



## Original Research Article

# A clinical profile of sputum positive pulmonary tuberculosis among elderly patients

Priyanka Tomar<sup>1</sup>, Pranay Kumar R P<sup>1</sup>, Anand Premanand Ambali<sup>1,\*</sup>

<sup>1</sup>Dept. of Medicine and Geriatric Medicine, BLDE (Deemed to be University), Shri B M Patil Medical College Hospital & Research Centre, Vijayapura, Karnataka, India



## ARTICLE INFO

## Article history:

Received 07-12-2022

Accepted 03-01-2023

Available online 13-02-2023

## Keywords:

Pulmonary Tuberculosis

Elderly

Atypical symptoms

Radiological features

## ABSTRACT

**Need for the Study:** The Pulmonary Tuberculosis has been known to mankind to cause increased morbidity and mortality especially in elderly. There is delay in diagnosis of pulmonary tuberculosis which led to increased mortality. Hence, this study looks into the pattern of presentations of the pulmonary tuberculosis and the radiological features that these patients demonstrate, which may help in early diagnosis and effective management.

**Materials and Methods:** A cross-sectional, descriptive study was conducted on seventy patients above 60 years of age, who attended the outpatient department or those who were admitted in the geriatric ward of BLDE DU, Shri B. M. Patil Medical College, Hospital and Research Centre with symptoms suggestive of pulmonary tuberculosis over a period of twenty-four months irrespective of sex. The patients who tested sputum positive by ZN Stain for Mycobacterium Tuberculosis irrespective of primary diagnosis, defaulters and reactivation of pulmonary tuberculosis were included in the study group.

**Results:** In our study male predominance was seen with 48% of elderly in age group of 60-65 years. Majority (67%) of patients had typical features like fever, cough, evening rise of temperature while 32% had atypical symptoms like decreased appetite, increased thirst, weight loss and breathlessness. The common comorbid was Hypertension (10%). The most common radiological feature was miliary mottling (21%), while there was 11% mortality reported.

**Conclusion:** This study being carried on elderly with sputum positive have given insight on the various pattern of clinical presentations and radiological features in elderly. Importance of sputum examination cannot be undermined in elderly and high degree of suspicion will help reach the diagnosis.

This is an Open Access (OA) journal, and articles are distributed under the terms of the [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License](https://creativecommons.org/licenses/by-nc-sa/4.0/), which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: [reprint@ipinnovative.com](mailto:reprint@ipinnovative.com)

## 1. Introduction

Tuberculosis (TB) is an infectious disease caused by the bacteria — Mycobacterium Tuberculosis. TB intimidates humans since time immemorial due to its effect on the social and economic welfare and as a medical tragedy. It continues to be a very important communicable disease in the world, especially in the developing countries like India, contributing to a major burden of it. Historically, TB was a

disease of the younger population, but as the years pass by, there is a changing trend in the distribution of the disease with respect to epidemiological and clinical characters. One such major change is the transition of cases towards the older people, aged greater than 60 years.

The most constant and distinctive demographic event since the origin is ageing. Initially visualised by the developing countries but is now being observed globally. Worldwide, the number of adults over 60 years of age will rise to 2 billion by 2050 and will constitute over 20 percent of the world's population.<sup>1</sup>

\* Corresponding author.

E-mail address: [anand.ambali@bldedu.ac.in](mailto:anand.ambali@bldedu.ac.in) (A. P. Ambali).

Disproportionate increase in pulmonary tuberculosis among elderly population is being reported in many countries.<sup>2</sup>

The elderly people are more prone to developing TB, either through endogenous reactivation and the focus of maintenance of the disease in the community, or through exogenous reinfection. The disease finds a senescent respiratory system in the elderly and because of its preferential airborne transmission, with a reduction of their defence mechanisms, which further increases the risk of infection and illness from the reactivation of latent foci.<sup>3</sup>

TB in the elderly population usually present with atypical symptoms, thereby leading to a delay in the diagnosis and delay in initiation of treatment. Hence, higher rates of spread apart from mortality and morbidity is noted in this subset of the population. Underlying illnesses, age related immune deficiencies, higher rates of adverse drug reactions and prolonged hospital stays can complicate the overall outcome in elderly patients with Tuberculosis.<sup>4</sup>

There is a deficiency of data regarding the burden of this infection in the elderly from India. With the increase in the elderly population and a concomitant increase in the number of diagnosed cases, it is evident that the problem of tuberculosis in elderly is yet to seek the importance it deserves.

