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Characterization of Tuberculosis in Pinar del Río, 2015-2023

Caracterización de la Tuberculosis en Pinar del Río, 2015-2023

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ABSTRACT

Introduction: Tuberculosis is a bacterial disease that attacks the lungs, the incidence has increased in recent years. Objective: Characterize the incidence of tuberculosis in Pinar del Rio in the period 2015 to 2023. Methods: Cross-sectional descriptive research, universe consisting of 250 patients diagnosed with tuberculosis. To obtain information, the statistical records of the department of medical records and health statistics were reviewed, the statistical analysis was carried out through the EPIDATA 3.0 program, absolute and relative frequencies, and incidence rate per 100,000 inhabitants were used. Results: Trend of increase in the incidence of tuberculosis, the male sex represented more than 75% of the reported cases, more than 40% of the cases occurred in the group of 65 years and older in 2015, 2022 and 2016. More than 80% the location was pulmonary, smoking represented (56%) in 2016 and 2019, age 60 years and over represented (50.0%) in 2022, (44.0%) in 2016, 27.9% had with a history of being admitted to closed institutions in 2023 and 25% were alcoholics in 2020. Conclusions: Tuberculosis in Pinar del Río has had an increasing trend, showing a decline in the pandemic years, the male sex represented more than two-thirds of the diagnosed patients, especially in the elderly; The most frequent form of localization was pulmonary and smoking and alcoholism play an important role in it.

Keywords: Tuberculosis, Incidence, Risk factors.

RESUMEN

Introducción: La tuberculosis es una enfermedad bacteriana que ataca los pulmones, la incidencia se ha incrementado en los últimos años. Objetivo: Caracterizar la incidencia de la tuberculosis en Pinar del Rio en el periodo 2015 al 2023. Métodos: Investigación descriptiva de corte transversal, universo constituido por 250 pacientes diagnosticados de tuberculosis. Para la obtención de la información se revisaron los registros estadísticos del departamento de registros médicos y estadísticas de salud, el análisis estadístico se realizó por medio del programa EPIDATA 3.0, se utilizaron frecuencias absolutas, relativas, y tasa de incidencia por 100 000 habitantes. Resultados: Tendencia al incremento en la incidencia de tuberculosis, el sexo masculino representó más del 75% de los casos notificados, más del 40 % de los casos ocurrieron en el grupo de 65 años y más en 2015, 2022 y 2016. Más del 80 % la localización fue pulmonar, el tabaquismo representó el (56%) en 2016 y 2019, la edad de 60 años y más representó el (50,0%) en 2022, (44,0%) en 2016, el 27,9% tenían en antecedente de estar internado en instituciones cerradas en el 2023 y el 25% eran alcohólicos en 2020. Conclusiones: La tuberculosis en Pinar del Río ha tenido una tendencia al incremento, mostrando un declive en los años pandémicos, el sexo masculino representó más de las dos terceras partes de los enfermos diagnosticados, sobre todo en el adulto mayor; la forma más frecuente de localización fue la pulmonar y juega en ella un importante papel el tabaquismo y el alcoholismo.

Palabras clave: Palabras claves: Tuberculosis, Incidencia, Factores de riesgo.

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INTRODUCTION

Since the 1980s, the world has witnessed the emergence of new infections such as HIV/AIDS and the resurgence of infectious diseases that pose a growing threat to the dominance of biomedicine, such as tuberculosis, malaria, and syphilis. (1)

Tuberculosis is a that affects the lungs as well as other parts of the body, including the kidneys, spine, and brain. Not everyone who is infected can develop the disease; there are two types of conditions: latent infection and active tuberculosis. (2)

The symptoms of tuberculosis depend on the location of the infection. When the infection is in the lungs, symptoms include a severe cough lasting 3 weeks or longer, chest pain, and the ability to cough up blood or sputum. Other symptoms may include weakness or fatigue, weight loss, loss of appetite, chills, fever, and night sweats. (3)

