Cases (n = 46)	33.41 $\pm$ 11.1	16–55	0.447	0.657
Controls (n = 30)	34.57 (SD not provided)	18–55	—	—

Gender distribution among cases: male, 63%; female, 37%.

Most patients had completed only primary-level education (41.3%). The distribution according to educational status is shown in Table 2.

Table 2: Distribution of patients according to educational status

Educational status	Percentage (%)
Illiterate	19.6
Primary	41.3
Secondary	26.1
Graduate and above	13.0

Among the patients, 36.96% were smokers and 21.74% were tobacco-leaf users.

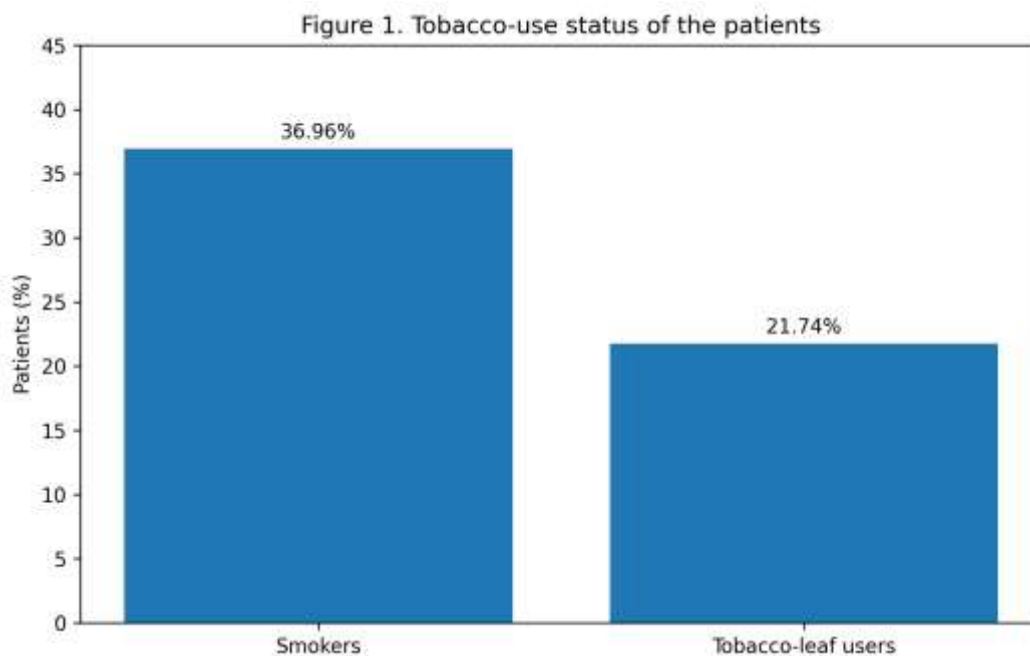


Figure 1: Tobacco-use status of the patients

Mean body weight and BMI increased after two months of anti-tuberculosis treatment. Mean body weight increased from 41.76 ± 5.53 kg at diagnosis to 43.02 ± 5.48 kg after two months. Mean BMI increased from 17.08 ± 1.87 kg/m² to 17.56 ± 1.88 kg/m².

Table 3: Comparison of body weight and BMI at diagnosis and after two months of treatment

Parameter	At diagnosis	After two months	t-value	p-value
Weight (kg)	41.76 ± 5.53	43.02 ± 5.48	13.96	<0.001
BMI (kg/m ²)	17.08 ± 1.87	17.56 ± 1.88	9.11	<0.001