## 2. Materials and Methods

The study was conducted among the elderly patients (above the age of 60 years), who either attended the geriatric medicine outpatient department or who were admitted to the wards in Shri B. M. Patil Medical College and Hospital, Vijayapura. The study was conducted for twenty-four months. A total of 70 patients satisfied inclusion criteria and are included in the study. All elderly patients aged more than 60 years who were positive for sputum Acid Fast Bacilli on ZN stain, diagnosed for the first time were included in the study. Patients with radiological features suggestive of tuberculosis, but sputum negative were excluded.

These patients were examined according to the protocol prepared, which included detailed history and examination of the patient. The radiological features were correlated to the clinical presentation.

The blood investigations like complete blood analysis, C-Reactive Protein, random blood sugar, serum creatinine, Human Deficiency Virus (HIV), liver function test and electrocardiogram were done, and the treatment was initiated as per Revised National Tuberculosis Control Program (RNTCP) guidelines. The observations made with specific regard to various patterns of clinical presentations and radiological appearances were tabulated. The results were analysed using diagrams, mean and Standard Deviation. The association between variables is found using Chi Square Test and Fisher's Exact Test.

**Table 1:** Age wise distribution of patients

Age (Years)	Number of patients	Percentage
60 - 65	34	48.6
65 - 69	18	25.7
70 - 74	06	8.6
75 - 79	05	7.1
80+	07	10.0
Total	70	100.0

**Table 2:** Distribution of patients according to the Zeehl — Neelson stain

Zn Stain	Number of patients	Percentage
1+	25	35.7
2+	20	29
3+	20	29
4+	1	1.4
Scanty	4	5.7
Total	70	100.0

**Table 3:** Distribution of patients according to common radiographical features

Common Radiographical Features	Number of patients	Percentage
Miliary mottling	15	21.4
Pleural effusion with infiltrations	14	20.0
Consolidation	12	17.1
Fibrosis	10	14.3
Cavity	8	11.4
Calcification with infiltrations	8	11.4
Collapse	1	1.4
Hydropneumothorax with infiltrations	1	1.4
Synpneumonic Effusion	1	1.4
Total	70	100.0

## 3. Results

Age and sex Maximum patients belonged to the age group of 60 to 65 years constituting to 48%, those in age group between 65 to 69 years were 25%, and in age group between 70 to 74 years were 8%, while 7% were in the age group of 75 to 79 years and 10% were above 80 years (Table 1). The oldest patient in this study was 84 years old. The study had 56 male patients and 14 elderly female patients.

**Table 4:** Comparison of symptoms presentation with other studies

Study	Towhidi M et al <sup>5</sup>	Gupta D et al <sup>6</sup>	Our study
Respiratory Symptoms	Cough – 37(92.5%) Haemoptysis – 6(15%)	Cough – 37(74%) Haemoptysis – 7(14%) Dyspnoea – 23(46%) Chest Pain – 19(38%)	Cough – 47(67.1%) Haemoptysis – 3(4.2%) Dyspnoea – 25(35.7%) Chest pain – 16(22.8%)
Constitutional Symptoms	Fever – 23(57.5%) Night sweats – 9(22%) Weight loss – 32(80%)	Fever – 37(74%) Night sweats – 25(50%) Weight loss – 40(80%)	Fever – 33(47.1%) Night sweats – 20(28.5%) Weight loss – 62(88.6)

**Table 5:** Comparison of radiographical features with other studies

Study	Gupta D et al <sup>6</sup>	Towhidi M et al <sup>5</sup>	Mohrana S et al <sup>7</sup>	Our study
Radiological Features	Normal – 3(6%) Infiltrates – 13(26%) Consolidation – 13(26%) Hilar lymphadenopathy – 3(6%) Pleural effusion – 9(18%) Miliary mottling – 3(6%) Cavitation – 16(32%) Fibrosis – (26%)	Upper and lower lobe infiltration – 20 (50%) Cavitation – 10 (25%) Miliary mottling – 1(2.5%)	Upper, middle and lower lobe infiltrates – 67 Cavitation – 9 Miliary mottling – 7	Middle and lower lobe infiltrates – 12(17.1%) Calcification – 8(11.4%) Cavitation – 8(11.4%) Collapse – 1(1.4%) Fibrosis – 10(14.3%) Hydropneumothorax with infiltrations – 1(1.4%) Miliary mottling – 15(21.4%) Pleural effusion with infiltrations – 14(20%) Synpneumonic effusion – 1(1.4%)

