










ORIGINAL

## Epidemiological, clinical, and therapeutic profile of tuberculosis in a high-burden Latin American capital: Tegucigalpa, Honduras

### Perfil epidemiológico, clínico y terapéutico de la tuberculosis en una capital latinoamericana de alta carga: Tegucigalpa, Honduras

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#### ABSTRACT

**Introduction:** tuberculosis (TB) remains a major public health problem in Honduras, particularly in urban areas such as Tegucigalpa. Identifying clinical and epidemiological patterns helps guide control strategies.

**Objective:** to describe the sociodemographic, clinical, and treatment outcome characteristics of patients diagnosed with TB in Tegucigalpa between 2022 and 2024.

**Method:** a descriptive, retrospective study was conducted with 165 patients diagnosed with TB. Data on sociodemographics, medical history, diagnostic methods, type of TB, treatment regimen, and discharge condition were collected. Analysis was performed using frequencies and percentages.

**Results:** males accounted for 61,2 % of patients. Unemployed individuals represented 15,8 %, prisoners 14,5 %, and housewives 8,5 %. A total of 14,5 % had completed preschool education, and another 14,5 % had no formal education. The most common comorbidity was diabetes mellitus (11,5 %), followed by diabetes mellitus/hypertension (8,5 %). The most frequent diagnostic method was smear microscopy (80,6 %). Pulmonary TB accounted for 97,6 % of cases. Basic treatment was administered to 96,4 % of patients. Cure rate was 84,8 %, with 3,6 % relapses and 1,8 % deaths.

**Conclusion:** most TB cases in Tegucigalpa occurred in adult men with low education levels and chronic comorbidities such as diabetes. Diagnosis was mainly through smear microscopy, with a high cure rate, though challenges remain in relapse monitoring and prevention in vulnerable populations.

**Keywords:** Tuberculosis; BAAR; Epidemiology; Public Health.

#### RESUMEN

**Introducción:** la tuberculosis (TB) continúa siendo un problema de salud pública en Honduras, especialmente en áreas urbanas como Tegucigalpa. La identificación de patrones clínicos y epidemiológicos permite orientar estrategias de control.

**Objetivo:** describir las características sociodemográficas, clínicas y resultados del tratamiento en pacientes diagnosticados con TB en Tegucigalpa entre 2022 y 2024.

**Método:** estudio descriptivo, retrospectivo, realizado con 165 pacientes diagnosticados con TB. Se recopilaron datos sociodemográficos, antecedentes patológicos, métodos diagnósticos, tipo de TB, esquema de tratamiento y condición de egreso. El análisis se efectuó mediante frecuencias y porcentajes.

**Resultados:** el 61,2 % de los pacientes fueron hombres. El 15,8 % no tenía ocupación, 14,5 % eran privados de libertad y 8,5 % amas de casa. El 14,5 % tenía educación prebásica completa y el mismo porcentaje sin escolaridad. La comorbilidad más frecuente fue diabetes mellitus (11,5 %), seguida de diabetes mellitus/hipertensión arterial (8,5 %). El método diagnóstico más utilizado fue BAAR (80,6 %). El 97,6 % presentó TB pulmonar. El tratamiento básico fue administrado al 96,4 % de los casos. El 84,8 % se curó, 3,6 % presentó recaída y 1,8 % falleció.

**Conclusión:** la mayoría de los casos de TB en Tegucigalpa afectaron a hombres adultos, con baja escolaridad y comorbilidades crónicas como la diabetes. El diagnóstico se realizó principalmente por BAAR y la tasa de curación fue alta, aunque persisten retos en el seguimiento de recaídas y prevención en poblaciones vulnerables.

