*Brief Report*

# Tuberculosis among elderly patients: diagnostic and therapeutic challenges (2020-2024)

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**Abstract: Background:** Tuberculosis (TB) in the elderly poses significant diagnostic and therapeutic challenges due to immunosenescence, comorbidities, and atypical clinical presentation. This study evaluates the epidemiological and clinical characteristics of TB in patients aged ≥65 years. **Methods:** A retrospective descriptive study was conducted including all TB cases reported between 2020 and 2024. Data from the National Tuberculosis Program were analyzed for demographic characteristics, clinical form, bacteriological confirmation, comorbidities, and treatment outcomes. **Results:** Of 1,335 TB cases, 352 (26.4%) occurred in individuals aged ≥65 years. Pulmonary TB accounted for 80.7% of cases. Men represented 63.4% of patients, and 56.8% lived in urban areas. Bacteriological confirmation was achieved in 82% of pulmonary cases, and treatment success exceeded 85%. Diabetes mellitus (26.5%) and arterial hypertension (31%) were the most common comorbidities. An increase in TB cases was observed in the post-COVID-19 period. A significant association was found between age and clinical form of TB ($p < 0.001$). **Conclusions:** Elderly individuals constitute a substantial proportion of TB cases and frequently present with chronic comorbidities. Despite diagnostic challenges, favorable treatment outcomes were achieved, highlighting the need for integrated and early management strategies in this population.

**Keywords:** Tuberculosis, Elderly Patients, COVID-19, Risk Factors

## 1. Introduction

Tuberculosis (TB) remains a major global public health concern, particularly among vulnerable populations such as the elderly. According to the World Health Organization (WHO), older adults represent a growing proportion of TB cases worldwide, especially in countries experiencing demographic aging [1]. Aging is associated with immunosenescence, malnutrition, and multiple chronic conditions, all of which increase susceptibility to Mycobacterium tuberculosis infection and progression to active disease [2,3].

Pulmonary tuberculosis in the elderly presents unique diagnostic and therapeutic challenges. Clinical manifestations are often atypical or nonspecific, frequently mimicking other chronic respiratory or systemic diseases, which may result in delayed diagnosis and increased disease severity at presentation [4,5]. Radiological findings can also be less characteristic, further complicating diagnosis in this age group [6].

Comorbidities such as diabetes mellitus, arterial hypertension, chronic obstructive pulmonary disease (COPD), and cardiovascular diseases are highly prevalent among elderly TB patients and significantly influence disease progression and treatment outcomes [7,8]. Diabetes mellitus, in particular, has been shown to triple the risk of active TB and is associated with delayed sputum conversion and higher relapse rates [9]. In

addition, polypharmacy and age-related changes in drug metabolism increase the risk of adverse reactions and treatment non-adherence [10].

The COVID-19 pandemic has further disrupted TB services globally, leading to reduced case detection, delayed diagnosis, and increased mortality, particularly among elderly individuals who faced greater barriers to accessing healthcare [11,12]. Therefore, understanding the epidemiological and clinical characteristics of TB in older adults is essential for strengthening TB control strategies.

This study aims to evaluate the epidemiological, clinical, and bacteriological characteristics of tuberculosis in patients aged 65 years and older over a five-year period, with particular emphasis on comorbidities and treatment outcomes.

## 2. Methodology

A retrospective descriptive study was conducted including all tuberculosis cases reported between 2020 and 2024. The study population consisted of patients aged ≥65 years diagnosed with pulmonary or extrapulmonary tuberculosis.

Data were obtained from the National Tuberculosis Program registry and included demographic variables (age, sex, and residence), clinical form of TB, bacteriological confirmation, comorbidities, and treatment outcomes. Diagnosis and classification of TB cases followed national and WHO guidelines [1,13].

Statistical analysis was performed using SPSS software. Descriptive statistics were used to summarize patient characteristics. Associations between age and clinical forms of TB were analyzed using inferential statistical tests, with a p-value <0.05 considered statistically significant.

## 3. Results

During the study period (2020–2024), a total of 1,335 tuberculosis cases were reported, of which 352 cases (26.4%) occurred in individuals aged 65 years and older. This finding is consistent with previous studies indicating a substantial TB burden among elderly populations [3,14].

Among elderly patients, pulmonary tuberculosis accounted for 80.7% of cases, while 19.3% were extrapulmonary TB, a distribution similar to that reported in other epidemiological studies [5,15]. The annual distribution showed an increase in cases after the COVID-19 period, particularly in 2022, suggesting delayed diagnosis and underreporting during the pandemic years [11,12]. Data collection is presented in the Table 1.

Men represented 63.4% of cases, consistent with the male predominance reported in TB epidemiology globally [1,16]. Urban residents accounted for 56.8% of cases, possibly reflecting better access to diagnostic services or higher population density [17].

Bacteriological confirmation was achieved in 82% of pulmonary TB cases, indicating effective diagnostic capacity. Treatment success exceeded 85%, aligning with WHO treatment success targets and comparable studies in elderly populations [1,18].

Comorbidities were highly prevalent. Diabetes mellitus was present in 26.5% of cases, while arterial hypertension was observed in 31%. These findings reflect the well-documented association between TB and chronic non-communicable diseases in older adults [7,9]. A statistically significant association between age and clinical form of TB was observed (p < 0.001).