**Table 6:** Comparison based on ZN stain with other studies

Study	Mohrana S et al <sup>7</sup>	Shaikh KU et al <sup>4</sup>	Our study
Zn Stain	Scanty = 6 3+ = 11 2+ = 8 1+ = 10	Scanty = 2 3+ = 13 2+ = 7 1+ = 7	Scanty = 4(5.7%) 3+ = 28(40%) 2+ = 27(38.6%) 1+ = 25(35.7%)

- Clinical features:** Distribution of patients according to presenting symptoms. Majority (67%) of patients had typical features like fever, cough, evening rise of temperature while 33% had atypical symptoms like decreased appetite, increased thirst, weight loss and breathlessness.
- Comorbidities:** The various comorbidities that the patients had were also studied. Most of the patients (54%), had no co morbidities, while the remaining 46% had either single or multiple co morbidity, most common being hypertension followed by chronic obstructive pulmonary disease, diabetes and HIV infection
- Sputum examination:** The ZN stain pattern in subjects, associating the strength of the positivity with the bacterial load was analysed. An almost equal number was seen in 1+, 2+ and 3+ grading, with four patients having scanty bacilli and only one patient with 4+. (Table 2)
- Radiological features:** The common features seen on Chest X ray were as follows. 15 patients had military mottling, 14 had pleural effusion with infiltrations, 12 had consolidation, 10 had fibrosis, calcification, and cavitation in 8 patients each, while hydropneumothorax with infiltrations, collapse and synpneumonic effusion in one patient each. (Table 3)
- Mortality:** As far as mortality is concerned, 8 patients died during their stay in our study group, summing up to 11.4% mortality among the study subjects. The most common cause of death was type I respiratory failure owing to the lung lesions. Two patients among the 8 who died were positive for HIV, indicating that the prognosis of the concurrent infection of TB and HIV is not good in terms of prognosis.

#### 4. Discussion

Studies done by various authors like Mohrana S et al.<sup>7</sup> included 56 elderly patients, Gupta D et al.<sup>6</sup> included 50 elderly patients, Towhidi M et al.<sup>5</sup> included 40 elderly patients while a large study by Li SJ et al.<sup>8</sup> involving 77192 patients, all of them showed male predominance.

Depending on the various clinical presentations the pattern of typical symptoms of respiratory and constitutional variations were seen in 67% of the patients in our study, while the remaining 33% did not present with the classical symptoms of tuberculosis. Dyspnoea was more common presenting symptom and haemoptysis was least common among the elderly.<sup>9</sup>

This emphasizes the need to prioritize the elderly patients, so that diagnosis is made in early stage and treatment is initiated therefore preventing morbidity and mortality. The two studies have been compared for pattern of symptoms as shown in Table 4.

In clinical practice the physician gets a clue for Pulmonary Tuberculosis only after taking chest x ray as part of evaluation. The elderly patient present with atypical radiological features, such as middle or lower lobe infiltrates (Rather than upper lobe as seen in adults) mass-like lesions appearing more like cancers, extensive bronchopneumonia without cavitation or non-resolving infiltrates.<sup>10</sup>

The evidence of miliary mottling (21%) being the most common manifestation radiographically in the elderly in our study. The elderly in contrast depicts more of lower and middle lobe infiltration, as evidenced in our study, and compared with other studies showing similar results. (Table 5)

In a study by Abbara A et al,<sup>11</sup> Miliary mottling (4.1%) was common radiological feature in elderly patients while Cavitation on chest radiograph was in 27 % and 40% respectively in studies by Hase I et al.<sup>12</sup> and Elineni JL.<sup>13</sup>

As ZN staining was the primary modality for diagnosis of tuberculosis in our study. The samples showing scanty bacilli were very less indicating that tubercle bacilli are usually present in moderate to large numbers in sputum samples. Two studies have also shown similar results as shown in Table 6.