**Palabras clave:** Tuberculosis; BAAR; Epidemiología; Salud Pública.

## INTRODUCTION

Tuberculosis is an infectious disease that is a significant cause of mortality and concomitant sequelae. Globally, by 2023, 10,8 million people had contracted tuberculosis worldwide; of these, 6 million were men, 3,6 million were women, and 1,3 million were minors, according to estimates by the World Health Organization (WHO).<sup>(1)</sup>

By 2023, Latin America was estimated to have 342 000 cases, with 80 % concentrated in eight countries in the region, including Honduras. In that year, 2 399 new cases were reported, with an incidence rate of 25,7 per 100 000 inhabitants in that country.<sup>(2,3)</sup> Caused by *Mycobacterium tuberculosis*, which is an intracellular biological agent that spreads and is transmitted through the inhalation of small droplets containing the transmitting agent, which is then phagocytosed by mononuclear cells, forming phagosomes that are a central aspect of the defense against the germ.<sup>(4)</sup>

In developing countries, it is considered a significant cause of mortality, especially in patients with concomitant diseases, considered comorbidities, of which the most common and best studied are: human immunodeficiency virus (HIV) infection, diabetes mellitus (DM), and other chronic noncommunicable diseases, excessive alcohol consumption, smoking, and depression.<sup>(5)</sup>

Regarding diagnosis and treatment: in the case of active pulmonary tuberculosis, whose clinical manifestations include fever, night sweats, asthenia, productive cough, and hemoptysis, the primary diagnostic methods are: direct microscopy of the pathogen, sample culture, and nucleic acid amplification technique (GeneXpert MTB/RIF), including imaging techniques such as biplanar chest X-ray. The standard treatment includes two months of quadruple therapy (isoniazid, rifampicin, ethambutol, and pyrazinamide) followed by four months of double therapy (rifampicin and isoniazid).<sup>(6)</sup>

The objective is to describe the sociodemographic and clinical characteristics, diagnostic methods, and treatment outcomes in patients with tuberculosis treated in Tegucigalpa during the period 2022-2024.

## METHOD

A descriptive, retrospective study was conducted. The population consisted of all patients diagnosed with tuberculosis in Tegucigalpa in 2022 and 2024, totaling 579 patients, with 165 excluded due to incomplete information.

Patients of all ages and sexes with a confirmed diagnosis of pulmonary or extrapulmonary tuberculosis were included, without excluding those with comorbidities. The information was obtained from clinical records and official databases, compiling sociodemographic variables (age, sex, occupation, educational level), pathological history, diagnostic methods used, type of tuberculosis, treatment regimen, and discharge status.

Data analysis was performed using descriptive statistics, calculating absolute frequencies and percentages.

## RESULTS

A total of 165 patients were registered between 2022 and 2024. Of these, 101 (61,2 %) were men. Twenty-six (15,8 %) had no profession or trade, 24 (14,5 %) were incarcerated, and 14 (8,5 %) were homemakers. Twenty-four people had completed pre-primary education (14,5 %), and 24 (14,5 %) had no formal education. One hundred sixty-four (99,4 %) of the individuals had no epidemiological history at the time of diagnosis.

Twenty-four (14,5 %) people had no pathological history, 19 (11,5 %) people had diabetes mellitus, and 14 (8,5 %) people had diabetes mellitus and hypertension.

Table 1. Pathological history		
	N	%
Alcoholism	2	1,2
History of anemia	1	0,6
Bronchial asthma	1	0,6
H. pylori bacteria	1	0,6
Malnutrition	3	1,8
Diabetes mellitus	19	11,5
Diabetes mellitus / rheumatoid arthritis	1	0,6
Diabetes mellitus / malnutrition	1	0,6
Diabetes mellitus / hypertension	14	8,5
Epilepsy	1	0,6
COPD	1	0,6
Hepatic / COPD / alcoholism / prediabetic	1	0,6
HTA	8	4,8
None	24	14,5
Renal	1	0,6
SD	77	46,7
Thyroid	1	0,6
HIV	8	4,8
Total	165	100,0

The most commonly used diagnostic method was BAAR, with 133 (80,6 %) people, followed by BAAR/GENE XPERT with 7 (4,2 %) people and BAAR/X-ray with 5 (3,0 %) people.

Table 2. Diagnostic method		
	N	%
BAAR	133	80,6
BAAR/Biopsy	1	0,6
BAAR/Culture/Clinical	1	0,6
BAAR/Culture/X-ray	1	0,6
BAAR/GENE XPERT	7	4,2
BAAR/Bronchial lavage	1	0,6
BAAR/X-ray	5	3,0
Biopsy	3	1,8
GENE XPERT	4	2,4
PDS/TC apical granuloma	1	0,6
X-ray	4	2,4
SD	4	2,4
Total	165	100,0

161 (97,6 %) people had pulmonary tuberculosis and 4 (2,4 %) people had extrapulmonary tuberculosis; of these people, 2 (1,2 %) had lymph node tuberculosis.

