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Epidemiological aspects of tuberculosis in the northern health region of the state of espírito santo (2015 – 2019)

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Aspectos epidemiológicos da tuberculose na região norte de saúde do estado do espírito santo (2015 – 2019)

Aspectos epidemiológicos de la tuberculosis en la región sanitaria norte del estado de espírito santo (2015-2019)

RESUMO

Objetivo: Descrever aspectos epidemiológicos da tuberculose na região norte de saúde do estado do Espírito Santo no intervalo de 2015 a 2019. Método: Trata-se de um estudo epidemiológico ecológico, com componente descritivo e analítico, do tipo série histórica. Para análise dos dados, foram calculados coeficientes de incidência (100.000 habitantes) e tendência quadrática para região norte. Resultados: durante o período avaliado, na Região Norte foram notificados 559 casos de tuberculose (2015-2019), onde foi possível observar um declínio do agravo nos anos de 2015 à 2017 voltando a crescer pós esse período. O coeficiente de incidência nos anos de 2018 e 2019foram de 26,3 e 26,7/ 100.000 habitantes respectivamente na região, sendo considerado abaixo da média nacional para mesmo período. Conclusão: A região apresenta bom desempenho na redução dos índices de incidência para o agravo, entretanto, é possível observar necessidades de modelação de políticas de saúde voltadas para o agravo.
DESCRITORES: Tuberculose; Promoção da Saúde; Saúde Pública; Política de Saúde

ABSTRACT

Objective: To describe epidemiological aspects of tuberculosis in the northern health region of the state of Espírito Santo between 2015 and 2019. Method: This is an ecological epidemiological study, with a descriptive and analytical component, of the historical series type. For data analysis, incidence coefficients (100,000 inhabitants) and quadratic trend for the northern region were calculated. Results: during the period evaluated, in the North Region, 559 cases of tuberculosis were reported (2015-2019), where it was possible to observe a decline in the disease in the years 2015 to 2017, growing again after this period. 2018 and 2019 were 26.3 and 26.7/100,000 inhabitants respectively in the region, being considered below the national average for the same period. Conclusion: The region has a good performance in reducing incidence rates for the disease, however, it is possible to observe the needs for modeling health policies aimed at the disease.
DESCRIPTORS: Tuberculosis; Health Promotion; Public Health; Health Policy.

RESUMEN

Objetivo: Describir aspectos epidemiológicos de la tuberculosis en la región sanitaria norte del estado de Espírito Santo entre 2015 y 2019. Método: Se trata de un estudio epidemiológico ecológico, con componente descriptivo y analítico, del tipo serie histórica. Para el análisis de los datos se calcularon coeficientes de incidencia (100.000 habitantes) y tendencia cuadrática para la región norte. Resultados: durante el período evaluado, en la Región Norte se notificaron 559 casos de tuberculosis (2015-2019), donde se pudo observar una disminución de la enfermedad en los años 2015 a 2017, creciendo nuevamente luego de este período. 2018 y 2019 fueron 26,3 y 26,7 / 100.000 habitantes respectivamente en la región, considerándose por debajo del promedio nacional para el mismo período. Conclusión: La región tiene un buen desempeño en la reducción de las tasas de incidencia de la enfermedad, sin embargo, es posible observar las necesidades de modelar políticas de salud dirigidas a la enfermedad.
DESCRIPTORES: Tuberculosis; Promoción de la Salud; Salud Pública; Política de salud.

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INTRODUCTION

Disease of infectious and contagious etiology tuberculosis (TB) is caused by Mycobacterium tuberculosis and despite the fact that it is an age-old problem, it still has great importance in the health scenario worldwide because it is a neglected disease. Data from the World Health Organization (WHO) suggest that tuberculosis is the leading cause of death from a single infectious agent worldwide.[14] It is estimated that in 2019, around ten million people worldwide developed TB. For the year 2020, Brazil registered 66.819 thousand cases of the disease, with an incidence coefficient of 3,16/100.000 inhabitants. [12] Thus, Brazil remains among the 30 countries that present a high burden for the disease and TB-HIV co-infection, being considered a priority for the control of the disease in the world by the WHO. [13]