The Sputum for AFB on ZN staining is still the most widely used diagnostic method for Pulmonary Tuberculosis.<sup>14</sup> However, its value for elderly patients who cannot produce sputum spontaneously is very little,<sup>15</sup> hence this study involved only sputum positive patients.

HIV and TB occur as co-infections to each other, and multiple studies have proved the same. The clinical features in both these devastating diseases are almost the same and hence are almost indistinguishable clinically in the geriatric population. Atypical presentation with constitutional symptoms is seen commonly in elderly patients. In a study by O J Daniel et al.<sup>16</sup> 353 sputum smear positive TB patients were studied among which 16.4%

were positive for HIV. Our study witnessed that among the 70 elderly patients studied, 9(12.9%) were positive for HIV. Hence, as described by many clinicians, it is rather difficult to identify the separate entities of TB and HIV among the elderly and high level of suspicion should be kept while dealing with such patients. Also, HIV screening should be mandatory in all elderly patients with Pulmonary Tuberculosis irrespective of age.<sup>17</sup>

While diabetes is common comorbid noted in various studies, hypertension (10%) was common in our study. Hypertension was common comorbid reported by Kwon et al.<sup>9</sup> and Rawat et al.<sup>18</sup> In a study by Nehal et al.,<sup>19</sup> Diabetes mellitus (48.57%) was the commonest comorbidity observed among the elderly followed by bronchial asthma (14.28%).

Diabetes mellitus increases the risk of active Tuberculosis and contribute to age related TB as the prevalence of diabetes increases with age.<sup>20</sup>

There was 11% mortality in our study population as our study was hospital based and carried out only on admitted patients and follow up was done till discharge from hospital. Mortality has been reported in studies which have done follow up. The study by Murali S<sup>21</sup> reported Forty-two (4.3%) mortality over six months follow-up.

In view of atypical presentations and to avoid delayed diagnosis, screening for pulmonary TB by Chest X ray in elderly should be carried out whenever they are admitted in hospital and in those who are undernourished and are having immunocompromised state. As part of world Tuberculosis Day celebrations on March 24, 2022, we here at geriatric clinic had organised screening program in association with District TB office. We here screened all the 40 elderly persons who attended the Awareness program and found one person having infiltrative lesions which later turned to be Positive for Sputum AFB. Such screening measures not only help diagnosing a new case, but it will also help prevent spread.

#### 5. Conclusion

The strong point regarding this study is that it has involved sputum positive cases only, hence has revealed the clear picture of correlation between clinical presentation and radiological features among elderly patients. The elderly manifesting with atypical symptoms of pulmonary tuberculosis, and having comorbidities leads to delay in diagnosis and management. This delay contributes to increased mortality. The elderly presenting with miliary mottling on X Ray, sputum for AFB should be carried out. Screening for Pulmonary Tuberculosis in patients with diabetes and hypertension should be considered. HIV testing in all elderly with pulmonary Tuberculosis should be mandatory. The role of Sputum test for ZN stain in diagnosis of pulmonary tuberculosis in elderly patients should not be undermined.

## 6. Source of Funding

None.

## 7. Conflict of Interest

None.