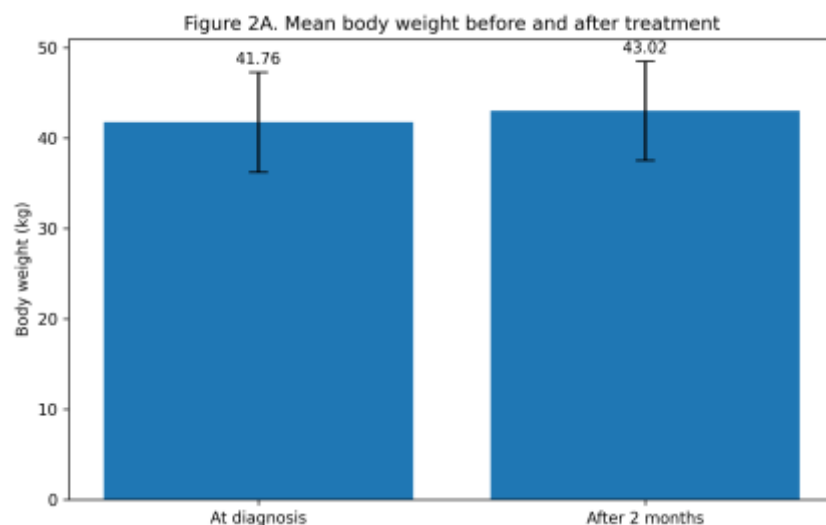


Figure 2A: Comparison of mean body weight before and after treatment

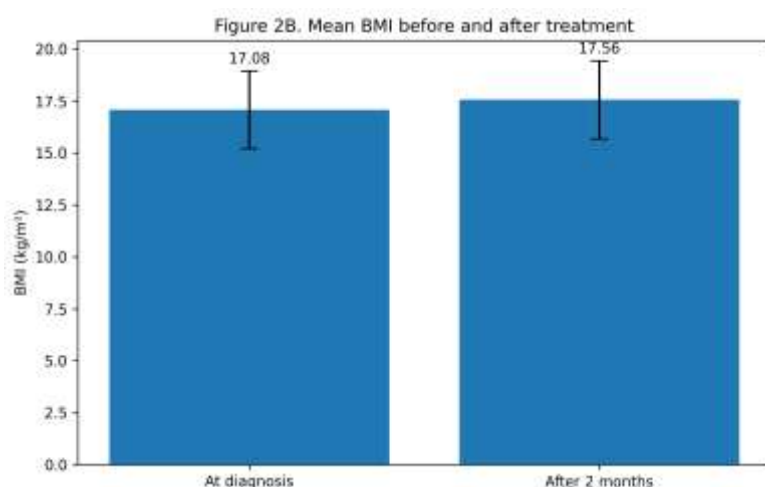


Figure 2B: Comparison of mean BMI before and after treatment

DISCUSSION

One study reported that the majority of patients (n = 32; 40%) belonged to the 21–30-year age group, followed by 31.2% in the 12–20-year age group. Thus, 71.2% of patients were below 30 years of age, which was consistent with the observations of another study.^{5,6}

One study reported a predominance of females (56.3%) over males (43.7%). However, another study found that 62% of patients were male and 38% were female.^{6,7}

The highest prevalence (18.37%) was observed in the 20–24-year age group, followed by 17.35% in the 25–29-year age group. The

lowest prevalence (3.06%) was reported among patients aged 55–59 years.

In the present study, the mean age of cases was 33.41 years (range, 16–55 years), while the mean age of controls was 34.57 years (range, 18–55 years). Most patients were male (63%). Regarding educational status, the largest proportion of patients had completed only primary-level education (41.3%). This finding may indicate a need for strengthened health education and awareness regarding pulmonary tuberculosis and its prevention; however, the present study does not establish a causal relationship between educational attainment and TB knowledge.

Another study reported that, among 330 patients, 98 (29.69%) tested positive for Mycobacterium spp., while 212 (64.24%) were male and 118 (35.76%) were female. Among the male participants, 69 (70.41%) were infected, compared with 29 (29.60%) of the female participants. The reported male-to-female ratio of TB prevalence was 2.4:1.⁸

CONCLUSION

Pulmonary tuberculosis remains a major public health problem in Bangladesh. Accurate diagnosis, early detection, effective prevention, and appropriate treatment are essential for TB control. Public awareness and health education may also support prevention and control efforts.

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