

EVALUATION OF THE TUBERCULOSIS SURVEILLANCE SYSTEM IN CRISTINO CASTRO-PI

AVALIAÇÃO DO SISTEMA DE VIGILÂNCIA DA TUBERCULOSE EM CRISTINO CASTRO-PI

EVALUACIÓN DEL SISTEMA DE VIGILANCIA DE LA TUBERCULOSA EN CRISTINO CASTRO-PI

✉ Samuel Lopes dos Santos¹ ✉ Cássio Marinho Campelo²

RESUMO

Objective: To evaluate the tuberculosis surveillance system in the municipality of Cristino Castro - PI, from 2019 to 2023. **Methods:** This is a descriptive, retrospective study using secondary data from the SINAN system, which was assessed for data quality attributes (completeness and consistency) and representativeness. **Results:** 20 tuberculosis records were analyzed, with 7 variables classified as excellent (completeness) and 3 relationships between variables classified as excellent (consistency). The surveillance system was considered adequate and rated excellent (representativeness). The epidemiological profile was of men aged between 35 and 49 and the majority of cases were new admissions. HIV testing was low (55%) for individuals with TB. **Conclusion:** The quality of the data for the TB surveillance system in the municipality of Cristino Castro-PI was considered excellent. The system was considered representative when analyzing the epidemiological variable of person.

Descritores: Epidemiologic Surveillance Services; Tuberculose; CDC

ABSTRACT

Objetivo: Avaliar o Sistema de Vigilância da tuberculose no município de Cristino Castro-PI, no período de 2019 a 2023. **Métodos:** Trata-se de um estudo descritivo, retrospectivo, através de dados secundários do SINAN, avaliados quanto aos atributos de qualidade dos dados (completude e consistência) e a representatividade (eixo/pessoa). **Resultados:** 20 registros de tuberculose foram analisados, com 7 variáveis analisadas e classificadas como excelente (completude); e 3 relações entre variáveis de classificação excelente (consistência). O sistema de vigilância foi considerado adequado, de classificação excelente (representatividade). O perfil epidemiológico foi de homens entre 35 e 49 anos, e os casos foram, em maioria, de nova entrada. A testagem para HIV foi baixa (55%) para indivíduos com TB. **Conclusão:** A partir da qualidade dos dados para o sistema de vigilância da TB do município de Cristino Castro-PI, foi considerado excelente. O sistema foi considerado representativo pela análise da variável epidemiológica de pessoa.

Keywords: Serviços de vigilância epidemiológica; Tuberculose; CDC.

RESUMEN

Objetivo: Evaluar el sistema de vigilancia de la tuberculosis en el municipio de Cristino Castro - PI, de 2019 a 2023. **Métodos:** Se trata de un estudio descriptivo, retrospectivo, utilizando datos secundarios del sistema SINAN, que se evaluaron los atributos de calidad de los datos (integridad y consistencia) y la representatividad. **Resultados:** Se analizaron 20 registros de tuberculosis, con 7 variables clasificadas como excelentes (integridad) y 3 relaciones entre variables clasificadas como excelentes (consistencia). El sistema de vigilancia se consideró adecuado y se calificó como excelente (representatividad). El perfil epidemiológico fue de hombres entre 35 y 49 años y la mayoría de los casos fueron nuevos ingresos. La prueba del VIH fue baja (55%) para las personas con TB. **Conclusión:** La calidad de los datos para el sistema de vigilancia de la tuberculosis en el municipio de Cristino Castro-PI se consideró excelente. El sistema se consideró representativo al analizar la variable epidemiológica de persona.

Descriptores: Servicios de Vigilancia Epidemiológica; Tuberculose; CDCCDC.

1 Escola de Saúde Pública. Fortaleza/CE - Brasil. 

2 Escola de Saúde Pública. Fortaleza/CE - Brasil. 

INTRODUÇÃO

Tuberculosis (TB) is an infectious disease caused by the *Mycobacterium tuberculosis* bacillus, which mainly affects the lungs but can also affect other parts of the body. It is one of the leading causes of morbidity and mortality worldwide, accounting for millions of cases and deaths annually. TB can be classified according to its form of presentation (pulmonary or extrapulmonary) and the bacillus's resistance profile to drugs, such as drug-resistant tuberculosis (DR-TB), which includes multidrug-resistant tuberculosis (MDR-TB) and extensively drug-resistant tuberculosis (XDR-TB)^{1,2,3}.

As the disease establishes itself, a slow progression is observed, with few symptoms, or with variations in coughing sustained for periods longer than three weeks, in the general population. Cases are identified based on the clinical criteria of individuals undergoing sputum smear microscopy (BAAR), supported by imaging tests. From there, treatment of the disease begins, which is treatable and curable, following the Ministry of Health protocol, with the use of antibacterials (rifampicin, isoniazid, pyrazinamide, and ethambutol) for a period of six months^{1,2}.