**Table 1. Data Collected For The Period 2020-2024**

| Age Groups | Male patients | Female patients |
|---|---|---|
| *Pulmonary form (only lung involvement)* | | |
| 0-4 | 11 | 5 |
| 5-14 | 9 | 6 |
| 15-24 | 104 | 64 |
| 25-34 | 126 | 58 |
| 35-44 | 110 | 31 |
| 45-54 | 121 | 22 |
| 55-64 | 114 | 32 |
| **>65** | **179** | **105** |
| Total | 774 | 323 |
| *Extrapulmonary involvement* | | |
| 0-4 | 2 | 2 |
| 5-14 | 2 | 1 |
| 15-24 | 20 | 20 |
| 25-34 | 18 | 18 |
| 35-44 | 13 | 16 |
| 45-54 | 16 | 11 |
| 55-64 | 20 | 11 |
| **> 65** | **46** | **22** |
| Total | 137 | 101 |

## 4. Discussion

The results confirm that elderly individuals represent a high-risk group for tuberculosis, particularly pulmonary TB. The elevated proportion of TB cases in this age group may be explained by immune system decline, cumulative exposure to infection, and reactivation of latent TB infection acquired earlier in life [2,19].

The high prevalence of diabetes mellitus among elderly TB patients is of particular concern, as diabetes impairs innate and adaptive immune responses, increases bacillary load, and negatively affects treatment outcomes [9]. Arterial hypertension, while not directly linked to TB susceptibility, complicates clinical management due to polypharmacy and increased risk of cardiovascular complications during treatment [10].

Despite these challenges, the high bacteriological confirmation and treatment success rates observed in this study indicate that existing TB control programs remain effective in elderly populations. However, previous studies emphasize that older patients are at increased risk of adverse drug reactions and require closer monitoring throughout treatment.

The observed increase in TB cases following the COVID-19 pandemic supports global evidence showing that disruptions in TB services have disproportionately affected vulnerable populations, including the elderly [11,12].

## 5. Conclusions

Pulmonary tuberculosis remains a significant public health issue among elderly individuals and is frequently associated with chronic comorbidities such as diabetes

mellitus and arterial hypertension. These conditions complicate diagnosis, delay treatment initiation, and influence therapeutic outcomes.

Although treatment success rates remain high, the findings underscore the need for an integrated and multidisciplinary approach that includes early detection, systematic screening for comorbidities, and individualized treatment strategies. Strengthening TB services for elderly populations is essential to improve disease control and reduce TB-related morbidity and mortality.

## References

[1]     World Health Organization. Global Tuberculosis Report 2023. WHO; 2023.

[2]     Rajagopalan S. Tuberculosis and aging: a global health problem. Clin Infect Dis. 2001;33(7):1034–1039.

[3]     Mori T, Leung CC. Tuberculosis in the global aging population. Infect Dis Clin North Am. 2010;24(3):751–768.

[4]     Smiljić S, Radović B. Clinical and radiographic characteristics of pulmonary tuberculosis. Medicinski pregled. 2012;65(5-6):196-9.

[5]     Lee JH, Han DH, Song JW, Chung HS. Diagnostic and therapeutic problems of pulmonary tuberculosis in elderly patients. Journal of Korean medical science. 2005 Oct 31;20(5):784.

[6]     McAdams HP, Erasmus J, Winter JA. Radiologic manifestations of pulmonary tuberculosis. Radiologic Clinics of North America. 1995 Jul 1;33(4):655-78.

[7]     Samuels JP, Sood A, Campbell JR, Ahmad Khan F, Johnston JC. Comorbidities and treatment outcomes in multidrug resistant tuberculosis: a systematic review and meta-analysis. Scientific reports. 2018 Mar 21;8(1):4980.

[8]     Marais BJ, et al. Tuberculosis comorbidity with noncommunicable diseases. Lancet Infect Dis. 2013;13(5):436–448.

[9]     Jeon CY, Murray MB. Diabetes mellitus increases the risk of active tuberculosis: a systematic review. PLoS Med. 2008;5(7):e152.

[10]    Saukkonen JJ, et al. An official ATS statement: hepatotoxicity of antituberculosis therapy. Am J Respir Crit Care Med. 2006;174(8):935–952.

[11]    Rodrigues I, Aguiar A, Migliori GB, Duarte R. Impact of the COVID-19 pandemic on tuberculosis services. Pulmonology. 2022 May 1;28(3):210-9.

[12]    Gunsaru V, Henrion MY, McQuaid CF. The impact of the COVID-19 pandemic on tuberculosis treatment outcomes in 49 high burden countries. BMC medicine. 2024 Jul 29;22(1):312.

[13]    World Health Organization. Treatment of Tuberculosis: Guidelines. WHO; 2010.

[14]    Negin J, et al. Tuberculosis among older adults: epidemiology and outcomes. Int J Tuberc Lung Dis. 2015;19(9):1110–1117.

[15]    Schwabe HK, Viehoff A. Extrapulmonary tuberculosis in elderly patients. Praxis der Pneumologie. 1973 Jul 1;27(7):427-31.

[16]    Horton KC, et al. Sex differences in tuberculosis burden. Lancet Infect Dis. 2016;16(5):570–580.

[17]    Hargreaves JR, Boccia D, Evans CA, Adato M, Petticrew M, Porter JD. The social determinants of tuberculosis: from evidence to action. American journal of public health. 2011 Apr;101(4):654-62.

[18]    Kwon YS, Chi SY, Oh IJ, Kim KS, Kim YI, Lim SC, Kim YC. Clinical characteristics and treatment outcomes of tuberculosis in the elderly: a case control study. BMC Infectious Diseases. 2013 Mar 5;13(1):121.

[19]    Flynn JL, Chan J. Tuberculosis: latency and reactivation. Infection and immunity. 2001 Jul 1;69(7):4195-201.