Tuberculosis remains the deadliest infectious disease in the world. An infected person can spread the bacteria to others through the air when someone with the disease in their lungs or throat coughs, speaks, or signs. Those at the highest risk of becoming ill include people who have contact with someone with the disease, people born in or visiting high-risk areas, healthcare workers, and others who work or live in settings with a high risk of transmission, such as homeless shelters, prisons, and nursing homes. (4)

In most infected people, the infection involves the immune system, with bacteria enclosed in caseous granulomas or tubercles. In approximately 5% of infected patients, rapid progression to tuberculosis occurs within the first two years after infection. Approximately 10% of people with latent infection will experience reactivation, half, within the first year and the rest over the course of their lives, primarily because of reactivation of dormant tuberculosis bacilli acquired through primary infection or, less frequently, through reinfection. (5)

The reporting of infectious disease cases has been and remains a critical step in controlling and preventing the spread of communicable diseases. Case reporting is essential for routine surveillance and for determining the disease burden in the community. Furthermore, it serves to detect the source of infection and outbreaks; helps establish the appropriateness of the diagnosis and recommended treatment regimens; and is essential for the planning, implementation, and evaluation of care and prevention programs. (6)

The Mycobacterium tuberculosis complex comprises a group of pathogenic bacteria that cause tuberculosis disease in humans and other mammals. It has approximately 4,000 genes, of which the function of less than half is known. Among the forms that affect humans, nine major lineages have diverged from a common ancestor and have diversified in different regions of the world. It is estimated that one-quarter of the world's population is infected with tuberculosis bacilli without developing the disease. (7)

During the COVID-19 pandemic, techniques related to genomic epidemiology—which combines classical epidemiology with whole-genome sequencing—gained particular relevance. These techniques can be applied to both the diagnosis and surveillance of infectious diseases, yielding results that complement conventional approaches and allowing for more precise identification of transmission routes. (8)

In 2018, an estimated 10 million cases of TUBERCULOSIS occurred worldwide, and 1.5 million people died from tuberculosis, including 251,000 people with coinfection with human immunodeficiency virus (HIV). In the region of the Americas, an estimated 289,000 cases of tuberculosis were reported in 2018, while an estimated 22,900 deaths occurred that same year, 26% of which were among people with tuberculosis/HIV coinfection. Tuberculosis is strongly influenced by social and economic determinants, as well as specific health risk factors. (9)

In November 2017, more than seventy ministers of health and nearly fifty high-level national representatives adopted the Moscow Declaration to End Tuberculosis. In May 2018, the World Health Assembly adopted the 13th WHO General Programme of Work 2019–2023 and approved a resolution that included commitments to act more quickly to end the disease. (10)

At the United Nations General Assembly high-level meeting on tuberculosis in 2023, the 2018 commitments and targets were reaffirmed, and new targets were set for the period 2023–2027. These include reaching 90% of people in need of tuberculosis prevention and care services; using a rapid test recommended by the WHO as the first method for diagnosing tuberculosis; offering a package of social and health benefits to all people with tuberculosis; ensuring the availability of at least one new tuberculosis vaccine that is safe and effective; and closing the funding gaps for tuberculosis interventions and research by 2027. (11)

In Cuba in 2023, 755 cases of tuberculosis were reported, with an incidence rate of 7.4 per 100,000 inhabitants; 50 people died, and the mortality rate from this cause was 0.5 per 100,000 inhabitants. In Pinar del Río, 44 cases were reported, and the risk of contracting the disease was 8.2 per 100,000 inhabitants. (12) Since 2021, an increase in the incidence of the disease has been observed, a situation similar to that reported internationally over the past 3 years.

Given the above, we consider it appropriate to conduct the following study with the aim of characterizing the incidence of tuberculosis according to the sociodemographic variables, location, and risk factors for cases diagnosed in the province of Pinar del Río from 2015 to 2023.