TB remains a critical global public health issue, responsible for approximately 1.3 million deaths in 2021 and accounting for 7.5 million new diagnoses in 2022. In Brazil, the scenario is no different. In 2019, the country reported 78,462 cases, with 5,120 deaths. In 2022, this number increased to 81,539 reported cases, with 5,845 deaths. In Piauí, in 2022, approximately 1,036 cases and 113 deaths were reported, representing an incidence rate of 24.6/100,000 inhabitants and a mortality rate of 2.4/100,000 inhabitants^{3,4,5}.

Epidemiological surveillance in this population is crucial, but faces significant challenges, such as underreporting and incomplete data. The Notifiable Diseases Information System (SINAN) is the principal tool used in Brazil to collect and process data on TB, covering the registration of case notifications, treatments, and disease outcomes, and providing essential data for surveillance. Hospitalizations and prolonged treatments due to late identification of the ill individual result in high costs for the Unified Health System (SUS). Studies indicate that MDR-TB cases are more expensive to treat due to the use of second-line medications, greater need for monitoring, and higher rates of complications and treatment failure^{2,6}.

In general, as a public health problem of great relevance, TB needs to be constantly evaluated in epidemiological scenarios for the adoption of preventive actions. The present study sought to evaluate the Tuberculosis Surveillance System in the municipality of Cristino Castro-PI between 2019 and 2023, and its research question is: "What is the quality of the data and the representativeness of the tuberculosis surveillance system in the municipality of Cristino Castro-PI?"

MÉTODOS

This epidemiological study is descriptive and retrospective in nature, focusing on the evaluation of the Tuberculosis Surveillance System, considering the guidelines of the Center for Disease Control and Prevention (CDC), described in the *Updated Guidelines for Evaluating Public Health Surveillance Systems* (2001)⁷, to assess the

qualitative attributes of data quality (completeness and consistency) and the quantitative attribute of representativeness. It did not need to be submitted to the Brazil platform and the research ethics committee, as it was a secondary study developed using public data.

The data were obtained by downloading files on tuberculosis for the period from 2019 to 2023, available on the DATASUS platform (<https://datasus.saude.gov.br/informacoes-de-saude-tabnet/>) between September and October 2024. The data refer to the municipality of Cristino Castro, located in the state of Piauí, which has approximately 10,503 inhabitants, according to the Brazilian Institute of Geography and Statistics (IBGE) (<https://www.ibge.gov.br/cidades-e-estados/pi/cristino-castro.html>). The data were decompressed, tabulated, and sorted using TabWin software version 3.2; organized in a Microsoft Excel® spreadsheet, version 18.0; and analyzed in the Epi Info™ program, version 7.1, based on descriptive statistics.

The variables were selected considering the fields in the tuberculosis notification form and observing, in the data dictionary, the classification of mandatory variable completion (Figure 1). To assess completeness, parameters adapted from those proposed by Romero and Cunha (2006) ⁸ were used, considering the percentage of complete data according to the following scores: > 95%, excellent; > 90 to 95%, good; > 80 to 90%, fair; > 50 to 80%, poor; and < 50%, very poor. To assess consistency, the score parameters proposed by Abth (2014) ⁹ were used, considering scores $\geq 90\%$ as excellent; 70 to 89% as fair; and less than 70% as poor.

The final assessment of the data quality attribute was based on the creation of scores for the average percentage of completion of the mandatory variable fields, considering above 70% - Satisfactory; above 50% to < 70% - Fair; above 50% to < 70% - Fair; below 50% - Unsatisfactory.

The evaluation of the representativeness of the data was based on the selection of epidemiological representation variables related to the individual, such as age, race, gender, and education level. From these sets of variables, the data were consolidated within the time frame of 2019 and 2023 and compared to secondary data in SINAN for the municipalities of Altos-PI and Bom Jesus-PI, which have a similar number of tuberculosis notifications to Cristino Castro. In addition, the data for the municipalities were compared to epidemiological studies of tuberculosis in the scientific literature in order to identify similarities in the behavior of the illness.

RESULTADOS

In Cristino Castro-PI, it was observed that between 2019 and 2023, males accounted for 65% of confirmed cases. Among the cases, 45% were concentrated in the 35-49 age group for both sexes, and 85% were classified as new (Table 1).

Table 1- Frequency of tuberculosis cases in the municipality of Cristino Castro – Piauí according to gender, age group, and pregnant women between 2019 and 2023.