Also in 2017, the Ministry of Health (MS) of Brazil adhered to the WHO target entitled "Strategy for the End of Tuberculosis", which suggests that there is a reduction in the incidence of TB to less than 10 cases per 100,000 inhabitants until 2035, an overall reduction of 4 to 5% per year would be necessary (SVS; MH, 2019). However, studies prove that in the year 2018 there were an estimated 10 million new cases of tuberculosis worldwide, and 1.5 million people died from the disease. We can then observe a significant increase in the estimated mortality from the disease in relation to the previous year as mentioned. In the same year in Brazil, the incidence of tuberculosis was 45 cases/100.000 inhabitants, and the mortality rate related to tuberculosis was 2,3 deaths/100.000 inhabitants, far from what is recommended by the WHO for reducing the disease. [2]

In line with the Strategy to End Tuberculosis, in 2017, the MH, through the General Coordination of the National Tuberculosis Control Program (CGPNCT - Coordenação Geral do Programa Nacional de Controle da Tuberculose), then launched the National Plan to End Tuberculosis as a Public Health Problem (National Plan), in which a geographic remodeling was carried out so that the distribution of Brazilian municipalities was divided into eight scenarios based on the similarity of socioeconomic contexts and capacity to implement TB control actions associated with the incidence of the disease. [4]

The state of Espírito Santo joined and adopted measures to fight the disease through the state tuberculosis control program, which, among the various competences, has those of consolidating and analy-

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zing the data generated by the information system, offering information through bulletins or reports, as well as using them for planning, monitoring and evaluation purposes. Conduct operational and epidemiological assessment of program actions at the state level. Promote and participate in the training of human resources in the area of tuberculosis, promoting the integration of teaching and service institutions. 4 Advise regional coordinators in the implementation and/or implementation of the Tuberculosis Control Program in the municipalities. Maintain close articulation with the State and Regional Reference Laboratory, participate in the planning of bacteriological diagnosis and quality control actions. Maintain close interaction with the technical-operational sphere, especially with the secondary and tertiary reference units. 4

In the entire state in 2019, 1129 cases of the disease and 73 confirmed cases of death due to tuberculosis were reported, with a mortality rate of 1,8/100 thousand inhabitants. 5 In the northern health region, according to the 2011 Regionalization Master Plan, in 2019, 115 reported cases of tuberculosis were observed, which corresponds to 21% of the state panorama, and a number of three deaths due to the disease. 5 The objective is to describe epidemiological aspects of tuberculosis in the northern health region of the state of Espírito Santo in the last five years prior to the survey: 2015 – 2019.

Given the above, the relevance of this study is justified since, knowing the clinical and epidemiological scenario of the distribution of tuberculosis cases as an important public and collective health problem, enables the management to create mitigating measures for interventions focused on real health need in the region in the user-centered format, and consequently positive changes in the current health situation.

METHODS
This is an ecological epidemiological study, with a descriptive and analytical component, of the historical series type, in which the cases included in the study were described and analyzed in an aggregated

way by year and period of study.

The study site consists of the territory defined by the northern health region according to a PDR (Master Plan for Regionalization - Plano Diretor de Regionalização) published in 2011 by the state of Espírito Santo. The PDR divides the state into health regions, with the northern health region comprising 14 municipalities, namely: Água Doce do Norte, Barra de São Francisco, Boa Esperança, Conceição da Barra, Ecoporanga, Jaguaré, Montanha, Mucurici, Nova Venécia, Pedro Canário, Pinheiros, Ponto Belo, São Mateus and Vila Pavão. 4

The study was carried out from August 2020 to June 2021, considering the period for data collection from January 1, 2015 to December 31, 2019. For data collection, the cases reported in the System Information on Notifiable Diseases (SINAN - Sistema de Informação de Agravos de Notificação) were used through the tabulation system TABNET of the database of the Unified Health System (SUS) or DATASUS. The TB case definitions used were those recommended by the Ministry of Health (MS):

• Laboratory criteria: every case that, regardless of the clinical form, presents at least one positive smear, culture or rapid molecular test sample for TB (TRM-TB); 5

• Clinical-epidemiological criteria: every case that does not meet the laboratory confirmation criteria described above, but that received a diagnosis of active TB, taking into account clinical and epidemiological data. 5

Inclusion criteria and exclusion criteria for the selection of research data were also defined, with inclusion criteria being: any individual with the confirmed diagnosis variable for tuberculosis who meets the criteria used by the MS and who has the variable place of residence located in any municipality that corresponds to the northern health region of the state of Espírito Santo. 5

For the calculation of incidence, the population bases of the Brazilian Institute of Geography and Statistics (IBGE - Instituto Brasileiro de Geografia e Estatística) and

data from the Regional Health Superintendence of São Mateus were used, where the number of available notifications divided by the population of that specific year x 100.000 inhabitants was used.