## References

- Centers for Disease Control and Prevention and The Merck Company Foundation. The State of Aging and Health in America 2007. Whitehouse Station, NJ: The Merck Company Foundation.
- Yew WW, Yoshiyama T, Leung CC, Chan DP. Epidemiological, clinical and mechanistic perspectives of tuberculosis in older people. *Respirology*. 2018;23(6):567–75.
- Oliveira AAV, Sá LD, Nogueira JA, Andrade SLE, Palha PF, Villa TCS. Diagnóstico da tuberculose em pessoas idosas: barreiras de acesso relacionadas aos serviços de saúde. *Revista da Escola de Enfermagem da USP*. 2013;47(1):142–8.
- Shaik KU, Dattu SM, Krishnamurthy S, Revanasiddappa HF, Reddy YJ. A prospective study of pulmonary tuberculosis in rural geriatric population of South India. *J Clin Sci Res*. 2016;5(1):28–32.
- Towhidi M, Azarian A, Asna AA. Pulmonary tuberculosis in the elderly. *Tanaffos*. 2008;7(1):52–7.
- Gupta D, Singh N, Kumar R, Jindal SK. Manifestations of pulmonary tuberculosis in the elderly: a prospective observational study from north India. *Indian J Chest Dis Allied Sci*. 2008;50(3):263–7.
- Moharana S, Lipika M, Moharana DN, Pattnaik SS, Padhy S, Sahoo TK. Pulmonary Tuberculosis in Elderly-Peculiarities and Dissimilarities: A Geriatric Clinic Experience. *Int J Sci Stud*. 2017;5(4):50–3.
- Li SJ, Li YF, Song WM. Population aging and trends of pulmonary tuberculosis incidence in the elderly. *BMC Infect Dis*. 2021;21:302.
- Kwon YS, Chi SY, Oh IJ, Kim KS, Kim YI, Lim SC. Clinical characteristics and treatment outcomes of tuberculosis in the elderly: a case control study. *BMC Infect Dis*. 2013;13:121. doi:10.1186/1471-2334-13-121.
- Lee JH, Han DH, Song JW, Chung HS. Diagnostic and Therapeutic Problems of Pulmonary Tuberculosis in Elderly Patients. *J Korean Med Sci*. 2005;20(5):784–9.
- Abbara A, Collin SM, Onn M, Kon K, Buell A, Sullivan J, et al. Time to diagnosis of tuberculosis is greater in older patients: a retrospective cohort review. *ERJ Open Res*. 2019;5(4):228.
- Hase I, Toren KG, Hirano H. Pulmonary Tuberculosis in Older Adults: Increased Mortality Related to Tuberculosis Within Two Months of Treatment Initiation. *Drugs Aging*. 2021;38:807–15.
- Elineni RJL, Amarnath. Clinicoradiological Profile of Newly Diagnosed Smear Positive Pulmonary Tuberculosis Among Adults and Elderly Patients. *J Res Med Dent Sci*;2021(5):352–358.
- Diacon AH, Wal BWVD, Wyser C, Smedema JP, Bezuidenhout J, Bolliger CT, et al. Diagnostic tools intuberculous pleurisy: A direct comparative study. *Eur Respir J*. 2003;22:589–591.
- Murray PR, Elmore C, Krogstad NJ. The Acid-Fast Stain: A Specific and Predictive Test for Mycobacterial Disease. *Ann InternMed*. 1980;92:512–513.
- Daniel OJ, Alausa OK. Treatment outcome of TB/HIV positive and TB/HIV negative patients on directly observed treatment. *Nigeria Nigerian journal of medicine*. 2006;15(3):222–222.
- Smit M, Brinkman K, Geerlings S, Smit C, Thyagarajan K, Sighem AV, et al. Athena observational cohort Future Challenges for Clinical Care of an Ageing Population Infected with HIV: A Modelling Study. *Lancet Infect Dis*. 2015;15:810–818.
- Rawat J, Sindhvani G, Biswas D. Effect of age on presentation with diabetes: Comparison of nondiabetic patients with new smear-positive pulmonary tuberculosis patients. *Lung India*. 2011;28:187–190.
- Nehal, Tiwari S, Kothandapani SK, Khena U. Tuberculosis in elderly: The Indian perspective. *Int J Adv Med*. 2018;5:983–990.
- Jeon CY, Murray MB. Diabetes mellitus increases the risk of active tuberculosis: a systematic review of 13 observational studies. *PLoS Med*. 2008;5(7):152–152.
- Murali S, Krishnamoorthy Y, Knudsen S, Roy G, Ellner J, Horsburgh CR. Comparison of profile and treatment outcomes between elderly and non-elderly tuberculosis patients in Puducherry and Tamil Nadu, South India. *PLoS ONE*. 2021;16(8):256773–256773.

## Author biography

**Priyanka Tomar**, Post Graduate

**Pranay Kumar R P**, Post Graduate

**Anand Premanand Ambali**, Professor

**Cite this article:** Tomar P, Pranay Kumar R P, Ambali AP. A clinical profile of sputum positive pulmonary tuberculosis among elderly patients. *Ann Geriatrics Educ Med Sci* 2022;9(2):53-57.