VARIABLES	2019	2020	2021	2022	2023	n=20	%
SEX							
Blank	0	0	0	0	0	0	0%

Ignored	0	0	0	0	0	0	0%
Male	2	2	3	1	5	13	65%
Female	1	4	1	0	1	7	35%
AGE GROUP							
<1	0	2	0	0	0	2	10%
1 a 4 years old	0	1	0	0	0	1	5%
5 a 9 years old	0	1	0	0	0	1	5%
10 a 14 years old	0	0	0	0	0	0	0%
15 a 19 years old	0	1	0	0	1	2	10%
20 a 34 years old	0	0	1	0	1	2	10%
50 a 64 years old	1	0	1	0	0	2	10%
65 a 79 years old	0	0	0	0	1	1	5%
80 years old +	0	0	0	0	0	0	0%
PREGNANT							
2º quarter	1	0	0	0	0	1	5%
No	0	1	1	0	1	3	15%
Do not apply	2	5	3	1	5	16	80%

Source: Elaborated by the author.

The pulmonary form of tuberculosis was the most prevalent in the analyses (95%). Regarding the first smear microscopy sample, it is noted that 95% of individuals were tested, while the rest were marked as “blank/ignored.” In the second smear microscopy sample, all records were marked as “blank/ignored,” making it impossible to identify whether the test was performed or what the result was. In the field of HIV testing, 55% of cases were recorded as “not done,” in disagreement with the recommendations of the Ministry of Health and with what is recommended by the TB surveillance system. (Table 2).

Table 2- Absolute and relative frequency of tuberculosis cases in the municipality of Cristino Castro, Piauí, according to type of entry, form, 1st and 2nd smear microscopy, sputum culture, tuberculin test, HIV, and contacts registered per month of diagnosis between 2019 and 2023.

VARIABLES	2019	2020	2021	2022	2023	n=20	%
TYPE OF ENTRY							
New case	2	6	4	0	5	17	85
Recurrence	1	0	0	0	0	1	5
Re-entry after abandonment	0	0	0	1	1	2	10
Form							
Pulmonary	3	6	3	1	6	19	95
Extrapulmonary	0	0	1	0	0	1	5
1st SPUTUM SMEAR MICROSCOPY							
Ignored/blank	0	0	1	0	0	1	5
Positive	3	1	0	1	4	9	45
Not used	0	5	3	0	2	10	50

2nd SPUTUM SMEAR MICROSCOPY							
Ignored/blank	3	6	4	1	6	20	100
SPUTUM CULTURE							
Positive	0	0	0	1	1	2	10
Negative	0	0	1	0	0	1	5
Not done	3	6	3	0	5	17	85
TUBERCULIN TEST							
Ignored/blank	3	6	4	1	6	20	100
HIV							
Negative	1	0	2	1	5	9	45
Not done	2	6	2	0	1	11	55
Positive	0	0	0	0	0	0	0
COUNT OF REGISTERED USERS PER MONTH							
Ignored/blank	0	0	0	0	0	0	0
January	0	1	0	0	0	1	2
February	0	0	0	0	0	0	0
March	6	0	0	0	5	11	21
April	0	0	0	0	5	5	9
May	0	0	1	0	3	4	8
June	7	0	0	0	0	7	13
July	0	0	0	0	0	0	0
August	0	6	0	0	0	6	11
September	0	0	0	3	4	7	13
October	0	5	0	0	0	5	9
November	0	0	6	0	0	6	11
December	0	0	1	0	0	1	2

Source: Elaborated by the author.

The consistency analysis demonstrated an overall rating of “excellent.” However, it is worth noting, and a cause for concern, that 55% of reported TB cases did not undergo serological testing for HIV, leaving gaps in the associative diagnosis of TB and HIV. Therefore, I condition the evaluation of the data quality attribute to have a “satisfactory” rating, demonstrating that, throughout the study period, the TB surveillance system in Cristino Castro has adequate conduct in filling out information related to the disease (Table 3).



Tabela 3 – Classification of the data quality attribute according to variables selected for evaluation of the tuberculosis surveillance system in Cristino Castro – PI.

ATRIBUTO		Nº	VARIÁVEL	TYPE	N=20	%	CLASSIFICATION
DATA QUALITY	COMPLETENESS	1	Age	mandatory	20	100	Excellent
		2	Sex	mandatory	20	100	Excellent
		3	Input type	mandatory	20	100	Excellent
		4	Pregnant	mandatory	20	100	Excellent
		5	HIV	mandatory	20	100	Excellent
		6	Form	mandatory	20	100	Excellent
		7	Smear microscopy	mandatory	19	95	Good
		8	Culture	mandatory	20	100	Excellent
	CONSISTENCY	9	Treatment start date earlier than diagnosis date	relationship between variables	0	100	Excellent
		10	Male gender with option 6 in the pregnant field		0	100	Excellent
		11	AIDS (yes) with HIV		0	100	Excellent
FINAL RESULT						99,37	>70% SATISFACTORY

Source: Elaborated by the author.