Having reached the preliminary results, the collected data were inserted, organized and analyzed in Excel spreadsheets (Windows 10 – Home Single Language). Incidence coefficients were analyzed over a period of five years of the historical series (time trend). In addition, the quadratic trend calculation was produced, the model proposed to adjust the analysis of the time series.

Where,

$$Y_i = \beta_0 + \beta_1 X_i + \beta_2 X_i^2 + \varepsilon_i$$

The quadratic trend model was calculated on top of each year's incidence coefficient with coded X (year), using Excel software for tabulation, calculation and together with the appropriate scatter plot for the study model for quadratic trend analysis.

The production of notification and incidence coefficient graphs was performed using the statistical software SIGMAPLOT, Scientific Data Analysis and Graphing Software. Version 12.0. Systat Software Inc, 2013. The calculation of the incidence coefficient was performed with data obtained from SINAN (TabWin). It is a research with data collection in secondary bases that do not directly infer human ethics, therefore according to resolution 466/12 that approves the "regulatory guidelines and norms for research involving human beings".

RESULTS

In 2020, the State of Espírito Santo presented 1176 thousand new cases of TB, with an incidence of 28,9/100.000 inhabitants. (13) During the period evaluated, in the North Region (ES) 559 cases of TB (2015-2019) were reported, being: 2015 with 118 cases, 2016 (110 cases), 2017

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Figure 1 – Tuberculosis cases reported in the 14 municipalities of the Northern Region of Espírito Santo in the period from 2015 to 2019.
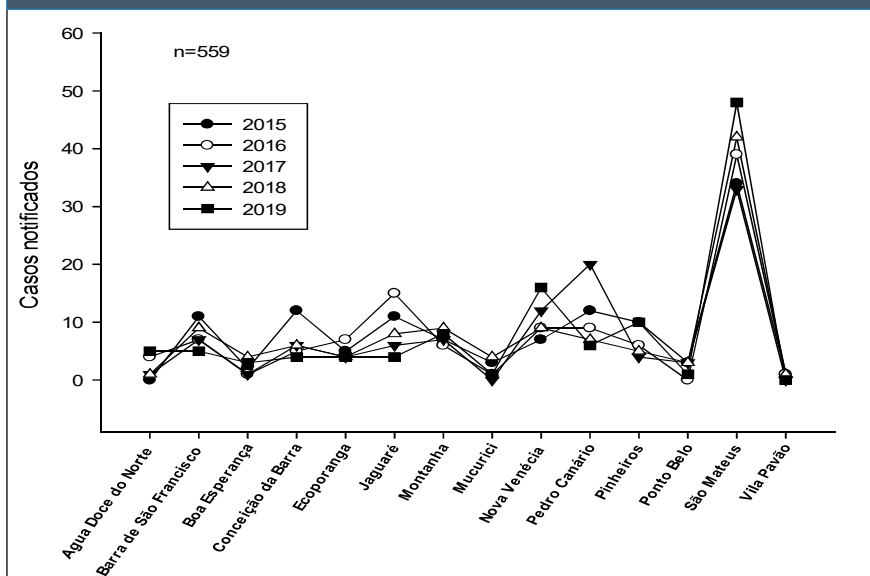
Fonte: SINAN, 2020.

(104 cases), 2018 (112 cases) and 2019   with 115 cases in total.

Table 1 - Tuberculosis Incidence Coefficient in the 14 municipalities in the North of Espírito Santo from 2015 to 2019.

| MUNICIPALITIES	INCIDENCE COEFFICIENT 2015-2019				
	2015	2016	2017	2018	2019
Água Doce do Norte	0,0	33,5	8,4	9,0	45,4
Barra de São Francisco	24,7	15,6	15,5	20,3	11,2
Boa Esperança	13,1	6,5	6,5	26,7	20,0
Conceição da Barra	38,6	15,9	19,0	19,4	12,9
Ecoporanga	20,6	28,9	16,5	17,4	17,4
Jaguaré	38,4	51,5	20,2	26,8	13,1
Montanha	36,4	31,1	36,1	47,9	42,5
Mucurici	51,0	17,0	0,0	72,0	18,1
Nova Venécia	13,9	17,8	23,5	18,1	31,9
Pedro Canário	45,9	34,2	75,4	26,9	22,9
Pinheiros	37,6	22,3	14,7	18,7	37,0
Ponto Belo	38,7	0,0	38,0	38,5	12,7
São Mateus	27,3	30,8	25,7	32,7	36,8
Vila Pavão	10,7	10,6	0,0	10,9	0,0

Fonte: SINAN, 2020.