159 (96,4 %) people received basic treatment and 6 (3,6 %) people received secondary basic treatment.

140 (84,8 %) people were cured, 6 (3,6 %) people relapsed, and 4 (2,4 %) people were awaiting further evaluation.

Table 3. Discharge status		
	N	%
Dropped out	2	1,2
Cured	140	84,8
Deceased	3	1,8
Pending	4	2,4
Relapse	6	3,6
SD	10	6,1
Total	165	100,0

## DISCUSSION

Tuberculosis is an infectious disease caused by *Mycobacterium tuberculosis*, a bacterium that almost always affects the lungs. It is transmitted from person to person through the air. The Americas region has recovered and exceeded case reporting levels compared to pre-pandemic levels; in 2023, the highest number of cases since the WHO began keeping records for the area was reported. For the same year (2023), it was estimated that there were approximately 342 000 (309 000-376 000) cases, representing a 6,6 % increase compared to the previous year and a 20 % rise compared to the 2015 rate. Eighty percent of cases are concentrated in eight countries, with rates ranging from 58 to 173 cases per 100 000 inhabitants. But at the same time, there are seventeen other countries and territories, particularly in the Caribbean region, that have incidence rates of less than 10 cases per 100 000 inhabitants, placing them in the low-incidence group, close to the thresholds for progress toward TB elimination. It was estimated that the number of people who died from tuberculosis in 2023 decreased by 5,4 % compared to the previous year; however, when compared to the 2015 baseline, there was an increase of 44 %.<sup>(13)</sup>

In terms of epidemiological behavior by gender, the present study reveals a predominance of males, particularly those without a profession or trade, and with a low level of education. Similar results are observed by Beltrán et al. in the Honduran population, specifically among individuals with incomplete secondary education and those without work or formal employment.<sup>(7)</sup>

Tuberculosis is transmitted through microdroplets containing bacilli expelled by the patient. In immunocompetent patients, the process commonly progresses to cure, but not in immunosuppressed patients. Based on the above, several factors favor the infection and development of the disease, including living in areas of high incidence, conditions of exclusion and marginalization, as well as chronic processes, whether contagious or not. In the present study, about the coexistence of other morbid processes, there is a predominance of diabetes mellitus and arterial hypertension, similar to the findings in different studies.<sup>(7,8)</sup>

Regarding diagnostic methods, the most widely used was BAAR, with which 80,6 % of patients were diagnosed. The performance of this test in a meta-analysis yields a 15 % positivity rate in BAAR smear microscopy of sputum. In the case of BAAR/GENE XPERT, the prevalence detected by this method was similar for both sexes, as reported by Noviyani et al.<sup>(9,10)</sup> Finally, in the present study, the cure rate was 84,8 %, similar to that reported by the WHO (85 %) for 2020 following the End Tuberculosis strategy. Other studies reported a success rate for treatment-sensitive tuberculosis of 79 %. Further studies are needed to understand the relationship between treatment success and the presence of associated comorbidities.<sup>(11)</sup>

## CONCLUSIONS

Tuberculosis in Tegucigalpa between 2022 and 2024 mainly affected men of working age, with low educational levels and in socially vulnerable conditions, confirming the role of social determinants in transmission. The frequent coexistence of diabetes mellitus and hypertension suggests that chronic comorbidities are influencing the onset and progression of the disease and that bidirectional TB-DM screening needs to be integrated. Diagnosis was primarily made by smear microscopy (BAAR), which is suitable for the level of care. However, it is advisable to expand the use of molecular tests to enhance detection in paucibacillary cases. The cure rate obtained was comparable to the WHO standard; however, the presence of relapses and cases in vulnerable groups highlights weaknesses in post-treatment follow-up and active case finding. These components of the program should therefore be strengthened.

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## CONSENT

The patient's consent was obtained for this study.

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## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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