METHODS

A descriptive, cross-sectional study was conducted to characterize the incidence of tuberculosis according to sociodemographic variables, location, and risk factors among cases diagnosed in the province of Pinar del Río from 2015 to 2023.

The study population consisted of 251 patients diagnosed with tuberculosis in the province of Pinar del Río between January 2015 and December 2023. The variables considered were tuberculosis incidence, age, sex, disease location, and risk factors. To obtain this information, theoretical methods of documentary analysis were employed, including a review of statistical records from the Department of Medical Records and Health Statistics at the Pinar del Río Provincial Center for Hygiene, Epidemiology, and Microbiology, reports of notifiable diseases (Form 84-011), weekly statistical reports (Form 241-403-02), and the epidemiological history of reported cases archived in the Provincial Department of Epidemiology. The data were presented in tables and graphs using Microsoft Office 2016. Statistical analysis was performed using the EPIDATA 3.0 program, employing absolute and relative frequencies, as well as incidence rates calculated per 100,000 inhabitants. The research adhered to ethical principles. No experimental procedures were performed, and the information was processed confidentially without presenting data that could compromise patient privacy. The study complied with the Second Declaration of Helsinki and with current legislation in Cuba. Under no circumstances will the identity of the patients be disclosed. The results will be published solely for the scientific community.

RESULTS

The incidence of tuberculosis in Pinar del Río from 2015 to 2023 is shown in Figure 1. The graph illustrates the annual rates of the disease and the calculated trend, excluding data from the COVID-19 years, with the point estimate of the rate during those years based on the trend.

The incidence of tuberculosis in Pinar del Río generally tends to increase during the period from 2015 to 2023, with the highest risk of contracting the disease occurring in 2018 and 2023.

The percentage distribution of tuberculosis cases by sex from 2015 to 2023 is shown in Figure 2.

More than 75% of the reported cases in each year were males from 2015 to 2023, except in 2021, when 61.9% were males.

Table 1 shows the percentage distribution of tuberculosis cases by age group in Pinar del Río from 2015 to 2023.

Source: statistical records (model 84-011)

Table 1. Distribution of tuberculosis cases by age group. Pinar del Río, 2015–2023.

Source: statistical records (form 84-011)

Grupos de	2015		2016		2017		2018		2019		2020		2021		2022		2023	
Edad	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
≤ 19 años	1	3,4	2	8	1	4,2	2	5,4	1	4	0	0	0	0	0	0	1	2,3
20–29 años	2	6,9	11	44	6	25	4	10,8	4	16	2	10	4	19	2	7,7	6	14
30–39 años	4	13,8	0	0	2	8,3	10	27	3	12	2	10	4	19	2	7,7	9	20,9
40–49 años	7	24,1	0	0	7	29,2	10	27	3	12	8	40	4	19	5	19,2	4	9,3
50–59 años	2	6,9	0	0	3	12,5	4	10,8	7	28	4	20	4	19	5	19,2	14	32,6
60 años y má	13	44,8	12	48	5	20,8	7	18,9	7	28	4	20	5	23,8	12	46,2	9	20,9
Total	29	100	25	100	24	100	37	100	25	100	20	100	21	100	26	100	43	100

Figure 2. Distribution percentage of tuberculosis cases by sex, Pinar del Río, 2015–2023.

Source: statistical records (model 84-011)

In Pinar del Río, more than 40% of reported tuberculosis cases by age group in 2015, 2016, and 2022 occurred in the 65 and older age group; in 2022, the 20–29 age group also accounted for a high percentage (44%); in 2017, 2018, and 2020, the highest percentage of cases was found in the 40–49 age group, and in 2023, the highest percentage was recorded in the 50–59 age group.

The percentage distribution of tuberculosis cases by location from 2015 to 2023 is shown in Figure 3.

The pulmonary form predominated in more than 80% of the cases diagnosed in all years; in 2021, it accounted for 100%, and in 2022 and 2017, the percentages were also high at 96.2% and 95.8%, respectively.