Among all reported cases, it is possible to notice a greater number of notifications in 2015, with São Mateus being the municipality that obtained the most notifications in all years, totaling 35,06% of the entire Northern Region of the state, followed by Pedro Canário with (9,66%, Nova Venécia (9,48%) and Jaguaré (7,87%), Figure 1. Lower incidences are observed for the municipalities of Água Doce do Norte, Boa Esperanza, Mucurici and Ponto Belo.

According to Table 1, it is possible to observe the disease incidence coefficients in the region. During the analyzed period, the following incidence coefficients were recorded for all forms of tuberculosis in the Northern Region of the state, 27,7/100,000 inhabitants (2015); 25,6/100,000 inhabitants (2016); 24/100.000 inhabitants (2017); 26.3/100.000 inhabitants (2018); 26.7/100.000 inhabitants (2019).

When we analyze data from across the country, it is observed that in Brazil, in 2018, 75,717 new cases of the disease were diagnosed, obtaining an incidence coefficient of 36,2 cases/100 thousand inhabitants. Although, from 2009 to 2018, an average annual decrease of 1,0% was observed, the incidence rate increased in the years (2017) 35.3/100 thousand inhabitants and (2018) 36,2/100 thousand inhabitants being that for the year (2015) we had 34,1/100 thousand inhabitants and (2016) 33,9/100 thousand inhabitants (Brazil, 2019). It is a fact that in the northern region of health there was an average annual decrease of 2,1% for the year 2015 to 2016, and for the year 2016 to 2017 with a decrease of 1,6%, rising again for the following years, but with much smaller percentages. The incidence rate between the years 2015 to 2019 was higher in 2015, where among the municipalities in the Mucurici region it had the highest coefficient (51). In 2016, Jaguaré presented a coefficient of (51,5), in 2017 Pedro Canário with (75,4), 2018 Mucurici (72) and 2019 Água Doce do Norte with (45,4).

Figure 2 shows the equation for the disease trend in the northern region of the State of Espírito Santo in the five years of the study.

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Figure 2 – Equation of trend of the Incidence Coefficient of the North Region in the period from 2015 to 2019
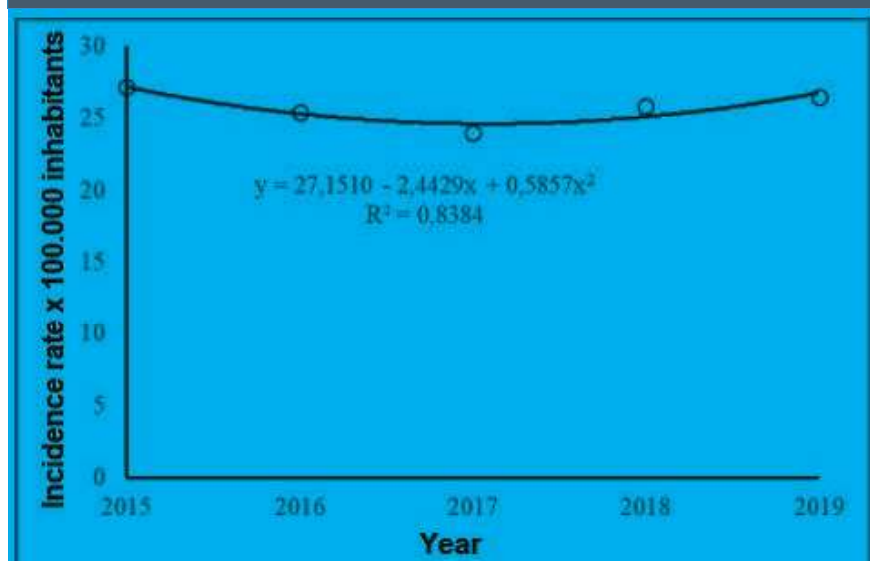
Source: The authors, 2021.