The municipalities of Altos and Bom Jesus (DATASUS) were selected, as they presented a frequency of accumulated tuberculosis cases similar to that of the municipality of Cristino Castro. Analysis of the gender of individuals affected by the disease showed a predominance of males, accounting to 65% in Cristino Castro, with similar behavior observed in Altos and Bom Jesus, with 78% and 74%, respectively.

Individuals reported with TB in the 35-49 age group are predominant in Cristino Castro during the study period – 2019 to 2023 – with a total of nine individuals. The year 2023 had more notifications (three in total) when compared to previous years. The years 2019 and 2022 had only one reported case. When comparing tuberculosis cases in the municipalities of Altos and Bom Jesus, it was observed that the predominant age range was between 20 and 34 years old, with a total of 47 cases for the municipality of Altos. However, the municipality of Bom Jesus had the same number of cases for both the 20-34 age range and the 35-49 age range, with a total of 11 cases for both ranges, suggesting that in Cristino Castro, tuberculosis mainly affects adults of working age, while in the municipalities of Altos and Bom Jesus, the highest incidence is concentrated among young adults.

The education variable is essential, and in this regard, the observation of the “unknown/blank” field stood out above the other education variables in the municipality of Cristino Castro, with a total of 5 individuals; followed by the education level of incomplete 1st to 4th grade of elementary school, which had a total of 4 individuals. In 2020, the number of 7 individuals was evident in relation to the other years of the period studied.

In the cities of Altos and Bom Jesus, the educational level did not differ from that presented in the municipality of Cristino Castro, with a predominance of individuals at the educational level between incomplete 1st and 4th grades, with 12 and 17 individuals, respectively.

For the race variable, the municipality of Cristino Castro showed a predominance of self-declared mixed-race individuals, with a total of 19 individuals, not differing from 2020, with the highest number of cases. The same phenomenon was observed for identified and examined contacts, with a total of 52 and 38 individuals, respectively.

The year 2023 was the period with the highest number of self-declared mixed-race individuals, with a total of 17 and 14 individuals, respectively. Self-declared mixed-race individuals were predominant both in Cristino Castro and in the municipalities of Altos and Bom Jesus, which recorded 62 and 24 cases, respectively.

CONCLUSÃO

The epidemiological surveillance system for tuberculosis in Brazil aims to monitor and control the disease through case reporting, epidemiological investigation, and treatment monitoring, following the guidelines of the National Health Surveillance System (SNVS). This has made it essential to monitor the quality of reported data in order to adapt public policies and actions for disease prevention and control.

According to the study by Da Silva et al. (2023)^{10,11} on the epidemiological profile of tuberculosis in the state of Piauí, between 2017 and 2021, 64.91% (2,559) of tuberculosis cases occurred in males, with a higher concentration in 2018 and 2019. The predominant age group was 35 to 44 years, representing 19.38% (764) of cases, followed by 25 to 34 years, with 18.08% (713). Regarding education, 35.33% (1,393) had incomplete elementary school education. Most cases (70.20%; 2,767) were recorded among self-declared brown individuals.

The study by Dias et al. (2024)¹² on the analysis of the epidemiological profile of tuberculosis recurrence cases in the state of Pará, where 2,990 cases were evaluated between 2010 and 2021, presented a similar behavioral profile, with 66.6% (1,993) of the individuals being male, 77.13% (2,205) self-declared brown, aged between 31 and 45 years, accounting for 29.96% of cases (891), and incomplete elementary school as the most frequent level of education, with 42.58% (1,218); Therefore, there was no difference from the findings in the municipality of Cristino Castro, which shows a predominance of self-declared brown males with incomplete elementary school education and economically active adults between 35 and 49 years of age.

The higher proportion of cases in men may be related to less concern about their own health and greater exposure to risk factors compared to women, which contributes to this epidemiological behavior¹³. Furthermore, it should be noted that TB is a disease that mainly affects people of working age, contributing to the factors of exposure to the disease¹⁴, consistent with the findings in the 35-49 age group.

The predominance of brown skin color/race in studies on tuberculosis may be associated with the social vulnerability of this group, since the disease affects individuals in unfavorable socioeconomic conditions more intensely¹⁵. Low educational attainment, in isolation, is not a determining factor for TB; however, it is associated with low socioeconomic conditions, a factor of vulnerability to the disease. Low educational attainment can affect treatment patterns for the disease, contributing to higher dropout rates and incidence¹⁶.

Regarding the limitations of the study, it is worth mentioning the scarcity of studies on tuberculosis surveillance in the municipality of Cristino Castro-PI or studies that express the more detailed functioning of TB surveillance. This limitation directly interfered with a more robust description of the municipality's surveillance system. Another limitation is the availability of data referring to temporal and spatial axes, which led this study to evaluate the attribute of representativeness considering only variables related to the person.

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