The risk factors for patients whose tuberculosis cases were reported from 2015 to 2023 are shown in Table 2.

Table 2. Distribution of tuberculosis according to risk factors. Pinar del Río 2015–2023.

Source: Epidemiological records (Form 81-51)

Factores de riesgo	2015		2016		2017		2018		2019		2020		2021		2022		2023	
	No	% n=29	No	% n=25	No	% n=24	No	% n=37	No	% n=25	No	% n=20	No	% n=21	No	% n=26	No	% n=43
Ancianos de 60 y más años	12	41,4	11	44,0	7	29,2	7	18,9	7	28,0	4	20,0	5	23,8	13	50,0	10	23,3
Contactos con paciente con baciloscopia positiva	0	0,0	0	0,0	1	4,2	0	0,0	1	4,0	0	0,0	1	4,8	1	3,8	1	2,3
Desnutridos	0	0,0	1	4,0	1	4,2	2	5,4	0	0,0	1	5,0	0	0,0	0	0,0	0	0,0
Seropositivos al VIH	1	3,4	1	4,0	0	0,0	2	5,4	1	4,0	2	10,0	0	0,0	1	3,8	2	4,7
Diabéticos	0	0,0	3	12,0	3	12,5	2	5,4	1	4,0	0	0,0	1	4,8	2	7,7	3	7,0
Alcohólicos	1	3,4	3	12,0	5	20,8	5	13,5	3	12,0	5	25,0	4	19,0	4	15,4	3	7,0
Antecedentes de internamiento en instituciones cerradas	0	0,0	3	12,0	0	0,0	3	8,1	2	8,0	3	15,0	0	0,0	4	15,4	4	9,3
Internamiento actual en instituciones cerradas	2	6,9	3	12,0	2	8,3	7	18,9	2	8,0	4	20,0	2	9,5	3	11,5	12	27,9
Fumadores	6	20,7	14	56,0	7	29,2	7	18,9	14	56,0	11	55,0	2	9,5	10	38,5	11	25,6
EPOC, asma bronquial	2	6,9	0	0,0	0	0,0	0	0,0	1	4,0	1	5,0	0	0,0	2	7,7	2	4,7
Trabajador de salud	0	0,0	0	0,0	2	8,3	3	8,1	0	0,0	1	5,0	4	19,0	0	0,0	1	2,3

Figure 3. Distribution percentage of tuberculosis cases by location, Pinar del Río 2015–2023.

Source: statistical records (form 84-011)

With respect to risk factors among patients diagnosed with tuberculosis from 2015 to 2023, smoking was found to be a risk factor, with high percentages in 2016 and 2019 (56%), 55% in 2020, 38.5% in 2022, 29.2% in 2017, and 25.6% in 2023. High percentages of those aged 60 and older were reported in 2022 (50.0%), 2016 (44.0%), 2015 (41.4%), 2017 (29.2%), 2021 (23.8%), and 2023 (23.3%). A history of incarceration was also a risk factor for the disease, with high percentages in 2023 (27.9%) and 2020 (20%), and the prevalence of alcoholism as a risk factor was high in 2020 (25%) and 2017 (20.8%).

DISCUSSION

In Cuba, a prevention and control program has yielded satisfactory results in tuberculosis control. A fundamental role in this effort is played by family doctors and nurses, who conduct active case finding in the communities where they work and ensure adherence to the treatment regimen. However, during the pandemic years (2019–2022), in Pinar del Río, as in the rest of the country did, healthcare was heavily focused on COVID-19, with a high demand for care related to the disease, while services for other conditions requiring medical attention continued. The economic difficulties faced by the country in the wake of COVID-19, the intensification of the economic blockade, and its impact on the most vulnerable segments of the population may be factors that contributed to the observed trends in the number of cases during this period in the region.