It can be seen that there were two behaviors, one decreasing for the year 2015 to 2017 and rising again from 2018 to 2019. Thus, the coefficient explains 83,84% of the factors that interfere in the incidence rate for the Northern Region of state of Espírito Santo. For the year 2015, the incidence coefficient under analysis was (27,2); 2016 (25,4); 2017 (24); 2018 (25,8) and 2019 (26,5).

DISCUSSION

According to the notifications, it is possible to verify a greater quantity concentrated in the city of São Mateus (35,06%), a fact that can be possibly explained by the high population index concentrated in the city of São Mateus, totaling approximately 132.642 thousand people according to the 2020 census. 10

When we analyze the rest of the municipalities that make up the region, we observe a smaller population number, favoring, however, a smaller number of cases for the disease compared to São Mateus. However, it is noteworthy that TB in the Northern Health Region of Espírito Santo has some stability in the occurrence of these notifications. According to Pelaquin; Silva and Ribeiro, 6 in cities with chaotic urbanization and large pockets of poverty, the deficiencies of the health system probably justify the high number of cases and deaths from TB. When we observe a lower rate of notification, the literature brings some factors that may be associated with these cases, such as the poor quality of databases and medical records, which may bring difficulties in their analysis to assess the problem and consequently generate the loss of these notifications resulting in a decrease in registered cases, including underreporting that occurs even in smaller municipalities. 6

In a study of patients with TB treated at a municipal health unit in Belém/PA in 2011 and 2012, according to Freitas; Santos: Silva and Rocha, 2016 3 reports that the disease is still being frequently registered in the basic health system, with this there is a need to intensify prevention strategies and dissemination of forms of treatment of the disease, aiming to reduce the incidence and prevalence of cases at the local and regional level.

It is possible to highlight these percentages that were identified in the northern region of health through various factors, including the high percentages of notification, which are extremely important to start the proper treatment and detect all cases in order to break the disease transmission cycle, as explained by Junior, 2004, 8 in which clinics, health centers, clinics and hospitals – to carry out the active search for respiratory symptoms should be a permanent attitude and incorporated into the routine of activities of all members of the health teams. These factors are extremely important, which leads institutions to identify patients, advocate early treatment, and from an epidemiological point of view, therefore the active search with case detection and early diagnosis leads to an increase in the incidence rate of each location.

Junior, 2004 8 also explains that in areas where actions are already organized, the visit should include the detection of cases between respiratory symptoms and contacts, especially of bacilli cases and children, and when necessary, they should be referred to the health service. When this does not occur, there is a reduction in cases and, consequently, a lower incidence of the disease in the region, leaving the cases to circulate without receiving adequate treatment and spreading the Koch's bacilli even further, even in domestic environments. It is known that the active search for TB cases is not yet a priority action in health services, although the patient's increased access to diagnostic tools is a useful strategy for controlling the disease. 1;15 And when we see a decrease between the years 2015 to 2017, it can be explained possibly as a result of the implementation of public policies to control the disease. 11

In the distribution of incidence coefficients in the trend equation, Peternelli, 2012 9 explains that the analysis consists of performing a statistic in order to verify the existence of a functional relationship between a dependent variable and one or more independent variables, a fact that is explained by the data already presented, where a higher coefficient was observed for the years 2015 and 2019 and consequent decreasing in the period from 2015 to 2017, rising again in 2018. And with that, some considerations are suggested when choosing the model, among them it should be consistent both in the degree and in the aspect of the curve, to represent the phenomenon under study. 9

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CONCLUSION

The findings demonstrate that the region has shown relevant results from the perspective of the national and state panorama in relation to combating and coping with the pathology.

This demonstrates that in the face of therapeutic and prophylactic innovations, even though not following the disease under constant surveillance, knowing the incidence factors and distribution of cases through a good territorial diagnosis exemplifies the combined efforts of different sectors of society to implement mitigating measures and reach a health that is integral, egalitarian and equitable as suggested by the guiding principles of the unified health system. It is noteworthy that there is a need to carry out more research on the subject in order to know the reality of tuberculosis in a given region, characterization of the carriers as well as the possible risks in order to avoid the spread of the disease and the increase in mortality.

It is also worth confirming that a well-structured surveillance service in a given health region supports the access to health of users in a non-summary way, contributing to the individual being the protagonist of their care.

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