According to the WHO, tuberculosis spread worldwide for the first time in 20 years because of COVID-19 and lockdowns, which limited testing and access to treatment; the incidence of the disease has increased worldwide except in Africa, where it is feared that the figures do not reflect reality due to disruptions in health services caused by the coronavirus pandemic. This aligns with the findings of this study. (13)

They further note that before the COVID-19 pandemic, many countries were making solid progress in the fight against tuberculosis; however, the COVID-19 pandemic and socioeconomic inequalities reversed the years of progress in the fight against tuberculosis and increased the burden on those affected, especially the most vulnerable countries. (14) Furthermore, owing to ongoing difficulties in providing and accessing basic tuberculosis services, many patients have gone undiagnosed and untreated. The number of new cases fell from 7.1 million in 2019 to 5.8 million in 2020. Although 6.4 million cases were diagnosed in 2021, this figure remains well below prepandemic levels. (15)

A study conducted in Cuba at the Pedro Kourí Institute of Tropical Medicine by the Department of Epidemiology, a PAHO/WHO Collaborating Center for Tuberculosis Elimination, revealed a reduction in the number of tuberculosis case reports from 2020–2021 to 4.9 (544 cases annually), suggesting that, as has occurred in other regions and worldwide due to the disruption of tuberculosis services caused by the impact of COVID-19, the number of case identification and detection processes declined sharply from 2020–2021 compared with previous years. This explains the widening diagnostic gap at the end of the period, and the observed decline requires a different interpretation. (16)

With respect to the results obtained by sex, men exhibit social behaviors that often predispose them to the disease, such as alcohol or tobacco use and the rate of hospitalization due to inappropriate social behaviors.

Several studies confirm the findings regarding the higher prevalence of tuberculosis among males. In Costa Rica in 2021, 353 cases of tuberculosis were reported, with two out of every three cases involving men (17). In a study conducted in Lima, Peru, in 2019 and 2020, males and the 18–29 age group were predominant; the predominant site of infection was the lungs. (18)

In a study conducted at the “Vladimir Ilich Lenin” University General Hospital in Santiago de Cuba from 2020 to 2021, 56.76% of patients diagnosed with tuberculosis were between the ages of 45 and 69; 64.86% were male, and pulmonary tuberculosis with a positive smear test () was the predominant form of the disease. (19) This finding coincides with the results of this study.

With respect to age, which is considered a risk factor for the development of the disease, we observed a predominance of individuals aged 60 years and older, which could correspond to the physiological immunosuppression that occurs at the extremes of life, the increased incidence and prevalence of chronic diseases in older adults, and long-term exposure to other risk factors such as smoking and alcoholism.

In a study presented in Mexico regarding risk factors identified in tuberculosis patients, smoking was associated with a 2- to 3-fold increased risk of developing tuberculosis and was found to be a risk factor in 30% of patients who developed extrapulmonary tuberculosis; alcoholism in patients with pulmonary tuberculosis was 35% and 30% in the extrapulmonary form, respectively; furthermore, a predominance of males was observed in both locations. This finding is consistent with the results of this study but does not correspond with the results regarding the association with HIV/AIDS, where 25% of the patients were infected with diabetes mellitus and 28% of the patients with pulmonary tuberculosis and 17% of those with extrapulmonary tuberculosis were affected. (20) These rates are higher than those reported in this study.

In terms of cases reported among inmates in closed detention facilities, this also constituted a risk factor with high percentages, reflecting the presence of factors such as overcrowding and prolonged detention periods and thus a higher risk of infection.

CONCLUSIONS

It is concluded that the prevalence of tuberculosis in Pinar del Río has tended to increase over the past nine years, with a decline during the pandemic years, which has an impact on tuberculosis prevention and control programs; more than two-thirds of the patients are males each year, particularly among elderly people; and the most common site of disease is the lungs, and the presence of multiple risk factors, such as smoking and alcoholism, play important roles in this process.

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